

LOCAL VESSELS ADVISORY COMMITTEE

**Deployment of Real-time Wave Monitoring Station
in the Waters West of Lantau Island, near to Wong Fa Pai**

Purpose

Members are invited to refer to the **Annex** for perusal of a paper concerning the captioned matter, and to submit any comments on the paper, if any, by replying to the Secretariat on or before 13 January 2023.

Marine Department
30 December 2022

Deployment of Real-time Wave Monitoring Station in West Lantau Island Waters near Wong Fa Pai

Purpose

Members are invited to note the details of the deployment of a real-time wave monitoring station in west Lantau Island waters near Wong Fa Pai as set out in this information paper.

Background

2. To enhance the government's capability in wave monitoring system in Hong Kong waters, Civil Engineering and Development Department (CEDD) plans to install a real-time wave monitoring station in the west Lantau Island waters near Wong Fa Pai to monitor the hydrodynamic conditions there, from which valuable reference information can be obtained to better understand how waves behave in calm and stormy weather conditions within Hong Kong to cope with the challenges of extreme weather due to climate change and the pace of infrastructural development in Hong Kong waters.

3. CEDD will launch the scheme tentatively in the first quarter of 2023 to deploy a real-time wave monitoring station mounted inside a new tailor-made Trawl Resistance Bottom Mount (TRBM) with height of about 0.63m in west Lantau Island waters near Wong Fa Pai to measure wave (including spectral significant wave height, maximum recorded wave height, peak wave period, zero crossing wave period, mean wave direction and average water depth). Data obtained from the system will be used to provide important information for planning and design of marine structures/works which are crucial to protect lives and properties along the coastline.

Proposal

4. The proposed real-time wave monitoring station in the form of underwater bottom mount will be placed at 22°14.215' N 113°50.016' E,

which is about 891m from the shoreline of Kai Kung Shan of west Lantau Island and about 423m away from the nearest submarine cables at the west. The proposed location and the schematic diagram of the real-time wave monitoring station are shown in **Appendices A and B**.

5. The proposed real-time wave monitoring station comprises three main components including an Acoustic Doppler Current Profiler (ADCP) deployed on the sea-bed for measurement of wave and current data, a special mark buoy with a modem for transmission of wave and current data, and an office server for storage of wave and current data. The system is self-contained and running automatically to conduct real-time monitoring of hydrodynamic conditions. No discharge will be generated during the operation of monitoring system as the analyses will be carried out acoustically and optically with no chemical reaction involved. The performance of the ADCP will be closely monitored via remote terminals. During the early phase of deployment, more frequent inspections (up to once per week) may be arranged if necessary. Afterwards, routine maintenance needs to be conducted on a quarterly basis.

6. The special mark buoy is designed with a diameter of 3m and focal height of 4.15m (**Appendix C**). Safety features include lights, top mark, signs, radar reflector and automatic identification system. The special mark buoy will be equipped with a modem, internal batteries and solar panels. The special mark 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 Naviguide 2018 Marine Aids to Navigation Manual (8th Edition) published by the IALA, the minimum length of mooring chain should be two times of the water depth. For the water depth of about 20m, two mooring chains with each length of about 40m will be connected to two 10 tonnes concrete block sinkers separately for anchoring the special mark buoy. The particulars of the special mark buoy are as follows:

Name	: PWWHK
Position (WGS 84 Datum)	: 22°14.215' N 113°50.016' E
Shape	: Pillar
Colour	: Yellow
Light Characteristics	: Fl (5)Y.20s
Top Mark	: Yellow “X”
Radar Reflector	: Fitted
Automatic Identification System	: Fitted

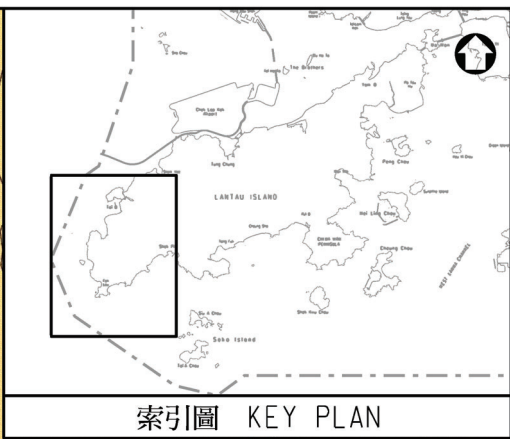
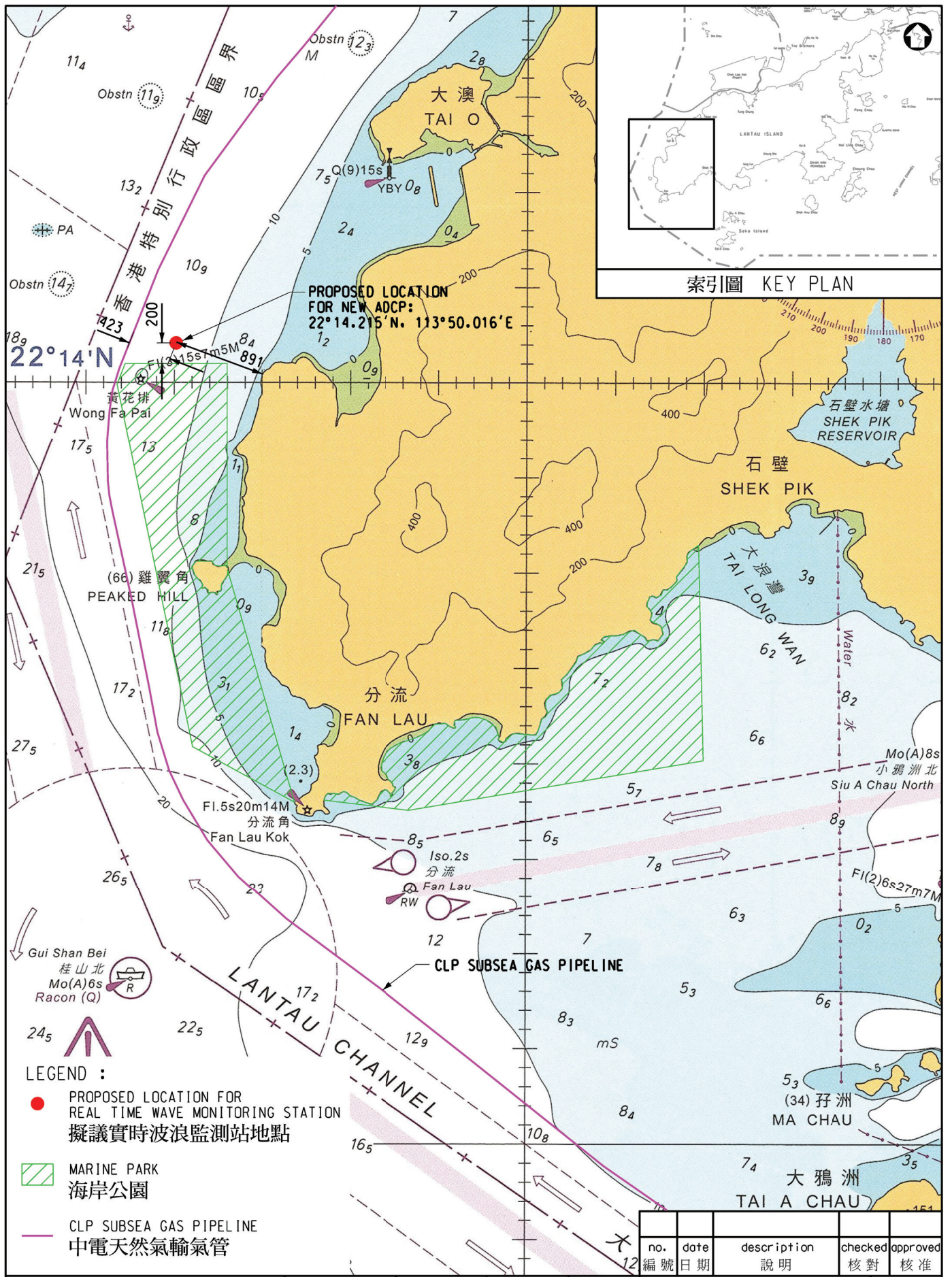
7. The position of the scientific buoy will be monitored by on-board GPS device in real time. For any drift of the buoy more than 60m from its original position, the contractor will perform inspection and relocate the buoy back to its original position within 1 day if the weather allows. Upon completion of the 1-year trial run, it is proposed that the real-time wave monitoring station will continuously be deployed at the west Lantau Island for measurement of wave and current.

Way Forward

8. CEDD will liaise with the Marine Department for the installation of the scientific buoy in west Lantau Island.

9. Members are invited to note the details of the proposal described in paragraphs 4 to 8 above. In case of any enquiry on the related matters, please contact Mr. WONG Hiu-dan of CEDD by phone at 2762 5553, or by email: hdwong@cedd.gov.hk.

Port Works Division
Civil Engineering and Development Department
December 2022



title 名稱
PROPOSED LOCATION FOR REAL TIME WAVE MONITORING STATION
 擬議實時波浪監測站地點

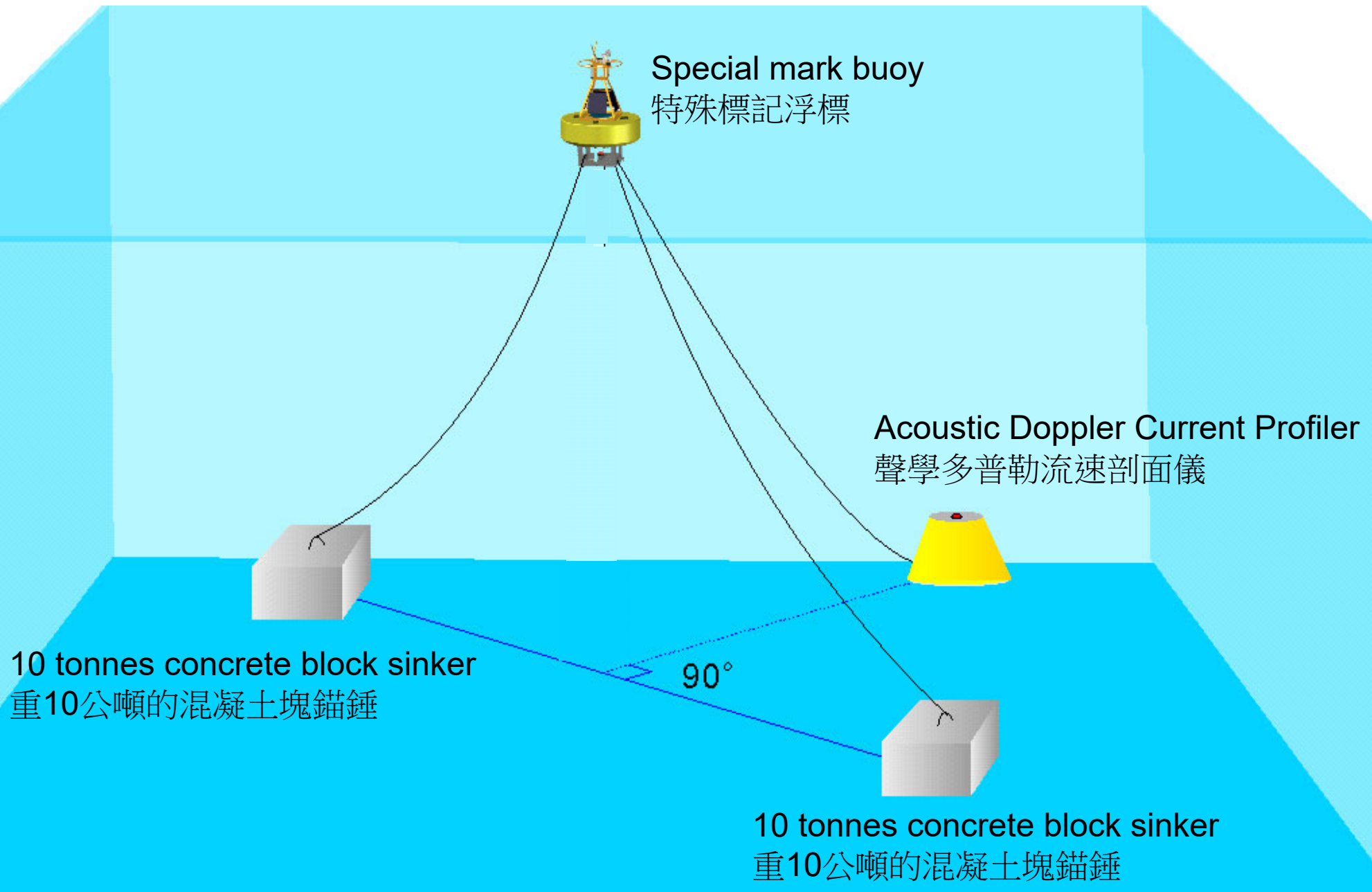
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drawn 繪畫	F. T. FAN		14/12/2022
checked 核對			
approved 核准			
office	PORT WORKS DIVISION 海港工程處 CIVIL ENGINEERING OFFICE 土木工程處		

no. 編號	date 日期	description 說明	checked 核對	approved 核准
drawing no. 圖則編號		Appendix A 附錄A		
		scale 比例	1:50 000	
office		CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT 土木工程拓展署		

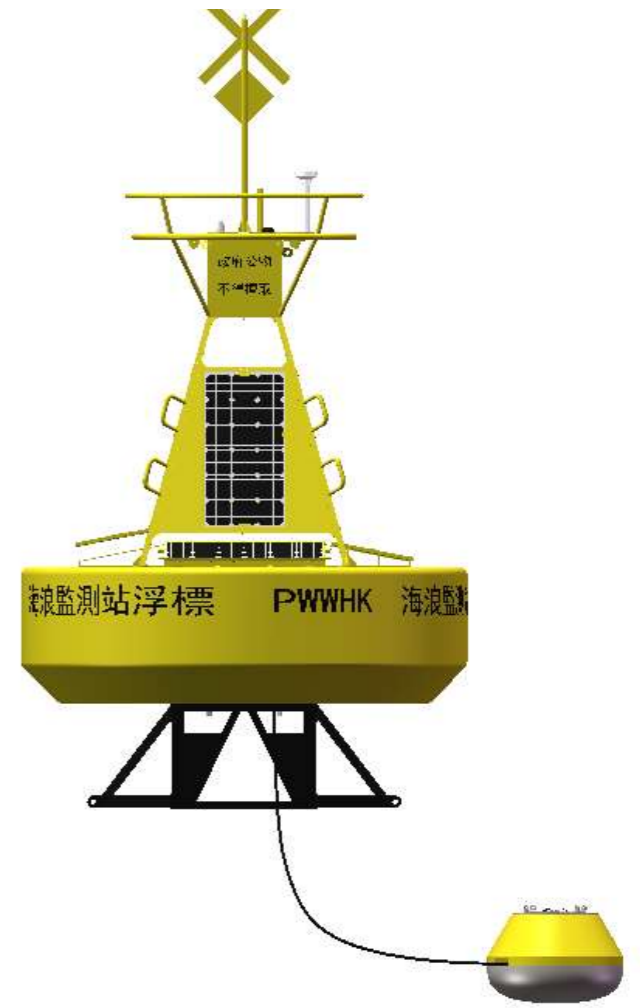
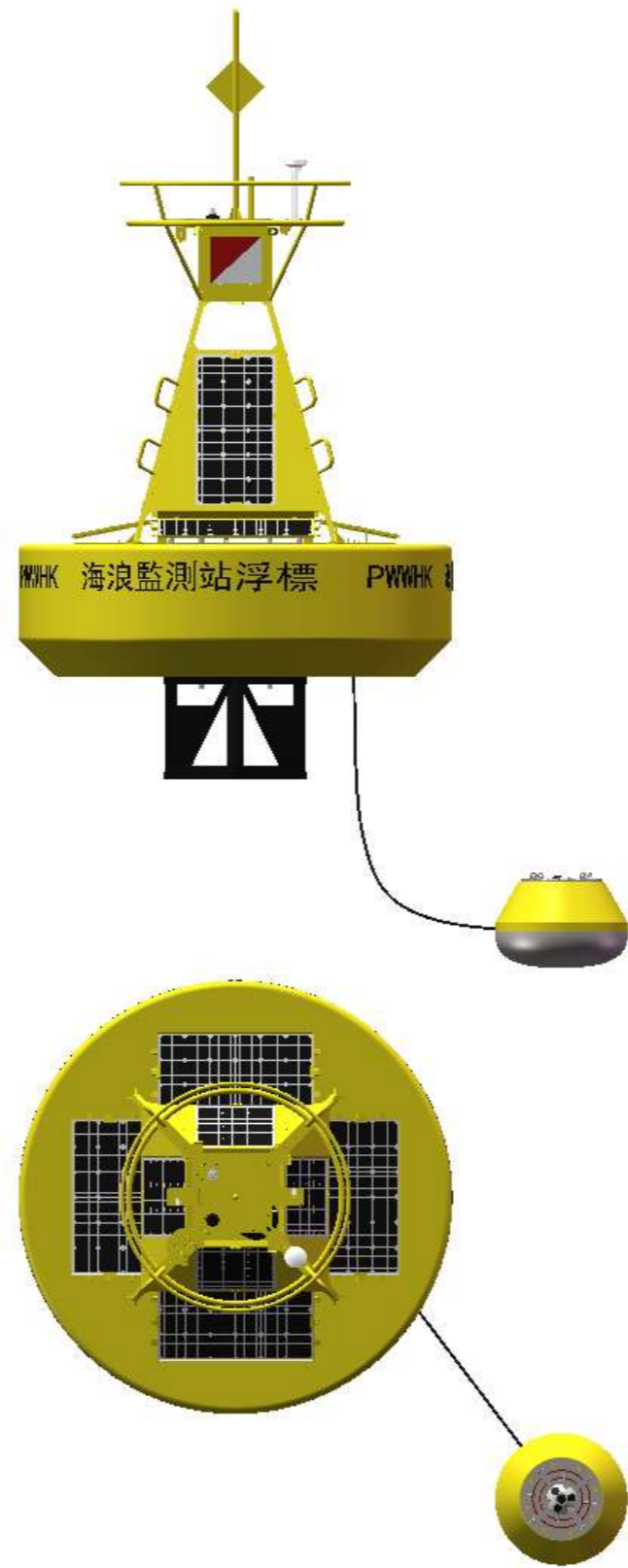
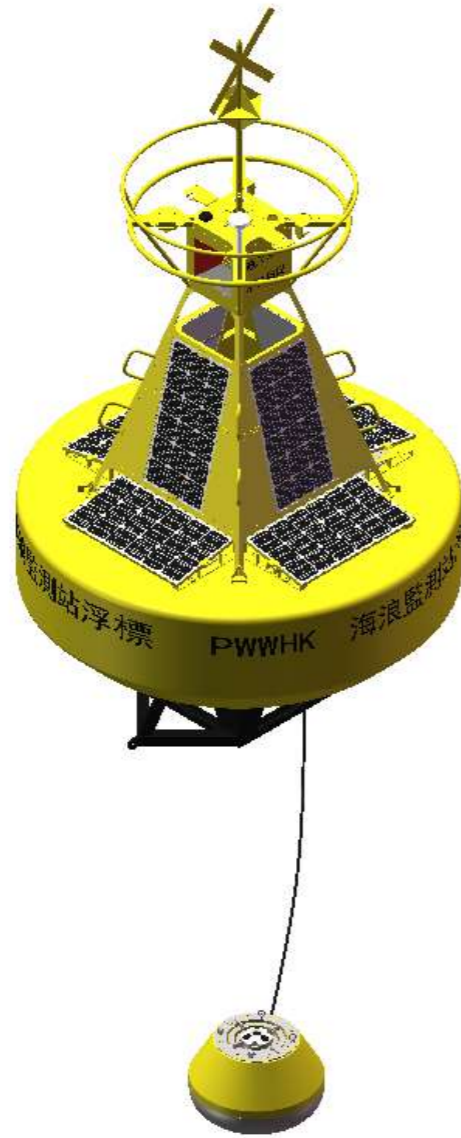
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Appendix B – Schematic Diagram of Real-time Wave Monitoring Station

附錄B – 實時波浪監測站示意圖

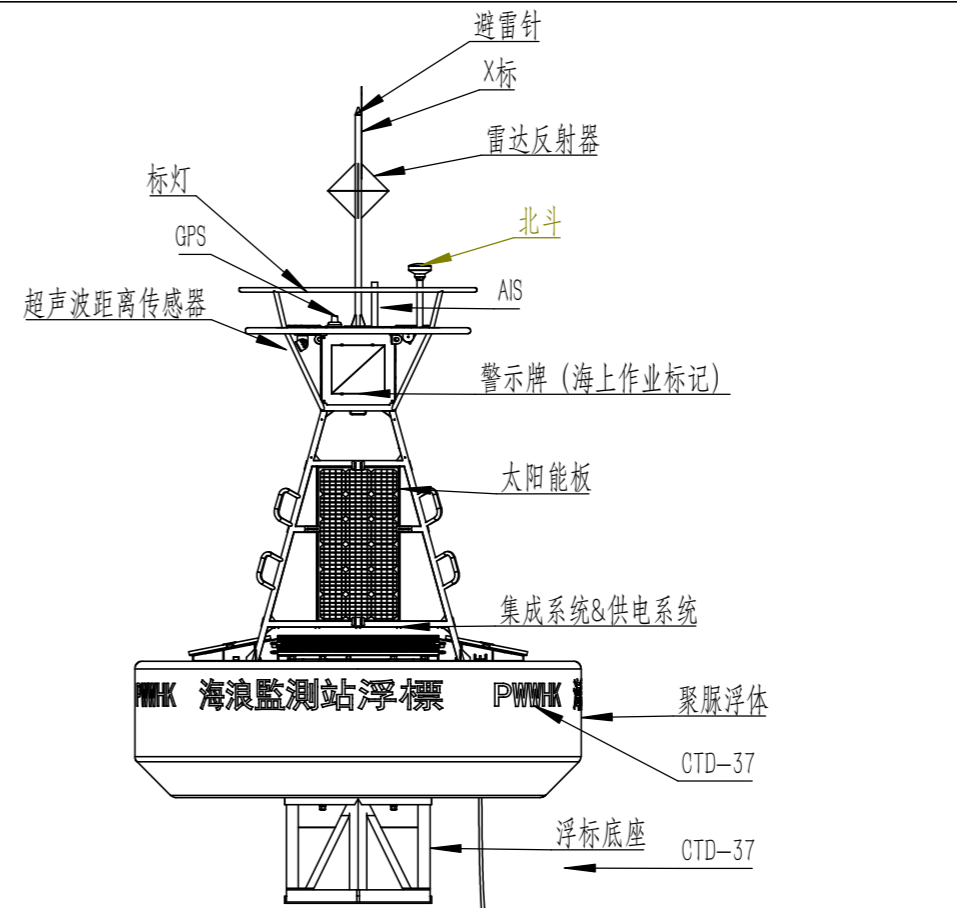
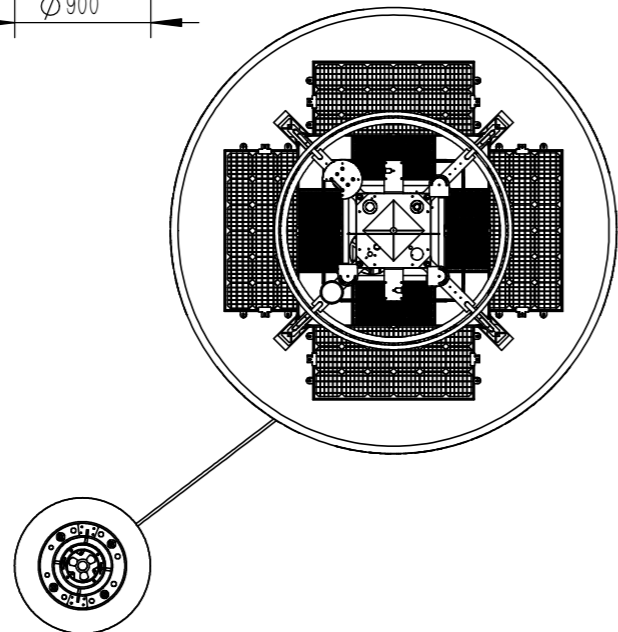
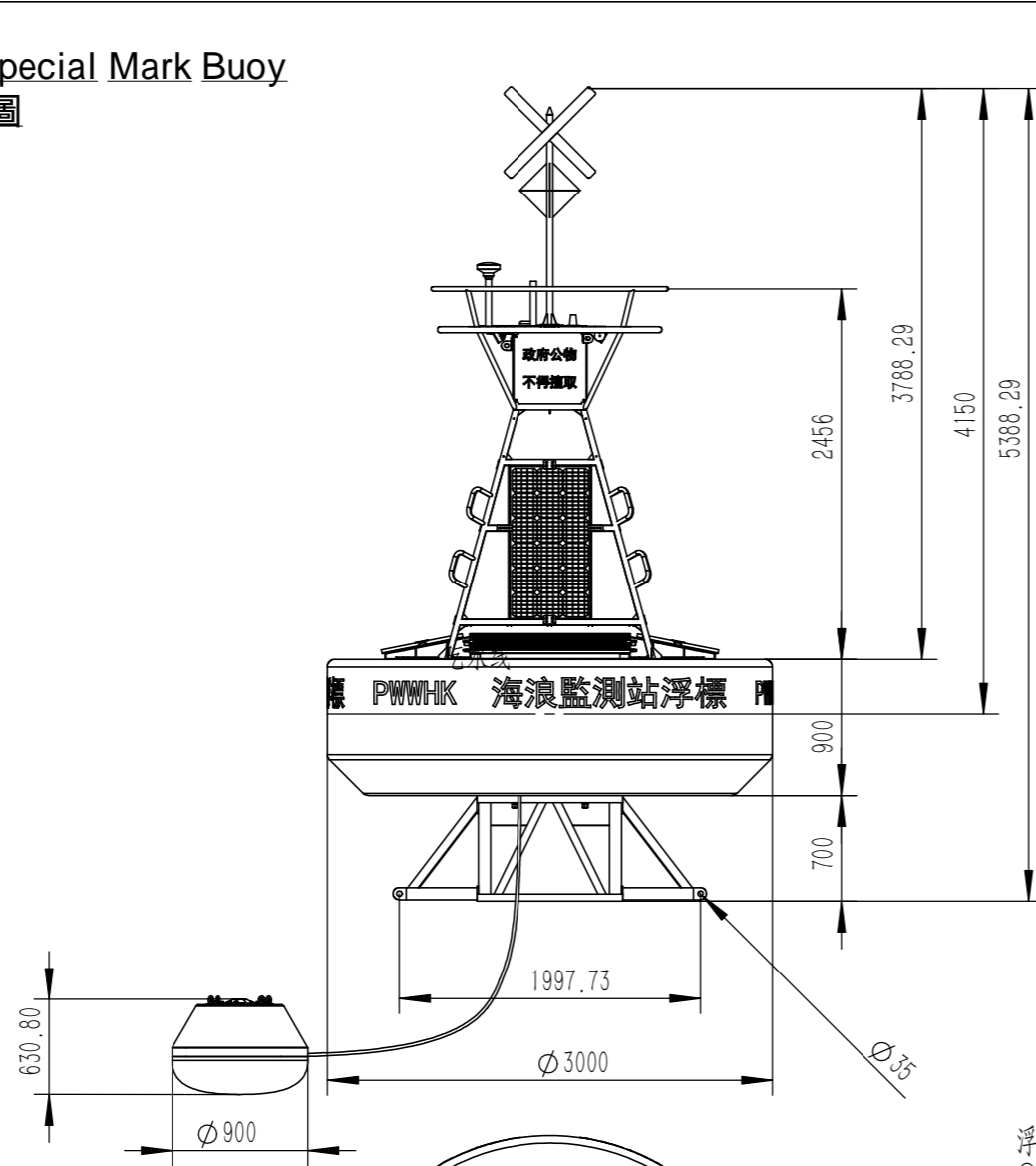


Appendix C - Drawing for Special Mark Buoy
附錄 C - 特殊標記浮標設計圖



Appendix C - Drawing for Special Mark Buoy

附錄 C - 特殊標記浮標設計圖



浮标技术参数:

- ①浮标规格: 3m x 0.9m
- ②浮标陆地自重: 1850kg
- ③浮标最大排水量: 5.4m³
- ④浮标净浮力: 约3500kg

浪龙技术参数:

- ①浪龙装置规格: 0.9m x 0.6m
- ②浪龙装置陆地自重: 210kg
- ③浪龙排水量: 0.17m³

技术说明:

- ①图纸所示设计尺寸为理论装配尺寸, 实际尺寸可能会存在2%以内的尺寸偏差。
- ②图纸所示内容为设计标准, 可作为交货参考但存在一定的差异, 一切以实物为准。

