

BIM 在香港地鐵公司的應用

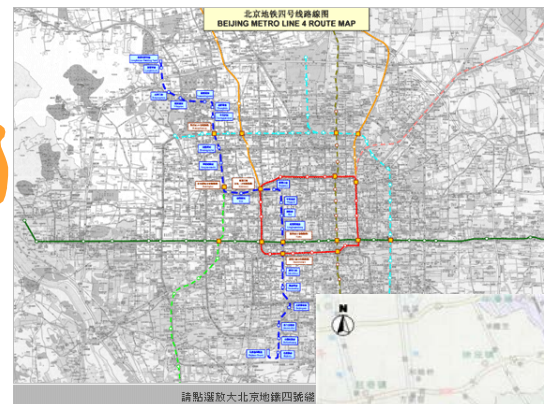
梁贊文
建築師

地鐵公司的鐵路系統



- 地鐵系統網路全長91公里
- 由觀塘、荃灣、港島、東湧、將軍澳及機場快線，共53個車站組成
- 每日平均載客量超過250萬人次，是世界上最繁忙的鐵路系統之一

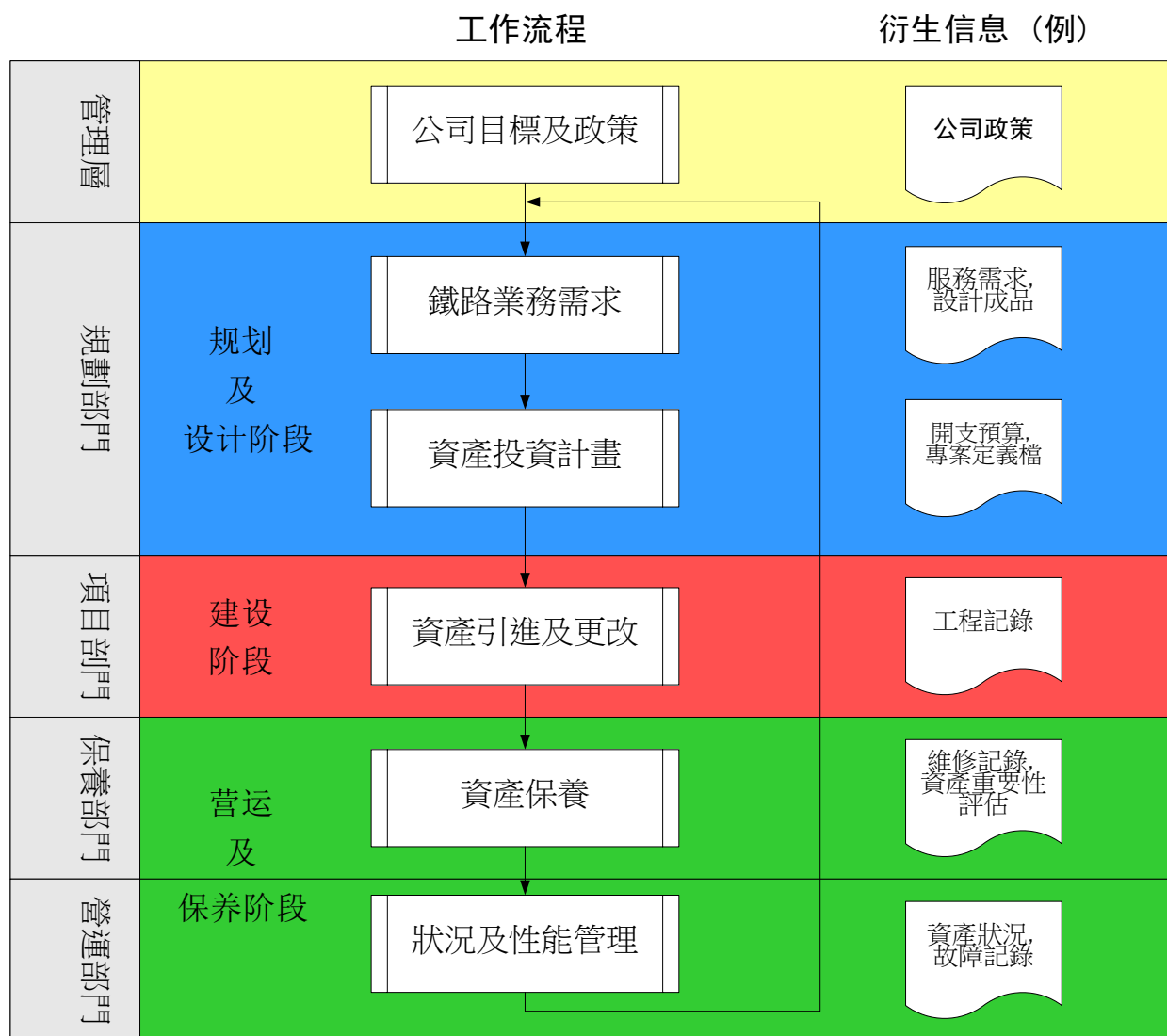
地鐵公司在中國大陸的主要工程



Why we need BIM?

- Building Information Modeling

資產資訊管理迴圈



信息氾濫



環境事務部 ? 顯示版管理、監察
(噪音)
廣告版租務、
店鋪租務、
投訴管理

資產資訊系統內的檔分類 (1)

- 契約文檔
- 成本計算
- 顧客要求
- 設計文檔
- 設計標準
- 環境保護
- 土地記錄
- 規劃
- 規格
- 法定文檔
- 維護

資產資訊系統內的檔分類 (2)

- 竣工記錄

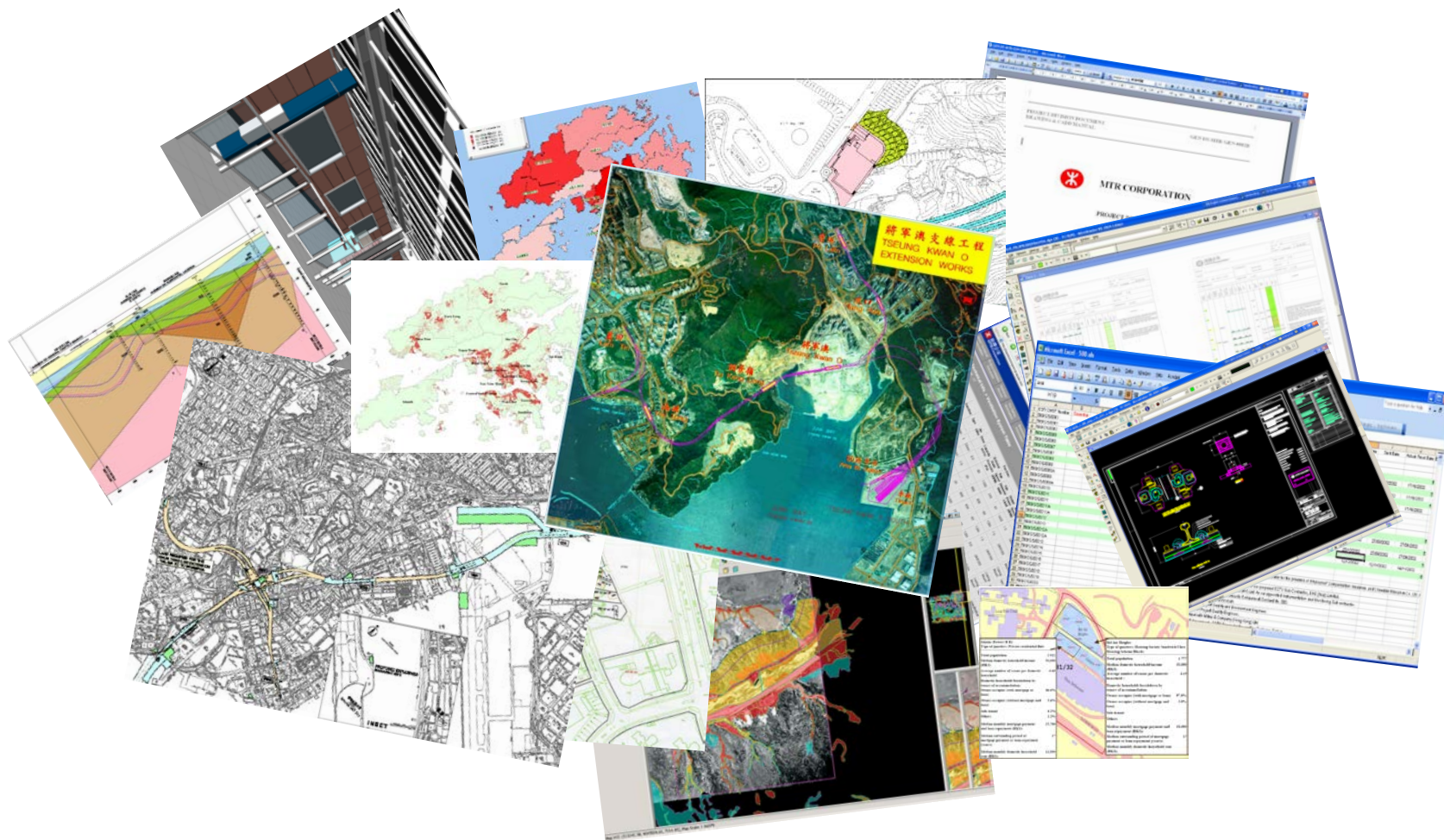
- 產品保證及保養書
- 供應商承包商資料及目錄
- 運行及維護手冊
- 竣工圖竣工圖
- 交收/測試程式及記錄
- 異常報告

- 資產更換規劃

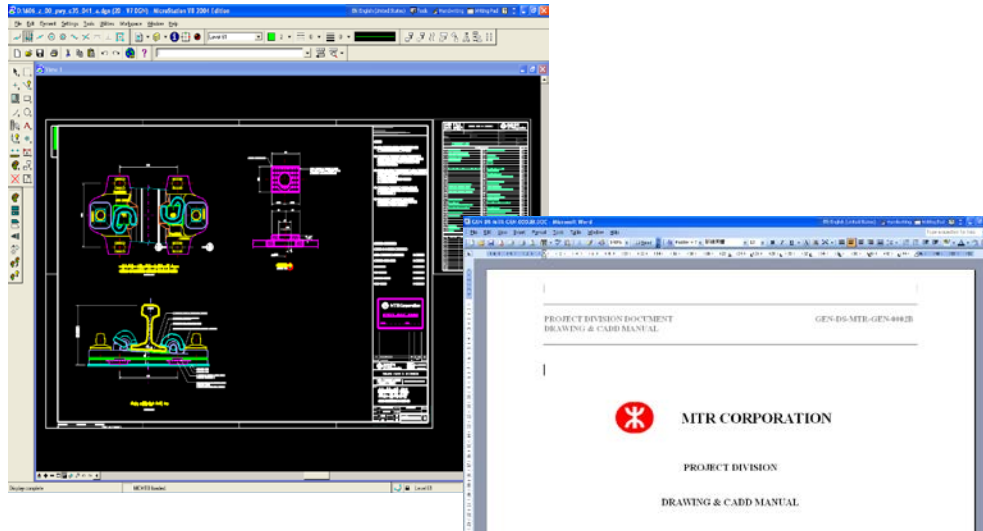
- 資產壽命延長研究
- 資產替換研究
- 測試及研究報告
- 長遠資產替換時間表

資訊管理的難題

- 如何從資料大海中找尋有用的資訊

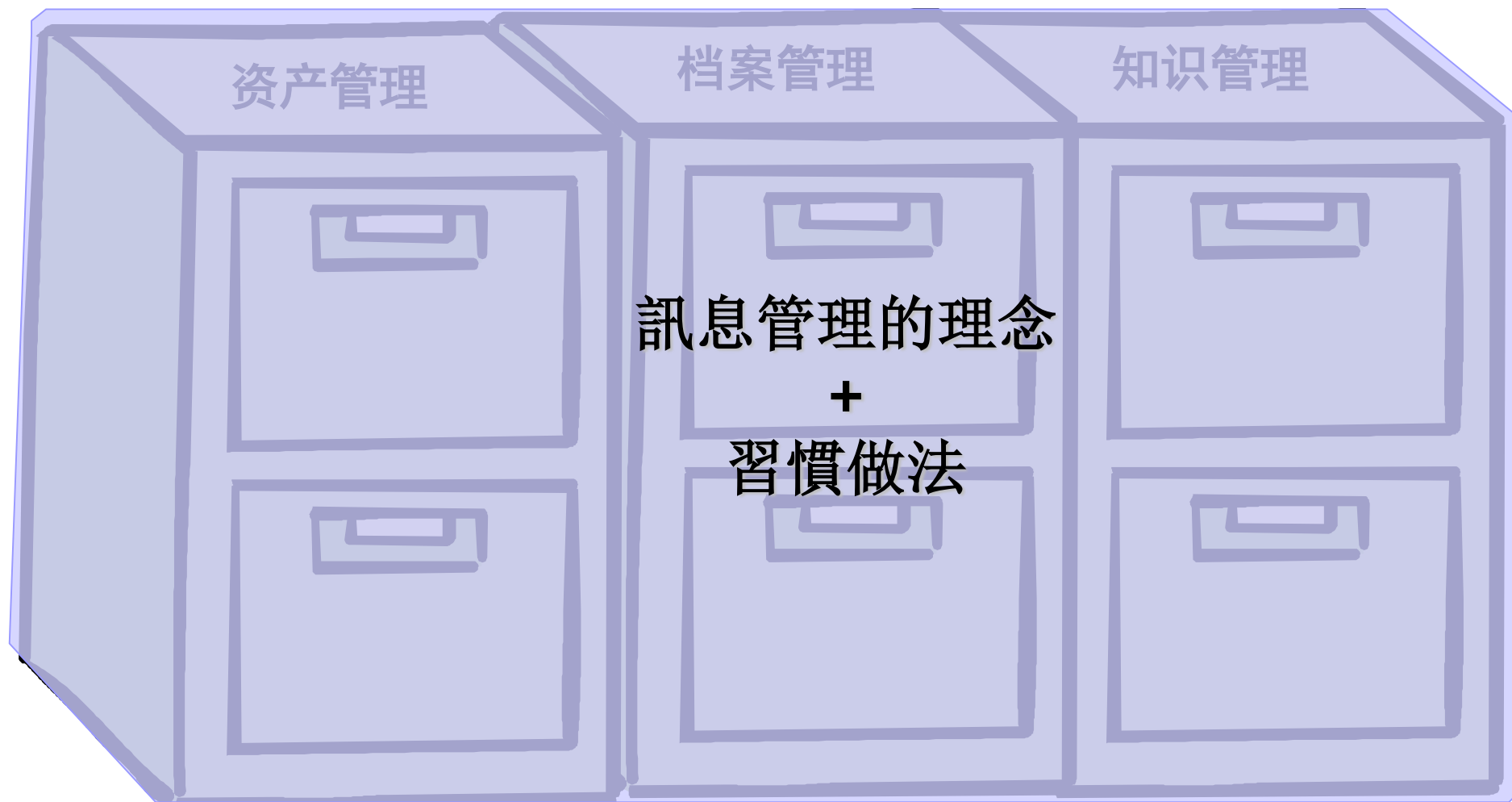


地鐵公司的資產資訊



- ~550,000電子圖紙
- ~2,000,000電子檔檔案
- 數以十萬計的原始檔

信息氾濫



資產資訊系統的用戶介面

Asset Technical Information System - Microsoft Internet Explorer provided by MTR Corporation Limited

File Edit View Favorites Tools Help

Address <http://hqsdms0002/mtrcl/rais/atis.htm> Go Links >>

地鐵公司 MTR Corporation

Asset Technical Information System

Asset Technical Information Project Definition Document Statutory Record Fire Safety Information Maintenance Information Asset Replacement Planning Project-In-Progress Asset Key Parameter Drawing Management System Knowledge Library

Project Definition Document

Project

LAR2 - All -

System

Architectural

Location

ISL TAK

Information Type

Contract Documents Conditions of Contract

Search

Done Local intranet

用戶視點

- 資產技術資訊
- 專案定義檔
- 法規記錄
- 消防信息
- 維護資訊
- 資產替換規劃等

檔屬性

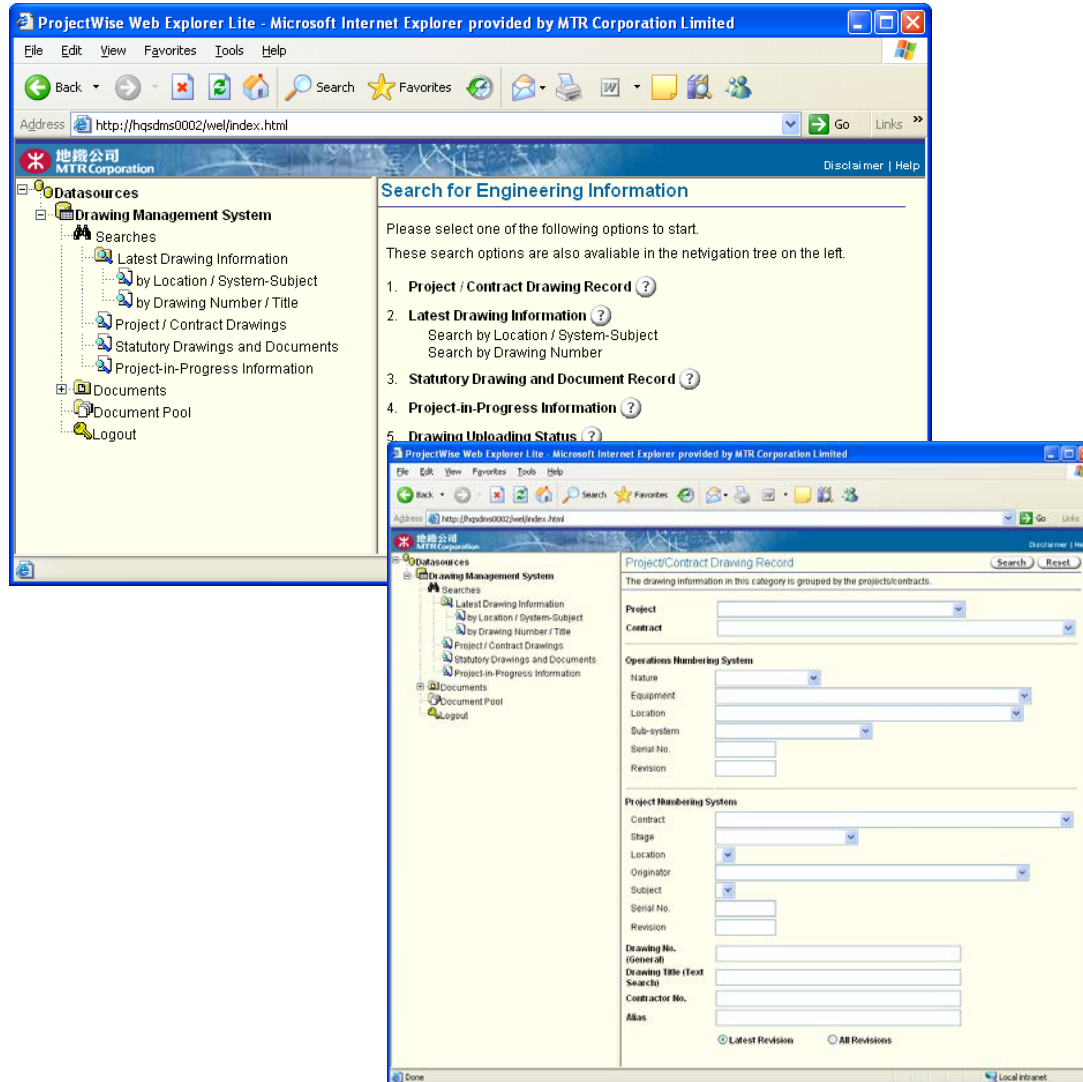
工程項目

地點

文件類別

專業

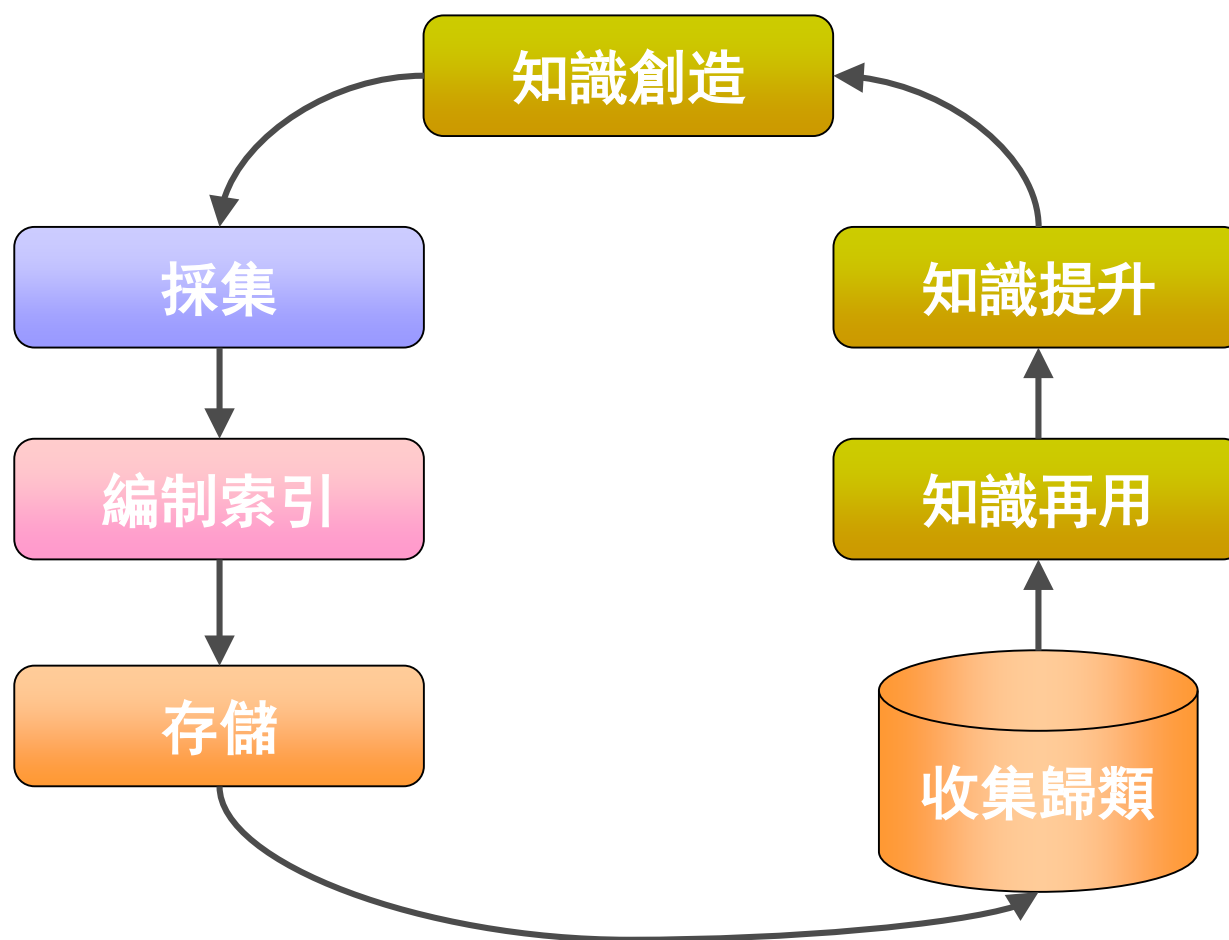
ProjectWise圖紙的分類



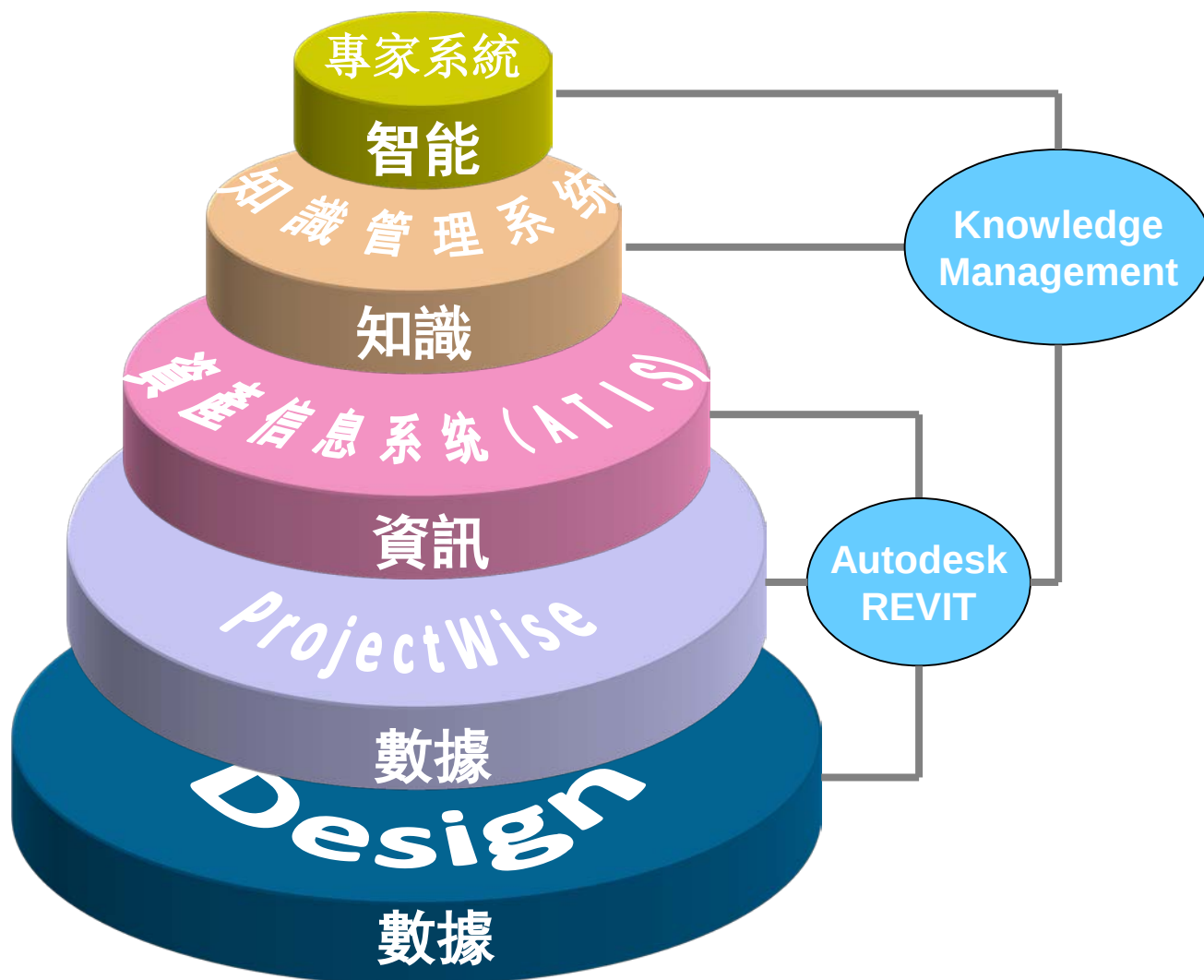
- 竣工圖、專案紀錄
- 不斷更新的圖紙、車站總圖
- 法規圖紙
- 工程進度示意圖
- 圖紙上載紀錄

知識的演化

- 知識是唯一一種透過使用而不斷增值的資產。



知識演化



衍生智慧

如何歸納和衍生新的知識

引申知識

資訊搜索系統的能力和效率

編制索引

資訊集是否有意義及能否與
工作流程否保持緊密聯繫

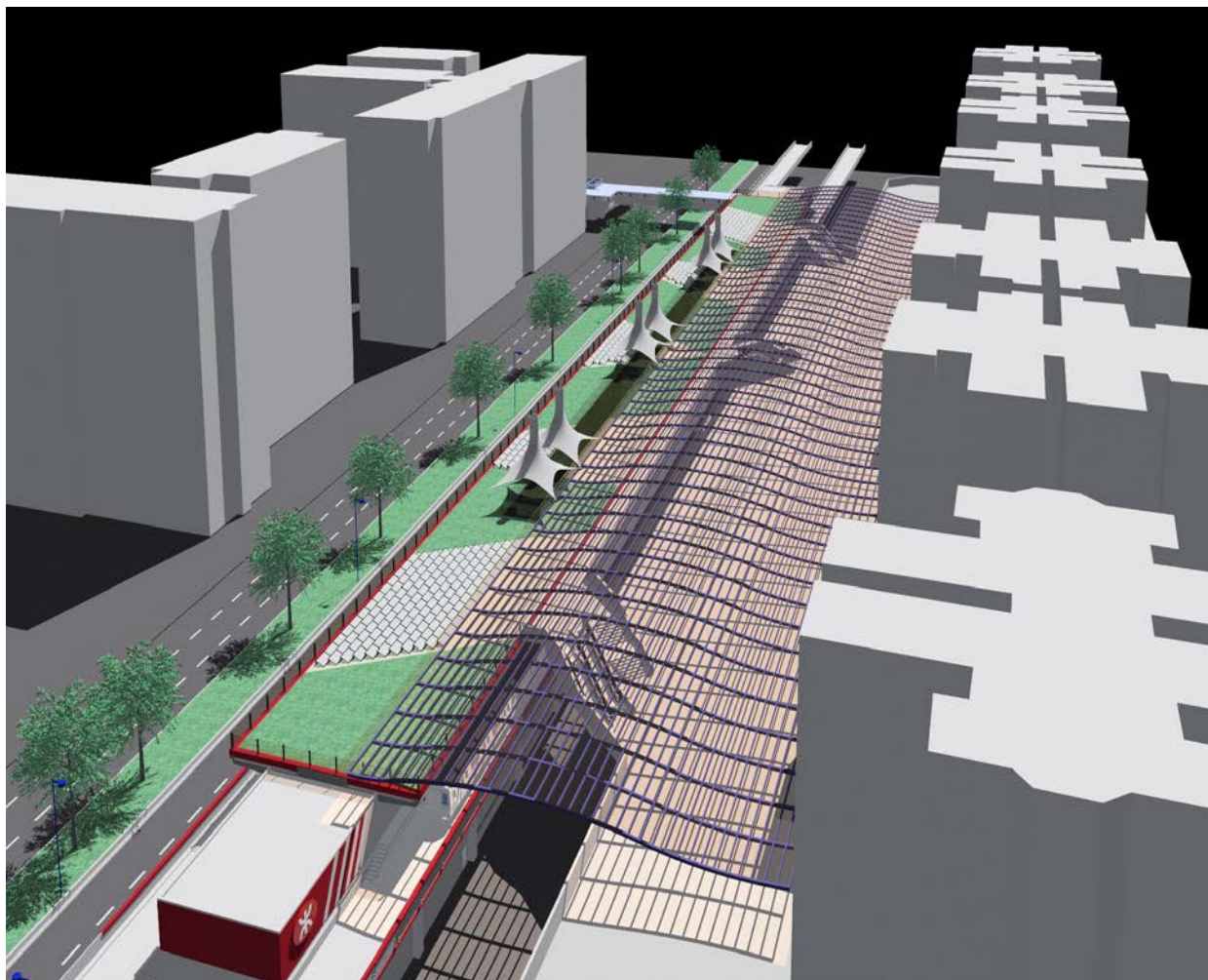
採集儲存

資訊的可靠性、完整性和保密性

採集儲存

資訊的可靠性、完整性和保密性

A year ago...

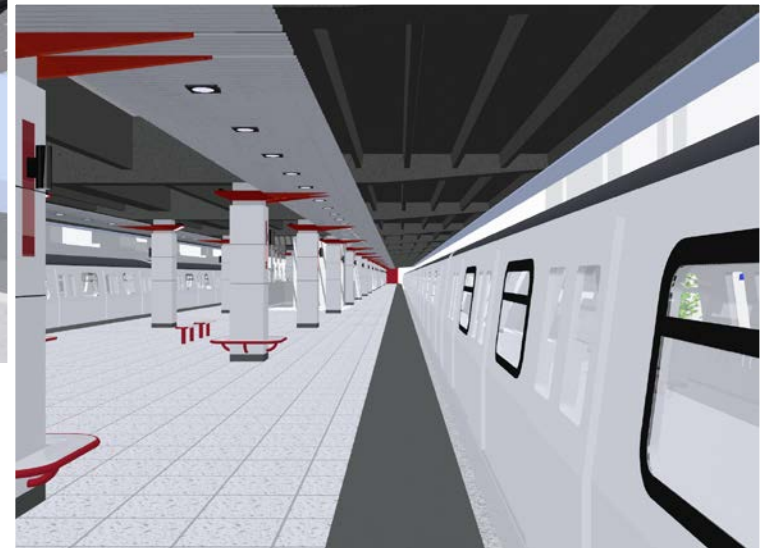


MTRC ...

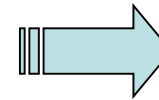
Early Projects...Yau Tong Park



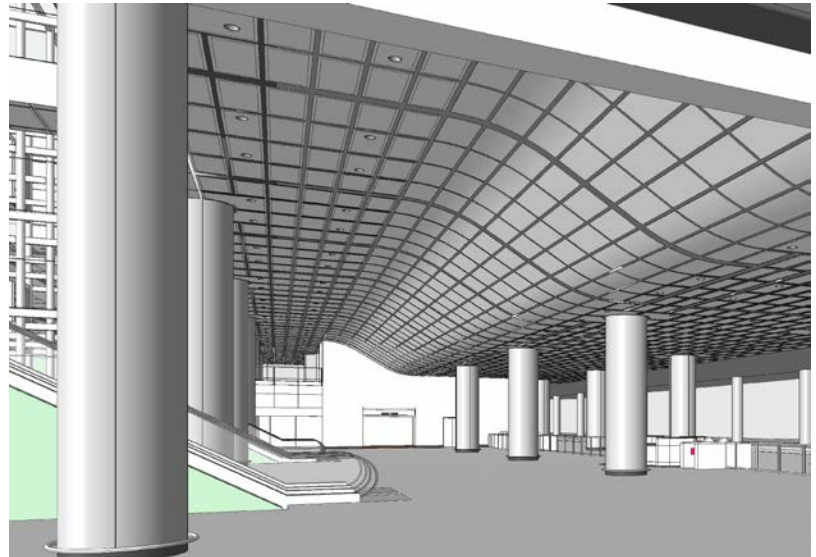
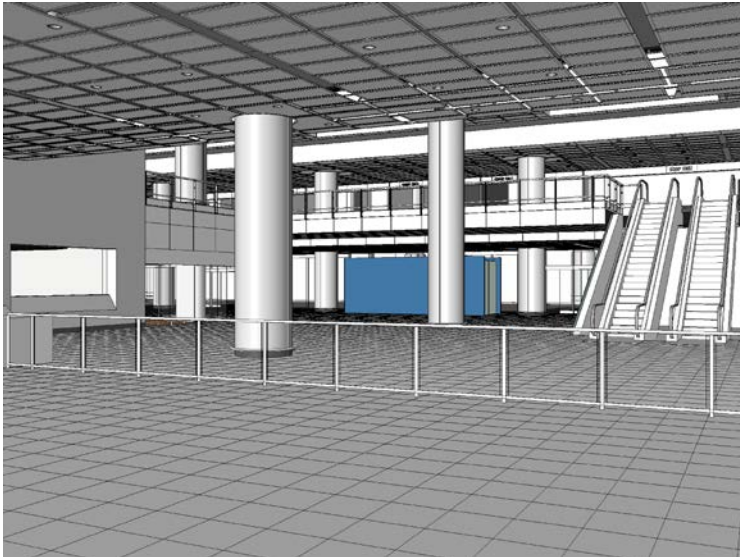
A year ago...



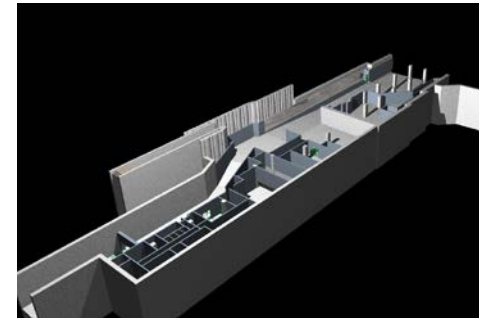
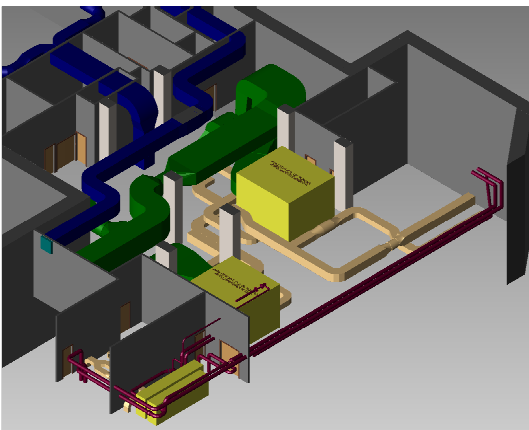
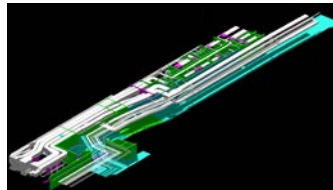
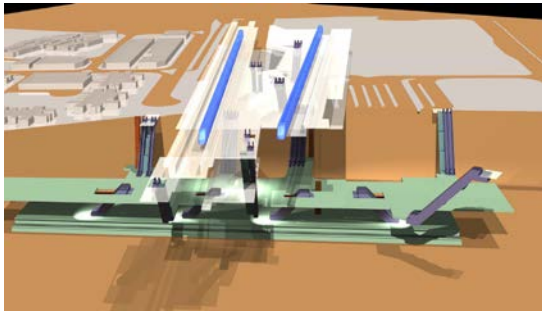
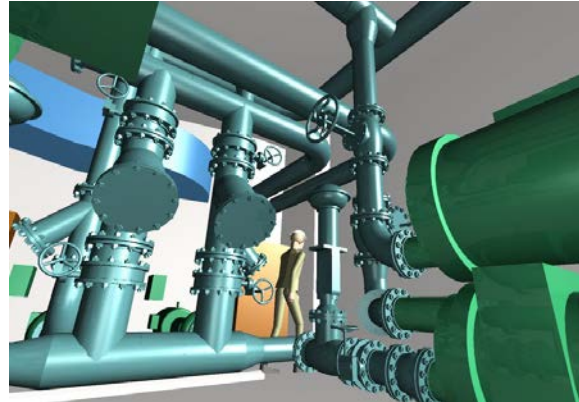
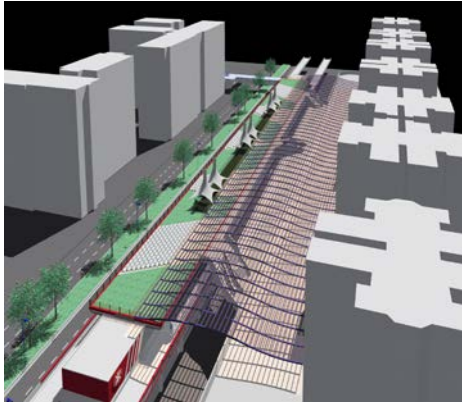
Early Projects...



Early Projects...Hong Kong Station



6 Months Ago



三維空間信息

- 更容易展示物體之間的關係
- 導線碰撞檢查

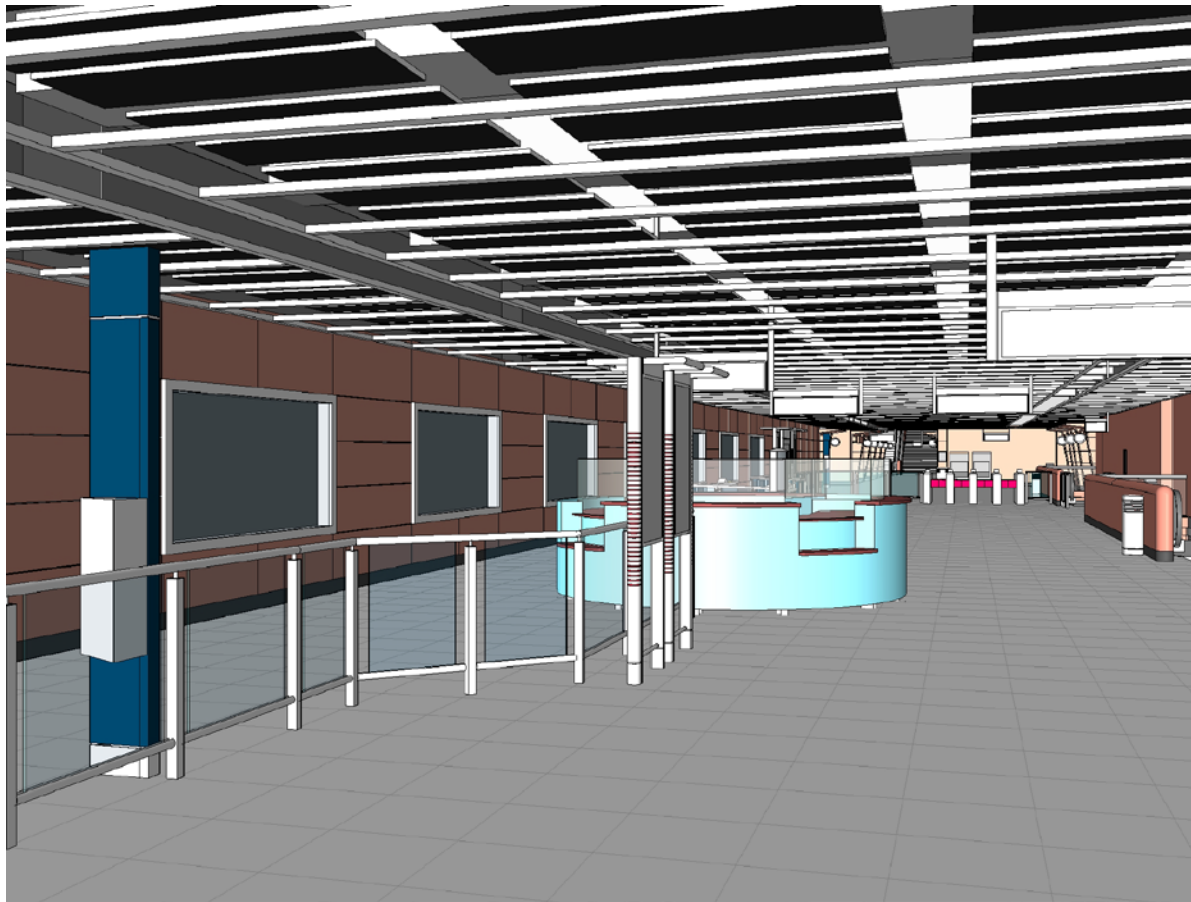
New Projects...Tai Wo Hau External Passenger Lift



From Design to Project Documentation

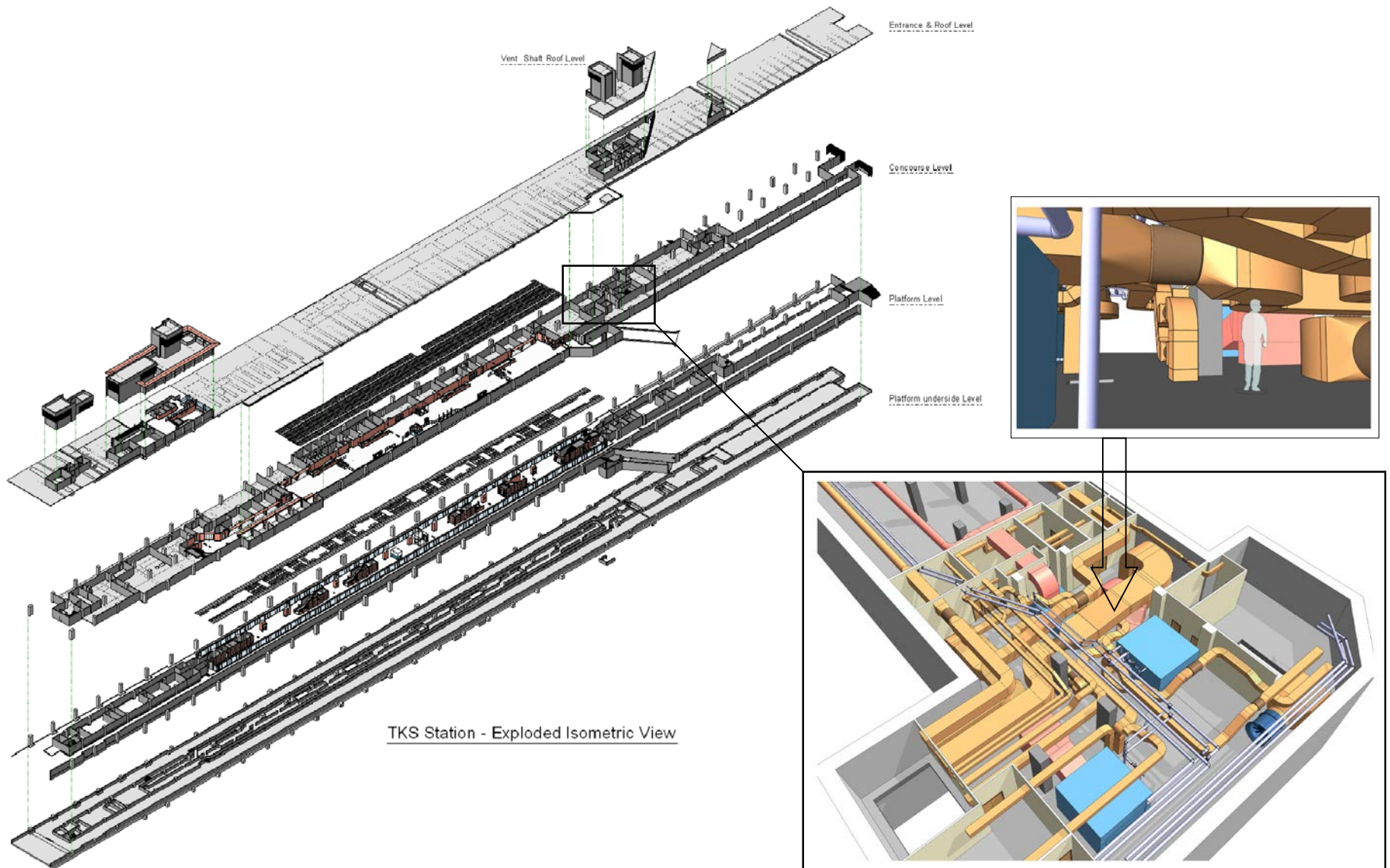


New Project...Tseung Kwan O South Station

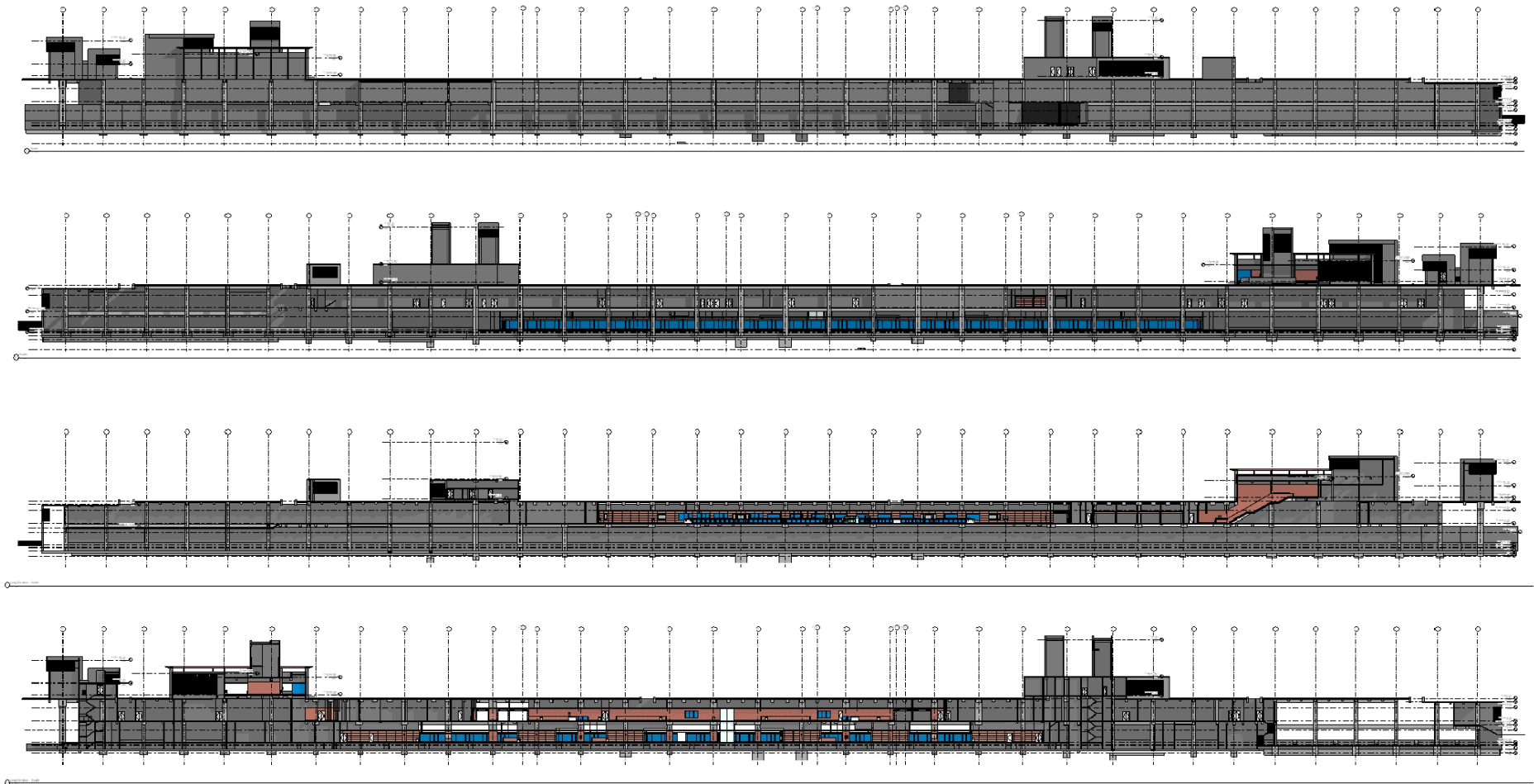


Spatial Study
Design Checking

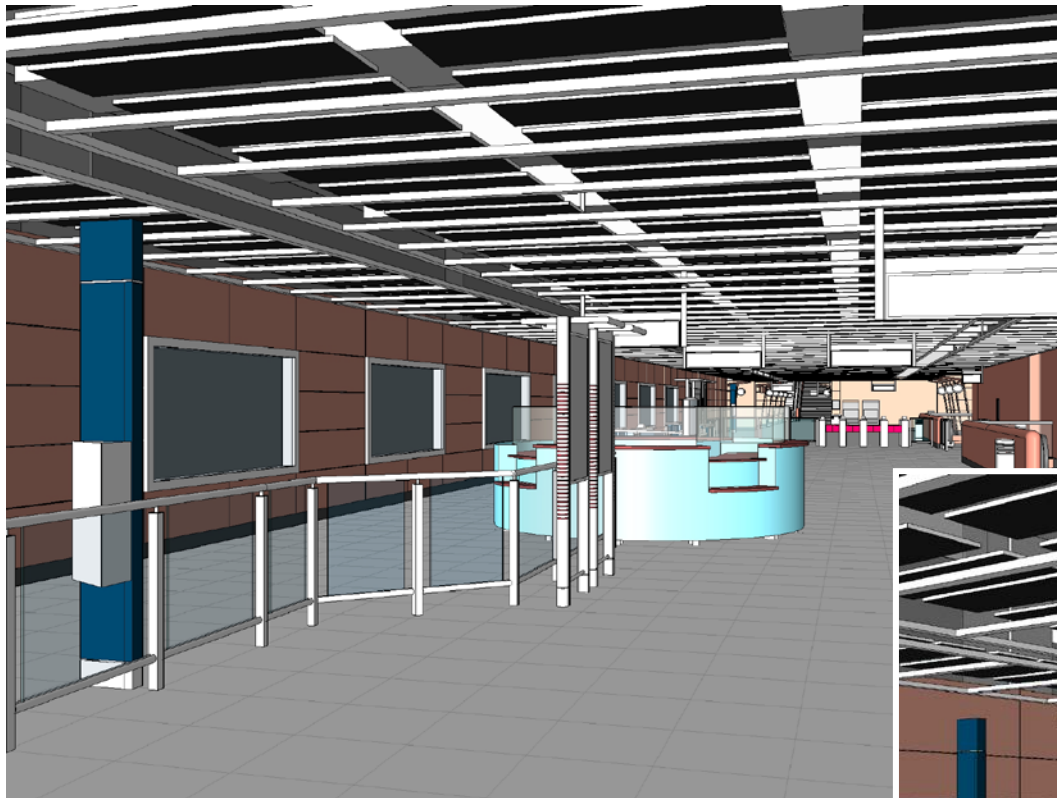
New Project...Tseung Kwan O South Station



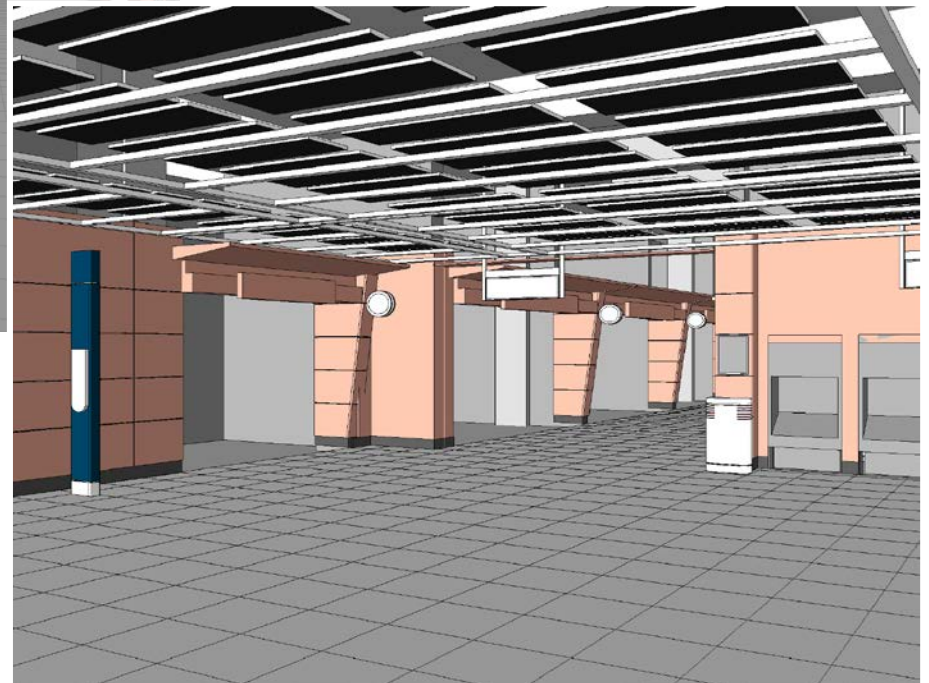
New Project...Tseung Kwan O South Station



New Project...Tseung Kwan O South Station



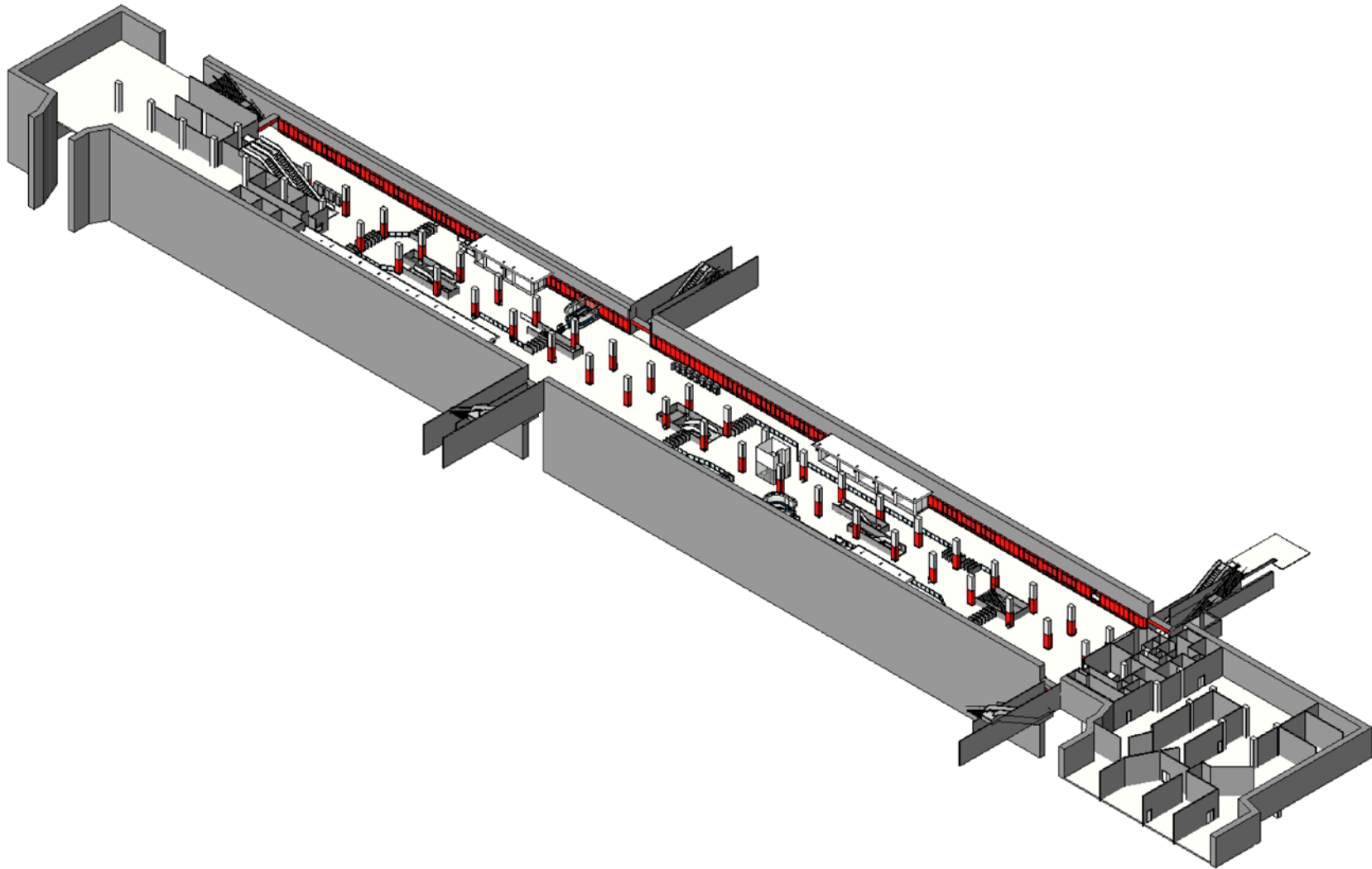
➡ See walkthrough



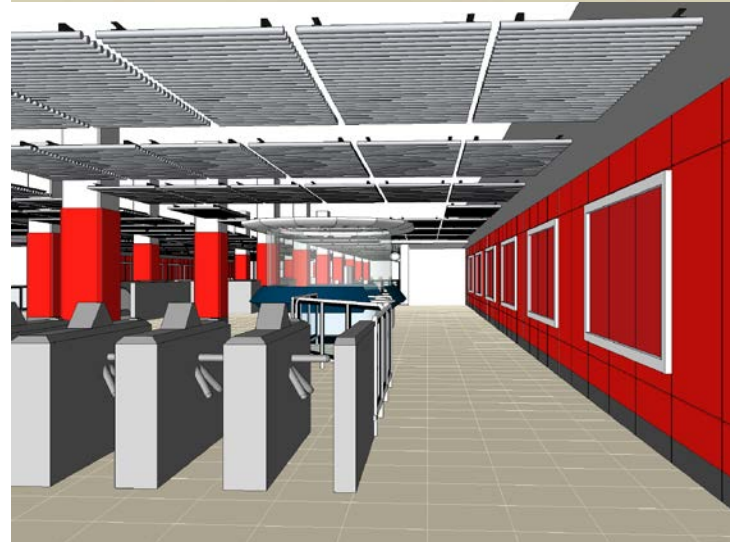
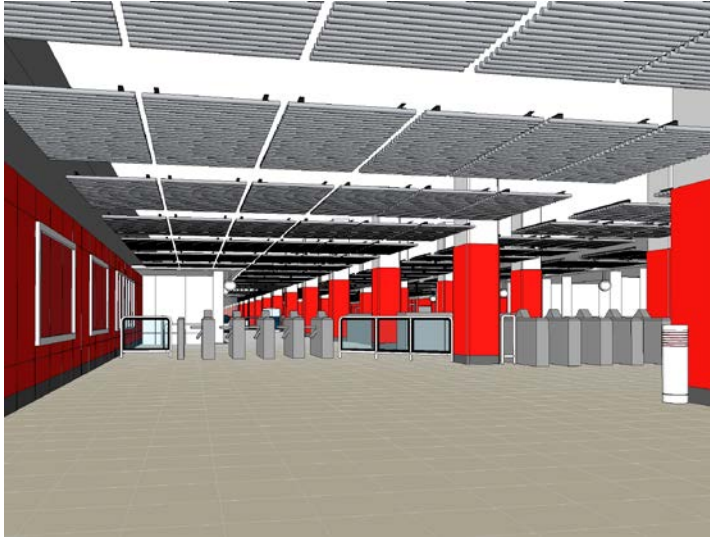
Spatial Analysis... Mong Kok Station Year 2020



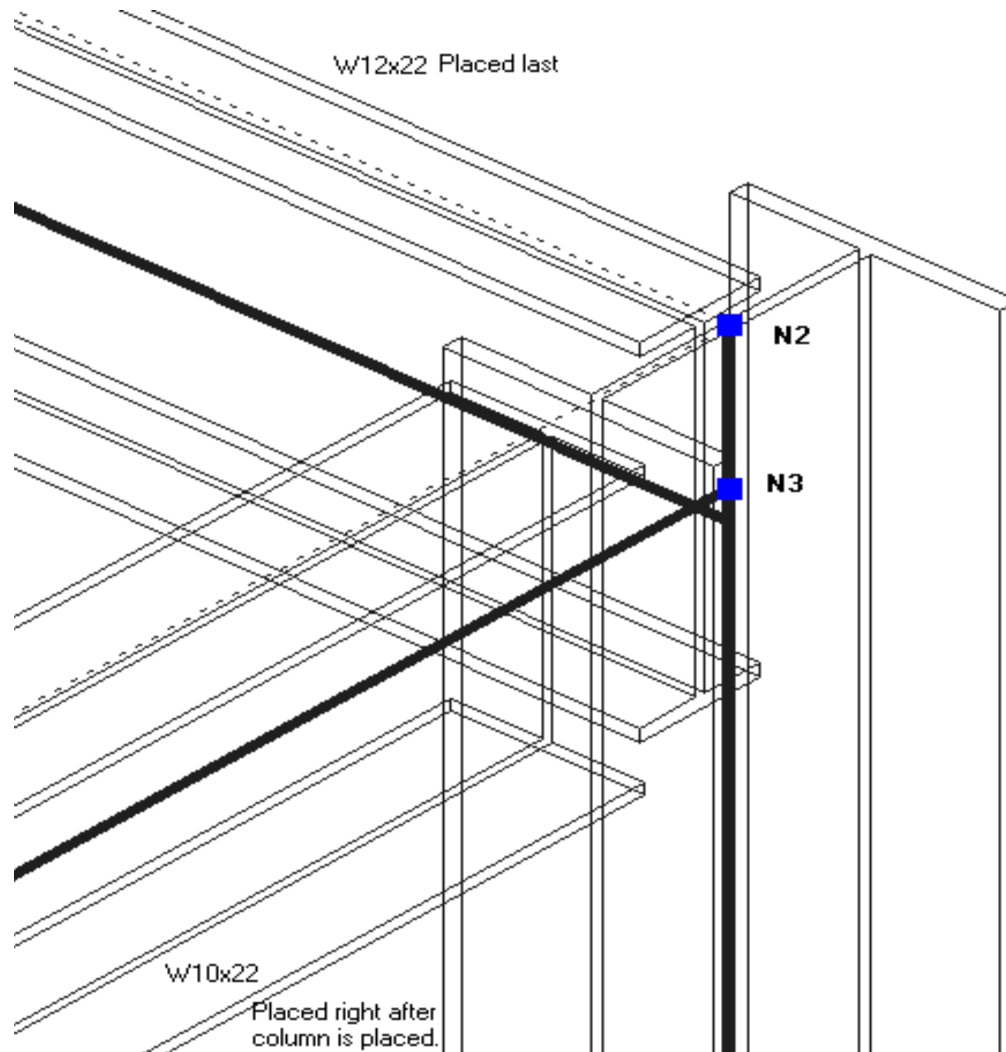
Spatial Analysis... Mong Kok Station



Spatial Analysis... Mong Kok Station



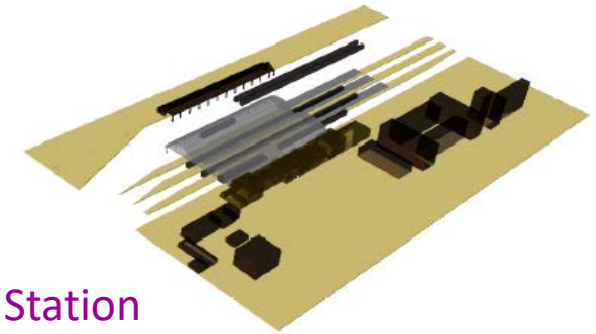
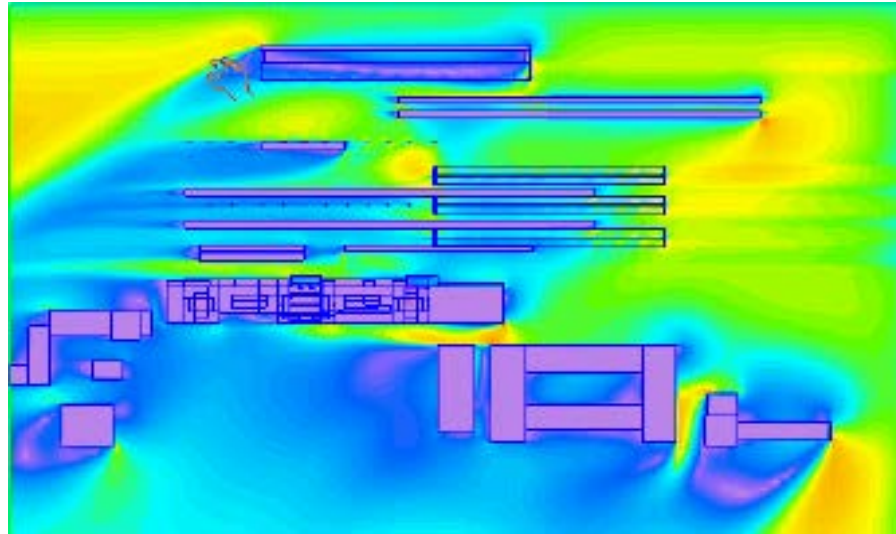
Synchronization between CAD Model and Analytical Models



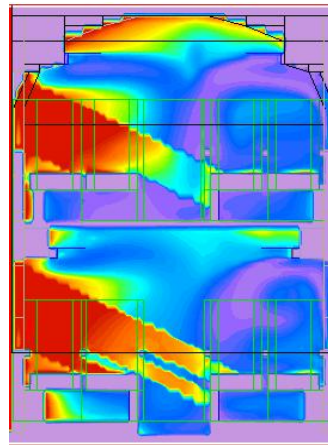
Energy Saving – Thermal Comfort



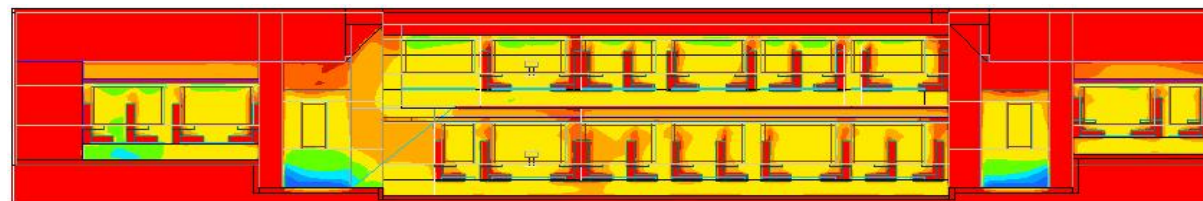
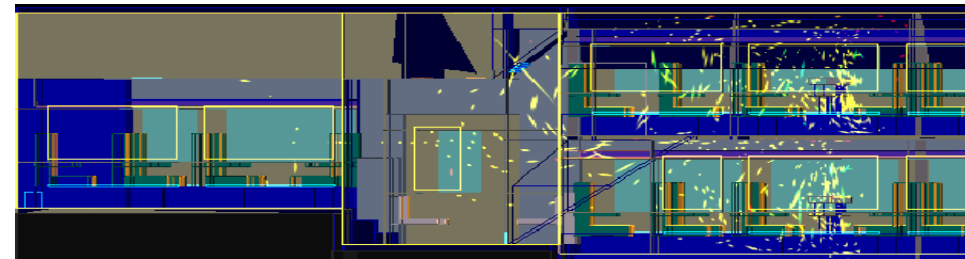
Train
Driver



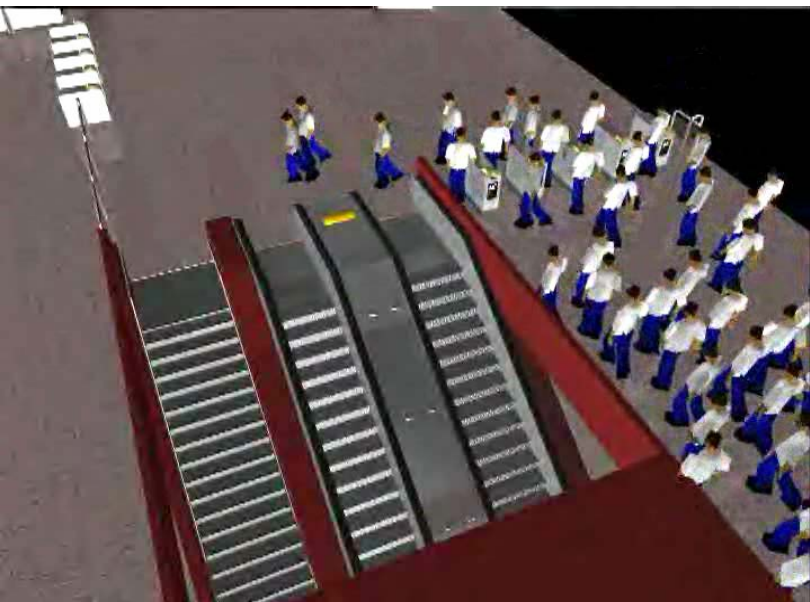
Station



Train

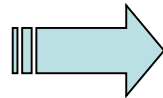
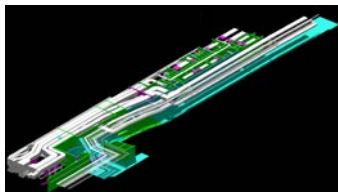


Simulations Software

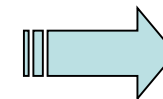
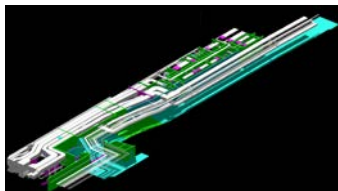


Smoke Extraction Simulation... Tsim Sha Tsui Station

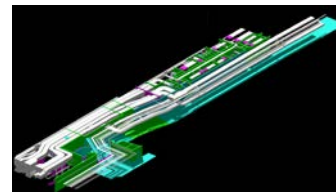
MTRC ...



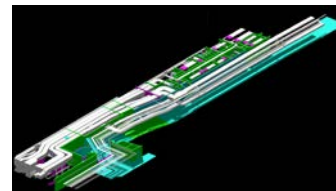
Simulation AVI-1



Simulation AVI-3

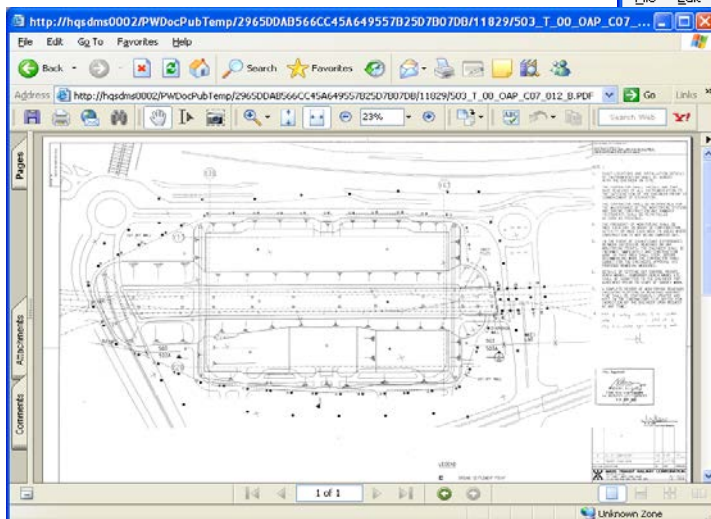


Simulation AVI-2



Simulation AVI-4

Asset Management



http://hqs002/PWDocPubTemp/296500AD566CC45A6495570250700700/11029/503_T_00_OAP_C07_012_B.PDF

Asset Technical Information System - Microsoft Internet Explorer provided by MTR Corporation Limited

File Edit View Favorites Tools Help

http://hqs002/mtrcl/rais/atis.htm

公司
t Corporation

Asset Technical Information System

Initial ion Project Definition Document Statutory Record Fire Safety Information Maintenance Information Asset Replacement Planning Project-In-Progress Asset Key Parameter Drawing Management System Knowledge Library

Record

ords found : 1126

Ungrouped

Statutory Type	Submission Title	Document Ref No
BD	Agreement between the Mass Transit Corporation and the Public Works Department	-
BD	Lantau Airport Railway - Kowloon Station	1993-09-28 BD 3/7163/93 F BD_ AURP
BD	Lantau Airport Railway - Kowloon Station	1993-10-26 BD 3/7163/93 F BD_ ARUP
BD	Lantau Airport Railway - Kowloon Station	1993-10-26 BD 3/7163/93 F BD_ ARUP
BD	Lantau Airport Railway - Kowloon Station	1993-10-26 BD 3/7163/93 F BD_ ARUP
BD	Lantau Airport Railway - Kowloon Station	1993-10-26 BD 3/7163/93 F BD_ ARUP
KOW	Lantau Airport Railway - Kowloon Station	1994-01-07 (20) in BD 3/7163/93 F BD_ ARUP
KOW	Lantau Airport Railway - Kowloon Station	1994-01-20 BD 3/7163/93 F BD_ ARUP.PDF
KOW	Lantau Airport Railway - Kowloon Station	1994-03-24 BD 3/7163/93 F BD_ ARUP.PDF
KOW	Lantau Airport Railway - Kowloon Station	1994-05-19 BD 3/7163/93 F BD_ ARUP
		1994-09-06 BD 3/7163/93 F BD_ ARUP
		1995-02-09 BD 3/7163/93 F BD_ ARUP
		1995-02-24 BD 3/7163/93 F BD_ ARUP

Drawing / Document List

Drawing Title	Drawing Number	Revision
	Letter	
CONTRACT 503A KOWLOON STATION FOUNDATIONS SITE PLAN GEOTECHNICAL MONITORING PLAN	503/T/00/OAP/C07/012/B	B
CONTRACT 503A KOWLOON STATION FOUNDATIONS SITE PLAN GEOTECHNICAL MONITORING PLAN	503/T/00/OAP/C07/012/B	B
CONTRACT 503A KOWLOON STATION FOUNDATIONS GENERAL INFORMATION FORMATION PLAN	503/T/00/OAP/C10/015/A	A
CONTRACT 503A KOWLOON STATION FOUNDATIONS GENERAL INFORMATION FORMATION PLAN	503/T/00/OAP/C10/015/A	A
CONTRACT 503A KOWLOON STATION FOUNDATIONS SITE FORMATION SECTIONS	503/T/00/OAP/C10/016/A	A
CONTRACT 503A KOWLOON STATION FOUNDATIONS SITE FORMATION SECTIONS	503/T/00/OAP/C10/016/A	A
CONTRACT 503A KOWLOON STATION FOUNDATIONS DIAPHRAGM WALL ZONE 11 LAYOUT AND WALL SCHEDULE	503/T/03/OAP/C10/150/B	B
CONTRACT 503A KOWLOON STATION FOUNDATIONS DIAPHRAGM WALL ZONE 11 LAYOUT	503/T/03/OAP/C10/150/B	B

Buildings Department
屋宇署

Our Ref. 申請編號: BD 3/7163/93 F
Your Ref. 案圖編號: 604 No. 3
電話: 648 1139
傳真: 526 7430

28 September 1993

Mr. I A Curreen
B63, Provident Centre,
Wharf Road, North Point,
Hong Kong.

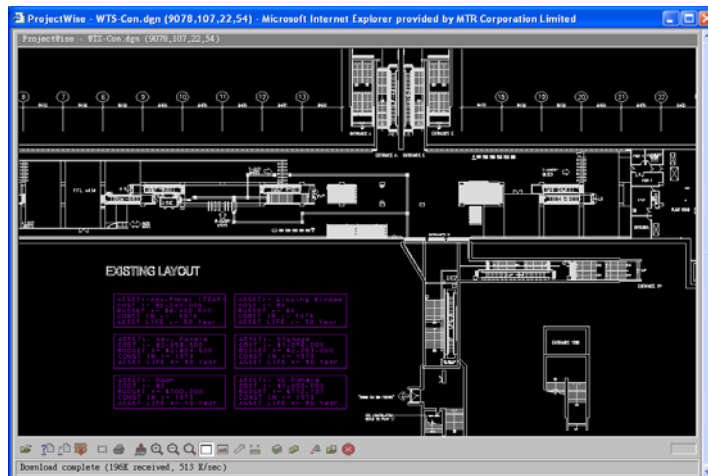
Dear Sir,

Lantau Airport Railway - Kowloon Station

I refer to your application dated ** for approval of proposals in respect of ***

www.mtr.com.hk has been checked in accordance with the contents of Practice

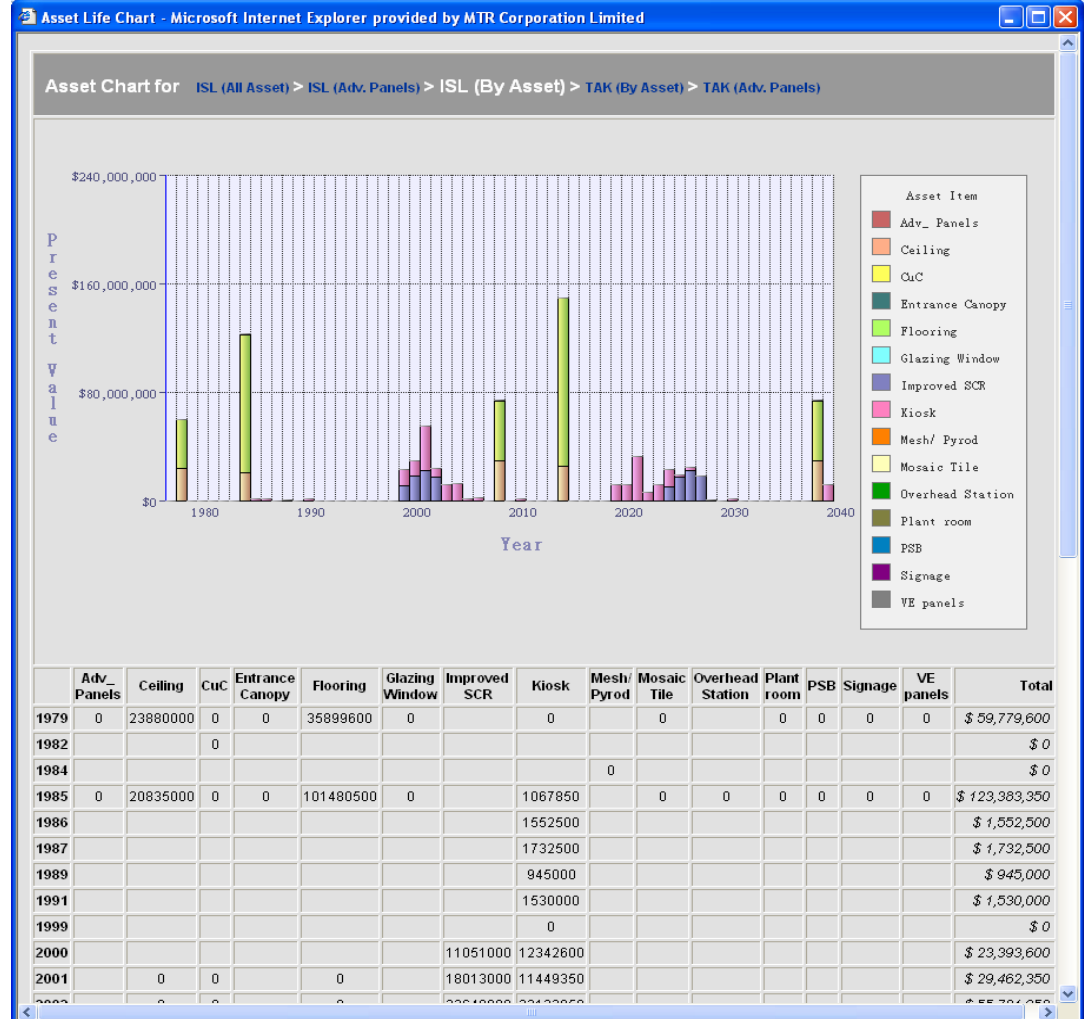
Asset Management



Asset Technical Information System - Microsoft Internet Explorer provided by MTR Corporation Limited

Asset Life Database

Station Location	Asset Category	Description	Initial Placement Service	Current Asset Life	Estimated Asset Life	Unit	Rate	Cost Paid Replacement	AMP Budget (2007-2010)	Remarks
ADM	Kiosk	ADM-KIOSK-ADM-132	2004	20	20	30.27	45000	1362150	0	Costs Kiosk-KIOSK-132
ADM	Kiosk	ADM-KIOSK-ADM-131	2004	20	20	31.45	45000	967500	0	ADM-KIOSK-ADM-131
ADM	Glazing Window	Glazing Window	1979	30	30	0.00	0	0	0	0
ADM	Kiosk	SP-KIOSK-ADM-138	2000	20	20	22.82	45000	1917900	0	ADM-KIOSK-ADM-138
ADM	Cu/C	Cu/C	1982	25	25	1.00	0	0	0	0
ADM	MOORE TIE	MOORE TIE	1979	20	20	1.00	0	0	0	0
ADM	Adv. Panels	Adv. Panel - T&AP	1979	50	50	8.00	0	0	0	0
ADM	CEILING	Ceiling - 0.8M Fan	1979	30	30	1.00	0	0	0	0
ADM	Kiosk	ADM-25	2005	20	20	19.23	45000	879000	0	Not Reported in F&R. Data placed in column referred to by SP Number 244
ADM	Kiosk	ADM-KIOSK-ADM-133	2004	20	20	24.00	45000	1385000	0	Costs Kiosk-KIOSK-133
ADM	Flooring	Flooring - Mosaic Tile	2001	15	15	1.00	0	0	0	0
ADM	Kiosk	SP-KIOSK-ADM-139	2000	20	20	36.00	45000	1617000	0	Replaced or replaced by SP (200-2000)
ADM	Plantroom	Plantroom	1979	25	25	1.00	0	0	0	0
ADM	Kiosk	ADM-36-37	2005	30	30	48.74	45000	1831000	0	Not Reported in F&R. Data placed in column referred to by SP Number 244
ADM	VE panels	VE panels	1979	30	30	1.00	0	0	0	0
ADM	Ceiling	Ceiling - Tubular	1979	30	30	1.00	0	0	0	0
ADM	Entrance Canopy	Entrance Canopy (Flat roof)	1979	25	25	1.00	0	0	0	0
ADM	Signage	Signage	1979	30	30	1.00	0	0	0	0
ADM	Kiosk	ADM-16	2005	20	20	23.09	45000	1036000	0	Not Reported in F&R. Data placed in column referred to by SP Number 244



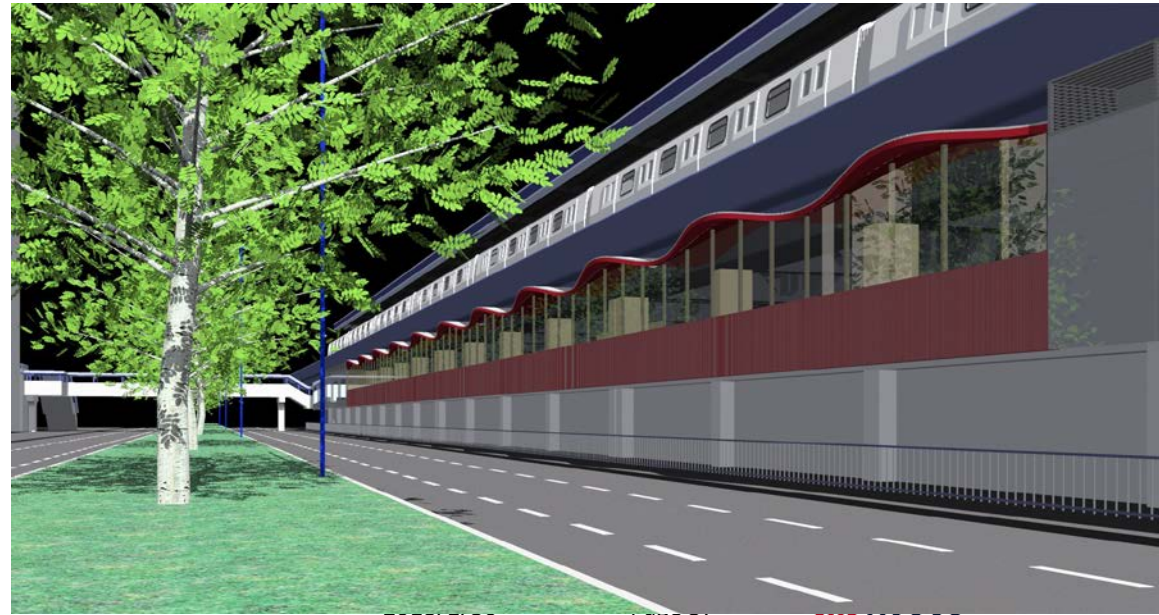
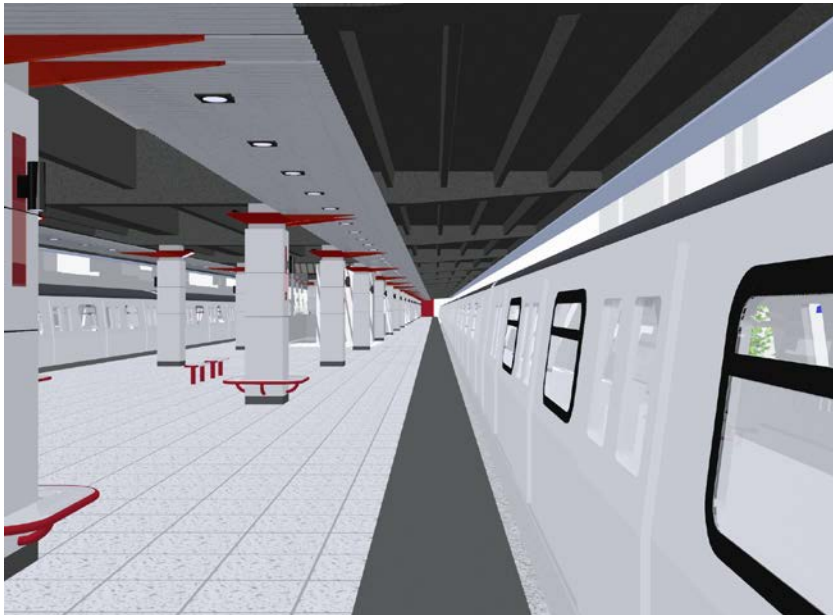
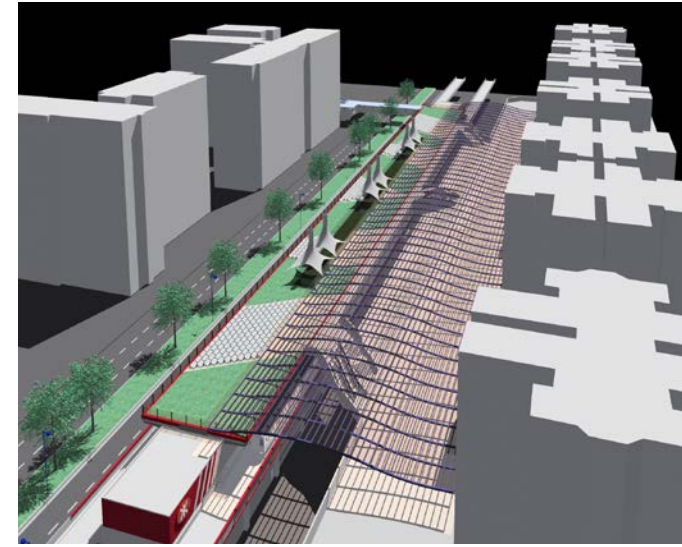
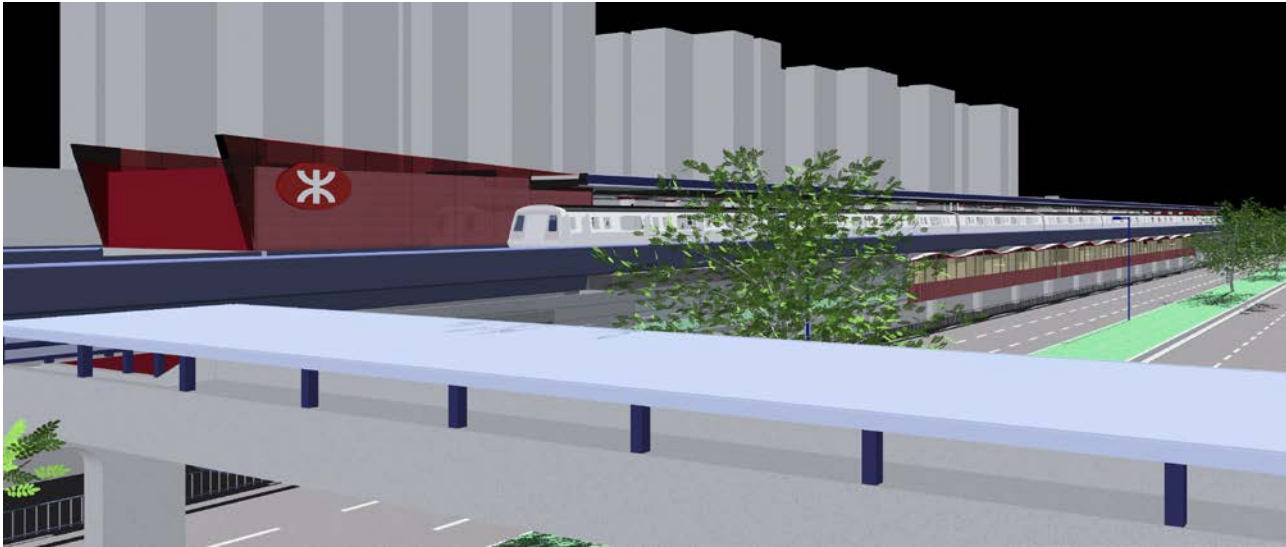
Asset Management – Integration with RFID

Radio Frequency Identification (RFID)

- Chip-based Tags storing equipment's ID and other information
- Remotely retrieve the information by RFID
 - ⇒ Portable Device
 - ⇒ Compact Flash Card
 - ⇒ Mobile Phone Reader
- Retrieve information directly by reading equipment ID stored in RFID



Asset Management



謝謝