

**LOCAL VESSELS ADVISORY COMMITTEE
PILOTAGE ADVISORY COMMITTEE**

**Deployment of Real-time Hydrographic and Water Quality Monitoring
Station in Southeast Lamma Waters**

Purpose

Members are invited to note the Annex containing a paper issued by the Environmental Protection Department concerning the captioned matter.

**Marine Department
April 2025**

Annex

Deployment of Real-time Hydrographic and Water Quality Monitoring Station in Southeast Lamma Waters

Purpose

Members are invited to note the details of the deployment of a real-time hydrographic monitoring station in southeast Lamma waters as set out in this information paper.

Background

2. To enhance the government's capability in water quality management, the Environmental Protection Department (EPD) conducted a 1-year pilot scheme with a scientific buoy installed in the southeast Lamma waters in 2024. The scientific buoy monitors the hydrographic and water quality conditions there, from which valuable reference information can be obtained to better understand the water quality variation in relationship to interaction with open waters in the South China Sea.

3. The 1-year pilot scheme shall be successfully completed by late March 2025 demonstrating that the monitoring system could operate well and achieves the expected results in respect of its monitoring function, maintenance and operational marine safety. It played an important role in regional marine environmental monitoring for Hong Kong waters. Data obtained from the system has been used to support EPD's development of near real-time hydrodynamic and pollutant transport modelling.

Proposal

4. To continue on supporting the development and long term validation of the near real-time hydrodynamic and pollutant transport modelling, and to maintain the real time monitoring in the area, EPD propose to continue the deployment of the scientific buoy in southeast Lamma waters. However, to facilitate port development in future, the scientific buoy will be relocated from the existing location (22°11.500' N 114°9.616') northwestward to within waters of Tung O Wan (22°11.926' N 114°9.362' E) (**Appendix A**).

5. The concerned scientific buoy comprises three main components including scientific instruments for measurement and sensing; communication and data transmitting equipment; and a power unit to harness and store solar energy. The system is self-contained and running automatically to conduct real-time monitoring of hydrographic and water quality conditions. No discharge will be generated during the operation of monitoring system as all the analyses will be carried out acoustically and optically with no chemical reaction involved. The performance of the buoy will be closely monitored via remote terminals and mobile phones. Maintenance will be conducted routinely in a monthly to bimonthly period, or with additional maintenance when necessary.

6. The sensing instruments installed on the scientific buoy include an Acoustic Doppler Current Profiler (ADCP) for measurement of sea current and wave; two multiparameter water quality sensors for monitoring the water quality and physical properties of sea water; and a camera module for capturing the conditions of the surrounding environment (**Appendix B**).

7. The scientific buoy is designed with a diameter around 3m and focal height around 3.7m (**Appendix C**). Safety features include lights, top mark, signs, radar reflector and automatic identification system. The scientific buoy is designed in compliance with the specifications and requirements of the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) Guideline No. 1099 on the Hydrostatic design of buoys (Edition 1 May 2013) published by the IALA. According to the Navguide 2018 Marine Aids to Navigation Manual (8th Edition) published by the IALA, the minimum length of mooring chains should be at least two times of the water depth. For the water depth of about 20m, two mooring chains each of about 50m long will be connected to two 12.5 tonne concrete block sinker for anchoring the scientific buoy. The particulars of the scientific buoy are as follows:

Name	: EPD-4
Position (WGS 84 Datum)	: 22°11.926' N 114°9.362' E
Shape	: Pillar
Colour	: Yellow
Light Characteristics	: Fl (5) Y.20s
Top Mark	: Yellow “X”
Radar Reflector	: Fitted
Automatic Identification System	: Fitted

8. The position of the scientific buoy will be monitored by on-board GPS device in real time. For any drift of the buoy more than 60m from its original position, the maintenance contractor will perform inspection and relocate the buoy back to its original position within 1 day if the weather allows.

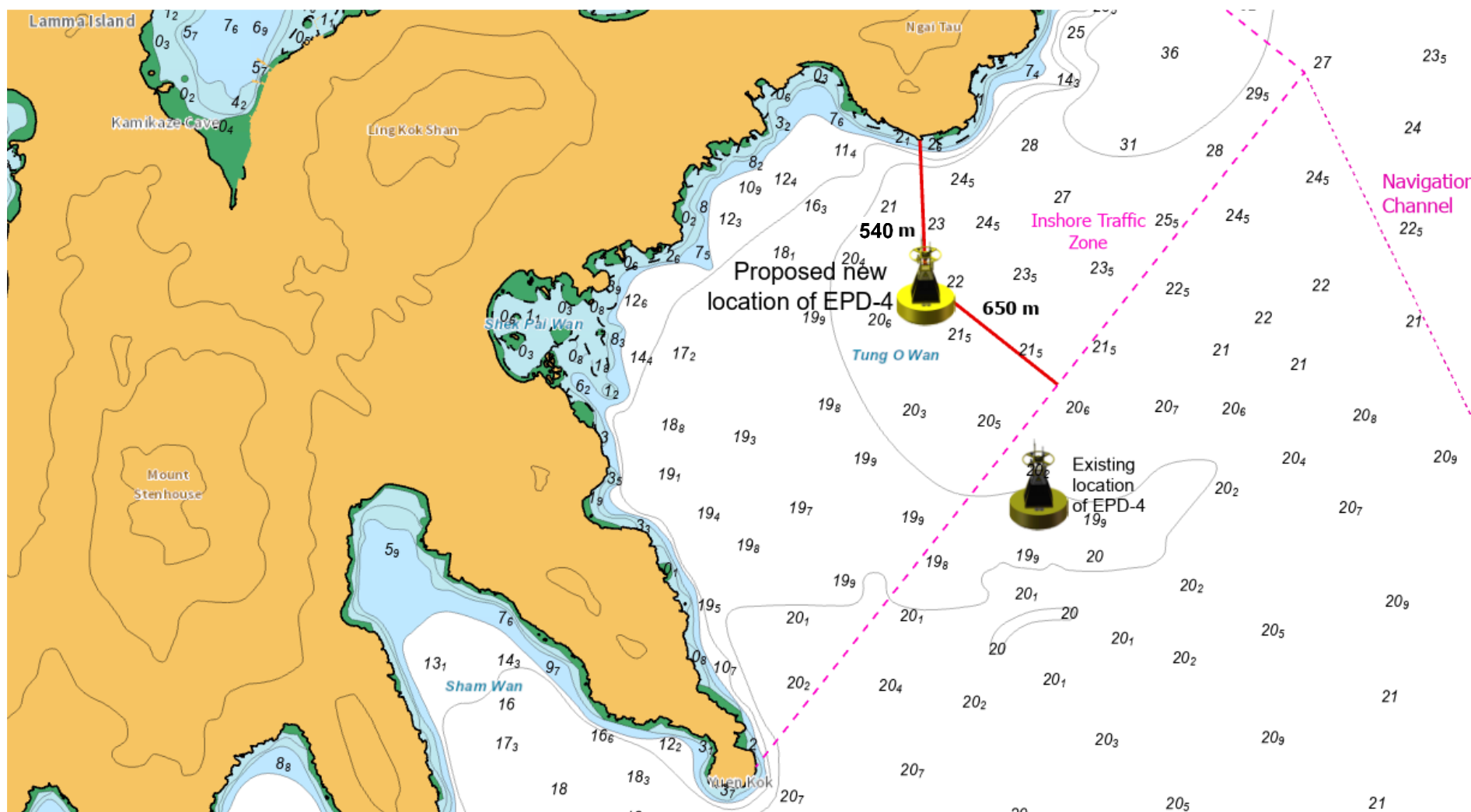
9. In view of the practical value of the system for monitoring and modelling of the hydrological and water quality conditions, we plan to set up the concerned system for long-term operation at the above location.

Way Forward

10. Members are invited to note the details of the proposal described in paragraphs 4 to 9 above. In case of any enquiry on the related matters, please contact Dr. WONG Tse Man, Ken of EPD by phone at 2594 6542, or by email: kentmwong@epd.gov.hk. For matters regarding the 24 hours maintenance of the scientific buoy, please contact Mr. CHAN Lawrence of Dragon Knight Technology Company Limited by phone at 9872 9175.

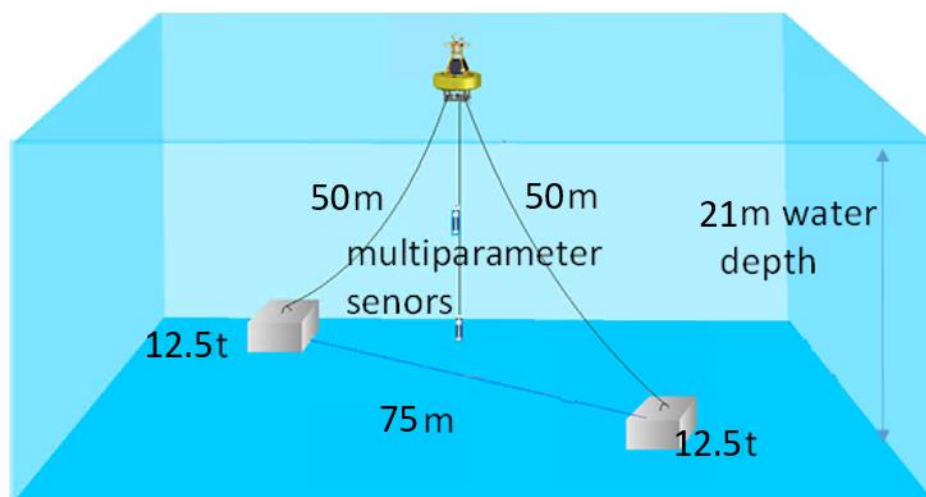
Water Quality Management Group
Environmental Protection Department
March 2025

New location of the real-time hydrographic and water quality monitoring station



Position: 22° 11.926' N 114° 9.362' E (WGS 84 Datum)

Schematic diagram of real-time hydrographic and water quality monitoring station deployment



Appendix C

The design of the scientific buoy

