TECHNICAL INFORMATION

The contents herein are provided for the information of the Tenants only. Whilst every care and attention has been taken in the compilation and preparation of all information, neither the Government of the Republic of Singapore nor the National Parks Board warrants that the contents contained herein represent all the conditions and requirements of the relevant public authorities / Public Utility Licensees in respects of the proposed project at the said premises or that they are free from errors or omissions whatsoever. The contents herein are subject to changes by the relevant public authorities / Public Utility Licensees concerned.

A summary of the initial services requirements of the relevant public 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.

1. GENERAL CONDITIONS & REQUIREMENTS

1.1. Diversion and Provision of Utilities Services

1.1.1. The Tenant shall ensure that the following requirements are complied with:

a) To consult and liaise directly with the relevant public authorities / Public Utility Licensees regarding the actual locations of all service mains within the said premises and on the requirements and conditions for services diversion and provision, if any, prior to the commencement of site work. All necessary precautions shall be taken by the Tenant to safeguard the service mains before they are diverted.

b) To ensure that all service mains that do not need to be diverted are identified and provided with protection, if necessary, during the renovation and preparation of site stage of the proposed project. The cost of repairs to any damaged service main as a result of work carried out by the Tenant shall be borne by the Tenant.

c) To make his own arrangements with the relevant public authorities / Public Utility Licensees and pay for the cost of any diversion and/or “capping off” of existing services, provision of service mains and connection fees if any, in connection with the proposed project.

d) To consult and liaise directly with the relevant authorities / Public Utility Licensees to provide all the internal distribution for water, electricity, drainage and sanitary discharge for the proposed project at the said premises.

1.1.2. In general, no structure shall be sited close to or over existing / proposed services. The Tenant shall comply with all the necessary requirements as stipulated by the relevant public authorities / Public Utility Licensees.

1.1.3. The Tenant shall at his own expense install separate utility meters and pay for the consumption of utility direct to the Public Utilities Board (PUB), SP Services Ltd and SP PowerGrid Ltd.

1.1.4. The Tenant shall at his own cost and expense make his own arrangements with the relevant service Departments or public authorities and shall pay for his own service connection including any diversion and provision of service mains and shall provide for his own internal distribution for water, electricity and sanitary discharge including sewer line, construction of substation or transformer in connection with the proposed usage. Any new service line serving the said premises shall be contained within the site boundary.

1.1.5. The Tenant shall also comply with the requirements of the relevant Departments or public authorities in relation to his service requirements such as provision of an electrical substation or transformer room, etc. if required by SP PowerGrid Ltd.

1.1.6. If required by SP PowerGrid Ltd, the Tenant shall construct a new electrical substation within the said premises at his own cost and arrangements and with the approval from SP PowerGrid Ltd.

1.1.7. The Tenant shall liaise with the Telecommunications System Licensee under the provision of current Telecommunications Act, for the telecommunication supply to the proposed development.

1.1.8. The Tenant shall provide all facilities for telecommunications services, such as MDF room, Telecom riser ducts, lead-in pipes and manholes, etc., within the said premises. All Telecom facilities shall be provided according to the prevailing Info-communications Development Authority (IDA) of Singapore "Code of Practice for Info-communications Facilities in Buildings".

1.1.9. The Tenant is advised to approach the Telecommunication Facility Co-ordination Committee (TFCC) and StarHub Cable Vision Ltd (SCV) early during the planning stage of the proposed development, for consultation on the location and diversion of existing Telecom services with the Telecommunication System Licensees, proposed connection and design of Telecom facilities. The detailed Telecom facilities shall be submitted and duly verified by TFCC and SCV and approved by the Info-communications Development Authority of Singapore prior to commencement of works.

1.1.10. The Tenant is required to engage a licensed telecommunication cable detection worker to locate and trace existing telecommunication plant routes by digging trial holes or by detection equipment before commencement of earthworks in the vicinity of telecommunications cables.

2. LAND TRANSPORT AUTHORITY (LTA)

2.1. Roads and Parking

2.1.1. Prior approval from LTA is required for any deviation from the designated access points.

2.1.2. There should be adequate setback for a standard side-table and footpath.

2.1.3. The general approach is to take reference from the centreline and setback the required space from there.

2.1.4. The Successful Tenderer is to carry out their design in accordance with LTA's standards and requirements. QPs should refer to LTA's Code of Practice for Street Work Proposals Relating to Development Works for the necessary requirements.

2.1.5. QPs are required to submit an Application for Approval of Layout Plans (Roads & Vehicle Parking) via CORENET ESS to obtain LTA's clearance. LTA will provide the necessary requirements upon receipt of the application.

2.1.6. The detailed plan for the said development, incorporating LTA's requirements, shall be submitted to LTA's Development and Building Control Division at the relevant DC and BP submission stages.

2.1.7. Access shall have sufficient line-of-sight as in accordance with LTA guideline, especially plots near to bends.

2.1.8. A minimum 2 car queuing lengths shall be provided before the drop barrier, if any within the development boundary to prevent queue build-up along the public road.

2.1.9. Any new applications or renewal of existing permits for Heavy Vehicle Parking within the premises must be approved by LTA and NParks.

3. NATIONAL ENVIRONMENT AGENCY (NEA)

3.1. General Requirements

3.1.1. For subject sites located within a water catchment area, where rainwater and surface runoff are collected in the downstream reservoir for treatment to produce drinking water by PUB, activity that could cause serious contamination problem to our water resources shall not be carried out. In addition, the Successful Tenderer shall adopt and implement the Best Management Practices (BMPs) at the subject site to minimise and prevent contamination risk to the reservoir, if required by PUB.

3.1.2. Sewage, used water and trade effluent from the proposed development shall be discharged into the public sewer in accordance to the conditions and requirements imposed by PUB. Sewage and wastewater (i.e. trade effluent from farming activities) shall not be discharged into any storm water drain or onto any land. The Lessee / qualified person should check with PUB on the point for sewer connection and the allowable discharge rate. Holding tanks shall not be used at locations served by sewer network.

3.1.3. Refuse and other solid wastes generated from the proposed developments shall be collected by a licensed waste collector for disposal at an approved waste disposal facility. Please ensure that the proposed refuse storage and collection systems (e.g. bin centre) are in compliance with the public health requirements stated in the Code of Practice on Environmental Health. Refuse or solid wastes are not allowed to be disposed by throwing them into any drain, burying them on-site or using open burning method.

3.1.4. If pesticides will be used in the proposed sites, the Successful Tenderer will have to ensure that only pesticides that are registered with the Singapore Food Agency (SFA) shall be used. Also, approval from NEA is required if any pesticides that are listed as hazardous substances under the Environmental Protection and Management Act 1999 (EPMA), will be used. Before application, pesticides shall be stored within a building or covered shed equipped with leakage or spillage containment facilities. Their dosage will also have to be controlled so that it will not cause any nuisance problem to people or contamination to the surface run-off during raining.

3.1.5. Off-road diesel engines used in the proposed site shall comply with the provisions and requirements as stated in the Environmental Protection and Management (Off-Road Diesel Engine Emissions) Regulations. Off-road diesel engines are any equipment or machinery with diesel engines as the main or auxiliary prime mover and not registered with the Land Transport Authority (LTA) for use on public roads. Examples include construction equipment such as cranes, excavators, forklifts, and power generators.

3.1.6. The emissions of air pollutants shall comply with the emission limits for air impurities as stipulated in the Environmental Protection and Management (Air Impurities) Regulations 2008. For air impurities with no prescribed emission standards, the best practical means shall be adopted to minimise air pollution and odour nuisance. i.e. odour abatement facilities shall be provided to treat the foul smell emission from activities carried out .

3.1.7. No raw animal waste shall be allowed for use as fertilizer in plant nurseries activities.

3.1.8. All compost shall be fully composted before use and composting activities (if any) shall be carried out using proper composting facilities in roofed and curbed areas such as concrete flooring to prevent feedstocks from leaching into the ground and entering the storm drain. All feedstocks for composting shall be stored in roofed and curbed areas with impervious flooring.

3.1.9. All the applicable requirements and provisions of the Singapore Standard on the Code of Practice for Pollution Control (i.e. SS593:2013), the Code of Practice on Environmental Health, the Environmental Protection and Management Act 1999, the Environmental Public Health Act 1987, the Energy Conservation Act 2012, the Radiation Protection Act 2007 and their Regulations shall be complied with.

3.1.10. The subject sites are located in very close proximity to the Tengah Airbase and hence is subject to very high ambient noise level attributed to the aircraft operations. Due to the relocation of Paya Lebar Air Base operations to Tengah Air Base in the near future, the subject site would be subjected to even higher noise level based on today's context. If workers' dormitories/quarters are included in the proposal, it is the operators /owner's responsibility to ensure that the workers staying in the dormitory would be sufficiently protected from loud aircraft noises. Hence, the operator/owner is required to incorporate Noise Mitigation Measures (NMMs) (such as concrete walls and roofs, noise fins (minimally 600mm to be effective) and laminated glass casement windows (i.e. minimally 1/2" glass, 0.03" PVB, 1/4" glass)/double-glazed casement windows (i.e. minimally monolithic 1/4" glass, 1/2" airspace, laminated 3/16" glass, 0.03" PVB, 3/16" glass)) into the design of the workers' dormitory. The Company is required to engage an Acoustic Consultant (AC) to assess, evaluate, verify, and certify the NMMs. The Company is also required to appoint a Qualified Person (QP) to certify that the NMMs are implemented.

3.2. Particular Requirements for Plot 2.2 at Neo Tiew Lane 3

3.2.1. The southern portion of the site should not be used for worker's quarters.

3.3. Particular Requirements for Plot 3.3 at Neo Tiew Lane 3

3.3.1. The site is located in close proximity to Tengah Airbase and hence is subjected to very high ambient noise level attributed to the aircraft operations. Workers' dormitories/quarters can be allowed on site up to 31 Dec 2031. However, we are not able to support workers' dormitory/quarters at the subject site beyond 31 Dec 2031. We advise the company to explore other workers' dormitory locations or consider housing the workers at commercial dormitories, to ensure that the occupants are relocated in time, by 31 Dec 2031.

4. NATIONAL PARKS BOARD (NPARKS)

4.1. General Requirements

4.1.1. Pursuant to the Parks & Trees Act 2005 read together with the Parks and Trees Regulations (Reg. 1), any tree with a girth exceeding one metre measured one metre from the ground, growing on any tree conservation area or any vacant land shall not be cut except with the prior approval of the Commissioner of Parks and Recreation.

4.1.2. The Successful Tenderer shall ensure that roadside trees and green verge(s) abutting the site are not to be affected, especially by 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, etc.

Similarly, the Successful Tenderer shall ensure that pick-up / drop-off points, taxi lay-bys, loading / unloading bays and fire engine hard-standing areas are to be located within the site.

4.1.3. The Successful Tenderer shall replace the existing roadside trees and green verge(s) fronting the site if it is affected by the proposed development. The width of the replacement green verge should be in accordance to LTA's standard road code for that category of road or match the existing green verge along the road, whichever is wider.

4.1.4. Development works are to be conducted strictly within the site and approved working boundaries. There must not be any illegal dumping or storing of construction materials beyond the approved boundaries. The proposed development shall not encroach upon the road reserve line, nor shall it affect any roadside table.

4.1.5. No change of soil level to the roadside planting verge without prior approval from NParks.

4.1.6. No widening or raising of existing carriageways and realignment of road kerbs and drains on abutting roads without prior approval from the relevant authorities.

4.1.7. The development shall comply with the requirements for the provision of green buffers (at the side of the development fronting roads) and peripheral planting verges (at the other sides of the development, where applicable). The green buffers and peripheral planting verges 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.

4.1.8. The Successful Tenderer shall consult NParks:

a) at the planning and design stage, on the felling of any trees that may be affected by the proposed development as well as the tree protection criteria for roadside trees and trees identified for conservation (whether located roadside, within the development or otherwise); and

b) in the event of any proposed redevelopment works or additions and alterations to the existing development.

In consulting NParks, the Successful Tenderer shall present a copy of recently surveyed plan of the site (of less than 2 years) and its peripheral roads, at a scale of at least 1:500, clearly indicating information of trees, such as location, species, height and girth. Relevant additional information such as plans on construction hoardings should also be submitted. In the event of 4.1.6(b), a detailed proposed development plan clearly demarcating proposed developments / additions / alterations and nearby trees should also be presented to NParks.

4.1.9. The Successful Tenderer must inform NParks at least 8 weeks before the commencement of works for NParks to transplant / salvage existing affected plants within the Land Parcel and / or along affected roadside tables.

4.1.10. The Successful Tenderer is to take precautionary measures to protect trees in adjacent lands, including lands on Temporary Occupation Licenses for other uses (e.g. site offices, construction access, services diversion).

4.1.11. If there are any trees that are retained within the development, the Successful Tenderer is to ensure that all trees located within the said development are maintained in a manner suitable and safe for the activities that occur within the said premises.

4.1.12. The Successful Tenderer is to note that the abovementioned requirements are not exhaustive and that NParks reserves the right to impose further terms and conditions not listed here consult and refer to all guidelines issued by NParks in the development of the site.

4.1.13. The Director-General will subsequently issue to the Successful Tenderer directions to carry out wildlife-related measures under section 10 of the Wildlife Act 1965 to safeguard the health, welfare, safety of any wildlife or class of wildlife, or public health or safety in relation to wildlife or the health of the ecosystem. The directions may include the following:

a) Hoarding Plan: The Site must be hoarded up entirely and there must be no gaps between the panels of the hoardings. The panels of the hoardings are to extend at least 300mm into the ground. There must be no gaps between the panels of the access gates when they are shut. The panels of the access gates must be as flushed to the ground as possible. If other hoarding designs are required for the Site, and these designs are expected to deviate or will deviate from the abovementioned requirements, you must consult nparks_wildlife_management@nparks.gov.sg before carrying out the hoarding works.

b) Presence of Wild Boar(s) at the premises: If any wild boar(s) is / are spotted at or around the premises at any time, NParks must be notified as soon as possible, via email at nparks_wildlife_management@nparks.gov.sg. An approved wild boar removal contractor must also be engaged by the Successful Tenderer to trap and remove the said wild boar(s). Do note that the trapping and removal process may take about 4-8 weeks and the Successful Tenderer is expected to factor this into the development plans for the premises accordingly.

c) Other Wildlife Rescue Operations: If any wildlife (other than wild boars) is spotted at or around the premises at any time, and if the wildlife cannot be safely guided out of the premises to a suitable habitat, the Successful Tenderer must engage an approved wildlife management company (a registry is available at www.nparks.gov.sg/avs/animals/animal-related-businesses/animal-management-companies/public-registry-of-certified-animal-management-specialists) to rescue the said wildlife.

4.2. Additional Conditions

4.2.1. Ground & Water Management Plans

a) The Successful Tenderer shall install and maintain an above-ground layer that covers any bare soil, (e.g. use of granite chips or concrete layer) throughout the entire premises, excluding any required internal buffer areas which can be turfed.

b) Any water treatment ponds, sedimentation tanks and associated drains should be concretized or concrete lined to maximise water retention rates and for ease of regular maintenance.

c) The Successful Tenderer shall install and maintain an impervious layer (i.e. water impermeable) within the entire premises to:

i) Increase the rate of surface run-off captured and routed to the water treatment pond similarly lined with an impervious layer
ii) Increase operational productivity for vehicle and / or equipment movement and / or storage

iii) Decrease time taken to conduct regular housekeeping / nursery maintenance commitments, (e.g. reduce time taken for regular weed control, soil and mud cleansing from vehicles / machinery / equipment, etc.)

d) The impervious layer must be proposed, inspected and certified by a Qualified Person (QP) as defined in the 3rd Schedule of the Building Control Regulations. The QP is to submit the relevant documentation of the inspection, and certification of said impervious layer to the Board after the construction phase and prior to the service of the written request on the Landlord to occupy the premises for a further term.

4.2.2. **Optimization of Planting Areas**

a) The Successful Tenderer shall not plant directly into the ground. Instead, the Successful Tenderer shall optimise use of the planting area by using space-saving technologies, including but not limited to benches, compactors and shade houses.

b) Notwithstanding clause 4.2.2(a) above, the Successful Tenderer shall consult NParks on its proposal to optimize the use of the planting areas, and shall present to NParks details on its proposed optimization of the said planting area.

4.2.3. The Successful Tenderer shall not plant directly into the ground. Instead, the Successful Tenderer can place plants in pots to meet the Green Buffer and Peripheral Planting Verge requirements.

5. PUBLIC UTILITIES BOARD (PUB)

5.1. Catchment and Waterways

5.1.1. For clarifications, please contact YEO MAY CHOO (email: JENNIFER_YEO@PUB.GOV.SG), Sophia Ang (email: sophia_ang@pub.gov.sg), TAN PEI MIN EUGENIA (email: EUGENIA_TAN@PUB.GOV.SG), from PUB(C&W).

5.1.2. The minimum platform level (MPL) for the subject site shall not be lower than 4.5m 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.

5.1.3. 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 Corenet or Design Gateway/Construction Gateway (where applicable) in Corenet X.

5.1.4. 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.

5.1.5. The Successful Tenderer shall reconstruct the existing drain (if any) affected by the development site. Appropriate Drainage Reserves shall be set aside for drains in accordance with the prevailing Code of Practice on Surface Water Drainage. The Successful Tenderer shall consult relevant agencies including URA on the required Drainage Reserves and obtain land use approval for the DR. The new drains shall be constructed and functional prior to the development. The detailed drainage plan for the proposed drainage work shall be submitted for PUB's approval before the commencement of works.

5.1.6. 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 detailed drainage plan shall be submitted to PUB(C&W) for approval prior to the commencement of work on site.

5.1.7. 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.

5.1.8. 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.

5.1.9. 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.

5.1.10. 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).

5.1.11. 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.

5.1.12. The Successful Tenderer shall carry out soil instrumentation for monitoring the soil / geo-technical / structural movements or changes at and around the work-site 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 organisation chart of the Successful Tenderer and their consultant / contractor shall be submitted to PUB before commencement of works.

5.1.13. 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.

5.1.14. 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.

5.1.15. 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, post-condition survey and topography survey of the affected drains shall be submitted and PUB may request for joint site inspection of the rectification works.

5.1.16. The Successful Tenderer shall inform PUB in writing at least one week before the commencement of any work at the site which affects drains.

5.1.17. 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.

5.1.18. 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. The Successful Tenderer may download the latest version of the COP from the PUB website: https://www.pub.gov.sg/Professionals/Resources/Code-of-Practices.

5.1.19. The topography of the site shall not be changed without the approval of PUB.

5.1.20. 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.

5.1.21. 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.

5.1.22. The Successful Tenderer / QP shall pre-consult PUB(C&W) on the required size of the proposed drains affected by the proposed development before making DC/BP submission in Corenet or Design Gateway/ Construction Gateway (where applicable) in Corenet X. 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.

5.1.23. 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.

5.1.24. 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 to the latest edition of the 'Code of Practice on Surface Water Drainage'.

5.1.25. 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.

5.1.26. 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.

5.1.27. All 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.

5.1.28. The Successful Tenderer’s Qualified Person (QP) 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, Successful Tenderer / QPs can refer to the ABC Waters Guidelines and relevant chapters in the Engineering Procedures, available on the PUB website.

5.1.29. 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: https://www.pub.gov.sg/Professionals/Resources/Guides-and-Handbooks.

5.1.30. 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: https://www.pub.gov.sg/Professionals/Awards-and-Certification/ABC-Waters-Certification.

5.1.31. 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.

5.1.32. The Successful Tenderer can contact PUB-ABCWaters@pub.gov.sg for issues related to ABC Waters design features.

5.2. General Requirements for Agricultural Developments within Water Catchment Areas

5.2.1. If the development site abuts a watercourse (reservoir or storm drain), the Successful Tenderer shall provide and maintain a vegetated buffer strip of minimum 2m width along the length of the boundary abutting the watercourse, within the farm development. The buffer strip can be part of the planting verge set by the National Parks Board (NParks).

5.2.2. There shall be no agricultural activities within the buffer strip.

5.2.3. Water pollution control requirements as stipulated in Environmental Protection and Management Act 1999 (EPMA) shall be fully complied with. The discharge from any agricultural sites into the drainage system shall comply with Allowable Limits for Trade Effluent Discharge to Controlled Watercourses under the EPMA (Trade Effluent) Regulations and PUB's discharge water quality requirements of Total Nitrogen $\leqslant$ 10 mg/L, Total Phosphorus $\leqslant$ 0.65 mg/L, Total Organic Carbon $\leqslant$ 20 mg/L and Ammonia $\leqslant$ 1 mg/L for water catchment areas.

5.2.4. The drains within the development site shall be regularly de-silted and maintained.

5.3. Specific Requirements for Plant Nurseries

5.3.1. Best management practice (BMP) is to be adopted to prevent the discharge of nutrient-rich water into the watercourse / reservoir. Such BMP could be in the form of a cut-off drain be constructed along the boundary of farming areas to channel all runoff with high nutrient (Nitrogen and Phosphorus) to a treatment pond (as illustrated in **Attachment 4, Diagram 1**) which is designed to treat the pond water to meet the discharge water quality indicated above. Alternative proposals designed and endorsed by a Qualified Person (QP) to meet the discharge water quality requirements can be submitted for PUB's approval.

5.3.2. A typical design of a treatment pond to treat the pond water before discharge into the storm drain is shown in **Attachment 4, Diagram 2** for reference. The design of the treatment pond with sufficient size shall be endorsed by a QP. Some suggested wetland plants that can be used at the treatment pond are shown in **Attachment 4, Table 1**. Details on the construction of wetlands and vegetated swale can be found in the ABC Waters Design Guidelines at https//www.pub.gov.sg/abcwaters/designguidelines.

5.3.3. Ponds shall be regularly de-sludged and the sludge shall be disposed off-site.

5.3.4. No raw animal waste shall be allowed for use as fertilizer in plant nurseries activities.

5.3.5. All compost shall be fully composted before use and composting activities (if any) shall be carried out using proper composting facilities in roofed and curbed areas such as concrete flooring to prevent feedstocks from leaching into the ground and entering the storm drain. All feedstocks for composting shall be stored in roofed and curbed areas with impervious flooring.

5.3.6. Only pesticides (including herbicides) registered with SFA are allowed to be used in the agricultural activities.

5.3.7. All pesticides (including herbicides) shall be used in accordance with the manufacturers' recommendations and guidelines.

5.3.8. No fertilizers, soil amendments and pesticides (including herbicides) shall be applied within 2m of storm drain or reservoir.

5.3.9. Proper storage and disposal measures shall be taken to prevent any fertilizers, soil amendments, pesticides (including herbicides), and plant waste from entering storm drain. They are to be stored in roofed / properly covered areas.

5.4. Water Reclamation

5.4.1. For clarifications, please contact LOW SOO BEE (email: LOW_SOO_BEE@PUB.GOV.SG), NUR AI'SHAFINA BINTE AMRAN (email: Nur_Aishafina_AMRAN@pub.gov.sg), PEH CAILING (email: PEH_Cailing@pub.gov.sg), from PUB(WRN).

General Requirements

5.4.2. The planning of this project shall comply with the prevailing Code of Practice on Sewerage and Sanitary Works [thereafter referred to as the “COPSSW”].

5.4.3. The Successful Tenderer shall ensure that the premises is served by an adequate, effective and functional internal sanitary drainage and plumbing system and be connected to public sewers.

5.4.4. The reuse of existing sanitary drain-lines / sewer connection to public sewer is subjected to PUB(WRN)’s approval. If PUB agrees to the reuse of the drain-lines / sewer connection, the Successful Tenderer shall carry out CCTV inspection and water tightness test to satisfy PUB(WRN) that the existing sanitary drainlines / sewer connection are in a serviceable condition. Otherwise, they shall be replaced / repaired by the Successful Tenderer to the satisfaction of PUB.

5.4.5. Should there be existing on-site sewerage facility, the Successful Tenderer shall ensure the on-site sewerage facility is demolished. All proposed plots shall be connected to the public sewers.

5.4.6. Manholes shall not be buried under any circumstances. Where there is a need to raise or lower any existing manholes, the Successful Tenderer shall liaise with PUB(WRN) Department’s Network Management Branch and carry out the necessary works at his own cost and expense. In Detailed Plan submissions, the Successful Tenderer’s QP shall provide details of the proposal including the surveyed existing manhole top and invert levels, proposed new manhole top level and manhole details (i.e. new headroom clearance from the intermediate platform, etc.). Upon completion of the manhole raising / lowering work, as-built drawings showing the surveyed final manhole top and invert levels and updated details of manhole details of the affected manholes shall be submitted to PUB(WRN). For such proposals, please contact Mr Muhd Nabil Mohd Raus (email: muhd_nabil_mohd_raus@pub.gov.sg) or Mr Aliff Sufian (email: aliff_sufian_osman_munawar@pub.gov.sg) at Tel 6517 2230 from PUB(WRN).

5.4.7. Due to the terrain of plot, it may be possible that an ejector pumping system is needed to serve the plot. The construction and maintenance cost of the ejector pumping system will be carried out at Successful Tenderer's own cost. If ejectors are not used, the Successful

Tenderer is to ensure that the floor level of the premises and the levels of the sanitary appliances, floor traps and inspection chambers are constructed suitably higher than the top level of the public manhole to which the sanitary drain-line is connected to.

5.4.8. 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 Diameter(mm) D	Sewer Depth (m)	Minimum Distance (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 Sections 1.2.4 and 1.2.5.

5.4.9. The Successful Tenderer / QP shall take every measure to protect all existing sewers, particularly large (≥900mm diameter) sewers, affected by or in close proximity of the proposed works.

5.4.10. 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 / QP 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.

5.4.11. 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.

5.4.12. 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 and "Standard Requirements for Abandoning of Disused Sewerage System" for compliance [https://www.pub.gov.sg/Documents/StdReq_sealing.pdf].

5.4.13. 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.

5.4.14. For minimum clearances of utilities crossing and parallel to sewers, please refer to COPSSW Section 1.2.4 c. In addition, pre- and post-construction CCTV inspection shall be carried out on the affected sewers and manholes. The CCTV reports and video shall be submitted to PUB(WRN). A WRc certified CCTV specialist contractor [https://www.pub.gov.sg/Documents/RegisteredCCTVContractor.pdf] shall be engaged to interpret, prepare, and certify CCTV reports in accordance with PUB(WRN)'s CCTV inspection requirements. Please note that the defect classification shall be in accordance with the latest edition of the WRc/WAA "Manual of Sewer Condition Classification".

5.4.15. Trade effluent discharge from the proposed development into the public sewerage system shall comply with the requirements as stipulated in the Sewerage and Drainage (Trade Effluent) Regulations. Pre-treatment plant / facilities shall be installed to ensure the compliance of the trade effluent with the discharge requirements. The Successful Tenderer shall be responsible for the provision, operation and maintenance of the pre-treatment plant / facilities. Please refer to COPSSW Section 5 on requirements for trade effluent discharge into public sewer.

5.4.16. All industrial premises, whether located on individual land lots or within flatted factories, are required to provide a sampling sump which enables representative sampling of trade effluent before it is discharged into the public sewerage system.

5.4.17. Effluent that is prohibited to be discharged into public sewer shall be disposed of in accordance with its waste classification e.g. toxic industrial waste, general waste, etc. For toxic industrial waste (TIW), the Successful Tenderer shall engage only NEA licensed TIW collector. Sullage water from businesses involving the use of oil such as motor workshop, lubrication bay or car washing bay shall be discharged into the public sewerage system via an oil interceptor (see Standard Drawing No. PUB/WRN/STD/042C). The discharge to the public sewerage system shall not contain any of the substances specified in Regulation 9 of the Sewerage and Drainage (Trade Effluent) Regulations. In particular, the following types of biohazardous wastes shall be properly segregated and not be discharged to the public sewerage system. (a) Any waste specified in the Environmental Public Health (Toxic Industrial Waste) Regulations. These include pathological, pharmaceutical, chemical and contaminated waste, etc. (b) Blood waste, infectious waste and other waste contaminated or likely contaminated with pathogens of an infectious disease. (c) Radioactive waste unless it has been decayed to a safe level in accordance with NEA’s requirements. After obtaining Temporary Occupation Permit (TOP) for the development, the Successful Tenderer shall apply to PUB for a Written Approval (WA) before discharging trade effluent into public sewers. The application for WA for discharge of trade effluent into the sewer can be made online at https://www.gobusiness.gov.sg/licences. For further information on matters relating to trade effluent discharge, please email to PUB_WA@pub.gov.sg.

5.4.18. 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.

5.4.19. The Successful Tenderer shall be responsible for seeking approval from all relevant authorities / landowners for the proposed sewerage works to be carried out beyond the

development site. Such approval or consent from the landowner / 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 COPSSW. All sewers and manholes shall be readily accessible at all times to PUB for inspection and maintenance.

5.4.20. 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.

5.4.21. Where there are any Specified Activities (including excavation / tunnelling / jacking / boreholes / installation of ERSS for services diversions) 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 Section 2.1.2, a written approval from the Director, Water Reclamation Network of PUB should first be obtained before carrying out the specified activities at the site. The Successful Tenderer's 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 commencement of the specified activities. The applicant shall refer to COPSSW Section 2 for the technical requirements on sewer protection. 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 Successful Tenderer's QP / contractor is required to submit a notification to PUB's Network Management Branch (NMB) at least 7 days before the commencement of any works or specified activities within the public sewer corridor.

5.4.22. The Successful Tenderer / QP 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.

5.4.23. For development control clearance for the proposed development / building / infrastructure / utility works and clearance certificates for the proposed sewerage / sanitary works, the Successful Tenderer / 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%20Procedures.pdf.

5.5. Water Supply

5.5.1. For clarifications, please contact ANG LIEW KWEE (email: ANG_LIEW_KWEE@PUB.GOV.SG), WANG QIONG (email: WANG_QIONG@PUB.GOV.SG), TAN KE HAN, REGINA (email: REGINA_TAN@PUB.GOV.SG), from PUB(WSN).

General Requirements

5.5.2. The Successful Tenderer is to provide the estimated PW demand for the premises. Pls contact Mr Quah Wei Ren (quah_wei_ren@pub.gov.sg) for further clarifications.

5.5.3. **Submission Of Plans**

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 in **Attachment 5**.

b) Notwithstanding the above modes of supply, where water is essential for the operations of the proposed development, 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 non-domestic 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.

5.5.4. **Protection Of Watermains**

a) The Water Supply Plan (**Attachment 6**) shows the approximate positions of PUB existing and proposed water main of 100 mm diameter and above in the vicinity of the proposed site. Smaller submain to the premises are not indicated. The Successful Tenderer is to 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 shall be borne by the Successful Tenderer. Diversion of PUB existing water pipes of 500 mm and above, being 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.

b) Refer to PUB WSN Advisory-Prevention of Damage to Watermains (**Attachment 7**) 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 https://www.sla.gov.sg/INLIS.

5.5.5. **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) Water fittings (e.g. pipes, pipe fittings, valves, water storage tanks, taps and mixers (basin, sink / bib, shower), dual-flush low capacity flushing cisterns (LCFCs), flush valves, materials in contact with water, etc.) to be used in the proposed development shall be tested for compliance with the standards and requirements as stipulated in PUB's Stipulation of Standards & Requirements for Water Fittings (PUB S&R) which is available for downloading from PUB's website at https://www.pub.gov.sg/compliance/watersupplyservices/standards. Additionally, water fittings such as taps and mixers, LCFCs and flush valves shall be registered under the PUB's Mandatory Water Efficiency Labelling Scheme (MWELS).

c) Only water fittings (i.e. taps and mixers, LCFCs, WC flush valves and urinal flush valves / waterless urinals) that are of at least 2-tick rating under PUB's MWELS shall be installed. The proposed development should obtain the Water Efficient Building (Basic) Certification by PUB.

d) 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, the Successful Tenderer is encouraged to use drought tolerant plants.

e) 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.

f) 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.

g) 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.

h) Use non-water cooled systems (such as air-cooled, refrigerant-cooled, etc) for cooling purposes wherever possible.

i) Cooling towers should achieve minimum 7 and 10 Cycles of Concentration (COC) using potable water and NEWater respectively.

5.5.6. For queries on matters relating to water pipes please contact PUB(WSN) officer at Tel: 68852475 / 68852477 or Email to: PUB_WSN_WESTBU@pub.gov.sg

5.5.7. For Small Mains Diversion (300mm diameter & below), please contact:

- North / Wang Ningxiang / Wang_Ningxiang@pub.gov.sg
- East / Choo Yi Xuan (Amy) / Choo_Yi_Xuan@pub.gov.sg
- Central / Low Zhan Hong / Low_Zhan_Hong@pub.gov.sg
- West / Poon Yee Sheng / Poon_Yee_Sheng@pub.gov.sg

5.5.8. For Big Mains Diversion (Larger than 300mm diameter), please contact:

- North / Wang Ningxiang & Loh Kai Yeong / Wang_Ningxiang@pub.gov.sg & Loh_Kai_Yeong@pub.gov.sg
- East / Qiu Tian & Loh Kai Yeong / Qiu_Tian@pub.gov.sg & Loh_Kai_Yeong@pub.gov.sg
- Central / Qiu Tian & Loh Kai Yeong / Qiu_Tian@pub.gov.sg & Loh_Kai_Yeong@pub.gov.sg
- West / Qiu Tian & Loh Kai Yeong / Qiu_Tian@pub.gov.sg & Loh_Kai_Yeong@pub.gov.sg

5.6. Conditions For Use of Drainage Reserve

5.6.1. The approval for the use of Drainage Reserve is subject to compliance with the following conditions / requirements:

a) The Successful Tenderer shall allow the Public Utilities Board (PUB) or PUB's agent access to carry out drainage works within the Drainage Reserve as and when necessary;

b) The Successful Tenderer shall not construct any structures or facilities on, over or under the Drainage Reserve;

c) The Successful Tenderer shall be responsible for the physical maintenance of the land within the Drainage Reserve;

d) The Successful Tenderer shall be responsible for public safety within the Drainage Reserve

e) The Successful Tenderer shall at all times indemnify and keep indemnified the Government fully and completely against all liabilities of whatsoever nature or description which may be incurred or suffered by the Government in connection with or arising out of the use of the Drainage Reserve by the Successful Tenderer and against all actions, proceedings, claims, costs and expenses therefrom;

f) PUB reserves the right to rescind the approval for the use of Drainage Reserve as and when required by PUB for drainage works and without the need for reinstatement of the affected facilities;

g) The Successful Tenderer shall be responsible for safeguarding the structural integrity of the affected drains within the Drainage Reserve when carrying out the work; and

h) The Successful Tenderer shall reinstate or rectify any damage to the drainage structures caused by their work at their own cost and to PUB's satisfaction upon the completion of the work.

5.7. Specific Requirements for Plot 2.2, Plot 2.4, Plot 2.5, Plot 3.3

5.7.1. The subject site is not affected by Drainage Reserve.

5.7.2. The proposed site is within the Kranji Water Catchment.

a) The proposal shall not result in any loss of yield from the catchment area.

b) Stringent pollution control measures shall be incorporated in the design and during the construction of the proposed development.

c) All sewage and sullage water shall be discharged into a public sewer.

d) Bulk storage of toxic and hazardous materials shall not be allowed.

e) If there is any earth filling work at the development site, use good earth free of any debris or construction waste materials. If sand is used for backfilling, do not use marine sand. Only washed sand with chloride content not exceeding 0.01% (by Weight) shall be allowed. Test reports on the chloride content of the washed sand shall be submitted to PUB(C&W) for records before commencement of work.

5.7.3. The proposed site is to connect to the existing 300mm diameter sewer across Neo Tiew Lane 3 using the 300mm diameter advance drain-line connection (ADC). The 300mm diameter advance drain-line connection has been included in the sale of the land parcel and shall become part of the development's internal sanitary plumbing and drainage system, which shall be owned and maintained by the owner or occupier of the completed development. The Tenderer shall take over the advance drain-line connection in its as-is condition and, at its own cost and expense, carry out all necessary rectification works on the advance drain-line connection, including total reconstruction where necessary. **(Attachment 8)**

5.7.4. The internal sanitary plumbing and drainage system, including the 300mm diameter advance drain-line connection, shall comply fully with PUB's requirements and the Code of Practice on Sewerage and Sanitary Works. The advance drain-line connection shall be in good working condition and shall be subject to PUB's inspection and acceptance before clearance can be issued by PUB for the completed development. If the existing 300mm diameter advance drain-line connection is not utilised, it shall be abandoned and the affected manhole or sewer properly reinstated by the Tenderer at its own cost and expense. Details of the proposed abandonment of the ADC and sealing of openings shall be included in the detailed sewerage/sanitary proposal for the development to be submitted to PUB(BPD) for approval.

5.7.5. PUB's approval shall be obtained for any proposed abandonment of sewers, pumping mains, manholes, chambers, drain-lines or advance drain-line connections, as well as the manner in which they will be abandoned. The upstream and downstream ends of abandoned drain-line connections to public sewers, drain-lines, advance drain-line connections or sewers or pumping mains of all sizes shall be sealed watertight with 225mm thick brick plugs rendered with cement mortar. Abandoned sewers or pumping mains of diameter 300mm or larger, and abandoned sewers, pumping mains or advance drain-line connections of all sizes within the road reserve, shall be grouted with cement grout or other approved materials.

5.8. Specific Requirements for Plot 9.4

5.8.1. The subject site is not affected by Drainage Reserve.

5.8.2. The proposed site is within the Kranji Water Catchment.

a) The proposal shall not result in any loss of yield from the catchment area.

b) Stringent pollution control measures shall be incorporated in the design and during the construction of the proposed development.

c) All sewage and sullage water shall be discharged into a public sewer.

d) Bulk storage of toxic and hazardous materials shall not be allowed.

e) If there is any earth filling work at the development site, use good earth free of any debris or construction waste materials. If sand is used for backfilling, do not use marine sand. Only washed sand with chloride content not exceeding 0.01% (by

Weight) shall be allowed. Test reports on the chloride content of the washed sand shall be submitted to PUB(C&W) for records before commencement of work.

5.8.3. The planning of the project shall comply with the prevailing Code of Practice on Sewerage and Sanitary Works. Existing sewerage infrastructure in the vicinity of the proposed site includes existing internal drain lines and existing sewerage infrastructure 300mm in diameter. The existing on-site sewerage system, STP (BJ823)-81, shall be demolished or backfilled by the successful tenderer.

a) Successful tenderer to demolish/remove the STP pump control panel

b) Successful tenderer to seal the outlet of the STP to prevent any used water from the Premises to flow into any drain leading to a watercourse

c) Successful tenderer to demolish/remove the STP chambers and backfill the site with approved materials

5.8.4. The proposed site shall connect to the existing 300mm diameter sewer fronting the site via MH ID 3307304 using the 225mm diameter advance drain-line connection. The 225mm diameter advance drain-line connection has been included in the sale of the land parcel and shall become part of the development's internal sanitary plumbing and drainage system, which shall be owned and maintained by the owner or occupier of the completed development. The advance drain-line connection shall be taken over by the Tenderer in its as-is condition. The Tenderer shall carry out all necessary rectification works on the advance drain-line connection, including total reconstruction where necessary, at its own cost and expense. **(Attachment 8)**

5.8.5. Any facilities or buildings, including toilets or wastewater treatment facilities, where used water will be generated must be sited on high ground above 129.449 mRL. Should such facilities or buildings be sited at ground lower than this level, ejectors would be required to prevent backflow to the property in the event of high used water level in the sewer due to sewer blockage. If ejectors are not used, the Tenderer shall ensure that the floor level of the house and the levels of the sanitary appliances, floor traps and inspection chambers are suitably higher than the top level of the manhole to which the sanitary drain-line is connected, as stipulated in the Code of Practice on Sewerage and Sanitary Works.

5.8.6. There are existing Left-In Caissons located at MH3307304, MH3307302 and MH3225097 within or in the vicinity of the proposed site. Manholes shall not be covered up, paved over or buried under any circumstances. Where there is a need to raise or lower any existing manholes, the Tenderer shall liaise with PUB's Network Management Branch and carry out the necessary works at its own cost and expense.

5.8.7. No sewerage systems, including abandoned sewers, pumping mains, sensors, meters, equipment or instruments within manholes, shall be altered or interfered with without approval from PUB. Where diversion or removal of any sewer or pumping main is required, it shall be carried out by the Tenderer at its own cost and expense. All sewers and manholes shall be readily accessible at all times to PUB for inspection and maintenance.

5.9. Specific Requirements for Plot 9.22

5.9.1. The subject site is not affected by Drainage Reserve.

5.9.2. The proposed site is within the Kranji Water Catchment.

a) The proposal shall not result in any loss of yield from the catchment area.

b) Stringent pollution control measures shall be incorporated in the design and during the construction of the proposed development.

c) All sewage and sullage water shall be discharged into a public sewer.

d) Bulk storage of toxic and hazardous materials shall not be allowed.

e) If there is any earth filling work at the development site, use good earth free of any debris or construction waste materials. If sand is used for backfilling, do not use marine sand. Only washed sand with chloride content not exceeding 0.01% (by Weight) shall be allowed. Test reports on the chloride content of the washed sand shall be submitted to PUB(C&W) for records before commencement of work.

5.9.3. The proposed site shall connect to the existing 300mm diameter sewer fronting the site via MH ID 3100411 using the 225mm diameter advance drain-line connection. The 225mm diameter advance drain-line connection has been included in the sale of the land parcel and shall become part of the development's internal sanitary plumbing and drainage system, which shall be owned and maintained by the owner or occupier of the completed development. The Tenderer shall take over the advance drain-line connection in its as-is condition. The Tenderer shall carry out all necessary rectification works on the advance drain-line connection, including total reconstruction where necessary, at its own cost and expense. **(Attachment 8)**

5.9.4. Any facilities or buildings, including toilets or wastewater treatment facilities, where used water will be generated must be sited on high ground above 124.164 mRL. Should such facilities or buildings be sited at ground lower than this level, ejectors would be required to prevent backflow to the property in the event of high used water level in the sewer due to sewer blockage. If ejectors are not used, the Tenderer shall ensure that the floor level of the house and the levels of the sanitary appliances, floor traps and inspection chambers are suitably higher than the top level of the manhole to which the sanitary drain-line is connected, as stipulated in the Code of Practice on Sewerage and Sanitary Works.

5.9.5. Manholes shall not be covered up, paved over or buried under any circumstances. Where there is a need to raise or lower any existing manholes, the Tenderer shall liaise with PUB's Network Management Branch and carry out the necessary works at its own cost and expense. No sewerage systems, including abandoned sewers, pumping mains, sensors, meters, equipment or instruments within manholes, shall be altered or interfered with without approval from PUB. All sewers and manholes shall be readily accessible at all times to PUB for inspection and maintenance.

6. SINGAPORE CIVIL DEFENCE FORCE (SCDF)

6.1. Fire Safety

6.1.1. For Fire Safety requirements, the Successful Tenderer is required to comply with the Fire Safety Act 1993 and its Regulations (see **Attachment 9**). If the Successful Tenderer needs any clarification on Fire Safety requirements, they should consult the Fire Safety Department (FSD) located at SCDF Headquarters.

6.1.2. For Worker's quarters usage, the developer and building owner/management (named as the Proposer) is required to comply with the Fire Safety Act 1993 and its Regulations, the prevailing "Code of Practice for Fire Safety Precautions in Buildings" (Fire Code) and the

relevant Codes of Practices and Guidelines. The following conditions will also apply where applicable:

a) To consult SCDF on the specific design requirements if the premises is to store or handle hazardous and/or flammable substances which may impose health and safety risks to occupants within the premises or to the surrounding developments. Where applicable, a quantitative risk assessment (QRA) study may be required.

b) To consult SCDF on any specific developments or structures having impact on SCDF operations e.g. deep basement works (which are more than 4 storey or more that 24 metres in depth), tunnel or any other special developments, etc.

c) The proposed development shall not affect the existing other surrounding developments such as exit provision, sideline / backlane, window openings (unprotected openings) and fire engine accessway etc.

d) Please be informed that SCDF generally discourage the siting of a Workers' Dormitory (WD) within industrial zones, unless necessary. The Proposer shall be fully aware of the risks involved and restrictions for siting WDs within industrial zones. The main safety consideration is that there shall be no Health & Safety (H&S) buffer generated by premises storing or handling large quantities of hazardous and/or flammable substances affecting the proposed site. In this case, the Proposer can be allowed to build and operate the WD since there is no existing H&S buffer affecting the site. This condition will no longer hold if there are any new H&S buffer zones that encroach upon the site in future, as a result of developments from future or current industries.

6.1.3. In addition, the proposer shall comply to the following conditions:

a) Establish Emergency Response Plan (include In-place protection plan) and conduct fire drill (including comms exercise with neighbours) at least twice a year.

b) Establish comms with immediate neighbouring premises to update each other in case of an emergency.

c) Install internal PA system.

6.1.4. The Proposer is advised to seek clearance/approval from other authorities (include land and building owner) particularly from NEA pertaining to the H&S buffer from toxic chemicals storage. Please engage a Qualified Person (QP) to carry out a feasibility study to ensure the proposal is able to comply with all the fire safety requirements in the Fire Code and the additional conditions. The QP shall then assist you to obtain the FSD's Plans Approval and the Fire Safety Certificate (FSC).

7. URBAN REDEVELOPMENT AUTHORITY (URA)

7.1. Development Control Guidelines

7.1.1. The Successful Tenderer shall comply with all relevant Development Control Guidelines (e.g. quantum control, planning conditions, etc. and modifications thereto, in respect of the proposed development which have been issued or may be issued from time to time by the Competent Authority under the provision of the current Planning Act.

7.1.2. The proposed works and use(s) shall comply with the parameters stipulated in the Tenancy Agreement and Tender Conditions, unless specific consent has been obtained from the National Parks Board for deviations.

7.1.3. The proposed works and use(s) shall not create any nuisance, annoyance and / or inconvenience to the surrounding users.

7.1.4. The Successful Tenderer can proceed with the works / use(s) without the need to submit an application to URA for planning permission, after the proposed works / use(s) are approved by the National Parks Board, and provided the works / use(s) comply with conditions 7.1.1, 7.1.2 and 7.1.3.

7.1.5. Breach of conditions 7.1.1, 7.1.2, and / or 7.1.3 shall cause the authorisation to cease. In such situations, the change in use / use of the premises shall cease and the development works shall be demolished.

7.1.6. The Successful Tenderer will be required under the Planning Act 1998 to apply to the Development Control Group (DCG), URA for planning permission if the proposed works / use(s) do not comply with conditions 7.1.1, 7.1.2, and / or 7.1.3, upon obtaining approval from the National Parks Board for the proposed works / use(s).

7.1.7. The length of time for temporary use of the said premises, if issued planning permission by URA, is determined from the date of formal Development Control approval issued by URA. Upon expiry of the planning permission, the approved use shall cease and development works shall be demolished unless the planning permission is extended.

7.1.8. For works / use(s) issued planning permission by URA, except with the prior written approval(s) from the relevant authorities and provided that exceptional circumstances exist, the Successful Tenderer shall not increase the Gross Floor Area (GFA) nor construct any new structures whether temporary or permanent in nature. The overall plot ratio or the declared estimated GFA is to be verified by the Successful Tenderer. The Successful Tenderer is to establish the existing GFA and to submit the figure and survey plans showing the existing approved GFA to URA for evaluation.

7.1.9. Temporary Permission (TP) from URA (for works / use(s) issued planning permission) shall be cancelled if the use causes disamenity, nuisance and / or inconvenience to the surrounding users.

8. OTHER AGENCIES

8.1. Backfilling Works

8.1.1. The Successful Tenderer shall not undertake any backfilling / levelling works without the prior written approval of the Landlord and/or its agents. In the event that NParks and the relevant authorities consent to such backfilling / levelling works, the Successful Tenderer shall engage competent professionals to submit plans, drawings and calculations proposal for any proposed backfilling / levelling works for approval before commencement of works. Additional conditions on backfilling / levelling works would be imposed at this stage.

8.2. Height Restrictions

8.2.1. The Successful Tenderer shall ensure that all developments, structures and fixtures on the said Land shall not exceed the maximum height of **60m 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.

8.2.2. Republic of Singapore Air Force's (RSAF) clearance shall be sought for the use of construction equipment and temporary structures above **45m 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.

8.3. Glazing Control Requirements

8.3.1. The subject site is located within a Glazing Control Zone. All buildings / structures (in their entirety) are subject to glazing control requirements if their height is more than **12m Above Ground Level**. A copy of the glazing control guidelines can be obtained from BCA upon obtaining Planning Permission from the relevant authorities.

8.4. Visual Controls

8.4.1. There is a need for visual controls at the subject site to shield the facilities at Tengah Air Base from external view. This can only be determined when design details such as number of storeys of the proposed development, location of openings (e.g. windows) etc. are made known to us. The Successful Tenderer shall comply with the details of the visual controls as follows:

(i) The views from windows, corridors, staircases, or any openings, or any surveillance cameras, devices or equipment (e.g. CCTVs) on the land parcel exceeding the height of **refer to list below for height limits of specific plots** (indicative) must be directed away from MINDEF's premises.

Plot 2.2	Visual controls not applicable
Plot 2.4	Visual controls not applicable
Plot 2.5	Visual controls not applicable
Plot 3.3	Visual controls not applicable
Plot 9.4	35m to 45m SHD
Plot 9.22	35m to 45m SHD

(ii) If (i) becomes impracticable to implement, the Successful Tenderer can propose visual screening measures in the form of permanent fixtures which are impossible or difficult to remove. They can include but are not limited to the following:

(1) Window openings are to be recessed or have fixed frosted glass panels;

(2) Corridors, staircases, fixtures and other openings are to be provided with louvres; and

(3) Access to rooftops is to be restricted. If the development includes a roof garden, measures to screen off the view are required to achieve the above.

The Successful Tenderer is advised to liaise with MINDEF early on the requirements for these visual controls and submit the proposal to DSTA for MINDEF's comments and clearance at the detailed design stage.

8.5. Noise & Vibrations

8.5.1. As the subject site is located in proximity to Tengah Air Base, noise and vibrations should be expected. As such, these effects should be taken into account in the proposed development, and in particular, in the design of the facilities and operating equipment. If necessary, the Successful Tenderer should assess if a noise study should be carried out. The proposal must not impose any constraint on MINDEF or curtail its existing and future developments, operations and activities in any way.

8.6. General

8.6.1. All capital and operating costs or expenses incurred to meet all the above conditions and requirements will be borne by the Successful Tenderer.

8.6.2. The Successful Tenderer shall consult DSTA through URA - Development Control Group when the detailed development plans are available.

8.7. Singapore Food Agency (SFA)

8.7.1. Horti-waste processing activities shall include appropriate dust pollution control measures to mitigate the impact of horticultural waste dust on surrounding vegetable farms. SFA shall be consulted on any proposed horti-waste processing facilities within these plots before implementation.

Best Management Practice to Mitigate against Pesticide Drift and Other Requirements

8.7.2. Use medium droplet size (around 200 micron) when spraying. Finer particles (i.e. less than 200 microns) can remain suspended on air currents for long periods of time and can be carried far outside of the target area.

8.7.3. Consider the use of new generation flat fan nozzles designed for lower pressures. Higher pressures will result in smaller droplet sizes, which may cause more pesticide drift.

8.7.4. Use boom height of around 50 cm from the target. Higher boom height may result in more pesticide drift. A wind screen (if available) around the boom will further reduce the drift.

8.7.5. Do not spray if the wind speed is higher than 10-15 km/h and pay attention to wind direction. Do not spray against the wind.

8.7.6. Read and follow label instructions as they may have information on buffer zones.

8.7.7. Use low drift nozzles (farms can enquire with local suppliers), drift reduction agents or drift control adjuvant. Drift reduction agents are thickeners and minimize the formation of smaller droplets.

8.7.8. Avoid spraying (especially herbicides) during noon when temperature is above 30-35°C. This is to avoid vaporization which can affect nearby crops. Do also check the formulations on whether the pesticides can vaporize.

8.7.9. Use solid cone / flat fan nozzle rather than hollow cone nozzle. Choice of nozzles should be based on ml / minute output of sprayer calculations rather than l / ha calculations.

8.7.10. Service and calibrate your nozzles.

8.7.11. Planting of fence plants such as Baphia

9. OTHER SERVICES

9.1. Electricity

a) The Successful Tenderer is required to change the address of the Electricity Account to an IRAS address upon taking over the account.

b) There are underground electricity cables in the vicinity of your proposal. If the Successful Tenderer has to carry out earthworks in the vicinity of the cables, their contractors shall engage the services of licensed cable detection workers to carry out the cable detection work prior to the commencement of earthworks. All necessary precautionary measures must be taken to prevent damaging our cables at the work site.

c) The Successful Tenderer can contact Earthworks Surveillance & Patrolling Section's Mr Benny Quek, Principal Engineer at Tel no. 69165150 regarding cable damage preventive measures. The Successful Tenderer is required to submit notices to SP PowerGrid at least 7 days prior to earthworks (including trial trenches) in the vicinity of high voltage electricity cables under the provisions of the Electricity Act.

d) The Successful Tenderer is advised to acquire a set of drawings for the electricity cables around the proposed work area. For further details on cable plan requests, please contact Mapping & Earthworks Administration Section at Tel No. 69165022.

e) For proposed earthworks which are likely to affect the cables and need cable diversion / protection / suspension etc, after the cable detection work is done, the Successful Tenderer can request for diversion via our SP e-Business Portal located at https://ebiz.spgroup.com.sg/index.html or contact the following officers:

- For 22kV and below cables, please contact Mr Teng Yeow Han, Principal Engineer of Distribution Network North Section at Tel No. 69165556 or email: yeowhan@spgroup.com.sg
- For 66kV cables, please contact Mr Shiva Raj, Principal Engineer of Regional Network West 66kV Section at Tel No. 69165557 or email: shivaraj@spgroup.com.sg
- For 230kV and above cables, please contact Mr Mohamed Shariff Bin Mydin A S, Senior Technical Officer of Extra High Voltage Network Section at Tel No. 69165483 or email: mohamedshariffmydin@spgroup.com.sg
- For cable tunnels, please contact Mr Kua Siang Meng, Principal Engineer (Facilities Management Section) at Tel No. 69166008 or email: kuasiangmeng@spgroup.com.sg

The Successful Tenderer shall notify SP PowerGrid 6 months before the commencement of earthworks affecting distribution cables and 24 months if the work involves transmission cables (66kV and above). The cost of cable diversion / protection / suspension incurred by SP PowerGrid shall be borne by the Successful Tenderer. The Successful Tenderer shall not commence the proposed earthworks until the affected cables are diverted / protected / suspended.

f) Please consult Mr Tok Jun Wei, Engineer of Distribution Planning Section at Tel No. 69169122 or email: tokjunwei@spgroup.com.sg if you need information on substation and connection requirement, etc. for your proposal. For matters on substations to make way for redevelopment works, please contact Mr Tan Juay Hwee, Senior Technical

Officer of Distribution Planning Section at Tel No. 69168385 or email: tanjuayhwee@spgroup.com.sg

g) If you need further clarification on cable damage prevention measures, please contact Mr Benny Quek, Principal Engineer of Earthworks Surveillance & Patrolling Section at Tel no. 69165150 or email: quekgh@spgroup.com.sg

h) The electrical provisions are listed in the table below:

Plot 2.2	150A	The overground box (OG Box) is located at the entrance of each plot
Plot 2.4	150A	The overground box (OG Box) is located at the entrance of each plot
Plot 2.5	150A	The overground box (OG Box) is located at the entrance of each plot
Plot 3.3	150A	The overground box (OG Box) is located at the entrance of each plot
Plot 9.4	200A	The Successful Tenderer shall procure cabling plans and bear the cost of electrical connections
Plot 9.22	200A	The Successful Tenderer shall procure cabling plans and bear the cost of electrical connections

9.2. Gas

9.2.1. The Successful Tenderer is to comply with the terms and conditions stated in the following documents:

a) Notes for Working Near PowerGas Gas Transmission Pipeline
b) Requirements for Distribution Gas Pipe Diversion Works

9.2.2. As there are existing gas pipelines in the vicinity of the development, the Successful Tenderer can purchase the gas / cable plan from our Mapping & Earthworks Administration section at 6916 5022 or email mea@spgroup.com.sg. After the purchase of the gas / cable plan and if our gas pipelines are affected by your proposal, kindly submit a request together with the diversion corridor and length to https://ebiz.spgroup.com.sg/index.html for consultation on gas pipeline diversion. For any enquiries pertaining to the submission request, please email to ebiz@spgroup.com.sg.

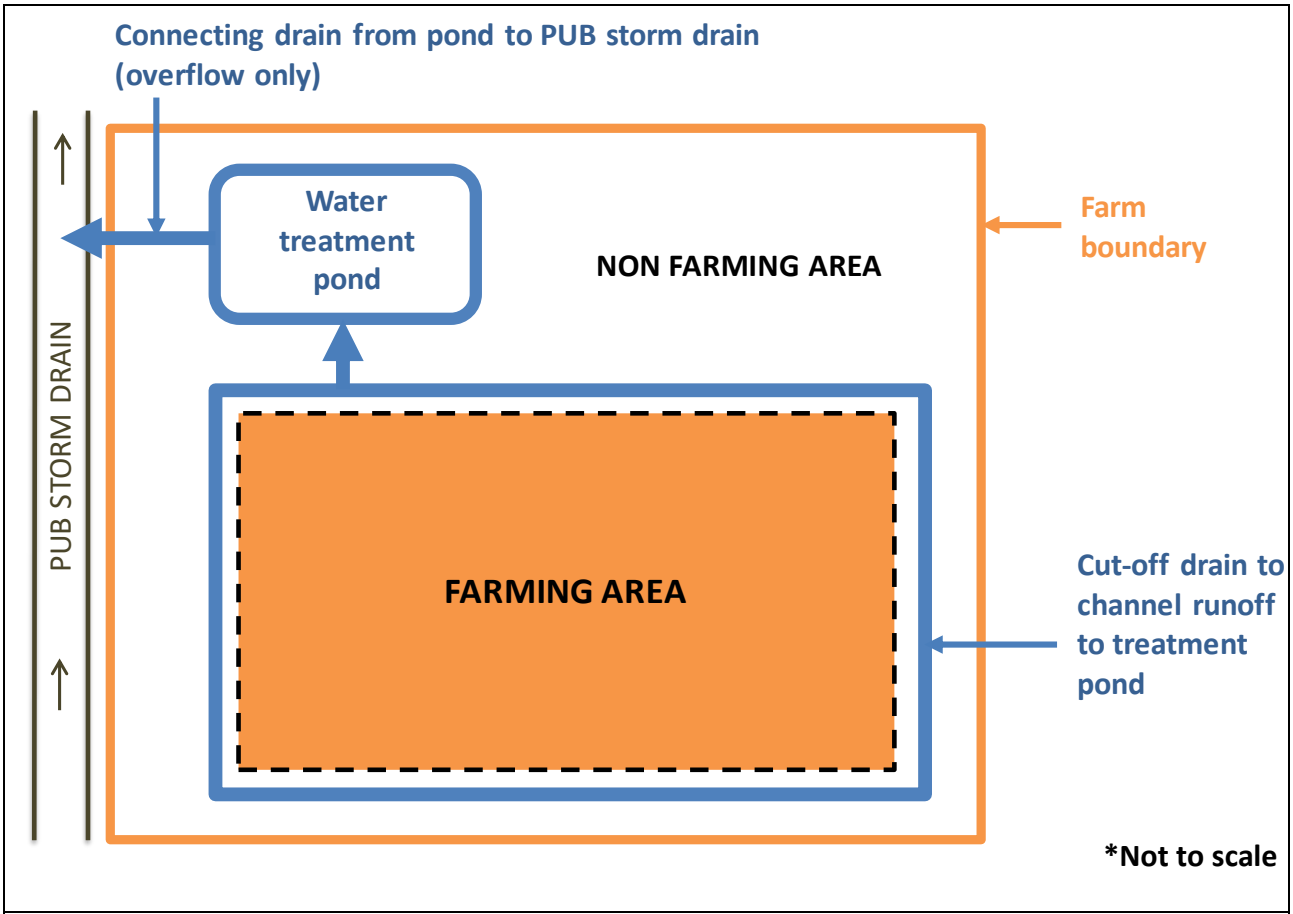
9.2.3. The Successful Tenderer is required to submit written notice to SP PowerGrid Ltd (Earthworks Surveillance & Patrolling section) if you intend to carry out earthworks in the vicinity of gas pipelines at least 7 working days prior to commencing the earthworks. All necessary precautionary measures 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 section during office hours at 6916 5119 or email espsection@spgroup.com.sg.

9.3. Telecommunications

9.3.1. The Successful Tenderer shall liaise with SP Telecommunications to check for any existing service / sub-ducts in the vicinity of the said premises.

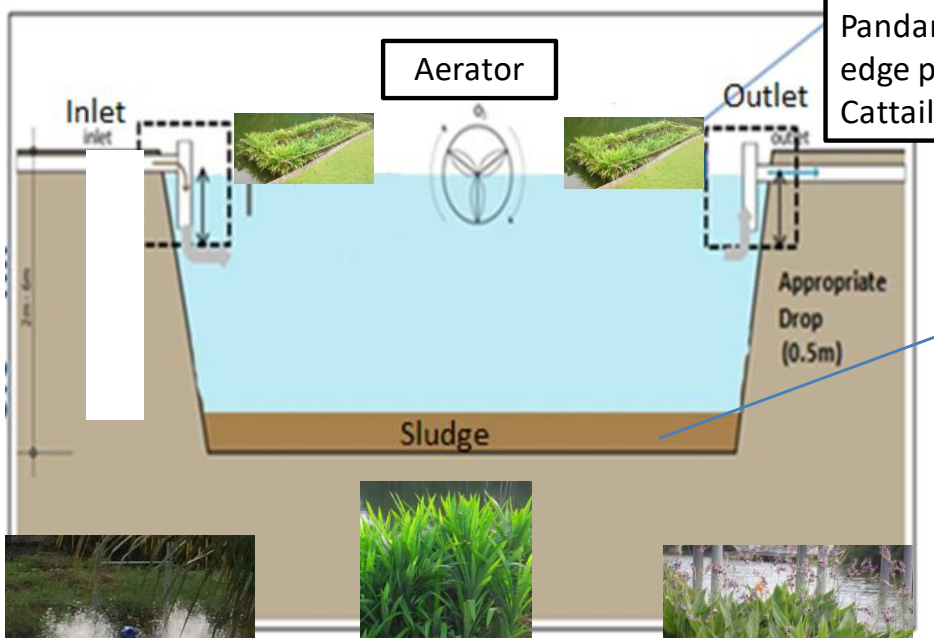
Attachment 4

DIAGRAM 1



A TYPICAL CUT-OFF DRAIN AND TREATMENT POND FOR AGRICULTURAL RUNOFF MANAGEMENT

DIAGRAM 2



Pond surface aerator

Fragrant Pandan (*Pandanus amaryllifolius*)



Alligator Flag (*Thalia geniculate*)



Cattail (*Typha angustifolia*)

A TYPICAL TREATMENT POND

TABLE 1

TYPICAL WETLAND PLANTS SUITABLE FOR USE IN TREATMENT PONDS

Plant species	Water-treatment function
Papyrus reed / Egyptian Paper Plant *(Cyperus papyrus)*	Reduces nitrogen and phosphorus and able to accumulate copper, zinc and lead
Cattail *(Typha angustifolia*)	Reduces nitrogen and phosphorus, accumulates a range of heavy metals and serves as habitat for a variety of animals
Blue Rush / Tube Sedge *(Lepironia articulata)*	Reduces nitrogen and phosphorus and accumulates lead
Dwarf Papyrus *(Cyperus haspan var. viviparus)*	Able to absorb nitrogen and phosphorus rapidly
Water Canna / Alligator Flag *(Thalia dealbata / Thalia geniculata)*	Reduces nitrogen and phosphorus
Fragrant Pandan *(Pandanus amaryllifolius)*	Reduces nitrogen and phosphorus
Pickerelweed *(Pontederia cordata L.)*	Reduces nitrogen and phosphorus
Ricefield bulrush *(Scirpus mucronatus)*	Reduces nitrogen and phosphorus

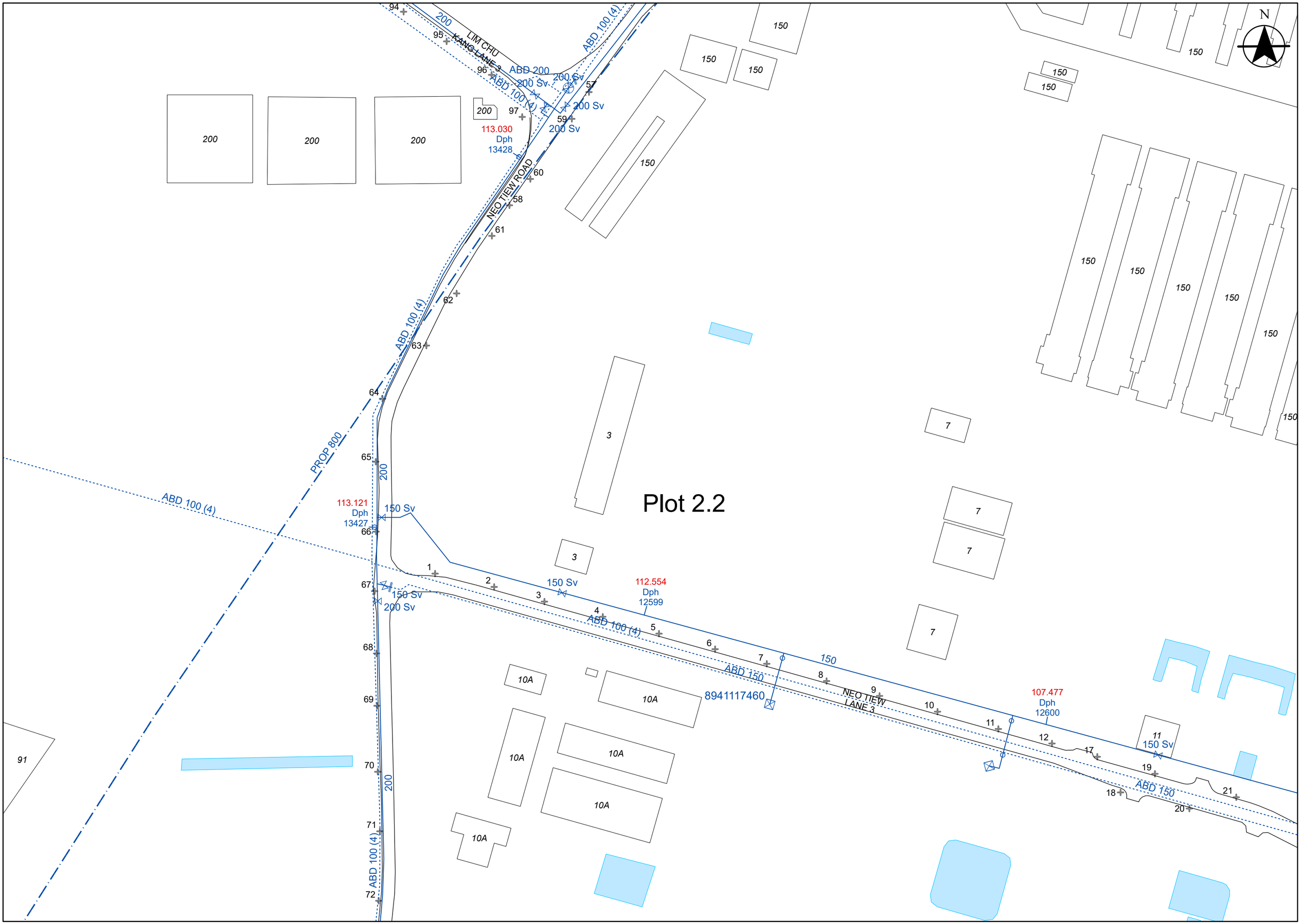
Attachment 5

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.)		

Attachment 6

Water Supply Plan – Plot 2.2



SCALE 1:1,500

Printed on 10/12/2025

Printed By

Water Supply Plan – Plot 2.4

Plot 2.4

N

200 Sv
200
97
113.030
Dph
13428
200 Sv
57
59
3
LIM CHU KANG LANE 3
200
200
150
60
58
NEO TIEW ROAD
61
ABD 100 (4)
62
PROP 800
63
64
200
65
113.121
Dph
13427
150 Sv
66
ABD 100 (4)
67
150 Sv
200 Sv
68
69
70
71
72
200 Sv
150 Sv
73
200 Sv
1
2
150
ABD 100 (4)
3
TURUT TRACK
4
112.554
Dph
12599
150 Sv
1
2
3
4
ABD 100 (4)
5
6
7
ABD 150
8941117460
8
9
10
11
NEO TIEW LANE 3
12
17
19
18
20
21
23
24
25
26
27
29
28
ABD 150
ABD 150
150 Sv
28AV
AMH
4
NEO TIEW LANE 3
150
107.477
Dph
12600
11
150 Sv
3
7
7
7
7
13
13
15
15
15
10A
10A
10A
10A
10A
150
150
150

Water Supply Plan – Plot 2.5

Plot 2.5

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Printed on 10/12/2025

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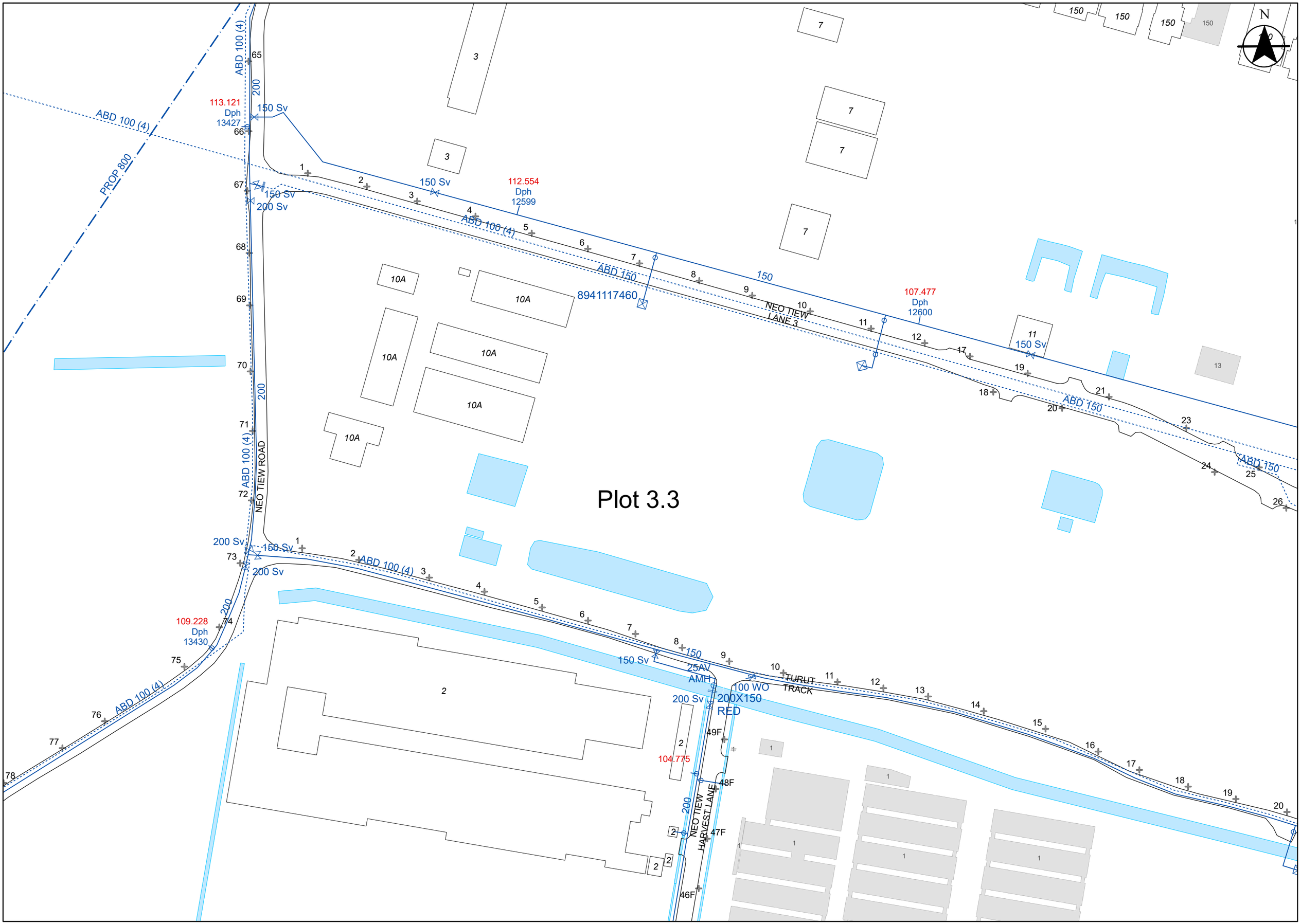
Water Supply Plan – Plot 3.3



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Water Supply Plan – Plot 9.4

Plot 9.4

N

SCALE 1:1,500

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126.350
Dph
11410

130.370
Dph
11409

117.240
Dph
11403

120.170
Dph
11404

131.080
Dph
11408

124.930
Dph
11407

124.070
Dph
11379

121.570
Dph
11378

122.760
Dph
11428

115.750
Gh
7188

150
150 Sv
ABD 150
ABD 100 (4)
PROP 800
ABD 150 (6)
100 WO

LORONG SEMANGKA
JALAN LEKAR
LORONG PASU

HONG HUP

ACRES WILDLIFE RESCUE CENTRE

Water Supply Plan – Plot 9.22

Plot 9.22

N

SUNGEI TENGAH ROAD

FARMART CENTRE

ABD 150 (6)

ABD 100 (4)

150

150 Sv

125.160 Gh 7166

126.054 Dph 11354

115.120 Dph 11355

135.892 Dph 11353

139.550 Dph 11352

113.599 Dph 11356

SCALE 1:1,500

Printed on 11/12/2025

Printed By

Attachment 7

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 ≥ 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 http://sso.agc.gov.sg/Act/PUA2001.

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: https://www.sla.gov.sg/INLIS.

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: https://bpu.pub.gov.sg/pows.
- 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 delvis_chew@pub.gov.sg or 96604443
- Potable Water/NEWater/Industrial Water pipelines at Central & Western areas – Mr Fong Xi Ning at fong_xi_ning@pub.gov.sg or 90124666
- Raw Water pipelines – Mr Roderick Ho at roderick_ho@pub.gov.sg or DID 65172916
- General enquires – PUB_WSN_Surveillance@pub.gov.sg

Appendix 1

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

PUB SINGAPORE'S NATIONAL WATER AGENCY

WATERMAIN SETBACK DISTANCE CLEARANCE REQUIRED

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

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.

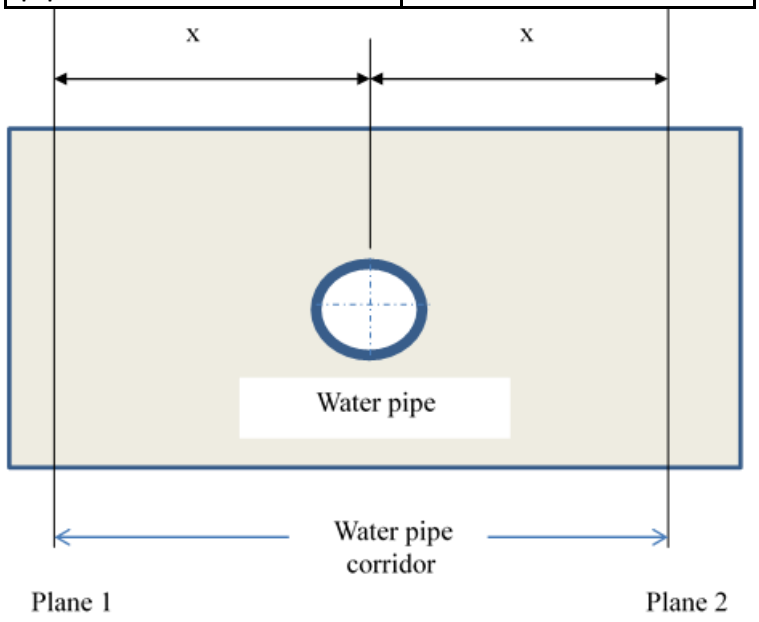
3. E PUB will not be held responsible for any damage or injury caused to any persons, property, road, etc as a result of watermain leakage due to the Developer/Contractor's works. The Developer/Contractor shall be fully liable for any damage caused to adjacent property whether public or private as a 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.

Water Pipe	**Distance X on either side from the centreline**
<900 mm Diameter	10 metres
≥ 900mm Diameter	20 metres
Tunnels and Tunnelled pipes	40 metres



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:

1. 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/mm^2.

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

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 ≥ 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.

Appendix 3

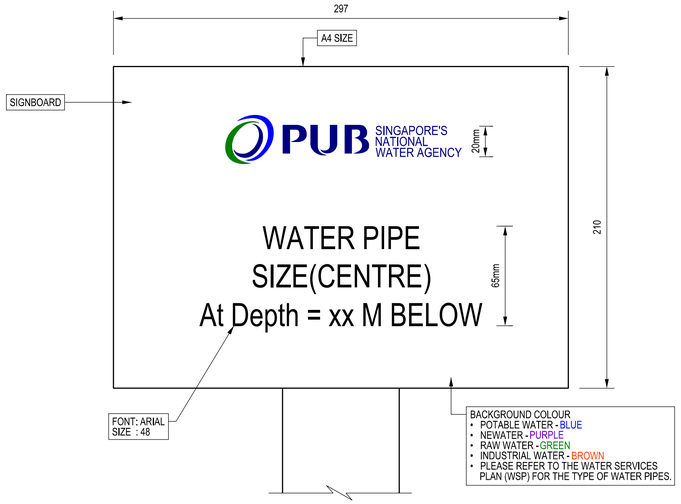
DOs AND DON'Ts WHILST WORKING IN THE VICINITY OF WATERMAINS

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.

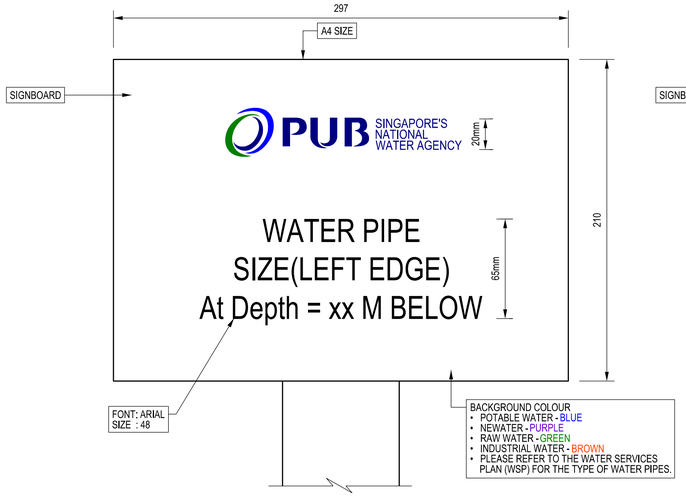
DON'Ts

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.



STANDARD DESIGN TO MARK OUT CENTRE ALIGNMENT OF WATER PIPES

SCALE 1 : 2



STANDARD DESIGN TO MARK OUT THE LEFT EDGE OF WATER PIPES ≥ 1200MM DIA.

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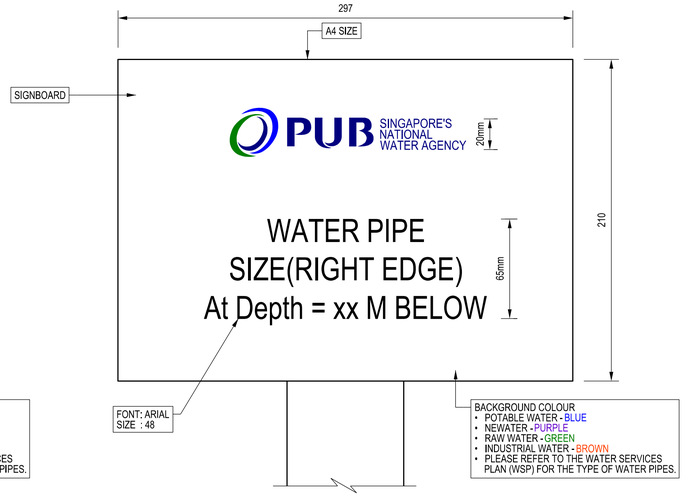
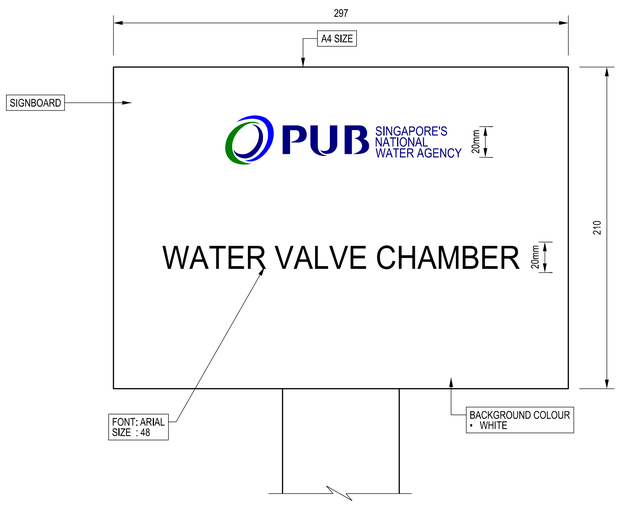


STANDARD DESIGN TO MARK OUT THE RIGHT EDGE OF WATER PIPES ≥ 1200MM DIA.

SCALE 1 : 2



STANDARD DESIGN TO MARK OUT THE WATER APPURTENANCES

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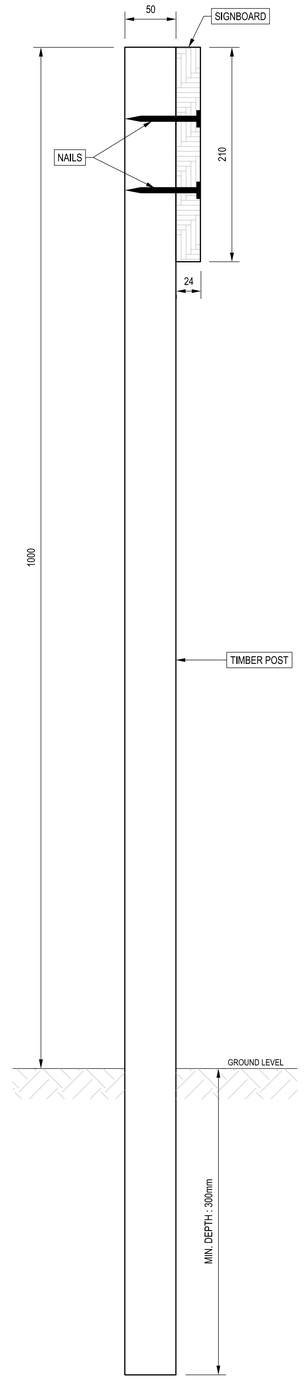
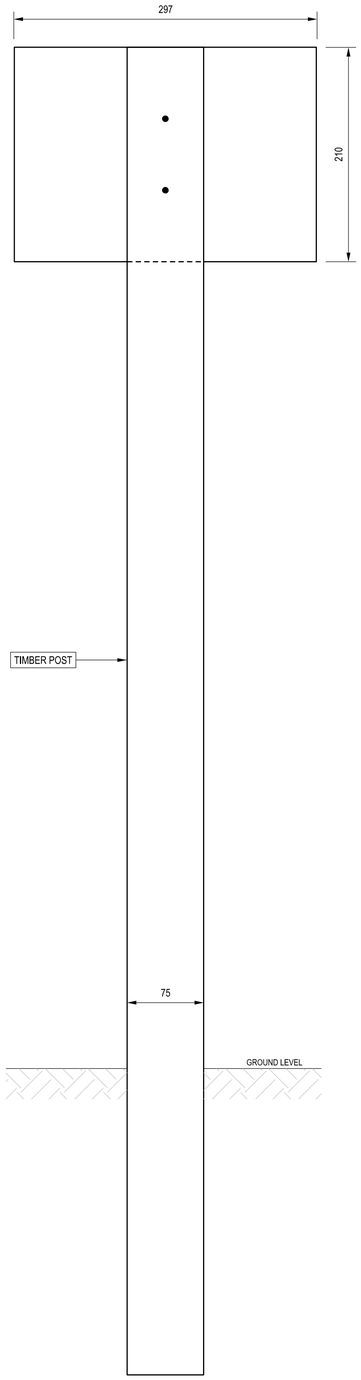


SIDE ELEVATION

SCALE 1 : 3



BACK ELEVATION

SCALE 1 : 3

NOTES:

1. SIGNBOARD : PLYWOOD (24mm THICKNESS).
2. 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 EDGE OR RIGHT EDGE OF THE PIPE. REFER TO THE STANDARD DESIGN OF THESE MARKERS.

REV	DATE	AMENDMENTS	DRAWN	CHECKED

PUB SINGAPORE'S NATIONAL WATER AGENCY

WATER SUPPLY(NETWORK) DEPARTMENT
NS DIVISION

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

Attachment 8

Sewerage Information Plan – Plot 2.2

SEWERAGE INFORMATION PLAN

THE INFORMATION GIVEN ON THIS SEWERAGE INFORMATION PLAN FORMS THE BEST INFORMATION AVAILABLE ON THE DATE PRINTED AND IS LIABLE TO CHANGE WITHOUT NOTICE WHILST EVERY ENDEAVOR IS MADE TO ENSURE THAT THE INFORMATION PROVIDED IS CORRECT, THE PUB DISCLAIMS ANY LIABILITY FOR ANY DAMAGE OR LOSS THAT MAY BE CAUSED TO ANY PERSON DIRECTLY OR INDIRECTLY AS A RESULT OF ANY ERROR OR OMISSION.

CAUTION:

The information given is INDICATIVE only and shall be verified on site. For proposed sewer / pumping main / DTSS, please consult PUB for the latest details and status.

PUB
Water for All:Conserve,Value,Enjoy

SCALE

(in A3 Size)

1:1,500

LEGEND

- EXISTING SEWER
- UNSURVEYED SEWER
- UNCOMMISSIONED SEWER
- PROPOSED SEWER (CONSULT PUB FOR THE LATEST DETAILS AND STATUS)
- REHABILITATED SEWER
- SEWER TO BE ABANDONED (NO CONNECTION TO THIS SEWER IS ALLOWED)
- ABANDONED SEWER
- DECOMMISSIONED SEWER
- EXISTING DRAINLINE
- PROPOSED DRAINLINE
- EXISTING PUMPING MAIN
- PROPOSED PUMPING MAIN (CONSULT PUB FOR THE LATEST DETAILS AND STATUS)
- PUMPING MAIN TO BE ABANDONED
- ABANDONED PUMPING MAIN
- DECOMMISSIONED PUMPING MAIN
- EXISTING SLUDGE PUMPING MAIN
- ABANDONED SLUDGE PUMPING MAIN
- EXISTING DTSS TUNNEL
- PROPOSED DTSS TUNNEL (CONSULT PUB FOR THE LATEST DETAILS AND STATUS)
- 123456 IMMEDIATE DOWNSTREAM SEWER GIS ID
- 123456 MANHOLE GIS ID
- LEFT-IN CAISSON
- LEFT-IN SHEET PILES
- RC TRENCH

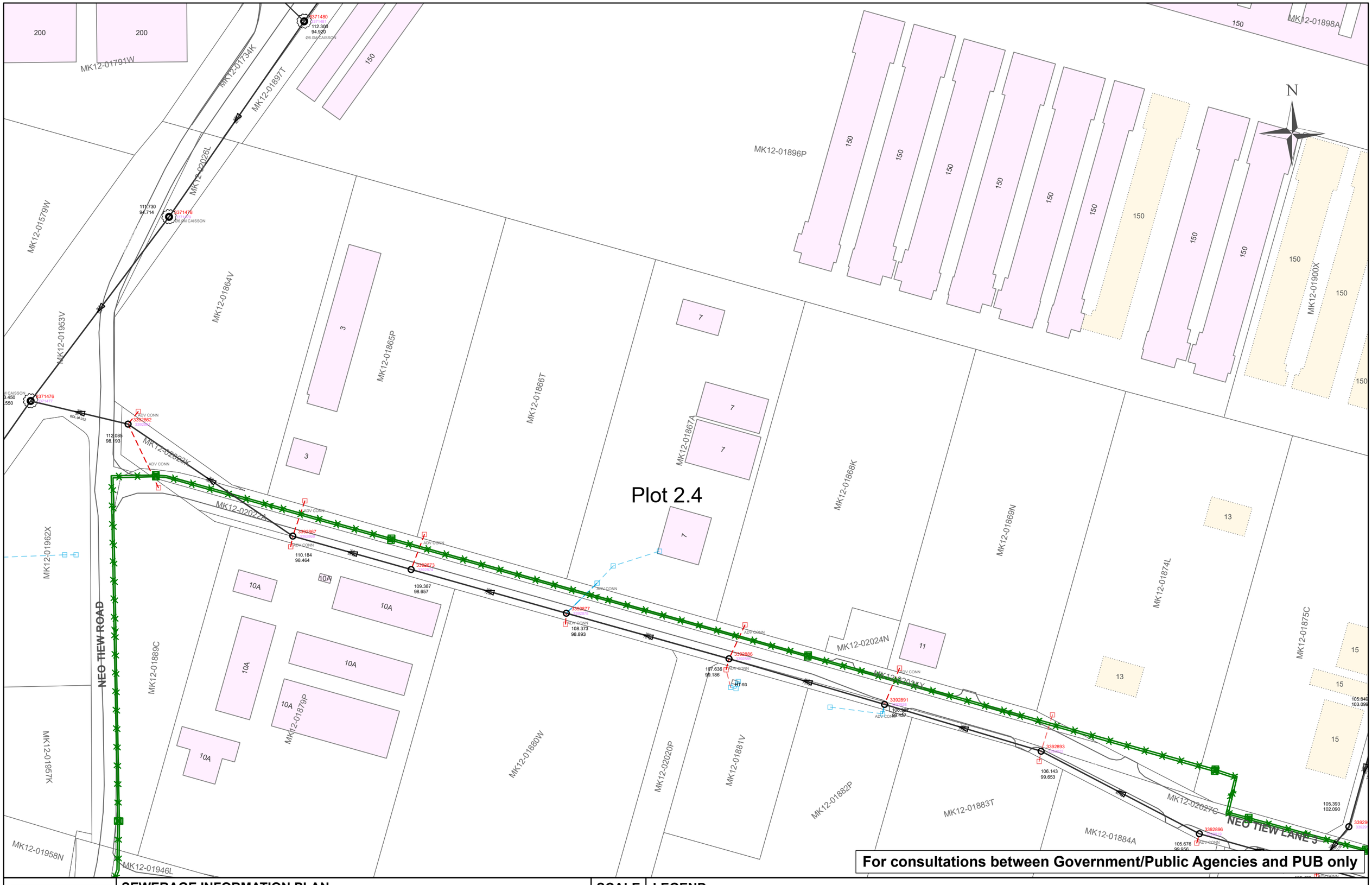
Plot 2.2

For consultations between Government/Public Agencies and PUB only

Date: 10/12/2025

Prepared By: geri_print@soe

Sewerage Information Plan – Plot 2.4



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SEWERAGE INFORMATION PLAN

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SCALE
(in A3 Size)
1:1,500

LEGEND

- EXISTING SEWER
- UNSURVEYED SEWER
- UNCOMMISSIONED SEWER
- PROPOSED SEWER (CONSULT PUB FOR THE LATEST DETAILS AND STATUS)
- R REHABILITATED SEWER
- SEWER TO BE ABANDONED (NO CONNECTION TO THIS SEWER IS ALLOWED)
- ABANDONED SEWER
- DECOMMISSIONED SEWER
- EXISTING DRAINLINE
- PROPOSED DRAINLINE
- EXISTING PUMPING MAIN
- PROPOSED PUMPING MAIN (CONSULT PUB FOR THE LATEST DETAILS AND STATUS)
- PUMPING MAIN TO BE ABANDONED
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- DECOMMISSIONED PUMPING MAIN
- EXISTING SLUDGE PUMPING MAIN
- ABANDONED SLUDGE PUMPING MAIN
- EXISTING DTSS TUNNEL
- PROPOSED DTSS TUNNEL (CONSULT PUB FOR THE LATEST DETAILS AND STATUS)
- 123456 IMMEDIATE DOWNSTREAM SEWER GIS ID
- 123456 MANHOLE GIS ID
- LEFT-IN CAISSON
- LEFT-IN SHEET PILES
- RC TRENCH

Date: 10/12/2025 Prepared By: geri_print@soe

Sewerage Information Plan – Plot 2.5



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SEWERAGE INFORMATION PLAN

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CAUTION:
The information given is INDICATIVE only and shall be verified on site. For proposed sewer / pumping main / DTSS, please consult PUB for the latest details and status.

SCALE
(in A3 Size)
1:1,500

LEGEND

- EXISTING SEWER
- UNSURVEYED SEWER
- UNCOMMISSIONED SEWER
- PROPOSED SEWER (CONSULT PUB FOR THE LATEST DETAILS AND STATUS)
- R REHABILITATED SEWER
- SEWER TO BE ABANDONED (NO CONNECTION TO THIS SEWER IS ALLOWED)
- ABANDONED SEWER
- DECOMMISSIONED SEWER
- EXISTING DRAINLINE
- PROPOSED DRAINLINE
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- PROPOSED PUMPING MAIN (CONSULT PUB FOR THE LATEST DETAILS AND STATUS)
- PUMPING MAIN TO BE ABANDONED
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- ABANDONED SLUDGE PUMPING MAIN
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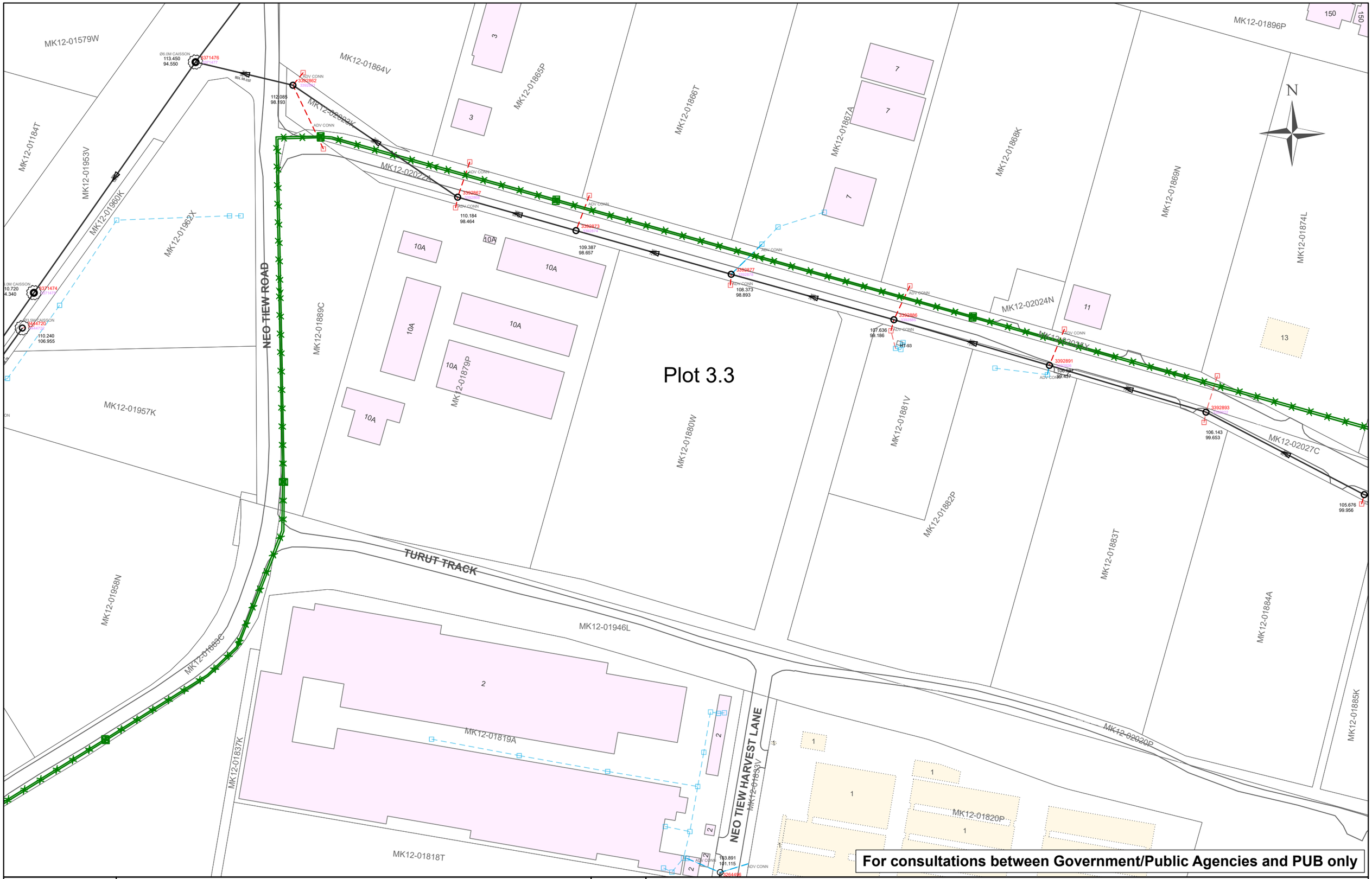
- 123456 MANHOLE GIS ID
- LEFT-IN CAISSON
- LEFT-IN SHEET PILES
- RC TRENCH

Date: 15/12/2025 Prepared By: geri_print@soe

Sewerage Information Plan – Plot 3.3



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Water for All:Conserve,Value,Enjoy

SEWERAGE INFORMATION PLAN

THE INFORMATION GIVEN ON THIS SEWERAGE INFORMATION PLAN FORMS THE BEST INFORMATION AVAILABLE ON THE DATE PRINTED AND IS LIABLE TO CHANGE WITHOUT NOTICE WHILST EVERY ENDEAVOR IS MADE TO ENSURE THAT THE INFORMATION PROVIDED IS CORRECT, THE PUB DISCLAIMS ANY LIABILITY FOR ANY DAMAGE OR LOSS THAT MAY BE CAUSED TO ANY PERSON DIRECTLY OR INDIRECTLY AS A RESULT OF ANY ERROR OR OMISSION.

CAUTION:
The information given is INDICATIVE only and shall be verified on site. For proposed sewer / pumping main / DTSS, please consult PUB for the latest details and status.

SCALE
(in A3 Size)
1:1,500

LEGEND

- EXISTING SEWER
- UNSURVEYED SEWER
- UNCOMMISSIONED SEWER
- PROPOSED SEWER (CONSULT PUB FOR THE LATEST DETAILS AND STATUS)
- R REHABILITATED SEWER
- SEWER TO BE ABANDONED (NO CONNECTION TO THIS SEWER IS ALLOWED)
- ABANDONED SEWER
- DECOMMISSIONED SEWER
- EXISTING DRAINLINE
- PROPOSED DRAINLINE
- EXISTING PUMPING MAIN
- PROPOSED PUMPING MAIN (CONSULT PUB FOR THE LATEST DETAILS AND STATUS)
- PUMPING MAIN TO BE ABANDONED
- ABANDONED PUMPING MAIN
- DECOMMISSIONED PUMPING MAIN
- EXISTING SLUDGE PUMPING MAIN
- ABANDONED SLUDGE PUMPING MAIN
- EXISTING DTSS TUNNEL
- PROPOSED DTSS TUNNEL (CONSULT PUB FOR THE LATEST DETAILS AND STATUS)
- 123456 IMMEDIATE DOWNSTREAM SEWER GIS ID
- 123456 MANHOLE GIS ID
- LEFT-IN CAISSON
- LEFT-IN SHEET PILES
- RC TRENCH

Date: 10/12/2025 Prepared By: geri_print@soe

Sewerage Information Plan – Plot 9.4

MK11-03839P
MK11-03843T
MK11-03842P
MK11-03760N
MK11-03810V
MK11-03495L
MK11-03494X
MK11-03974W
MK11-03972C
MK11-04136X
MK11-03757N
MK11-03764M
MK11-04029N
MK11-03770P
MK11-04030A
MK11-022937
MK11-03482C
MK11-03775X
MK11-03772A
MK11-03780C
MK11-03932T

LORONG SEMANGKOK
LORONG PASU
JALAN LEKAR

Plot 9.4

N

ADV CONN
Ø3.5M CAISSON
WRN TAKEN OVER FOR MAINTAIN ON 12 JUN 2012 HT NOT IN USE
FORMERLY WAS R2-90 MAINTAIN BY WRT FROM 1 FEB 2013
STP-109

For consultations between Government/Public Agencies and PUB only

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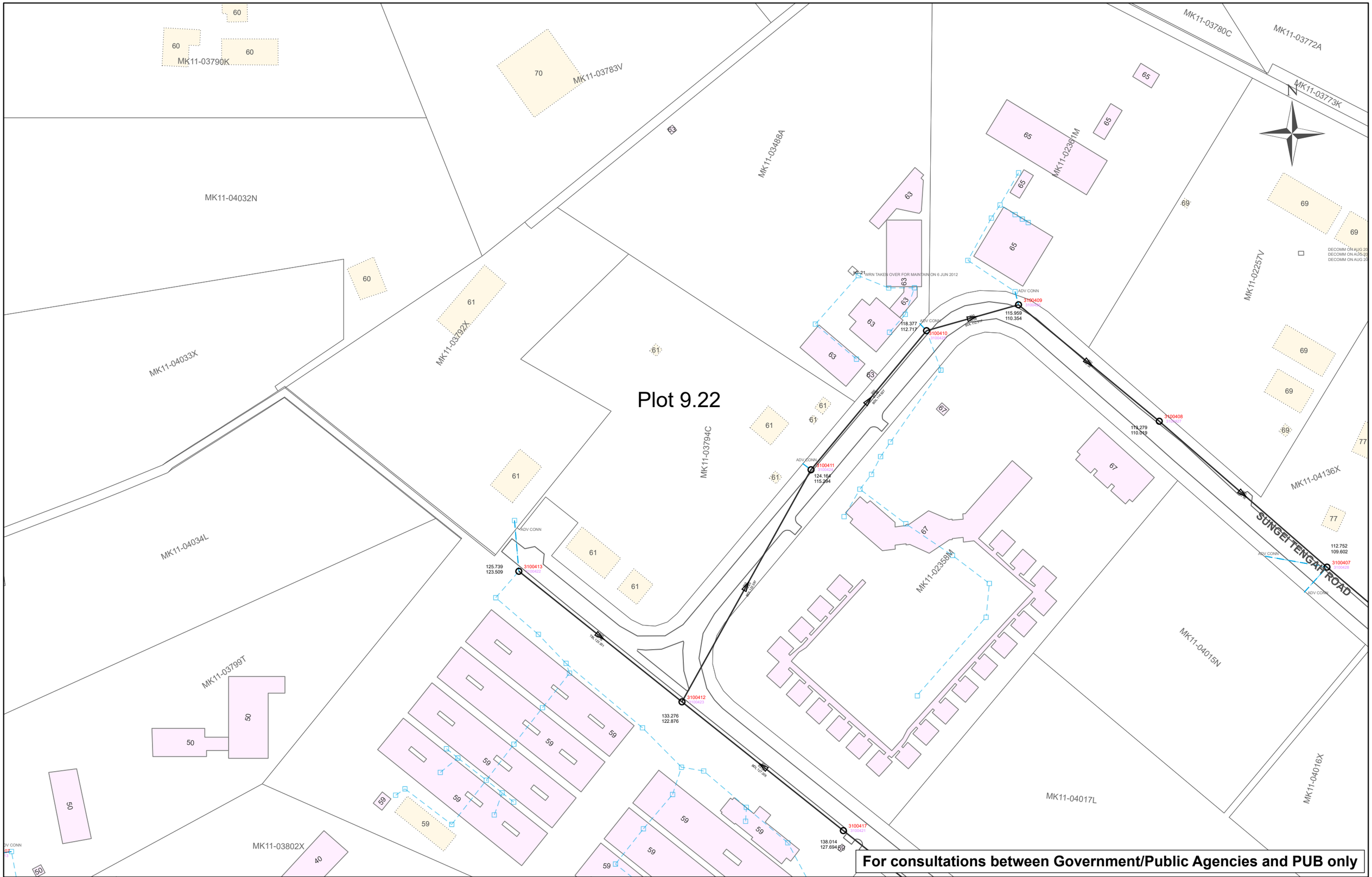
Picture of existing on-site sewerage system, STP (BJ823)-81 to be demolished by the successful tenderer.



Sewerage Information Plan – Plot 9.22



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Date: 11/12/2025 Prepared By: geri_print@soe

Attachment 9

FIRE SAFETY REQUIREMENTS, SINGAPORE CIVIL DEFENCE FORCE (SCDF)

The developer and building owner/management/user (named as the Proposer) are required to comply with the Fire Safety Act 1993 and its Regulations, the prevailing "Code of Practice for Fire Safety Precautions in Buildings" (Fire Code), the relevant Codes of Practices & Guidelines, and SCDF Circulars. These general fire safety requirements are also applicable to any proposed temporary usage or installation. In addition, the following conditions will apply where applicable:

(a) To consult SCDF on the specific design requirements if the premises is to store, handle, use, transport or import of hazardous materials, including petrol station or CNG station which may have impact within the premises or on the surrounding existing or new developments. SCDF may impose the Quantitative Risk Assessment study (QRA) and/or additional Fire Safety requirements, or disapprove such proposal if there is possible impact within the premises or on the surrounding developments.

(b) To consult SCDF on any specific developments or structures having impact on SCDF operations e.g. deep basement works (which are more than 4 storey or more than 24 metres in depth), tunnel or any other special developments, etc. SCDF may impose additional Fire Safety requirements.

(c) The Proposer shall ensure that their proposal will not affect existing other surrounding developments (neighbouring) such as their exit provision, sidelane / backlane, window openings [the unprotected openings requirements, i.e. the Proposer and their Qualified Person (QP) shall strictly observe these existing conditions and provide more setback if necessary to prevent fire spread] and fire engine accessway etc. The Proposer and their QP shall consult SCDF directly for those new proposed building structures to be sited near to common boundary line, as additional Fire Safety requirements may be imposed.

(d) The Proposer shall ensure that the boundary line of petroleum service stations, either be an existing or going-to-build petrol station, shall be at least 50m from any residential building, or 90m from any place of public assembly.

(e) For existing premises, the Proposer may wish to note that the SCDF's Plan Approval and Fire Safety Certificate (FSC) will have to be obtained if there is any change in use or involving any alteration / addition works. The Proposer shall ensure that the existing premises, including existing layouts and usages, have obtained the necessary Approvals from SCDF.

(f) For lease extension, the Proposer is urged to engage their own QP in assisting them to obtain the SCDF's Plan Approval and Fire Safety Certificate (basing on the prevailing Fire Code) if it is not done so for the entire buildings/premises. The fire safety provisions and mitigation measures are essential for all buildings; it is particularly true for religious premises where congregation of general public is possible, and for premises with similar usage as Nursing Home & Childcare Centre where the occupants are vulnerable to emergency situations. (The premises/building owner, such as HDB, SLA and JTC etc shall engage the operator and see how to address the shared concerns before considering granting their lease extension application).

(g) For applications of non-exclusive and limited religious use, the Proposer shall liaise directly with the building owner/management to ensure their proposed usage and number of occupants for that particular room /floor does not exceed the limit as originally designed & approved for. The Proposer shall also provide the full details to the building owner/management so that the Emergency Response Plan (ERP) can be updated accordingly.

(h) For new road development (including road widening, realignment, road expunction & interim measures etc), it shall not affect or encroach upon any part of existing development compounds. For public fire hydrant, do liaise with PUB directly for any proposed relocation or erection of new fire hydrant.

(i) For drainage system development (including widening, realignment, extension & interim measures etc), it shall not affect or encroach upon any part of existing development compounds.

2. Before making any commitment (purchase/occupation or rental/lease etc) or commencement of any proposal, the Proposer shall engage **Qualified Person (QP)** 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 & other relevant standards/guidelines/circulars). The feasibility study shall also ensure those existing fire safety provisions of surrounding developments are not affected. The QP will then assist them to obtain the SCDF's Plan Approval and the Fire Safety Certificate (FSC). If the Proposer has any doubts or queries regarding the fire safety requirements or plan approval procedures, he shall visit the *SCDF at SCDF Headquarters, 91 Ubi Ave 4,* for a walk-in consultation.

3. For projects involving petroleum and flammable materials (P&FM) such as Chemical Plants, Petroleum Refineries and Buildings/Structures used for handling & storage of bulk P&FM, the Proposer and their QP shall provide the overall layout details to *SCDF at SCDF Headquarters at 91 Ubi Ave 4*, for further comments, as additional fire safety provisions and mitigation measures will be imposed. The Proposer and their QP may wish to consult **MAJ Bryan Ng** (Email: *Bryan_NG@scdf.gov.sg*) for a consultation session.