

1 Dec 2022

Dear Industry Professionals,

REQUIREMENT TO INSTALL GPS-ENABLED DEVICES ON SOIL INVESTIGATION AND BORING/PILING RIGS WORKING WITHIN THE CORRIDOR OF CRITICAL PUBLIC SEWERS/WATER PIPES

1. PUB operates an extensive network of public sewers and water pipes, that include the **Deep Tunnel Sewerage System (DTSS) tunnel**, more than 340km of **large sewers (i.e. sewers of diameter \geq 900mm)**, and 1,290km of **transmission water pipes (i.e. water pipes of diameter \geq 700mm) [collectively known as "critical pipelines"]**. The critical pipelines serve a significant proportion of our population, and if damaged, could cause widespread public health risks, service disruption and prolonged inconvenience to the public. The critical pipelines would also be costly to repair. Hence, PUB hope to work with the built industry to further reduce the likelihood of damage to the critical pipelines.

2. Currently, the built industry is required to seek approval from PUB via the Protection of Water Pipes and Sewers (POWS) portal (<https://bpu.pub.gov.sg/pows>), and implement sewer/water pipe protection measures before carrying out any specified activity¹ within the corridor of any public sewer/water pipe² (See **Annex 1**). Notwithstanding, there have been near-misses and damages to our critical pipelines and with the expected recovery in construction activities, we can expect increasingly deeper and more complex underground works that will continue to pose significant risks to our sewers and pipelines. To enhance the protection of the critical pipelines, PUB has developed a virtual geofence of the DTSS tunnel, large sewers, and transmission water pipes.

3. Soil investigation (SI) and boring/piling works are specified activities with high risk of damaging the critical pipelines. Hence, in addition to the existing pipeline protection measures, Contractors carrying out **SI and boring/piling works within the corridor of DTSS tunnel, large sewers and transmission water pipes** will be required to install GPS-enabled devices on the rig(s) and connect the devices to PUB's geofencing system before the commencement of the works. This requirement will be imposed on **new POWS application submitted from 1 Jan 2023 onwards**, and the proposed plan submitted to PUB will have to include such protection measure.

4. Contractors are allowed to choose a GPS-enabled device supplier of their choice but are responsible for ensuring the GPS-enabled device remains fitted on the

¹ Specified activity refer to any subsurface/underground works which could potentially affect the public sewers and water pipes. This includes activities such as but not limited to earthwork for site formation, excavation more than 0.5m deep, soil investigation, boring/piling, soil improvement, tunnelling/pipejacking, and erection of temporary/permanent structures.

² The corridor is the land/space bounded by 2 vertical plans through which the sewer/water pipe runs – 40m on either side from centreline of the DTSS/tunnelled water pipes; 20m on either side from centreline of a sewer/water pipe with diameter \geq 900mm; 10m on either side from centerline of a sewer/water pipe with diameter < 900 mm.

rig, is in working order and is continuously connected to PUB's geofencing system throughout the period whereby the rig is mobilised onsite. Contractors may also refer to **Annex 2** on list of GPS-enabled devices tested to be compatible with PUB's geofencing system. This will provide both PUB and contractors timely alerts should the rigs move too close to the pipe/tunnel and enable all parties to intervene before deep underground works occur to damage our pipelines.

5. The key actions required from contractors are summarised in **Annex 3**.
6. Should you require any clarification on the new requirement, please contact my colleagues at KHONG Hui Shan@pub.gov.sg and LIEW Jia Yan@pub.gov.sg.

Yours faithfully,



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Annex 1 – Corridor and Setback Zones for DTSS tunnel, Transmission Water Pipes and Large Sewers

Type of Pipe	Setback Zone	Corridor Zone
	Distance from pipe center	Distance from pipe center
Transmission water pipe of diameter $\geq 0.7\text{m}$ to 0.9m	0.5D + 2.5m	10m
Large sewer of diameter $\geq 0.9\text{m}$ to 1.5m		20m
Transmission water pipe of diameter $\geq 0.9\text{m}$ to 1.5m	0.5D + 3m	
Large sewer of diameter $> 1.5\text{m}$ to 2.5m		
Transmission water pipe of diameter $\geq 1.5\text{m}$ to 2.2m		
Large sewer of diameter $> 2.5\text{m}$	0.5D + 4m	
Transmission water pipe of diameter $> 2.2\text{m}$		
Tunnelled Water Pipes	0.5D + 6m	40m
DTSS tunnel		

Note: D stands for pipe diameter.

Annex 2 – List of GPS-Enabled Devices Compatible with PUB's Geofencing System

Model	Location Accuracy	Installation Fee*	Device Price*		Other Fees*	Supplier
			Rent	Buy		
rEye Track - RTK	0.5m - 2.5m	NA	S\$150 / month (min 6 months) S\$120 / month (min 12 months)	NA	NA	SpaceAge Labs Email: info@spaceagelabs.com.sg Tel: 8503 4824
rEye Track – no RTK	2.5m – 10m	NA	S\$60 / month (min 12 months)	NA	NA	Cutech Group Email: enquiry@cutechgroup.com Tel: 6665 0187
cuteTrac Personal Tracker CT-07W with power bank	2.5m – 10m	S\$100	NA	S\$400	S\$20 / month	
Model FMC125 with external power supply option	2.5m – 10m	S\$100	NA	S\$400	S\$20 / month	
Cartrack Cat4	2.5m - 10m	NA	S\$160 / month (min 36 months)	NA	NA	Cartrack Email: hello.sg@cartrack.com Tel: 6255 4151

*Prices/fees are indicative only. Contractors shall liaise directly with the GPS device supplier to obtain exact prices/fees.

Annex 3 – Summary of Key Actions Required of Contractors

A. During POWS application submission stage

- QPs/Contractors to indicate in the proposed plan submitted for POWS application (for SI, boring/piling works) that the sewer/water pipe protection measures to be implemented include the installation of GPS-enabled device on any rig mobilised to carry out SI/boring/piling works within the sewer/water pipe corridor, and that the device will be connected to PUB's geofencing system throughout the period whereby the rig is mobilised on site.

B. After receiving POWS approval and before commencing works

- Contractors to rent/procure GPS-enabled device from the supplier of their choice. PUB will also provide the industry with a list of compatible GPS-enabled device brands (and tech specifications).
- Contractors to contact PUB at least three working days in advance to schedule for inspection to verify that the GPS-enabled device has been installed on the rig, has a back-up battery, and is able to connect to PUB's geofencing system.

C. During works

- Contractors to conduct regular checks that GPS-enabled device remain fitted on rig and is functioning. Contractors shall inform PUB if there is any issue with the device and/or its GPS data transmission.

D. After completion of works

- Contractors to notify PUB to disconnect the GPS-enabled device from PUB's geofencing system.

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