計畫摘要

一、計畫名稱：

「111 年臺中市水質自動監測設施設置及維運計畫」

Project Name: “Year 2022 Taichung City Water Quality Automatic Monitoring Facilities Setup and Maintenance Project”

二、投標單位：

技佳工程科技股份有限公司

Tenderer:

BT Engineering Corporation

三、計畫主持人：

計畫主持人-翁筱琪

Project Host: Weng Hsiao-Chi

四、決標日期：

111/01/24

Tender Awarding Date:

Jan 24, 2022

五、執行結束時間：

111/12/31

Date End of Administration:

Dec 31, 2022

六、計畫預算金額：

決標金額新臺幣 960 萬元，第一次契約變更 1,049 萬元。

Project Budget Amount:

NTD$ 9.6 Million

NTD$10.49 million for the first contract change

七、中文摘要關鍵詞：

水質自動預警設施(水管家)設置及維運，移動式水質感測器操作巡檢維護(水盒子)，定點式水質監測站設置巡檢維運，辦理水質感測器相關環境教育。

Abstract Keywords:

Setting and maintenance of water quality automatic warning facilities (Waterkeeper); Mobile water quality sensor operation, inspection and maintenance (Waterbox); Fixed-point water quality monitoring station setup, inspection, maintenance and operation; Related environmental education holding for water quality sensors

八、中文摘要

Abstract:

有鑑於高污染潛勢事業對水體水質之影響，為擴充本市水體水質管理面向及落實事業端自主管理，優先規畫輔導本市高污染潛勢事業於放流口(槽)裝設水質自動預警設施(水管家)，結合雲端資訊平台及 line 推播告警提醒，提升事業高管理觸及面、擴充水體水質管理面向，亦能教育事業污染預防之概念。

In view of the impact of high-potential contaminated industries on water quality, and in order to expand the water quality management of the city's water body and implement the self-management of the industries' side, we prioritize the planning and counselling of high-potential contaminated industries in the city to install automatic water quality warning facilities (Waterkeeper) at the discharge outlets (troughs). It combines cloud information platform and instant line pushing to broadcast alarm reminding, in order to improve industries reach to high-level management and expand their water quality management. It can also educate the industries about the concept of pollution prevention.

為擴大本市水體自動監測管理網絡，辦理移動式水質感測器(水盒子)之設置及維運，以持續掌握本市高污染潛勢水體水質變化情形，另針對民眾特定水域遊憩區域規劃設置具自動採樣分析功能並能提供即時水質檢測結果之定點式水質監測站，讓民眾可以直觀地獲知區域水質情形，進而提升民眾對水環境保護意識。

In order to expand the city's water body automatic monitoring and management network, we handled the installation and maintenance of mobile water quality sensors (Waterbox) to keep abreast of the changes in the water quality of the city's high-potential contaminated water bodies. In addition, for the planning of the public's specific water recreation areas, a fixed-point water quality monitoring station with automatic sampling and analysis functions and real-time water quality test results was set up. It helps the public to intuitively understand the water quality condition in the region to raise their awareness of water environmental protection.

利用本計畫內容向下紮根，設計環境教育教材(以民眾、中學學生或大專生為施行教育對象)，及辦理水質儀器相關說明會，導入廢污水源頭減廢污染預防的環境教育概念，一同參與守護河川及水環境。

We use the work contents of this project to establish the public's foundation (get down to the roots) and design environmental

education teaching materials (targeting the general public, middle school or college students). And we handled water quality instrument related briefings. We introduced the concept of environmental education of waste reduction and pollution prevention at the source of waste water to help people participate in the protection of rivers and water environment.

本計畫執行期程自決標日 111 年 1 月 24 日起至 111 年 12 月 31 日止，各工作項目總執行率已達 100%，執行成果摘要說明如下：

The implementation period of this project starts from the tender awarding date (January 24, 2022) to December 31, 2022. The total implementation rate of each work item reached 100%, and the summary of the implementation results is as below:

臺中市環保局於 110 年度辦理水管家試驗計畫，已成功完成 30 家金屬表面處理及電鍍業推廣設置，延續去年度試辦計畫，今年度於 3 月份針對轄內尚未安裝水管家事業單位辦理 4 場次宣導說明會、1 場次座談會，並導入廢污水源頭減廢污染預防的環境教育概念，1~4 場次會議中邀請臺灣區金屬表面處業同業公會共同辦理，並由去年已完成安裝之業者進行經驗分享，共計 93 家業者出席，會後有 62 家業者完成安裝，而座談會共計 48 家業者出席，會後有 43 家業者同意安裝，後續搭配環保局稽查作業現場宣導。統計 111 年新增同意安裝水管家之事業共計有 200 家，累計安裝臺數為 230 臺 (110 年度 30 臺、111 年度 200 臺)。

Taichung City Environmental Protection Bureau conducted the water stewardship pilot project in 2021, and had successfully completed the promotion and installation of 30 metal surface treatment and electroplating industries. Continuing the pilot plan of last year, this year, in March, four publicity briefings and one symposium were held who had not installed waterkeepers in the jurisdiction. And we introduced the environmental education concept of waste reduction and pollution prevention at the source of waste water. During the 1~4 meetings, the Taiwan Metal Surface Treatment Industry Association was invited to jointly handle it. And industries who had completed the installation last year shared their experiences. Total 93 industries attended the meetings, and after the meeting, 62 industries completed the installation. Total 48 industries attended the symposium, and after the meeting, 43 industries agreed to install waterkeepers. We

subsequent cooperated with the EPB to conduct on-site publicity for inspection operations. According to statistics, in 2021, there were total 200 industries that agreed to install waterkeepers, and the cumulative number of installations was 230 (30 in 2021, 200 in 2022).

本計畫已完成建置預警設施雲端資訊平台，可供查詢、管理、紀錄、蒐集及分析監測數據資料，提供進階應用規劃，並針對數據異常值提供 Line 推播告警功能，雲端資訊平台應具有高度相容性，能接收環保局既有 30 台及本計畫新設 200 台水管家傳輸數據，雲端平台其功能操作符合行政院及所屬各機關資訊安全管理規範中的網路資安要求。

This project had completed the construction of a cloud information platform for early warning facilities. It is available for offering inquiry, management, recording, collection and analysis of monitoring data. It provides advanced application planning, and provides Line instant pushing alarm function on data abnormal values. The cloud information platform is highly compatible and able to receive the data transmitted by the existing 30 waterkeepers of the EPB and the new 200 units of this project. The functional operation of the cloud platform complies with the network information security requirements in the information security management regulations of the Executive Yuan and its affiliated agencies.

在移動式水質感測器操作巡檢維護部分，本計畫於期初完成訂定相關巡檢維運規劃程序，延續 110 年度計畫交接 30 臺移動式水質感測器(布建 25 處點位，餘 5 臺為備機)，於 5 月遺失 1 臺、6 月遺失 1 臺、損毀 1 臺，遺失及損毀設備皆已報案備查，另 6 月底新增租賃 5 臺，截至目前，本市移動式水質感測器共計有 32 臺，期間為增加破案效率除滾動式調整應用點位外，同時針對故障率較高之一代水盒子執行維修升級為二代方案，本計畫今年度已完成 21 台維修升級作業，減少故障維修及無效監測頻率。本計畫運用移動式水質感測器科技辦案破獲污染案件 5 件(金屬表面處理及電鍍業)及環境應用實例 3 件(七星排水、東大溪、鎂光熱處理公司廠區側溝) 。

In the mobile water quality sensor operation inspection and maintenance part, at the beginning of the project, the relevant inspection and maintenance planning procedures were completed. Continuation of the Year 2021 project, we handed over 30 mobile

water quality sensors (25 points were deployed, and the remaining five were spare machines). We lost one unit in May, lost one unit in June, and got one unit damaged. Both lost and damaged equipments had been reported for investigation, and five new units were rented at the end of June. In the present, the city has a total of 32 mobile water quality sensors. During the period, in order to increase the efficiency of solving crimes, we rolled adjustments to the application points, at the same time, the first-generation waterboxes with a higher failure rate were repaired and upgraded to the second-generation solution. This project had completed 21 maintenance and upgrade operations this year, reducing fault maintenance and invalid monitoring frequency. This project used mobile water quality sensor technology to solve five pollution cases (metal surface treatment and electroplating industries) and three environmental application cases (side ditches of Qixing Drainage, Dongda Creek, and Mei Kwang Heat Treatment Co., Ltd.) .

為減少水污染事件發生頻率，本計畫針對高污染潛勢事業(金屬表面處理及電鍍業)執行推廣水管家輔助業者自主管理計畫，於事業端較具放流水質代表性之槽體安裝水管家水質自動預警設施，有效從源頭輔導高污染潛勢事業之放流水質，降低水污染排放事件發生機率，今年度已裝設事業放流水量合計達17529.348 CMD，而規模較小之事業資本較低、水量變異大，有較高的操作不慎或未及時發現設備異常頻率，因此列入主要推廣輔導對象(安裝推廣名冊中約 6 成事業放流水量小於 50CMD) 。

To reduce the frequency of water pollution incidents, this project was aimed at high-potential contaminated industries (metal surface treatment and electroplating industries) to implement and promote waterkeepers to assist industries' self-management plans. To install water quality automatic warning facilities-waterkeepers in the tanks that are more representative of the discharge water quality at the industries' end, it effectively guided the discharge water quality of high-potential contaminated industries from the source, and reduce the probability of water pollution discharge incidents. This year, the total amount of effluent water by the installed industries reached 17529.348 CMD. Smaller industries had lower capital, greater variation in water volume, thus there were higher frequency of inadvertent operation or failure to discover

equipments' abnormalities in time, there they were included in the main promotion and counseling targets (about 60% of the installation and promotion rosters, their effluent water were less than 50CMD).

科技執法層面，運用水盒子布建於高污染潛勢事業下游、死魚好發熱區及民眾陳情之環境水體，監測異常污染排放區間，搭配水管家自主管理事業名單有效限縮污染源追查範圍、提高追查效能，同時輔導破獲污染源之事業加入水管家自主管理計畫持續輔導水質，本計畫運用水盒子科技執法累計裁罰金額達2,887,500 元。

In the phase of scientific and technological law enforcement, we deploy ed waterboxes in the downstream of high-potential contaminated industries, hot areas where dead fishes are often occurred, and environmental water bodies where people petitioned. In the period of monitoring abnormal pollution discharge, We cooperated with the waterkeepers to independently manage the business lists and effectively limited the scope of investigation of pollution sources and improved the efficiency of investigation. At the same time, we counselled industries who had been captured pollution sources to join the waterkeeper self-management plan, and continued to provide them water quality counseling. This project applying waterbox-technology had enforced law and the accumulated fines were amounted up to NTD$2,887,500.

有關環境教育意義部分，今年度針對事業端完成辦理 5 場次說明會及座談會外，另於 111.11.24 針對大專學子辦理 2 場次相關環境教育活動，而定點式水質監測站(架設點位:豐原區葫蘆墩公園)已於 10 月中旬完成架設，並於 111.10.27 提送相關設備清單，供民眾於休憩期間了解周遭環境水體水質狀況。

The part about the significance of environmental education: This year, we held five briefing sessions and symposiums for the industries, two sessions of related environmental education activities for college students were held on Nov 24, 2022. The fixed-point water quality monitoring station (installation point: Huludun Park, Fengyuan District) had been set up in mid-October. And we submitted the relevant equipment list on Oct 27, 2022. It helps the public understand the water quality of the surrounding environment during the recreation period.