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ACC Reference Number:	1701	W	000	CSC	760	000439

METHOD STATEMENT TITLE	Rev.
Installation of socket H pile at bifurcation & OHL mast	

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Date:	3/5/24	3/5/24	2024/05/2024	6/5/24

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1.	Introduction (Overview of the operation/works)
	<p>This method statement focuses on the Socket-H piling work at W2 which lies between the test track and TCL/AEL and at W1 for those socket H pile for OHL mast. EDOC is required and will be submitted on approval of this method Statement. The H pile construction at W12 for Tai Ho Interchange, W6 for SPS construction and H pile near sewage deck will be submitted separately.</p> <p>Prior to the commencement of the piling, method statements associated with the utilities detection, installation of I&M, railway protection fencing installation, level crossing construction, sheet pile installation along bifurcation area and temp platform shall be submitted and approved.</p> <p>This method statement covers the access of labour, plant and material to the works area and the general procedure for socket H pile installation. Furthermore, it includes the specific drilling rig and mobile crane to be adopted and detailed set up on site. It provides the responsible personnel including managers, engineers and workers for executing the construction activities. Lastly, it includes the safety and environment and quality control requirements to ensure the construction is safe and robust. Relevant risk assessments and drawings can be found in the appendix.</p>
2.	Reference Documents (Identify relevant documents by name and reference number)
	<ul style="list-style-type: none">• Practice Note PNAP -24• Practice Note RC No.14• MTRCL-New Works Design Standards Manual -Section 3-Railway Engineering• Hong Kong Transport Services Business Unit Requirements and information for contractor• Hong Kong Transport Services Unit Railway Safety Rules• MTRCL Working Paper No.6-Railway Protection- Revision B-December 2022• MTRCL Contract 1701 Oyster Bay Station and Associated Works-(S2) Scope-Vol 4 (Book 4 of 9) Appendix AM-Clients Rules and Procedures for Working Within or Adjacent to the Railway• MTRCL Contract 17-1 Oyster Bay Station and Associated Works – Instructions TO Tenders, and• MTRCL Contract 1701 Oyster Bay Station and Associated Works – Contract Data• BUGN2023/21 (Issue/Rev:1.0)
3.	Details of Sub-Contractor/Specialist Sub-Contractor
	<p>The works will be carried out by our subcontractor and supervised by our front-line staff such as foreman and engineer. We will also provide the full time CP(T) (Railway Safety Rules and Requirements) on site, 1 CP(T) will be appointed for 20 workers at the same work area.</p> <p>All workers should possess the qualification Railway Safety Training (RSI). Besides, WPIC will be assigned to supervise the construction works at each work site.</p>



4.	Responsibilities for Activities described within Method Statement																																	
	CSHK is responsible to inspect, supervise and carry out the construction works. The following persons, as listed in the table below, will attend the specific tool-box talk and be responsible for the activities:																																	
	<table border="1"><thead><tr><th>Company</th><th>Name</th><th>Position</th></tr></thead><tbody><tr><td rowspan="12">CSHK</td><td>Vincent Li</td><td>Construction Manager</td></tr><tr><td>Nana Chung</td><td>Assistant Construction Manager</td></tr><tr><td>Lewis Ng</td><td>Assistant Section Agent</td></tr><tr><td>Johnson Chung</td><td>Senior Engineer</td></tr><tr><td>David Lam</td><td>Senior Engineer</td></tr><tr><td>Sam Tsang</td><td>Engineer</td></tr><tr><td>Jacky Luo</td><td>Engineer</td></tr><tr><td>Li Wenguang</td><td>Engineer</td></tr><tr><td>Kinsley Zhao</td><td>Assistant Engineer</td></tr><tr><td>Li Man Hin</td><td>Graduate Engineer</td></tr><tr><td>Benny Yeung</td><td>General Foreman (WPIC)</td></tr><tr><td>Jacky To</td><td>Foreman</td></tr><tr><td></td><td>TBC</td><td>CP(T)</td></tr></tbody></table>			Company	Name	Position	CSHK	Vincent Li	Construction Manager	Nana Chung	Assistant Construction Manager	Lewis Ng	Assistant Section Agent	Johnson Chung	Senior Engineer	David Lam	Senior Engineer	Sam Tsang	Engineer	Jacky Luo	Engineer	Li Wenguang	Engineer	Kinsley Zhao	Assistant Engineer	Li Man Hin	Graduate Engineer	Benny Yeung	General Foreman (WPIC)	Jacky To	Foreman		TBC	CP(T)
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5.	Programme and Working Hours (Start & finish date of operation/works)																																	
	The works are planned to commence in Aug 2024. The general working hours will be from 08:00 – 19:00 daily, from Monday to Saturday. However, as lifting over test track is required it is necessary to carry out works during Non-Traffic Hours which are from 0200 to 0400 subject to the PA works approval. We may also require to work from 19:00 to 23:00 and Sunday and Public Holidays in case of essential speeding up of the working process which will subject to CNP application and approval.																																	
	Socket H pile for OHL mast at W1. We plan to access the work area via the existing access through Tai Ho Interchange slip road during 0800-1800.																																	
	Socket H pile bifurcation at W2 (GL A1 – 40). After removal of the test track and RP fencing erection, we plan to access/egress the work area near the emergency gate 4 (EAG 4) and 5 (EAG 5) or the level crossing installed on the test track at proposed Gate TT06. The general working hours would be 0800-1900.																																	
	Socket H pile bifurcation at W2 (GL 40– 100). We plan to use Gate TT06, Gate TT07 and Gate TT0A or the level crossing on the test track for access to this area. The working hours are subject to further depot coordination.																																	



General Working hour Table for W2 (OYB-N & Depot superstructure)

Item	Works Activity	
1	Labour in-out of works area	TH/NPH/NTH
2	Plant in-out of works area through level crossing	NPH
3	Piling works (Casing drilling, H-beam installation)	TH
4	Grouting	TH
5	Construction materials lifting over the test track (if required)	NPH/NTH

General Working hour Table for W1 (OHL Mast)

Item	Works Activity	
1	Labour in-out of works area W1	TH
2	Plant in-out of works area W1	TH
3	Piling works (Casing drilling, H-beam installation)	TH
4	Grouting	TH
5	Construction materials delivery through TTA Gate 3	TH

6. Plant, Equipment & Material (Identify type, model and specification of MAJOR plant & equipment)

All plant and equipment will be inspected prior to mobilization on site to ensure they are in good working condition and comply with all current regulations. A plant permit system will be adopted to ensure the condition of the lifting crane and appliance are checked before use.

To meet the programme requirement, 3 work fronts will be arranged at OYB South and 6 work fronts will be arranged for OYB North. The major plant and equipment will be deployed to carry out the works are as follow:

Southern work area near Depot Access Road and Shun Long Road (3 no. Workfront)

Plant / Equipment	Quantity
Drilling Rigs	3
Mobile Crane	3
Crane Lorry	2

Manpower	Quantity
General Labour	6
Rigger	10
Rig Operator	3
Crane Operator	5

Northern work area at SHD Depot at W2 (6 no. Workfronts)

Plant / Equipment	Quantity
Drilling Rigs	6
Mobile Crane inside W2	6
Crane Lorry	3
90T Mobile Crane at South Road	2

Manpower	Quantity
General Labour	12



Rigger	20
Rig Operator	6
Crane Operator	11

7. Construction Methods / Construction Sequence Drawings

7.1 Prerequisite prior to pre-bored socket H pile installation

Flow of works activity

- | | |
|---|--|
| 1 | Installation of I&M (Baseline reading obtained & agreed) |
| 2 | RP Fencing erection |
| 3 | Predrilling |
| 4 | Construction of level crossing/backfilling |
| 5 | Precautionary sheet pile installation at W1 & W2 |

The above works activity shall refer to separate Method Statement.

7.2 Logistics Arrangement for W2

7.2.1 Logistics Arrangement: Labour Access

RSI training is required for workers working in W2 area which lies in close proximity to the test track and Mainline. During boarding of the shuttle bus, hand-held facial recognition will be performed to verify the worker's qualification. The facial recognition system will check if the person has passed the RSI and possesses a green card. A list of workers will be submitted to MTR for registration before starting of the works, the list shall be updated weekly and available for MTR as requested.

Workers will be picked up at a designated area such as Tung Chung/Mei Foo Station. They will be transferred through the West Gate or East Gate and taken to the Welfare facility at WX or W1 where they can change into working uniform. From here, the workers will be transported by another shuttle bus (escorted by CP on the shuttle bus) to the designated gate area. A label on the helmet will also help distinguish which workers have attended the RSI training.



7.2.2 General logistics arrangement: Material and Plant delivery



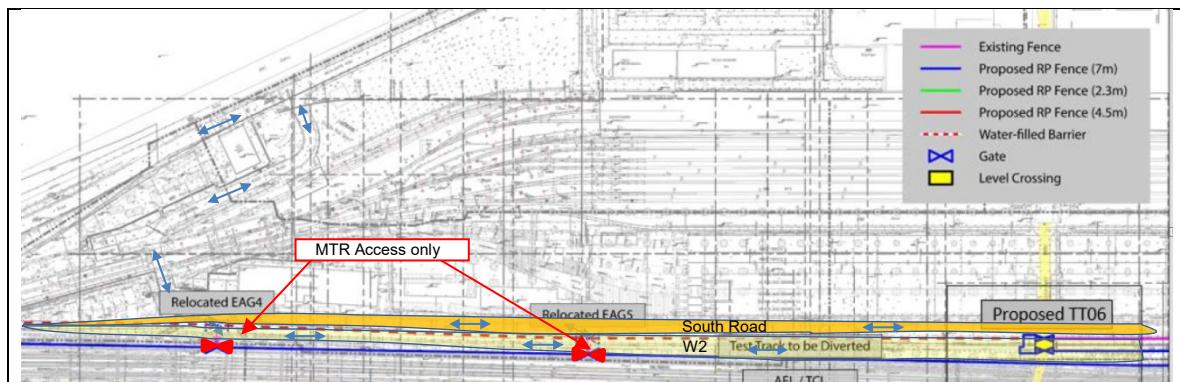
Height checking vehicle before entering East/West gate

Before entering the west gate/east gate, CP(T) will measure the height of vehicle to ensure the height is within 4m. After entering the east/west gate, the Contractor Vehicle will be accompanied by the escort vehicle with CP(T).

A Permit-to-Move is required for vehicles over 4m high and below 4.5m high. Vehicle height measurements/ checks for approval by CWBU to DCC shall be conducted by CP(T)s before entering the depot areas and passing through the west level crossing. When accessing the west level crossing, an escort car with a CP(T) shall communicate with DCC in order to get permission to drive across the level crossing. CP(T) shall inform DYM when the vehicles are passing through the yellow line underneath the height restriction gauge and within the double white zone. No vehicle Reversing is allowed.

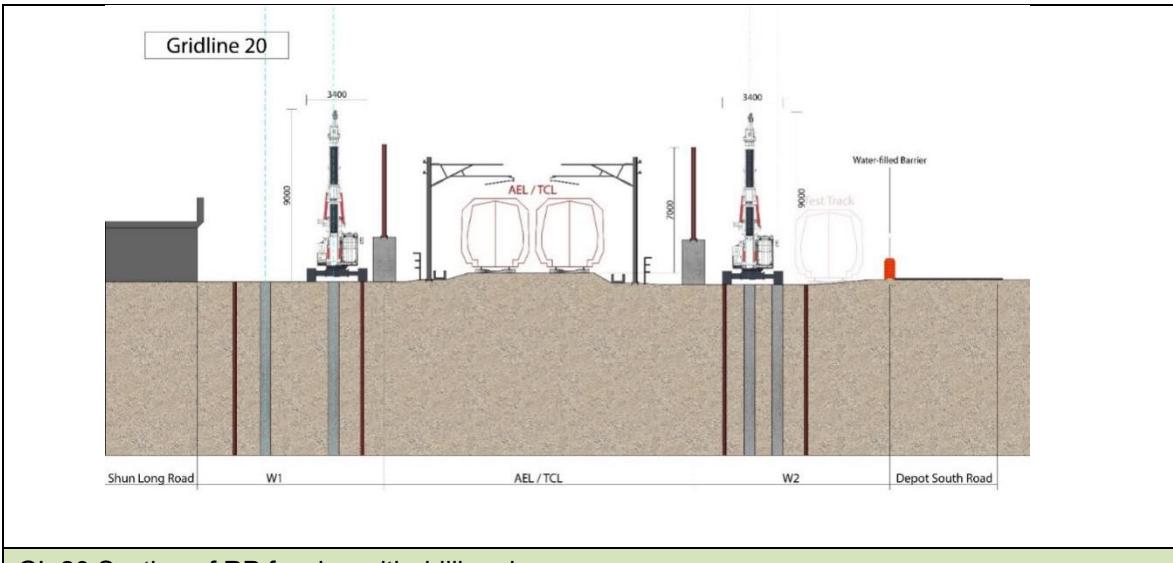
7.2.2.1 Logistics Arrangement from GL A1 – GL 40

We will primarily use the East Gate for the Works at GL A1-40. At this area the test track is to be removed from GL A1 - GL40. The ground level is relatively flat and does not require backfilling. After removal of the test track and OHL mast, construction vehicles with height limited to 4m will be able to access in and out of this area without a level crossing and lifting over the test track is not required for delivering plant and materials.



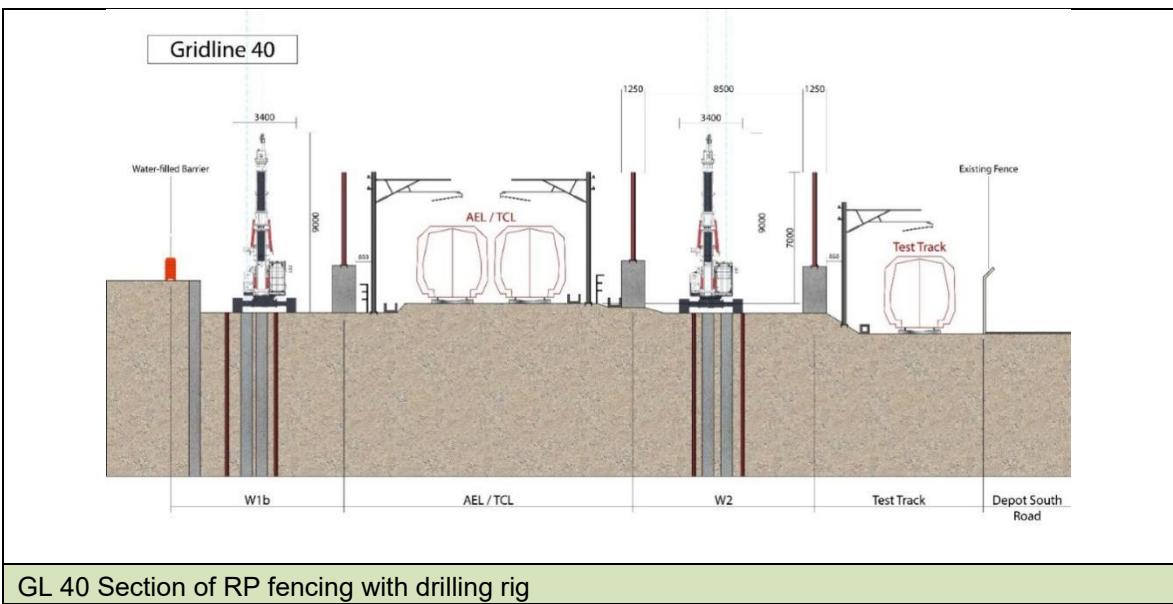
General logistics route to GL A1- GL 40 (after test track removal)

The relocation of EAG4 & 5 shall be approved in advance and these 2 gates will not be used for any logistics and access to W2. Those accesses are for MTR use only.



GL 20 Section of RP fencing with drilling rig

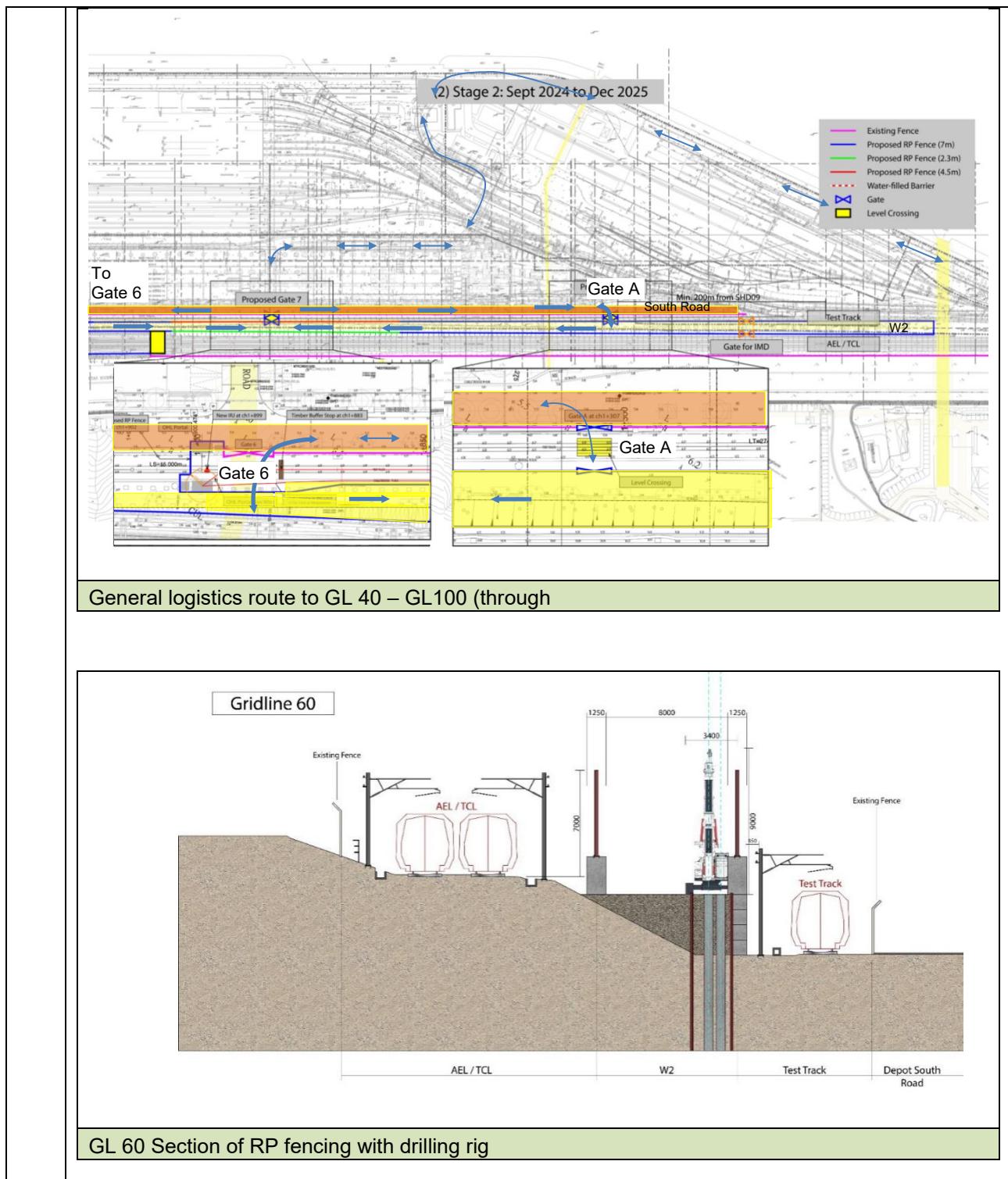
After installation of the RP fencing near the test track is complete, the existing railway fencing near the South Road will be removed and replaced with water filled barriers

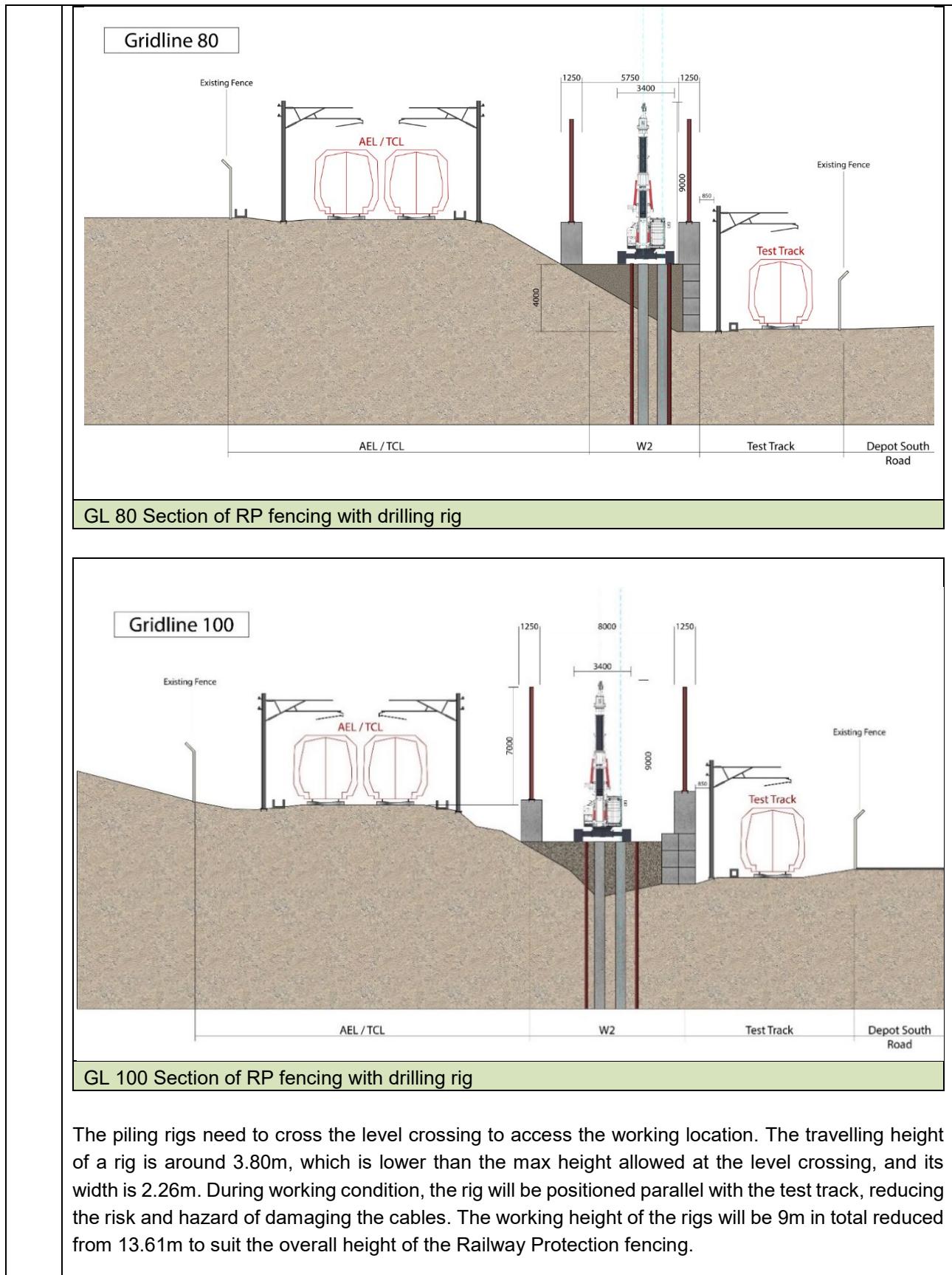


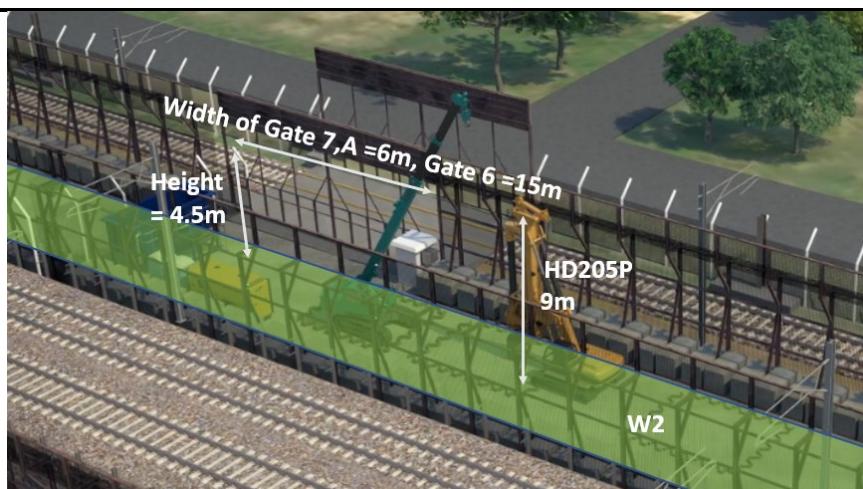
GL 40 Section of RP fencing with drilling rig

7.2.2.2 Logistics Arrangement from GL 40 – GL 100

We will primarily use the East Gate and level crossing at **Gate 06** and **Gate A** for the Works at GL 40-100. At this area the test track is to be maintained. Backfill along the existing slope is required for the erection of RP fencing. Details of the backfilling and erection of the RP fencing shall refer to the separate method statement of RP fencing. After backfilling, the rigs would be able to access from the lower side of **Gate 06** and **Gate A** as shown below.



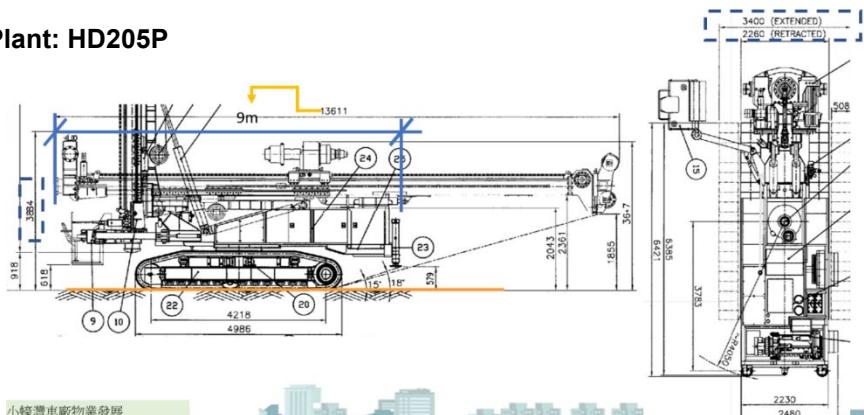


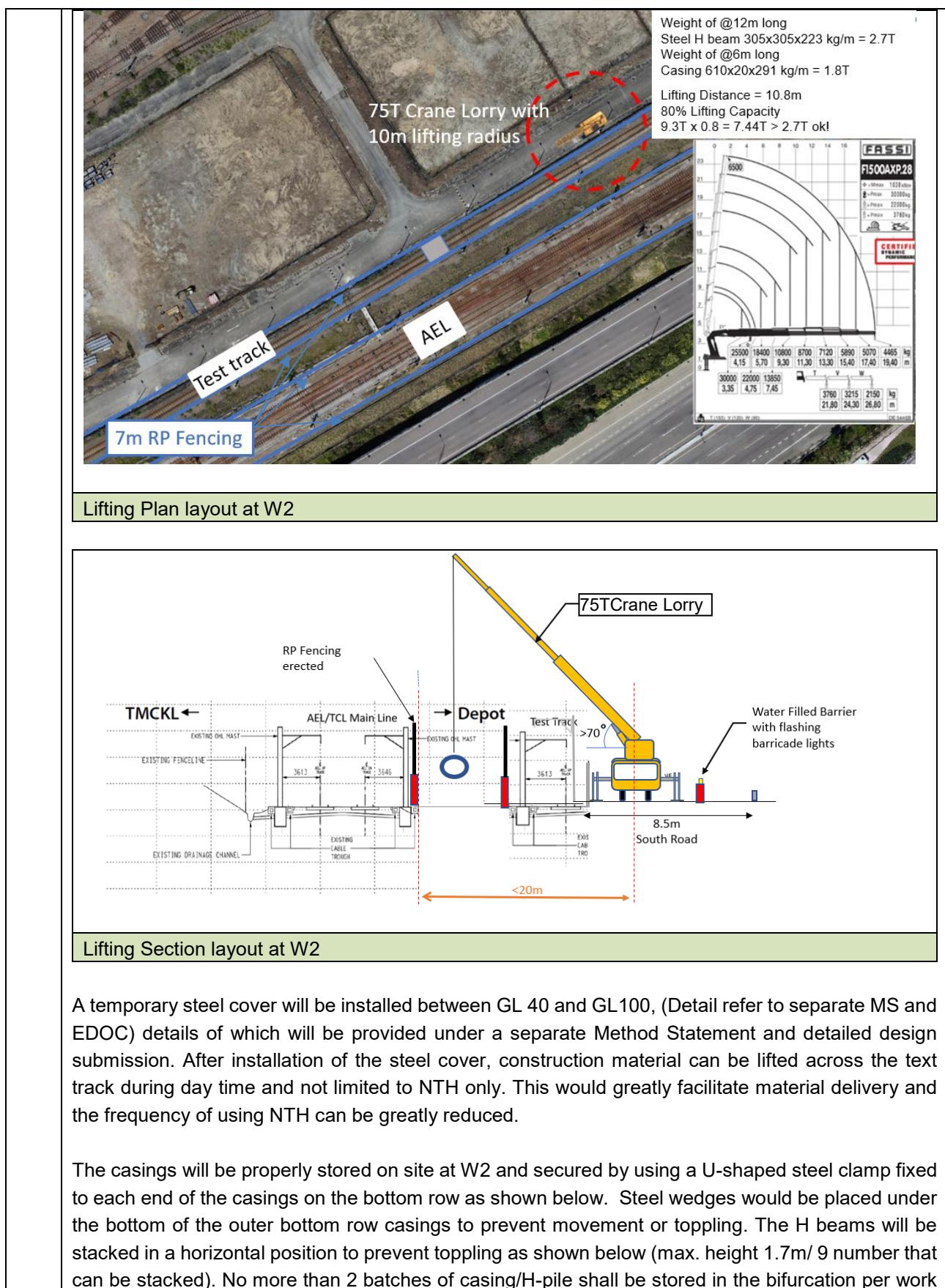


Typical level crossing clearances

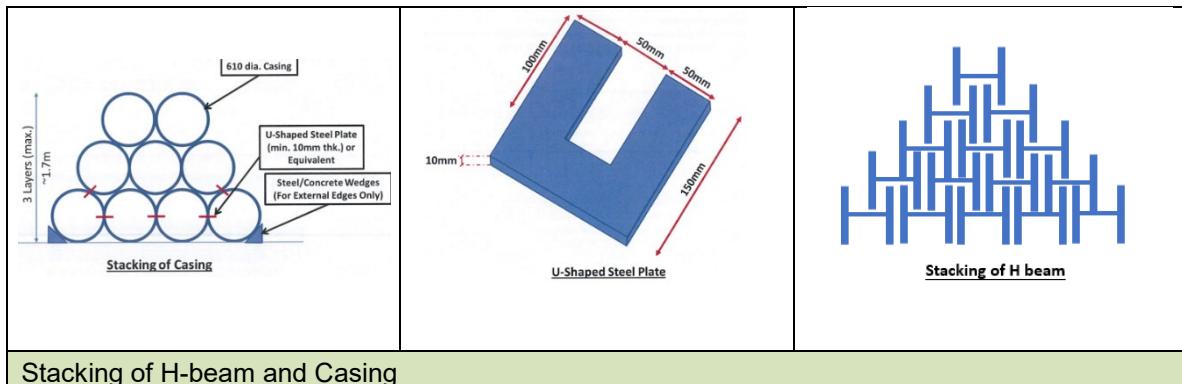
The detailed catalogue of the drilling rig is shown in Appendix E.

Model Plant: HD205P

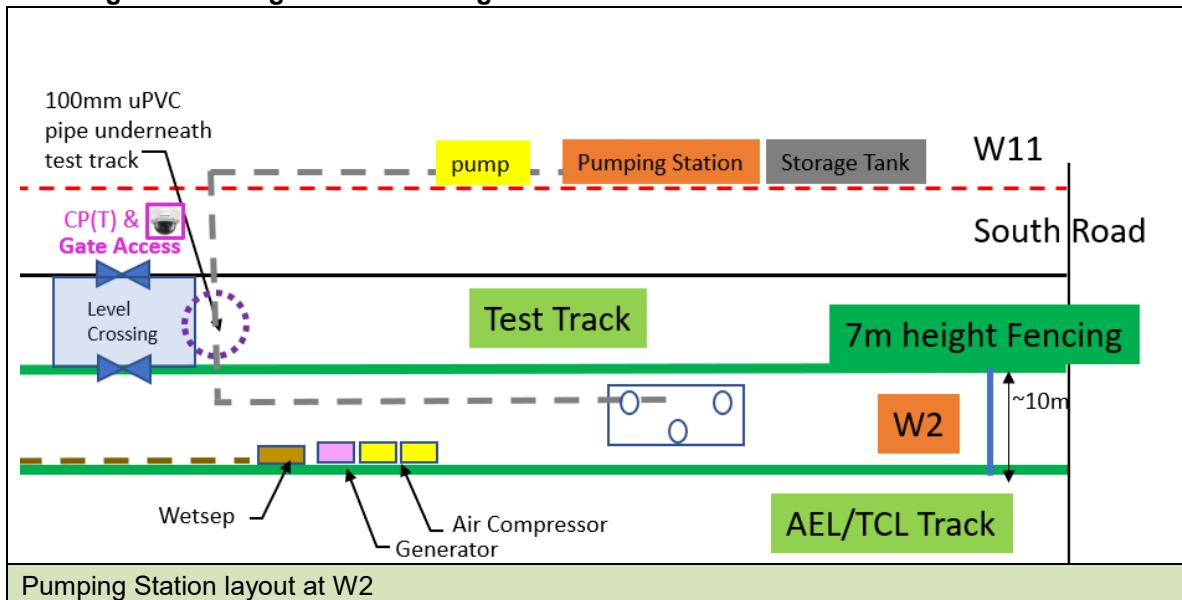




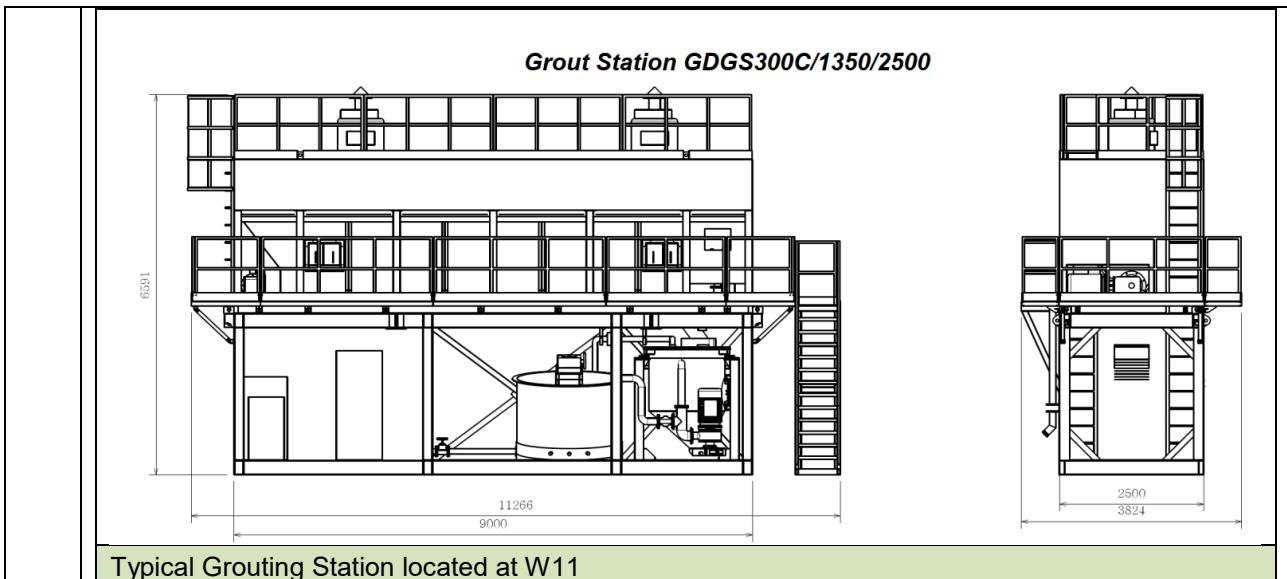
front. The casing length will be limited to 6m in order not to exceed the overall height of the fencing during lifting. A lifting Clamp will be used for rigging the H beam/casing during unloading and loading.



7.2.3 Logistics Arrangement: Grouting



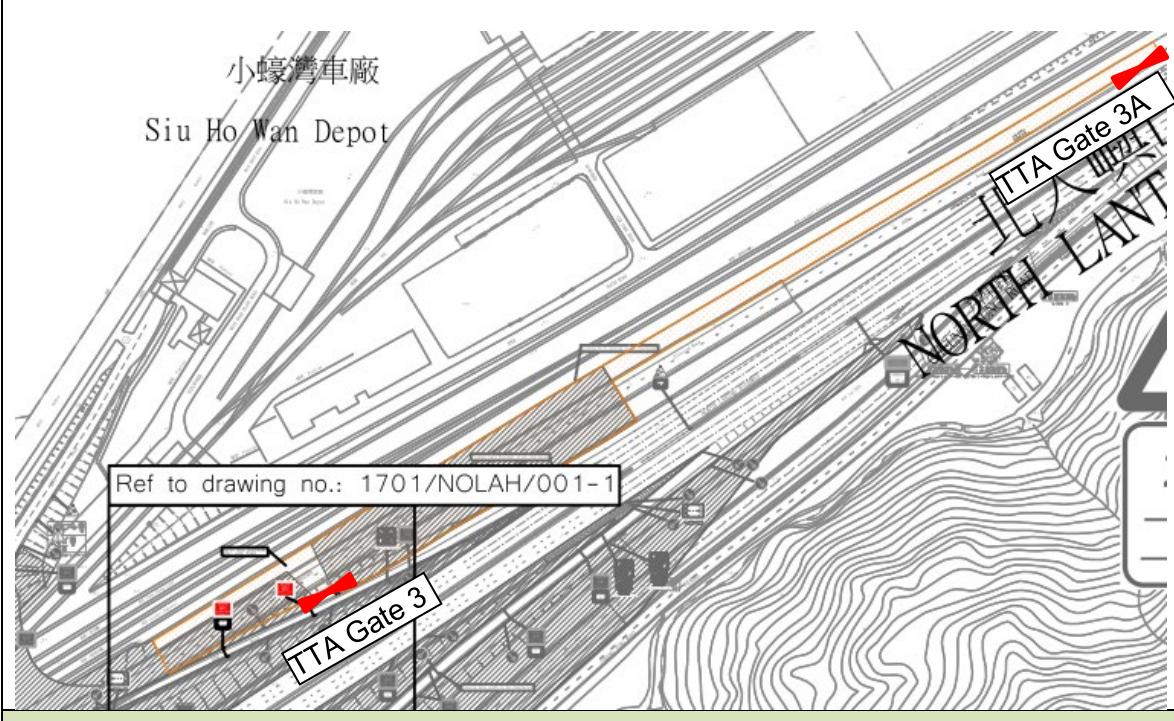
We propose to use on site mixing for the pile grouting due to the restricted space available at W2, the grouting station will be located at W11. There will be several grouting stations located at W11 with multiple storing tanks. Cement at the storing tanks/silo will be replenished by using a cement tanker truck through the hose from the refill truck. The grout station will be properly covered. There will be a separate grout pump connected to the grouting station to deliver the mixed grout. The grout pipe will be connected from the grout pump through the buried pipe under the test track and to the designated pile at W2 (Detail refer to separate MS and EDOC). The station will be delivered by flat lorry via the vehicular steel bridge and unloaded at W11. The detail of the pumping station shall refer to Appendix E.

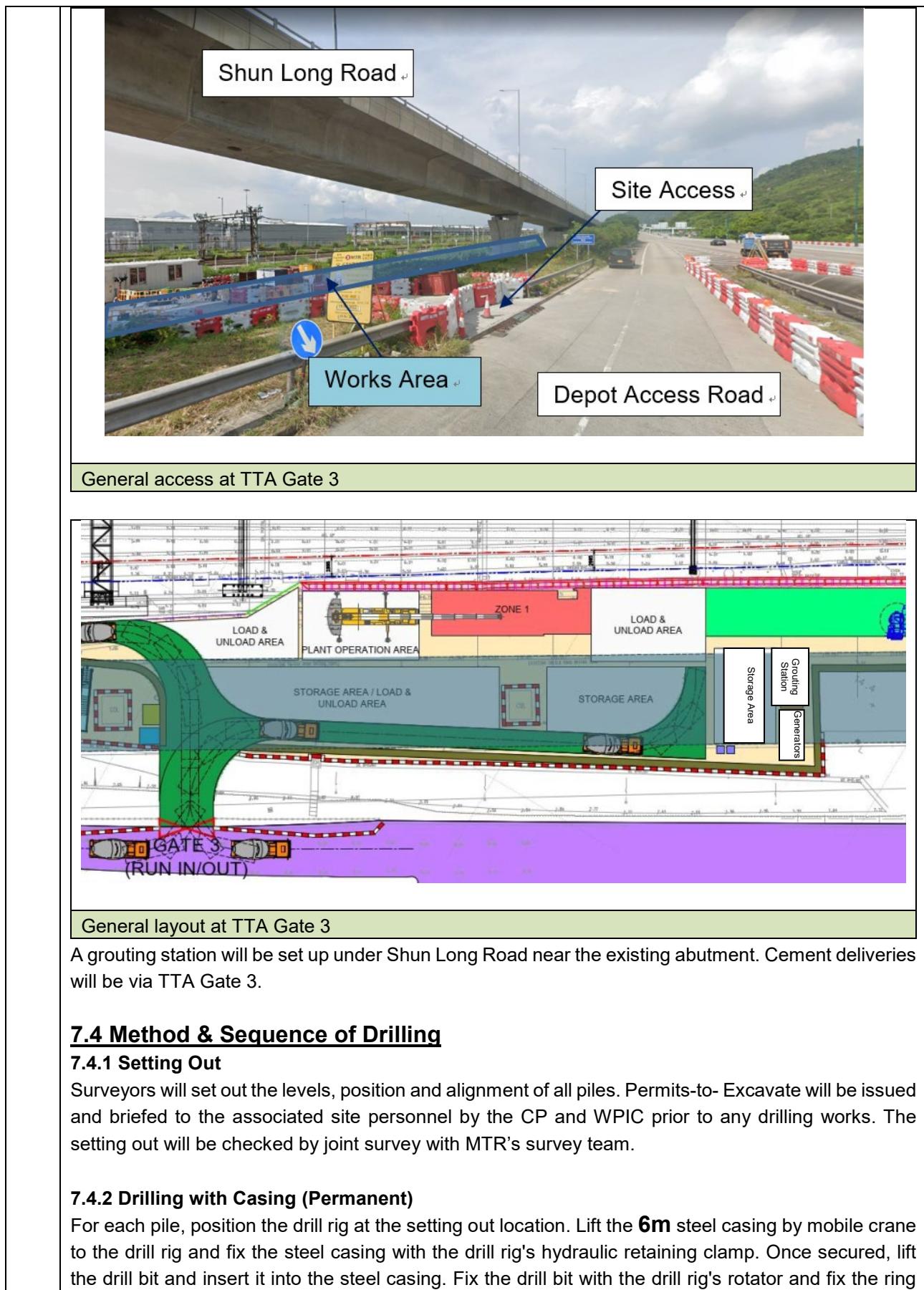


7.3 Construction Method/Sequence for W1

7.3.1 Logistics Arrangement: Labour & Plant Access through TTA Gate 3

On the South Side, there is an existing access gate (TTA Gate 3) from the slip road from the Tai Ho Interchange. An additional access gate (TTA Gate 3A) is proposed to be installed at the eastern end of Shun Long Slip Road for access and egress to the OHL portal and OYB- South construction areas.





7.4 Method & Sequence of Drilling

7.4.1 Setting Out

Surveyors will set out the levels, position and alignment of all piles. Permits-to-Excavate will be issued and briefed to the associated site personnel by the CP and WPIC prior to any drilling works. The setting out will be checked by joint survey with MTR's survey team.

7.4.2 Drilling with Casing (Permanent)

For each pile, position the drill rig at the setting out location. Lift the **6m** steel casing by mobile crane to the drill rig and fix the steel casing with the drill rig's hydraulic retaining clamp. Once secured, lift the drill bit and insert it into the steel casing. Fix the drill bit with the drill rig's rotator and fix the ring

bit to the drill bit and release the hydraulic retaining clamp. Check the verticality with the use of a spirit level in two perpendicular directions and adjust until vertical. Once complete and checked drilling may commence.

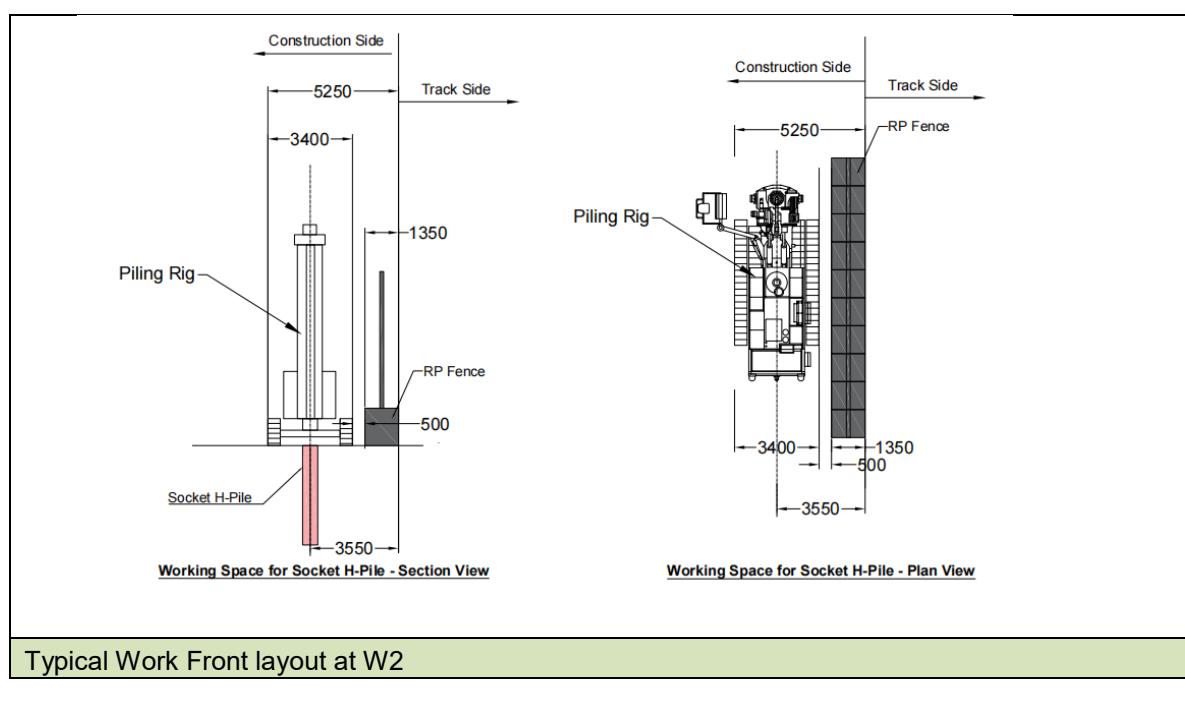
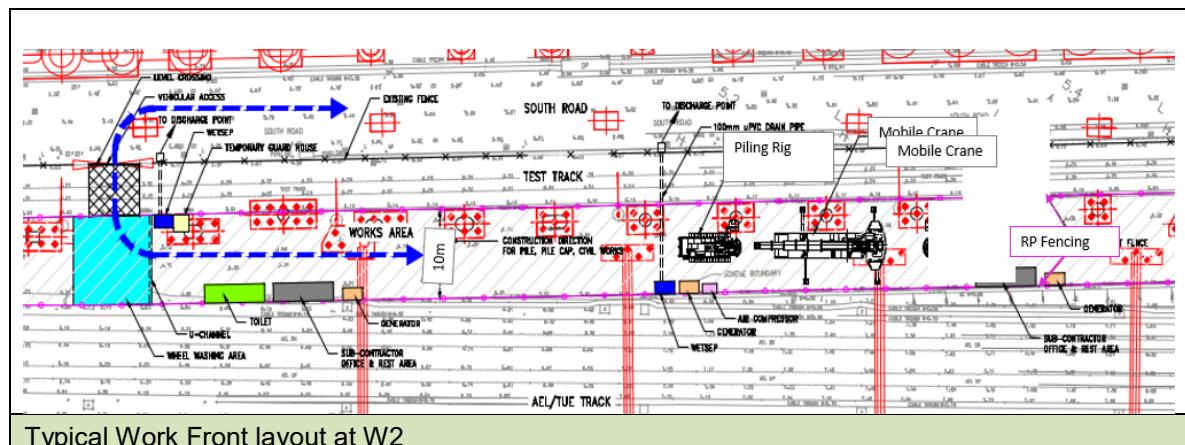
Each pile is drilled concurrently with the casing installation by using the ring bit method until the blockhead is reached. The verticality of the pile will be checked again once the first section of steel casing has been installed. Refer to Table 19.1 of the M&W Specification for the verticality tolerance. In accordance with the Project Specification, piles within 10m cannot be installed concurrently.

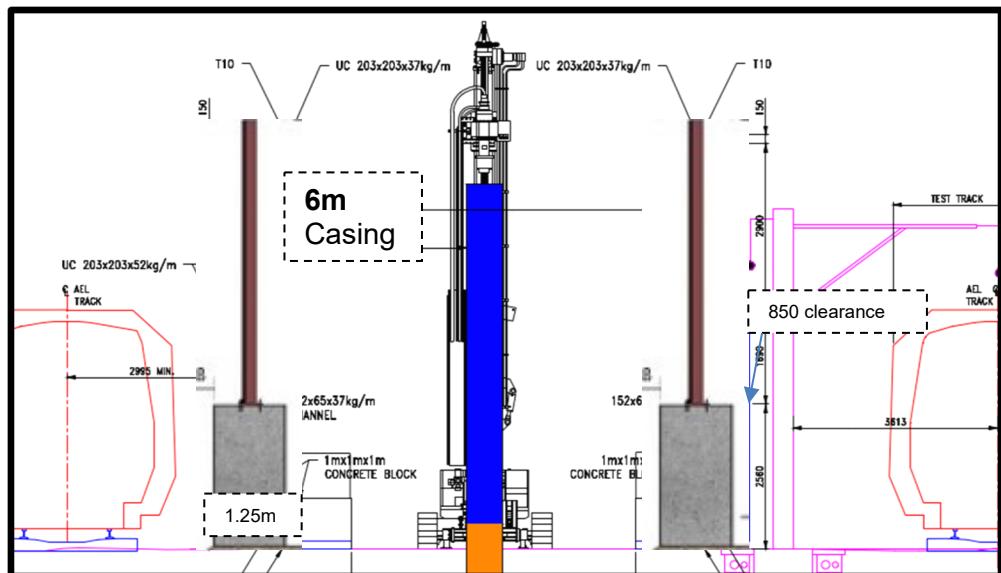
The RP fence structure is required to have sufficient clearance to the structural gauge which is a minimum of 2615 mm measured, from rail centreline, for the depot track and it is 2995 mm for the mainline. Refer to the RP fence method statement, submitted separately, for details.

Minimum Working Space for Socket H Pile along Track:

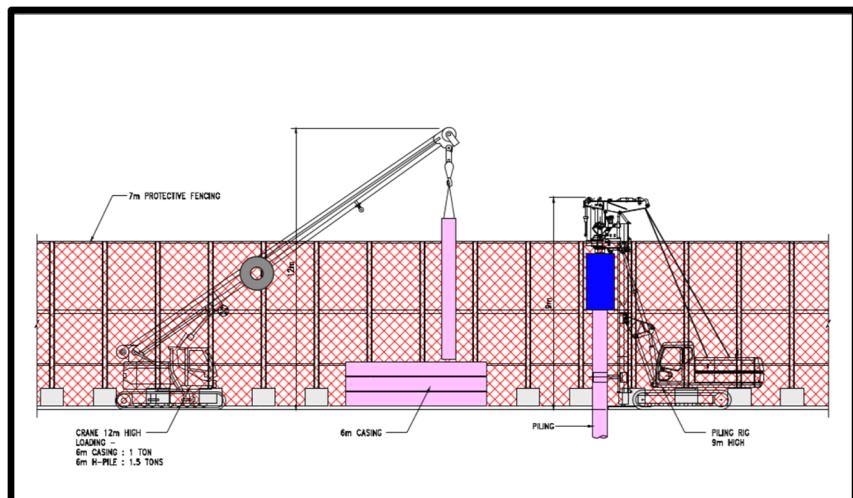
$$= 1.35\text{m} \text{ (width of RP fence footing)} + 0.5\text{m} \text{ (clearance)} + 1.7\text{m} \text{ (half width of piling rig)}$$

$$= 3.55\text{m}$$





General Section for 6m Casing Installation



If a pile is found to be out of tolerance, the casing will be extracted and re-drilled to the required position. If a pile is found within tolerance, the drilling will continue until reaching the required level. After reaching the required level, retract the drill rods and cover the top of the casing to prevent any object / body falling into the hole.

The drill bit shall not advance independently of the casing. During installation of the permanent casing, the drilling bit must be interlocked with the casing by the pilot bit and casing shoe as shown in the attached catalogue in Appendix D. Each segment of the steel casing are joined by butt-welding to form a continuous casing. During welding, a spirit level will be used to ensure the straightness of the joint between the 2 steel sections.

Upon the completion of permanent the casing installation, the volume of excavated material will be compared to the theoretical quantity to determine the extent of over break (if any). a procedure shall

be carried out to monitor the condition of over-break that the volume of drilled out soil will be measure and compare with the theoretical volume.

7.4.3 Rocket Socket Drilling

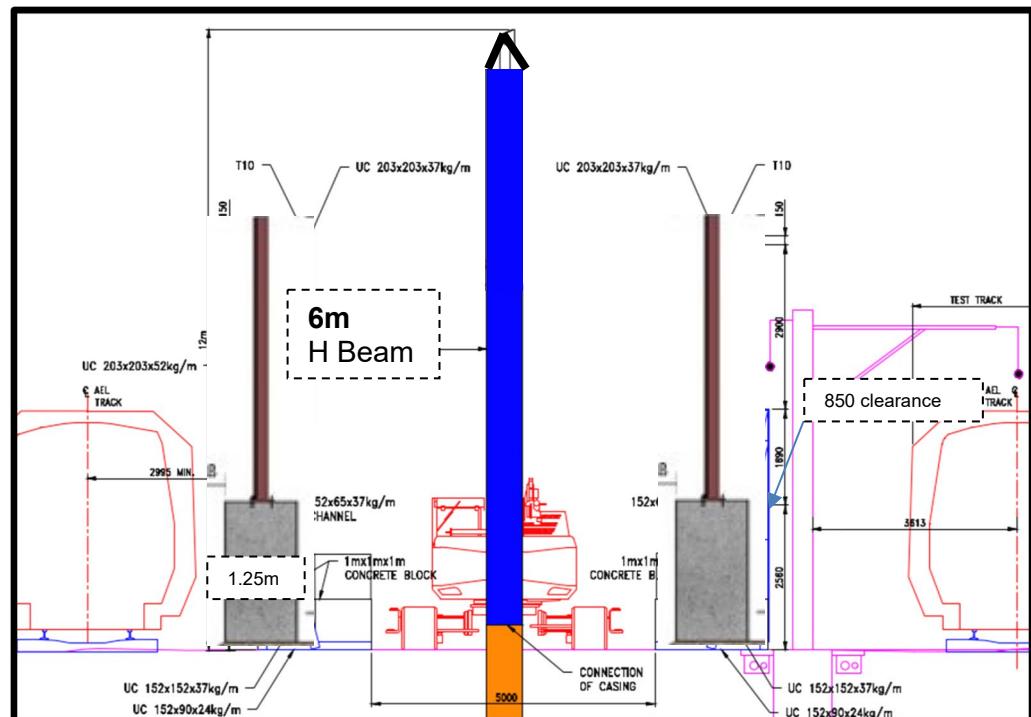
After completing the permanent left-in casing drilling to the required level, the "Down the Hole" method will be used to drill the specified 550mm diameter rock socket into grade III bedrock or better. The minimum length of rock socket shall be in accordance with the Contract drawings. The Engineer's Representative shall be informed to witness once the rock head level has been reached. Rock samples shall be collected for inspection by the Engineers representative.

7.4.4 Installation of Steel H Pile

After cleaning of the pile and prior to installation of the steel section, the MTR inspection team will be invited to check and verify the depth.

12m Steel H-pile sections (305x305x223 kg/m UBP) prefabricated will be lifted by mobile crane into the installed steel casing. The final length of the H-pile sections to be installed will be agreed with RP depending on the proximity of the pile to the nearest running rail. Temporary positioning plates shall be welding to the side of the H-pile prior to installation to support the pile once installed and allow welding of the subsequent H-pile section. The positioning plates shall be subject to a design and ICE check prior installation. After welding of the H-pile sections, splice plates and strengthening plates as shown on the contract drawings, shall be welded into position at each joint of the H-pile. This process will continue until the H-pile has been installed to the full depth of the pile. During welding, a spirit level will be used to ensure the straightness of the joint between the 2 steel sections. The welding procedure and welder certificates shall be submitted separately for approval to ensure all site welds meet the contract specification. All welds shall be subject to visual inspection and NDT testing in accordance with the M&W Specification. No welding on site is subjected to a hot works permit being issued in advance by CSHK.





General Section for 12m Casing Installation

7.4.5 Grouting

Cement grout mixed from the grout station will be pumped into the bottom level of each pile by tremie method through two 20mm grout pipes using the hydraulic pump until the required level has been reached. A grout of w/c ratio 0.4 is specified with a minimum strength of 30MPa at 28 days.

Grout Mix Ratio	
Cement	100kg
Water	40kg
Cebex	0.454kg

The length of the grout tube shall match with the depth of the hole to ensure the tube reaches the bottom of the hole prior to grouting. The grout tube is at all times submerged into the grout (i.e. at least 2m below the grout top level) within the drillhole, displacing any water as it rises. The grouting operation will cease once the confirmed grout top level has been verified by dipping method and a visual inspection completed.

Monitoring of the grout top level by dipping method will continue immediately after grouting has been completed to check for any grout loss due to soil movement or casing displacement, however as the casings are left in permanently this is considered unlikely. In the event that grout loss occurs, the grouting operation will resume to fill the void or replace the displaced material with cement grout. Withdraw the steel grout pipes.

Cement grout will be tested as follows:

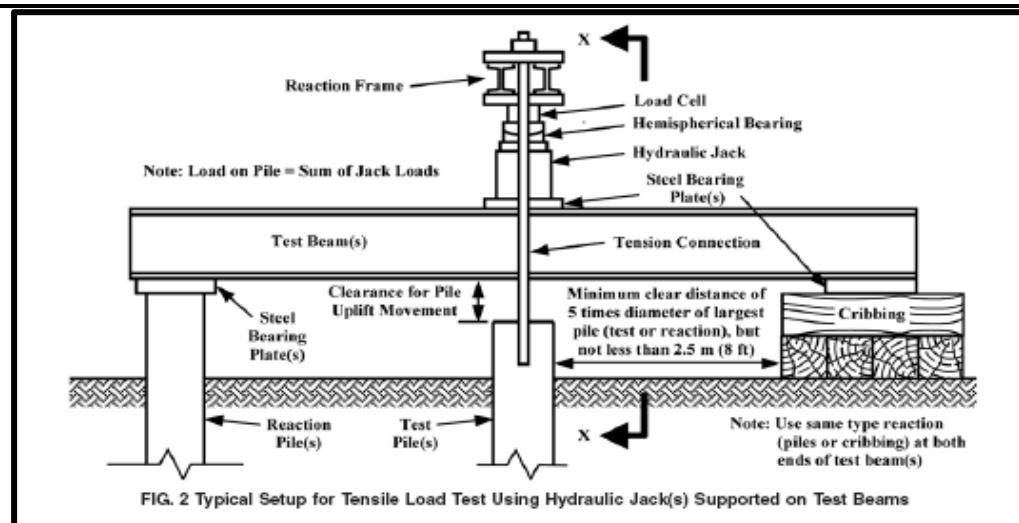
Flow Cone Efflux Test	Efflux time > 15 seconds
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Bleeding and Free Expansion Test	The max. amount of bleeding < 2% in first 3 hours and not exceed 4% in total The water must be reabsorbed by the grout within 24 hours after mixing.
Cube Crushing Strength Test	The min. characteristic strength of test cube shall be 30MPa at 28 days.

For the testing of pile loading, due to narrow site space (width from 7.5m to 10m approximately after 7m fence installation), the traditional kentledge setup which requires large area to install concrete block which is not feasible in this situation (Refer to the figure below). Therefore, we propose to use reaction pile method for testing. The location of pile will be selected by MTR or BD. Reaction pile will be installed and then conducted pile testing. Refer to figure below for the testing set up.



Detail of Reaction Pile Method for Loading Test



Detail of Reaction Pile Method for Loading Test

8. Safety (Risk Assessments)

A Risk Assessment is attached in Appendix A which has been prepared for all activities. The specific safety procedures and precautions have been developed for all site operatives to follow. The Construction Manager, together with the RSO, will supervise the implementation and make adjustment according where necessary to the actual site operations, in order to maintain a safe and amicable working environment.

Smoking Arrangement

- All workers should possess the qualification Railway Safety training (RSI), and can only smoke at the designated smoking area provided by CSHK.

9. Environmental (Environmental aspect & impact identification as well as mitigation measures)

- Works will be carried out during normal hours from 08:00 am to 07:00 pm. If necessary, works may need be carried out after 07:00 pm on Monday to Sunday with an approved construction noise permit.
- ULSD Diesel will be used in all PME;
- Plant with QPME label will be employed if available;
- Only regulated NRMM with approved NRMM label to be used on site.
- All chemicals will be placed on a drip tray;
- Any wastewater produced during the work will be treated prior to disposal;
- The works shall follow relevant mitigation measures as required under the Environmental Permit (EP) / EP submission and Contractor's Environmental Management Plan (EMP).
-

10. Quality Control (Inspection and Test Plan including hold points)

Refer to Appendix B for Inspection and Test Plan.

To ensure the attainment of the required standard of works, the methods of working and the required works standards / acceptance criteria are defined in the method statement **and** inspection & test plans



	<p>which are communicated to relevant staff and workers carrying out the works. Day to day routine inspections of the works will be carried out by the Construction Team Leader, Site Engineers and Foreman as appropriate, to ensure that all works are performed following the requirements of these documents.</p> <p>Specific quality checks shall be carried out in accordance with the approved Inspection & Test Plan with "Hold Points" at critical elements for confirmation of compliance before proceeding further.</p> <p>Request for Inspection and Survey Check (RISC) shall be issued to the MTR inspection team following inspection of the works by the CSHK's project team. The Inspection & Test Plan for the works (Appendix B) will identify all Hold Points and Witness Points.</p> <p>Following the Inspection & Test carried out, inspection and / or test records are to be prepared to indicate whether the specified requirements have been met. Records of Inspection and testing will be maintained and kept available for inspection and final handover as appropriate.</p>
11.	Appendices (Identify and include additional information in the submission package)
	Appendix A – Risk Assessment Appendix B – Inspection and Test Plan (ITP) Appendix C – Drawing Appendix D – Plant Catalogue Appendix E – Emergency Contact List

