

緊急維生水池、配水池加壓站及社區活動中心三項共構設計案例研究
Study on Co-Structure Design of
Emergency Life Supporting Water Pond, Distribution Pond Boost Station and
Community Activity Center

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摘要

本文介紹臺北市內湖區防災公園(大湖公園)原本不同功能標的之3處建築物，經政府及社區溝通討論後，決定以整體規劃、環境融合、設計共構方式相互結合搭配，整併為一多功能建築物，並探討共構設計概念之功能性、結構性、景觀性、經濟性四個面向，傳達未來防災維生設施將邁向多元功能結合及景觀美學融入之新趨勢。

Abstract

This article introduces the combining of 3 buildings of different function, different size and different structure of Neihu Disaster Shelter Park (Dahu Park) into a co-structured building after thorough communication and discussion between the government and the community. In addition to co-structure, integral planning, meshing into environment and mutual complementary and making it a multiple functions building. The discussion furthered into the function, structure, landscape and economics of co-structure design concept that conveyed a new trend of combination of functional integration and landscape aesthetics.

一、前言

1. Forewords

臺北市內湖區防災公園(大湖公園)維生水池，由原先單純提供災後緊急維生用水，提升至與自來水供水系統之配水池加壓站功能結合，並重視當地環境景觀之融合，進而與社區活動中心建物共構，讓當地居民由原先反對分別設置，轉為支持整合共構建設，此一案例推動模式，可提升都市整體防災維生水池設計功能及品質，並經社區居民參與，獲得地方民眾支持，加速建置時程。

The proposed Life-Supporting Pond in Neihu District Disaster shelter park (Dahu Park) has been redesigned from originally providing post-disaster emergency-supporting water to combining distribution pond and boost station of

tap-water supply system and community activity center to integrate local environment and landscape. This move has changed the attitude of local residents from opposing separate and individual buildings to supporting integrated co-structure plan. In this mode, the design function and quality of urban overall disaster life supporting pond are assured and it encouraged participation of community residents, secured support of the public and accelerated the construction.

二、臺北市防災公園維生貯水設施建置計畫

2. Construction of Disaster shelter park Life-Supporting Storage Facilities

臺北市面積約 272 平方公里，人口約 262 萬人，分為 12 個行政區，各行政區設有其防災公園，提供災後避難聚集場所，並配備民眾維生所需相關設施，其中包含可供應每人每日 3 公升持續 28 日以上飲用水量之維生貯水設施。

Taipei City has a total area of 272 Square KM, population of 2.62 million and is divided into 12 administration district. Each administration district has own disaster shelter park for post-disaster shelter and gathering and is equipped with facilities of life-supporting for the public, including life-supporting water storage facility for providing drinking water 3 liter/person consecutive 28 days.

臺北自來水事業處截至 2010 年底，已完成臺北市配水池及輸水幹管之維生取水站 34 處，可供應約 30 萬噸之維生飲用水，設施及緊急取水作業如圖 1 所示。另配合臺北市政府防災政策，規劃全市 12 個行政區防災公園維生貯水設施，除 5 個防災公園由既有鄰近緊急維生取水站支援送水外，其餘 3 個防災公園新設 100 噸之管狀維生貯水槽，2 個防災公園新設 500 噸維生貯水池，2 個防災公園新設 1,000 噸維生貯水池，上述新設 7 個維生貯水設施工程經費約 500 萬美金，由水處於 2008 年~2013 年執行，截至目前已完成 3 個 100 噸管狀維生貯水槽及 1 個 1,000 噸維生貯水池之建置，並於 2011 年 9 月發包 1,000 噸維生貯水池工程，其餘 2 處 500 噸維生貯水池工程預定 2012 年施工，整個計畫預定 2013 年全數建置完成，圖 2 顯示建置計畫所有維生配置位置，表 2 列出各區防災避難公園維生貯水容量及可提供避難人口數。

Up to end of 2010, Taipei Water Department has completed 34 life-supporting water supply stations from distribution ponds and transport trunk lines with a capacity of 300,000 tons. The facilities and emergency supply operation are shown in Fig. 1. Also, in coupling wit the disaster preventing policy of Taipei City Government, TWD has planned for building life-supporting water storage facilities in disaster shelter parks, each in every one of the 12 administration districts. Other than 5 disaster shelter parks having neighboring life-supporting water stations to supply, 3 have newly built 1000 ton pipe form storage tanks, 2 have 500 ton life-supporting pond and 2 have newly built 1000 ton life-supporting ponds. The expenditure for the above 7 life-supporting storage facilities is about US\$5 million, which are to be built between 2008 and 2013. So far, 3 x 100 ton pipe- form life-supporting tanks and 1 x 1000 tons life-supporting storage pond. 1 x 1000 tons life- supporting pond will be contracted for building in Sept. 2011 and 2 x 500 life-supporting storage ponds are to be

constructed in 2012. The entire project will be completed in 2013. Fig. 2 shows the location of all the life-supporting water storage facilities. Table 2 provides the capacity and serviceable population of the life-supporting storage facilities of disaster shelter parks of all the districts.

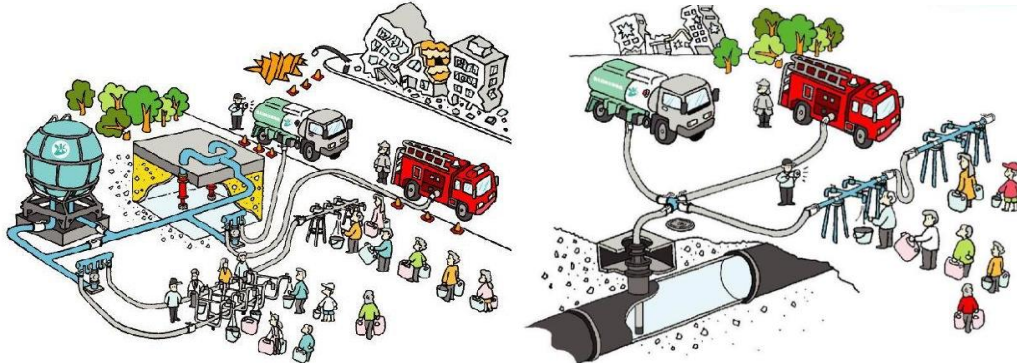


圖 1 臺北市維生貯水設施及緊急取水示意圖

Fig. 1- Sketch of Life-Supporting Reservoir Facility and Emergency Water Supply in Taipei City

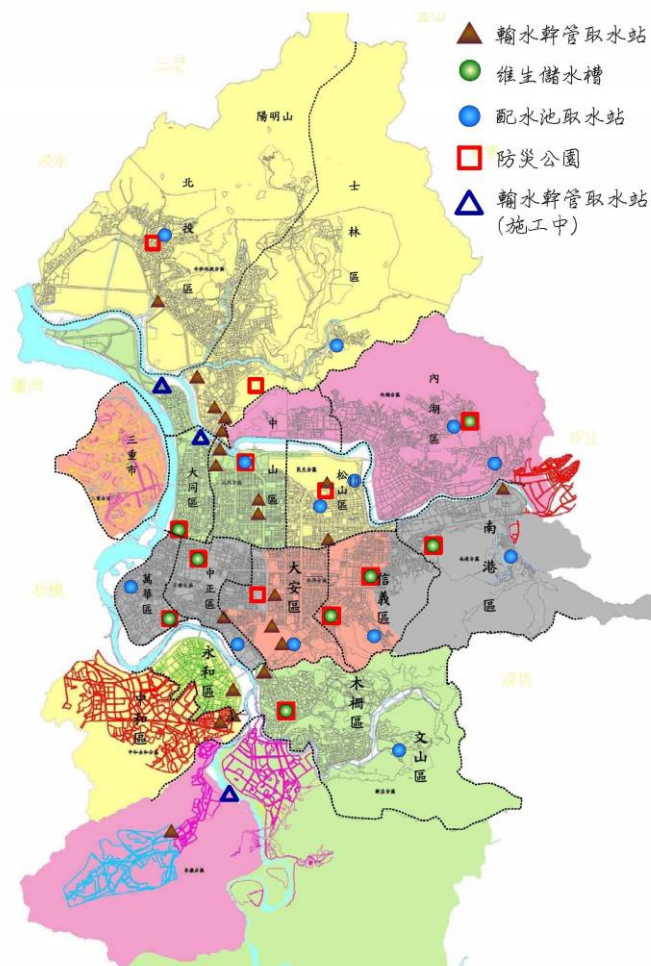


圖 2 臺北市緊急維生取水站及防災公園位置圖

Fig. 2- Locations of Life-Supporting Water Supply Stations and Disaster shelter park of Taipei City

Transport trunk line supply station, Life-supporting water storage tank, Water supply station of

distribution pond, Disaster Shelter Park, Transport trunk line supply station (under construction)

表 1 臺北市防災公園維生貯水設施容量、維生取水人數

項次	行政區	防災公園	貯水容量 (立方公尺)	可提供取水 人口數
1	中山	榮星公園	55,200	657,060
2	北投	復興公園	2,700	31,820
3	士林	士林官邸	1,200	14,210
4	松山	民權公園	50,000	595,240
5	大安	大安公園	2,700	31,230
6	信義	松德公園	100	1,190
7	文山	景華公園	100	1,190
8	中正	228 和平公園	100	1,190
9	南港	南港公園	1000	11,900
10	內湖	大湖公園	1000	11,900
11	萬華	青年公園	500	5,950
12	大同	玉泉公園	500	5,950

Table 1- Capacity and serviceable population of Life-supporting water storage facility in Disaster shelter park in Taipei City

No.	Administration District	Disaster shelter park	Storage Capacity (cbm)	Serviceable population
1	Zhongshan	Zongxing Park	55,200	657,060
2	Beitou	Fuxing Park	2,700	31,820
3	Shilin	Shilin Presidential Residence	1,200	14,210
4	Songshan	Minquan Park	50,000	595,240
5	Daan	Daan Park	2,700	31,230
6	Xinyi	Songde Park	100	1,190
7	Wenshan	Jinghua Park	100	1,190
8	Zhongzheng	228 Peace Park	100	1,190
9	Nangang	Nangang Park	1000	11,900
10	Neihu	Dahu Park	1000	11,900
11	Wanhua	Youth Park	500	5,950
12	Datong	Yuquan Park	500	5,950

三、本案位址環境背景條件

3. Environment and Background Conditions of this Project

內湖區防災公園為大湖公園，位於成功路五段，佔地約為 13.5 公頃，湖泊

面積約 9 公頃，依山傍水，岸邊蜿蜒曲折，湖面如鏡，視野開闊，拱橋彷彿垂虹，公園景色秀美，現況照片如圖 3，平面圖如圖 4。然而大湖湖泊為內湖地區重要防洪設施及灌溉埤塘，於 1979 年政府為促進都市發展，興闢成功路五段及大湖公園，2009 年捷運內湖線於大湖公園設站，因此，大湖公園具有都市區域滯洪、都市觀光景點、社區活動空間之功能，且交通便利為市民遊客經常造訪之親山親水性質公園。

Disaster Shelter Park in Neihu District is Dahu Park and is by Sec. 5, Chengong Road covered an area of 13.5 hectares with lake of 9 hectares approximately. The park is sided by mountain and waters and the bank is curvy, the lake is calm like a mirror with wide view and arch bridge seems like a rainbow. The scene is extremely beautiful as shown in Fig. 3 and the plan is shown in Fig. 4. The lake was functioned as a flood buffer and irrigation reservoir in Neihu. Since the develop of Dahu Park and building of Section 5, Chengong Road since 1979 and MRT Neihu Line set a Dahu Park Station, this lake is added with urban tourist attraction and a space for community. Due to the convenience in traffic, the park is now frequently visited park to be close to mountain and waters of the nearby residents.



圖 3 大湖公園現況照片(資料來源：內湖區公所網站)
Fig. 3- Photos of Present Dahu Park (Courtesy of Neihu District Office)



圖 4 大湖公園平面圖
Fig. 4- Plan of Dahu Park

大湖公園自 1979 年開闢迄今已逾 30 年，為符合都市發展，提升市民生活環境，臺北市政府工務局自 2008 年起辦理「大湖公園環境改造工程」規劃作業，其中包含公園活動中心及游泳池拆除重建工程。另北水處亦配合臺北市政府防災政策，於大湖公園規劃新建 1,000 噸維生貯水池工程，同時為因應內湖區東湖地區都市發展用水需求，亦規劃於大湖公園新建配水池加壓站。

It has been more than 30 years since the development of Dahu Park in 1979 and for coping with urban development and upgrading living environment for people around here, Taipei City Government Public Works Bureau started to plan Dahu Park Environment Renovation project in 2008. Content of which include demolition and rebuilding of Dahu Park Activity Center and swimming pool. Meanwhile, Taipei Water Department was planning a new 1000 tons life supporting water storage pond in Dahu Park to copy wit the Disaster Preventing Policy of Taipei City Government, and to meet with the water demand that increased along with the urban development

of Donghu area of Neihu District, TWD is also planned to build a new Distribution Pond and Boost Station in Dahu Park.

大湖公園地區原本分別獨立設置親水活動中心、維生貯水池、配水池加壓站，興辦3處結構建築。為減少公園使用面積，讓工程順利推動，本處將維生貯水池及配水池加壓站功能結合為1結構體，規劃容量1000噸地下水池及留設地上6m*6m*3m之人員材料出入口，但當地居民仍認為水池位於公園景觀草坪，並鄰近捷運站及公園進出入口，恐影響公園品質，致工程延宕無法推動，圖5顯示維生水池及配水池加壓站原預定施作示意圖。因此，為利工程順利推展，本處與台北市政府共同舉辦規劃設計說明會，多次與當地社區居民溝通討論後，決定以整體規劃、環境融合、設計共構方式，於舊有活動中心及游泳池位置，將維生水池、配水池加壓站與親水活動中心三項設計整併為一多功能建築結構。

The original plan is that a water front activity center, life-supporting storage pond and distribution pond / boost station are to be built into 3 independent building mass. In order to minimize the area of the park occupied by TWD project, it was later combine life-supporting water storage pond and the distribution pond/ boost station into one single structure, with 1000 ton underground pond and 6m x 6m x 3 m entry/exit for people and materials. However, the local residents are not happy with it still. They think the quality of the park could be compromised as the pond is located inside lawn of the Park and it is close to the MRT station and entrance and exit of the Park, hence the construction was delayed. Fig. 5 show the sketch of the location where the life-supporting pond and distribution pond / boost station was planned to build originally. Hence, in order to facilitate the smooth working of the project, TWD and Taipei City Government jointly held Presentation of Planning and Design. After communicating and discussion with the local community residents for many times, it was decided to work in total planning, meshing with environment and co-structure design to integrate the life-supporting water pond, distribution pond/ boost station and Aqua-Friendly Activity Center into one multiple function building structure and build to the original location of previous activity center and swimming pool.



圖 5 維生水池及配水池加壓站原預定施作位置示意圖
Fig. 5- Sketch of Original Construction Site of
Life-Supporting Pond and Distribution Pond Boost Station
MRT Station

Dahu Park Lawn

四、共構設計概念探討

4. Co-Structure Design Concept

大湖公園維生貯水設施暨配水池加壓站，設計需求包含容量 1000 立方公尺水池、3 台 15HP 供水抽水機、2 台 2HP 維生抽水機、 ϕ 400mm 進水管及相關設施，工程經費約美金 150 萬元，平時供應東湖地區約 5,000 人之日常用水，災時可提供約 11,900 人之緊急維生飲用水。

The life-supporting water pond, distribution pond / boost station of Dahu Park shall be designed with 1000 cbm pond, 3 set 15HP supply pump and 2HP pump for life-supporting use and ϕ 400mm inlet and outlet pipe and related facilities. The expenditure is estimated at US\$1.5 million. At ordinary time, it is for supplying daily water needs of about 5000 people in Donghu area, and at extraordinary time like disaster, it will be able to supply the life-supporting needs of water for 11,900 people.

大湖公園社區活動中心，設計需求包含戶外游泳池、室內溫水泳池、健身房、商店、多功能教室、辦公室、機房、廁所等空間，工程經費約美金 500 萬元，平時提供市民休閒健身活動空間，災時成為當地防災臨時指揮中心。

The needs of design of Dahu Park Community Activity Center include outdoor swimming pool, indoor warm water swimming pool, gym, store, multi-function classroom, office, engine room and toilet and the total expenditure is estimated at US\$5 million. It is for exercise, work-out, and leisure and in extra-ordinary time, it will be temporary commanding center.

上述三者需求，經整體規劃共構後，設計為 2 層樓建築物，建築面積約 3,500 m²，樓地板面積約 5,000 m²，其中包含活動中心 4,000 m²、維生水池 600 m²及相關附屬設施 400 m²，總經費約美金 650 萬元，已於 2011 年 9 月發包施工，預定 2013 年建造完成。其共構工程設計概念如下：

By putting needs of the above 3 into planning and design, it was designed into 2 stories building with total building area of 3,500M². The floor area is 5,000m², including 4,000 m² of activities center, 600 m² life-supporting water pond and 400 m² of accessorial facilities. The total expenditure is about US\$6.5 million and it is going to contract for construction in September 2011 and is scheduled to complete in 2013. The co-structure design concept covers:

(一) 功能性

(1) Function

維生水池加壓站：平時提供市民日常用水，滿足供水區域足夠之水壓及水量，並利用日常供水運作，讓新鮮自來水在維生水池中流動，確保水池貯水之水質安全，且利用水池深度及水位控制設施，讓水池水位維持在防災公園緊急維生基本水量以上，以利災後有足夠維生水量提供使用。若發生地震或爆炸等災難時，維生水池之加壓站將自動停止運轉，進水管之緊急遮斷閥將自動關閉，確保維生水池貯水之水量足夠及水質安全，並於災後，以備妥之緊急發電機提供電力給維生抽水機使用，且啟動維生取水設施，提供市民緊急維生飲用水，圖 6 顯示維生水池設施配置平面圖。

Life-supporting water pond boost station: This is used to supply daily water need of residents in the supply area, satisfying the supply area with sufficient pressure and flow, in ordinary time, and it allows fresh water to flow in to maintain the constant flowing of water in the life-supporting pond to ensure the quality of the water stored. Depth of the pond and level control facilities are used to maintain the water level at or above the minimum level required for life-supporting of the disaster shelter park, so that when there is disaster occurred, sufficient volume is ready to maintain the life-supporting level. T the occurrence of disaster like earthquake or explosion, the boost station of the life-supporting pond will stop operating automatically and the emergency cut-off valve of the inlet pipe will be shut off automatically to ensure the volume and quality of water in the pond, and after the disaster, emergency generator will provide power to run pump and activate life-supporting water supply facility to provide drinking water for citizen to support their life. Fig. 6 shows the Layout Plan of Life-Supporting Pond Facilities.

社區活動中心：平時游泳池及附屬設施作為市民休閒健身活動空間；綠屋頂草坪景觀平台提供市民知性休憩活動空間；多功能教室及防災設施指標系統提供防災教育解說推廣。災時及災後，活動中心之室內及戶外游泳池蓄水約 2,000m³，可以簡易取水方式，提供災民生活雜用水；辦公室及多功能教室面積約 200 m²，配備基本防災資訊設施，可轉變成當地防災臨時指揮中心。

Community Activity Center: At peacetime, swimming pool and accessorial facilities are for work-out, leisure and other activities of citizens and roof top green,

lawn and landscape platform are for citizen to kill time and social. Multi-function classroom and disaster preventing facility indicating system provide promotion and education of disaster prevention. At and after occurrence of disaster, the indoor and outdoor swimming pool, with the capacity of approximately 2,000 m³ can be used by citizens in purposes other than drinking, with simple drawing system. Office and multi-function classroom have gross area of 200 m², equipped with basic disaster preventing information and facilities, can be turned into temporary disaster prevention commanding center.

維生水池加壓站及社區活動中心之共構建築物，相互整合搭配，滿足都市公園及防災公園之平時及災時與災後所需各項功能，達到多元功能性結合目標，圖 7 顯示共構建築物之多元功能性配置圖。

Life-supporting pond boost station and Community Activity Center Co-Structured Building can be integrated and consolidated to satisfy the functional needs of normal park and disaster shelter park in peacetime and in extraordinary period, so that they can serve every purposes together. Fig. 7 shows Multi-Functional Layout of Co-structured Building.

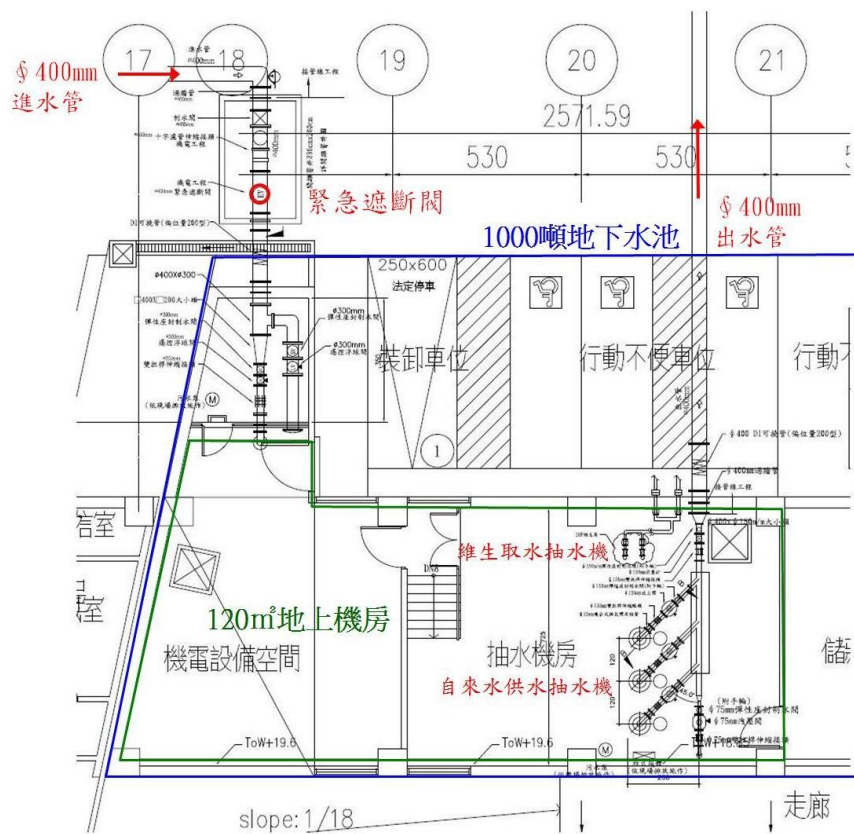


圖 6 維生水池設施配置平面圖
Fig. 6- Life-Supporting Pond Facilities Layout Plan

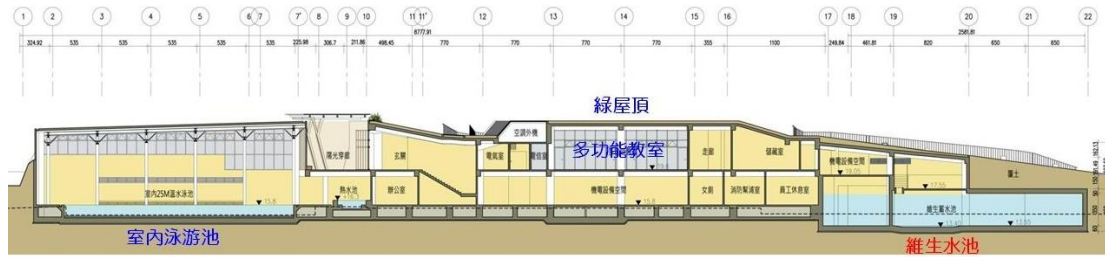


圖 7 共構建築物之多元功能性配置圖
 Fig. 7- Co=Structure Building Multi-Function Layout Sketch
 Green Roof
 Multi-function Classroom
 Indoor Swimming Pool

(二) 結構性

(2) Structure

維生水池加壓站與活動中心之共構建物基地，經地質鑽探調查，選擇規則性結構系統，主要採鋼筋混凝土結構，經結構耐震設計分析計算後，確保建物結構安全。

The foundation of the co-structured building of life-supporting pond boost station and activity center have been drilled and surveyed geologically and a regular structure system is selected. It is RC structure, and it has been gone through quake-resisting analysis and calculation to ensure the structural safety of the building.

依維生水池加壓站與活動中心之特性，考量兩者平面及立面配置之差異、設計載重及使用用途之不同等因素，採兩者結構獨立分開設計，並以伸縮縫予以區隔。活動中心之樓地板面積約 4,000 m²，量體較大，且室內游泳池挑高設計空間及外牆透空視覺景觀設計需求，其結構系統採筏式基礎及樑柱系統之韌性設計；維生水池加壓站之樓地板面積約 600 m²，量體較小，並為地下水池結構及上方覆土，且強調結構耐震不漏水，故採樁基礎(樁徑 ϕ 120 公分，樁深約 18 公尺)及版樑、牆柱、剪力牆系統之剛性設計。因維生水池加壓站與親水活動中心之特性不同及配置差異，故配合設計適合之混合結構系統，以確保結構耐震安全，以利災後確實發揮計畫效益，圖 8 顯示共構建築物結構平面配置圖，圖 9 顯示維生水池結構系統圖。

In view of the features of life-supporting pond boost station and activities center, the difference in the plan and erection layout and difference in the designed load and uses, they are designed into separated and independent structures with expansion joint to separate. The floor space of the activity center is about 4000m², a larger mass, and the indoor swimming pool is of high-ceiling design and the outer wall is designed to be hollow wall. The structure system is in raft foundation and tenacious pillar system. The life-supporting water pond boost station has floor space of 600 m², with smaller building mass and is an underground basin structure with overburden on top. The design is emphasized in quake-resistant and leak free, so it is in pile foundation (pile diameter is 120cm and pile depth is 18 m) plus rigid design of panel beam, wall pillar

and shear wall system. With the difference in features and layouts of life-supporting water pond and aqua-friendly activity center, so the design is mixed structure system to ensure structural quake-resisting and safety and the effectiveness in performing their designed purposes. Fig. 8 shows the plan layout of the co-structured building and Fig. 9 shows the structural system of life-supporting pond.



圖 8 共構建築物結構平面配置圖
Fig. 8- Co-Structure Building Structure Layout Plan

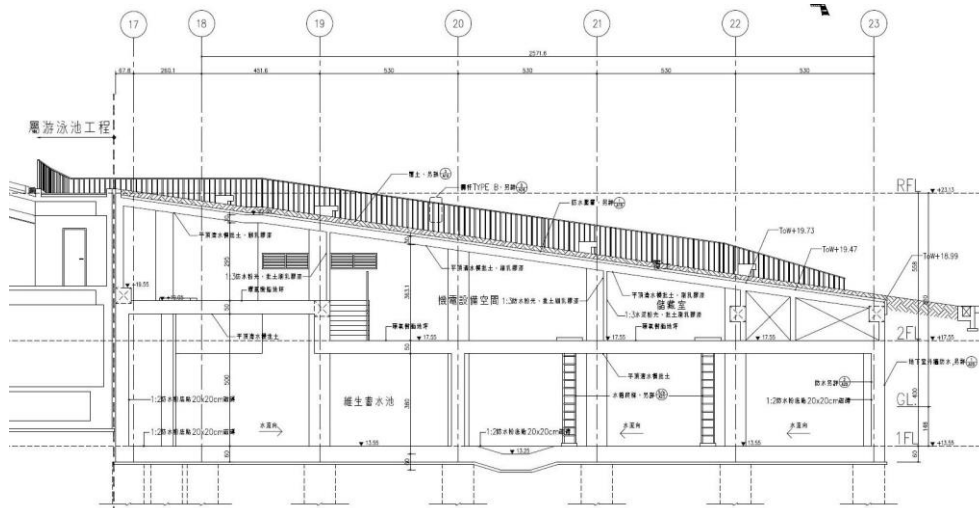


圖 9 維生水池樁基礎及版樑、牆柱、剪力牆結構系統圖

Fig. 9- Sketch of Structure System of Life-Supporting-Pond Pile Foundation and Slab Beam, Wall Pillar and Shear Wall

(三) 景觀性

(3) Landscape

維生水池加壓站與社區活動中心共構工程以地景化建築方式，創造水與綠地元素，融入公園整體景觀中，並將公園地面草皮延伸至屋頂，以土坵植栽景觀概

念，建置綠色環保屋頂，並加入節能、保水、綠化、減碳、減廢、生物多樣性、雨水回收等設計理念，取得政府核發之候選綠建築證書。另外考量居民與遊客之活動與視覺互動連繫，於屋頂設計迴遊步道及平台，創造最佳視野，盡覽公園湖光山色，並以廊道貫穿中軸，連結公園內外區域，讓市民愉悅地走進公園活動，讓視覺停留在綠地、藍水、綠建築之自然風貌中，景觀展示如圖 10 共構工程平面配置圖，圖 11 共構工程鳥瞰模擬圖，圖 12 綠屋頂、迴廊步道及戶外泳池模擬圖，圖 13 中軸穿廊及戶外泳池夜間模擬圖。

The co-structure of life-supporting boost station and community activity center is designed with the concept of landscape building and the waters and green element are fused into total landscape of the park and the ground lawn of the park is extended to roof top. Hilly planting is employed to make a green and environmental protection concept, in addition, energy conservation, water conservation, greening, carbon emission reduction, waste minimizing, bio-diversity and rain water recycle are also combined to the design. Due to the above, the building design won the Certificate of Candidate for Green Building issued by the Government. Also, considering the activities and visual connection and interaction of residents as well as visitors, the roof top is designed with winding walkway and platform to create the best view of the park and the lake and a gallery passes through the main axis that connects inside and outside area of the park. Walking into the park, visitors will be pleased with the natural scene of greens, the waters and the green building. The display of landscape is shown in Fig. 10 Co-Structure Work Plan Layout, Fig. 11 is the Simulation of Bird-Eye View of the Co-Structure work, Fig. 12 is the simulation of Green Rooftop, winding walkway and outdoor swimming pool and Fig. 13 is the Night View Simulation of Axial Corridor and Outdoor Swimming Pool .

此一共構工程結構體隱身在地景裡，除本身維生水池加壓站與社區活動中心功能外，兼具大湖公園自然山水之延伸，堪稱為優良景觀設計工程。

This co-structure work is hidden in the landscape and other than their main function as life-supporting pond boost station and community activity center, it has the extension of natural hills and waters of Dahu Park. It is a construction work of excellent landscape design.



圖 10 共構工程平面配置圖

Fig. 10 - Layout Plan of Co-Structure Work

Indoor Swimming Pool, Community Activity Center, Outdoor Swimming Pool

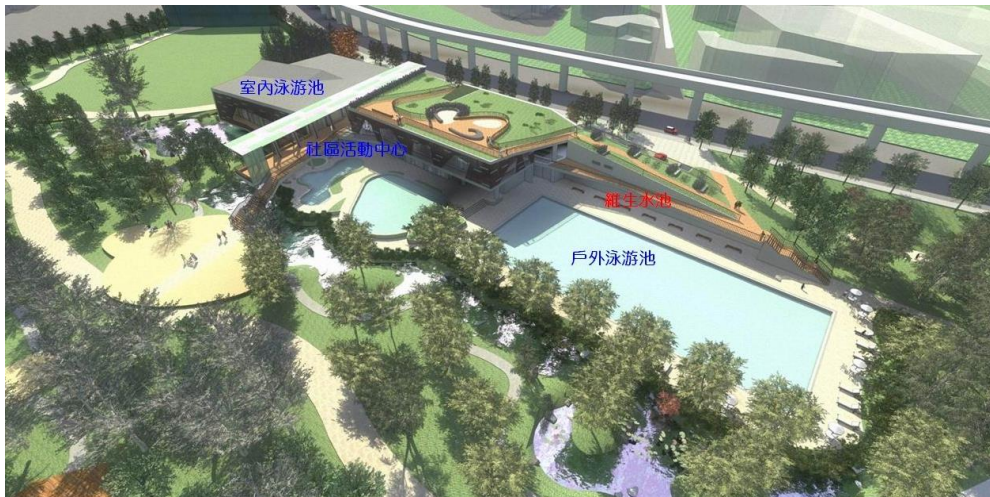


圖 11 共構工程鳥瞰模擬圖

Fig. 11 - Simulation of Bird-Eye-View of Co-Structure Work

Indoor Swimming Pool, Community Activity Center, Outdoor Swimming Pool



圖 12 綠屋頂、迴廊步道及戶外泳池模擬圖
Fig. 12- Simulation of Green Roof, Winding Walkway and Swimming Pool



圖 13 中軸穿廊及戶外泳池夜間模擬圖
Fig. 13 - Night View Simulation of Central Axial Corridor and Outdoor Swimming Pool

(四) 經濟性

(4) Economics

維生水池、配水池加壓站與親水活動中心三項設計共構後，比原先三項分別獨立設置，減少土地開發面積約 500 m²、棄方量約 1,000 立方公尺、回填量約 1,000 立方公尺，工程成本減少約美金 10 萬元；另工程減少材料使用量、減少營建廢棄物等，預估亦可減少 100 噸 CO₂ 排放量，達到工程經濟及環保經濟目標。

Life-supporting pond, Distribution pond / Boost Station and Aqua-Friendly Community Activity Center co-structure design reduced 500 m² of land development, 1000 cbm waste soil and 1000 cbm refill plus saving of US\$100,000 in construction cost. Further, the project will reduce material use, construction waste and 100 tons (appx.) CO₂ emission. This work is economic in money and in environment.

五、社區共同參與的價值

V. Value of Community Participation

原規劃親水活動中心、維生貯水池、配水池加壓站三項分別獨立設置，經本

處自行檢討後，維生貯水池及配水池加壓站二項結合為一項，經臺北市政府團隊 2 年來多次與當地居民及意見領袖溝通討論說明後，達成共識，將三項設計整併共構建築，市民原先反對者，轉為共構方案支持者，政府及社區共同推動執行，改造大湖公園新風貌。整個規劃設計過程，經由社區居民共同參與，讓設計成果更加美好，也更加顯現社區共同參與的價值，圖 14 為規劃設計說明會現場照片。

At the first, Aqua-Friendly Activity Center, Life-Supporting Water Pond and Distribution Pond/ boost Station are independent projects. TWD combined the first two into one and Taipei City Government reached consensus with the local citizens and opinion leaders after two year marathon communication and discussion and put all three together and into co-structure building. This co-structure proposal turn the opposition of local citizen into supporting that will give the Dahu Park with a new feature. The entire design and planning have the participation of community involvement. This is not only leading to an outcome satisfying all parties but also demonstrate the value of community participation. Fig. 14 are photos of the design and planning presentation.



圖 14 舉辦規劃設計說明會現場照片
Fig. 14 - Photos of Presentation of Planning & Design

六、結語

VI. Conclusion

藉此案例研究介紹，說明緊急維生水池建置，除本身緊急維生取水功能外，可提升與區域供水之配水池加壓站功能結合，可配合當地景觀建物整體設計搭配共構，並融入綠建築環保元素，增加社區居民接受度及參與感，滿足市民美學觀感及環保意識期待，減少都市防災設施建置阻力。本案傳達未來防災維生設施將邁向多元功能結合及景觀美學融入之新趨勢。

This paper about co-structure project tells that the establishment of emergency life-supporting water pond offers its emergency life-supporting water supply and allowing itself to combine with the water supply function of distribution pond / boost station and the landscape design together with green building environment protection element. It increased the acceptance and participation of community resident. In whole, it satisfied the expectation of citizens in aesthetics and in environmental protection awareness, and therefore reduce resistance of local citizen in building the

disaster prevention facilities. This project seems to transmit the new trend of multiple function integration of public work and landscape.