منتدى دبي العالمي لإدارة المشاريع
DUBAI INTERNATIONAL PROJECT MANAGEMENT FORUM

RTA

Portfolio of Enhancement Works in Operational Metro Stations

Case Study

- Enhancement of selected stations on Dubai Metro Redline
- Development above Gold Souq Metro Station
- Lifts of Mall of the Emirates Metro Station

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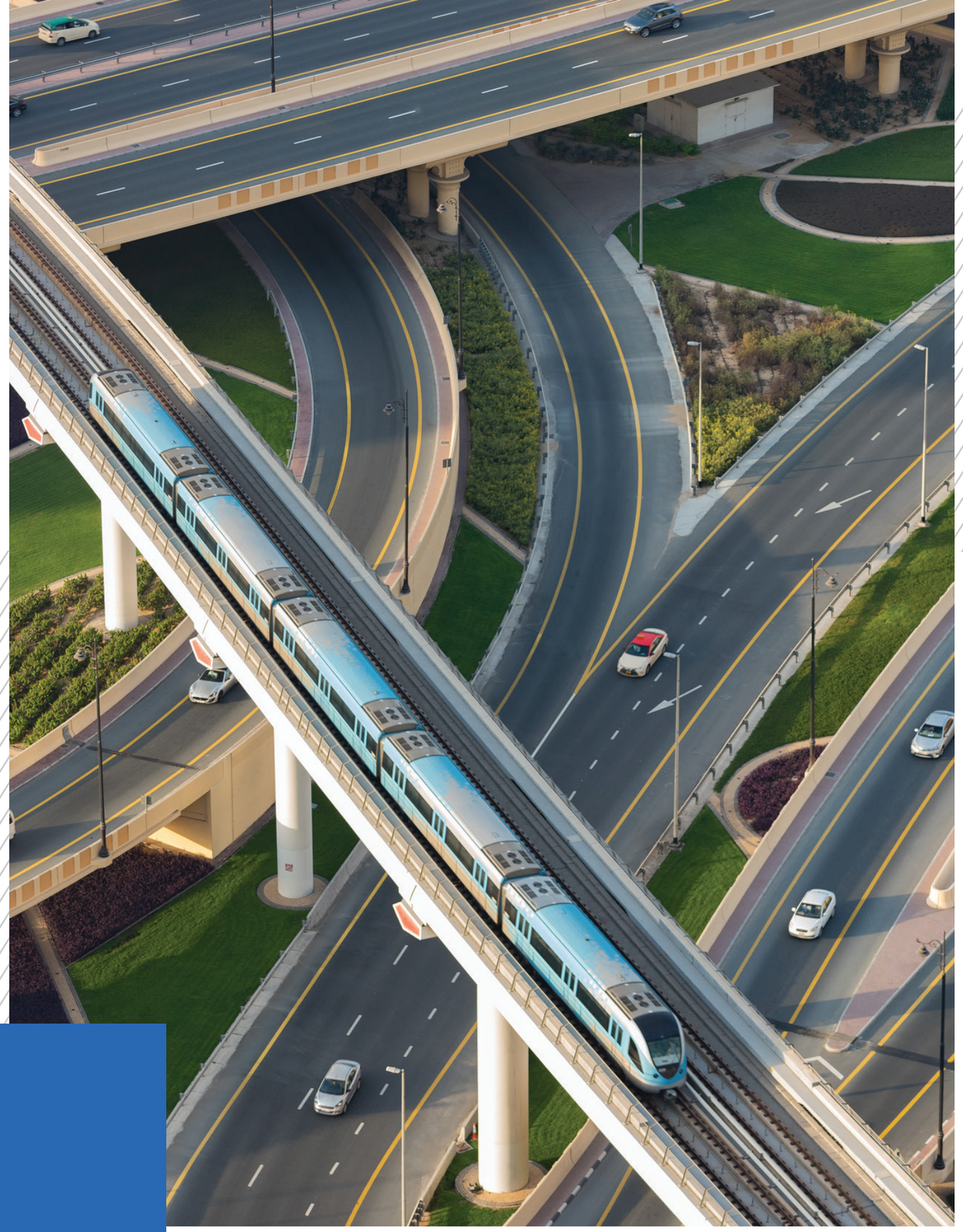

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RTA Background

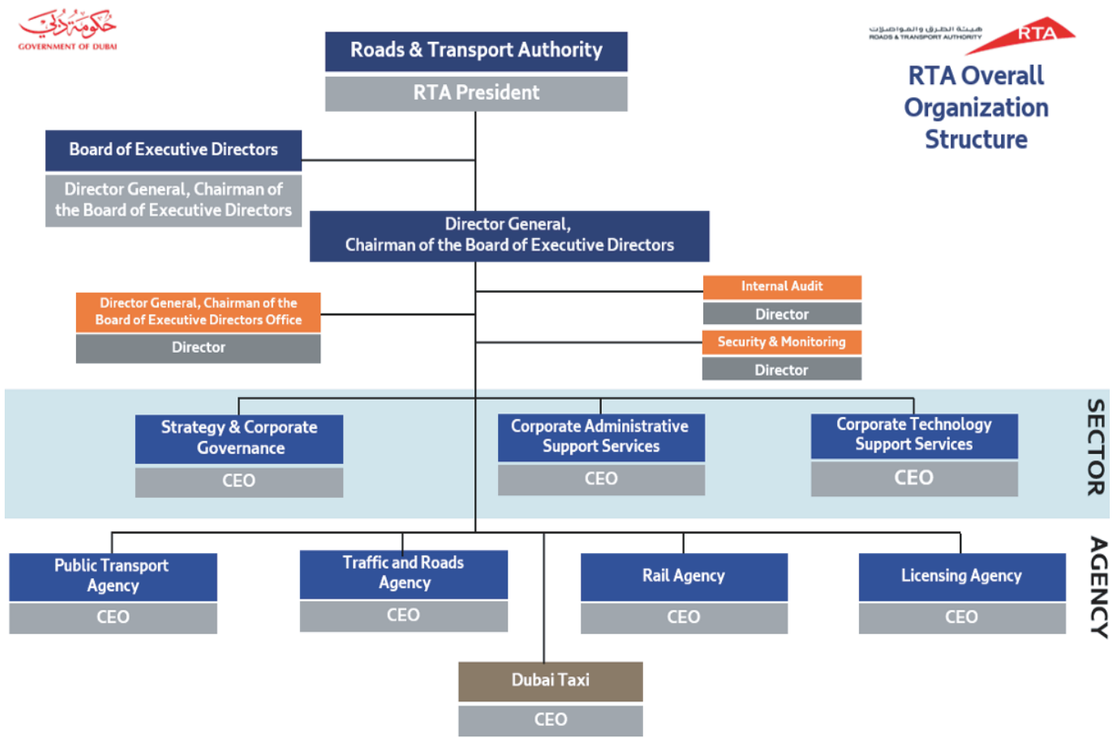
1.1 Brief History

The Roads and Transport Authority (RTA) was established by the decree number 17/2005 in November 2005. Accordingly, RTA is responsible for planning, design, operation and maintenance of public transport, roads & traffic systems in the Emirate of Dubai, between Dubai and other Emirates of the UAE. Since RTA's establishment, it adopted a challenging vision and Mission to contribute effectively to Dubai's big vision in serving the vital interests of the Emirate.

RTA works towards achieving the vision of providing **"The world leader in Seamless and sustainable mobility"** and RTA's mission is to "Develop and manage integrated and sustainable roads and transportation systems at a world-class level, and provide pioneered services to all stakeholders for their happiness, and support Dubai's vision through shaping the future, developing policies and legislations, adopting technologies, innovations and world-class practices and standards".

1.2 RTA Organization Structure

RTA's organizational structure (Figure 1) shows that RTA adapts the “Agency Model” which aims at providing flexibility in running work and separating regulatory issues from operational ones. Each Agency has a CEO, who is a member of RTA’s Executive Board that governs the organization and takes strategic decisions, leads Sector. This rail portfolio was managed by Rail Agency in RTA.



RTA Overall Organization Structure

Figure 1 : RTA Organizational Structure

02


الدرجة
الذهبية
Gold Class
Gold
Class
غرامة 100 درهم
لمن لا يحمل
البطاقة الذهبية
100 AED fine
For non
Gold Card Holders

Overview

Led by its Goals and Objectives, RTA is continuously creating its projects, programs and portfolios. As one of RTA's most important goals, "People Happiness" was the driving factor to initiate one of the rail project portfolios that is focusing on developing services based on customers' needs and experience. Customer experience is a never-ending journey and most leading organizations seek how they can enhance their relationship with customers targeting their happiness.

Dubai metro was in revenue service in Sep. 2009 with 29 stations (red line) which were increased to 47 stations through the introduction of the Green Line. The combined network of the two metro lines adds to 75km of track. A new 15km long extension connecting the existing Red Line with the Expo 2020 site in the south of the city was added to the network. These network serves 3.1 million Dubai residents and approximately 1 million commuters and tourists who visit Dubai every day, which impose continuous efforts to keep these commuters happy.

Many Customer-Centric Enhancements were initiated after metro operations, having the following objectives:

- Improve level of service, comfort of passengers and safety.
- Accommodate increased ridership from Expo 2020 event visitors.
- Stations accessibility improvement and ease of vertical movement.
- Enhanced connectivity and integration with other modes of transport.
- Provision of additional commercial services and station amenities and opportunities for revenue generation.
- Accommodate for the expected 2030 ridership.

The starting project was initiated early in 2018 : Enhancement of three stations on Dubai Metro Redline (Pj-1).

The short-term intension was to enhance the experience of Dubai Expo 2020 visitors while the ultimate objective was all Dubai metro commuters.

The following 2 components were added later with the same aim of enhancing customer experience. Forming a customer centric portfolio of three projects.

- Development above Gold Souq (Market) Metro Station (Pj-2).
- Lifts of Mall of the Emirates Metro Station (Pj-3).

Managing these projects as a Portfolio enabled RTA to oversee and manage the challenges on a macro scale and effectively making use of shared resources.

Although some common challenges were managed on the Portfolio level, the majority were project-level challenges and were successfully dealt with.

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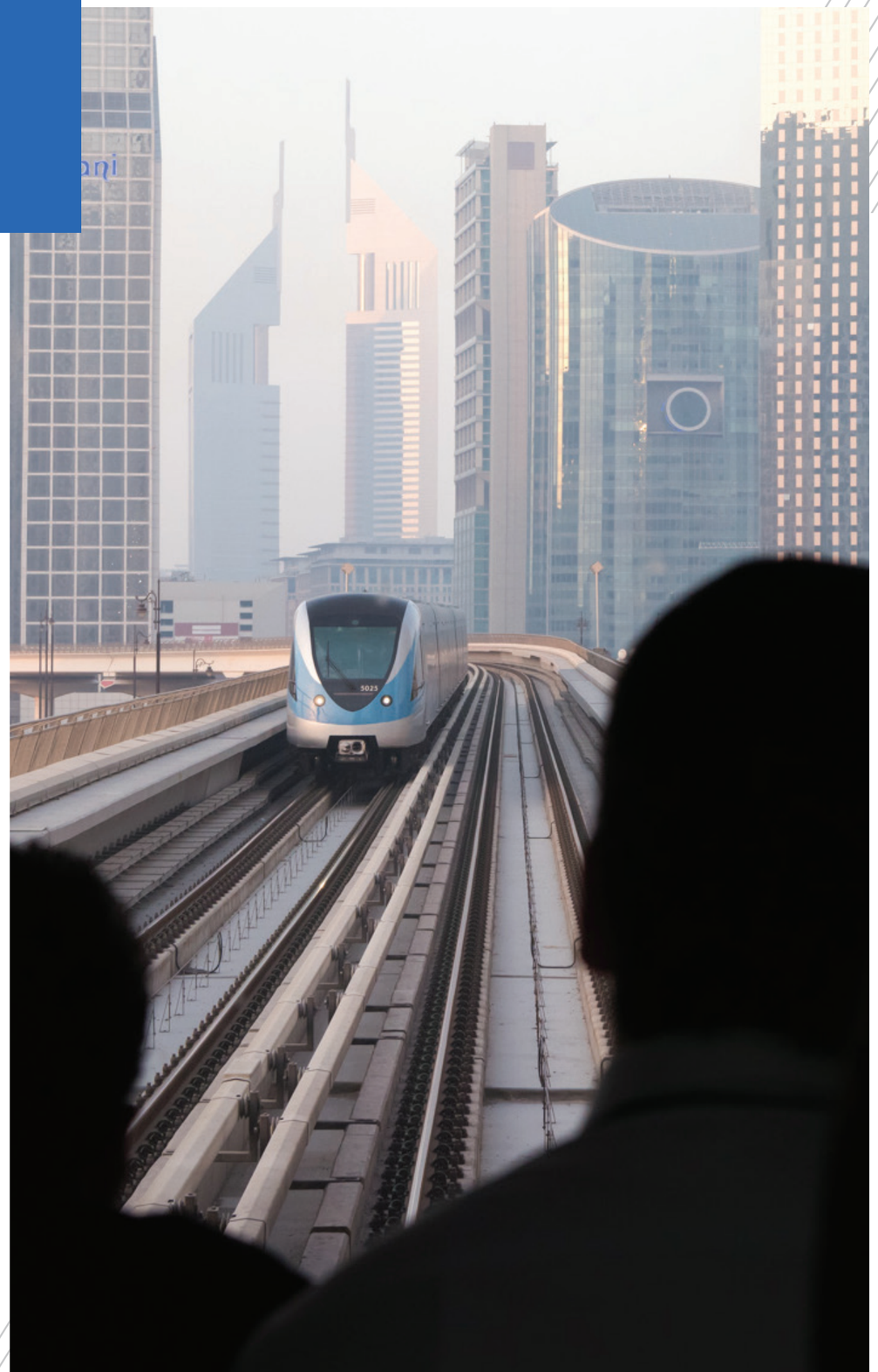
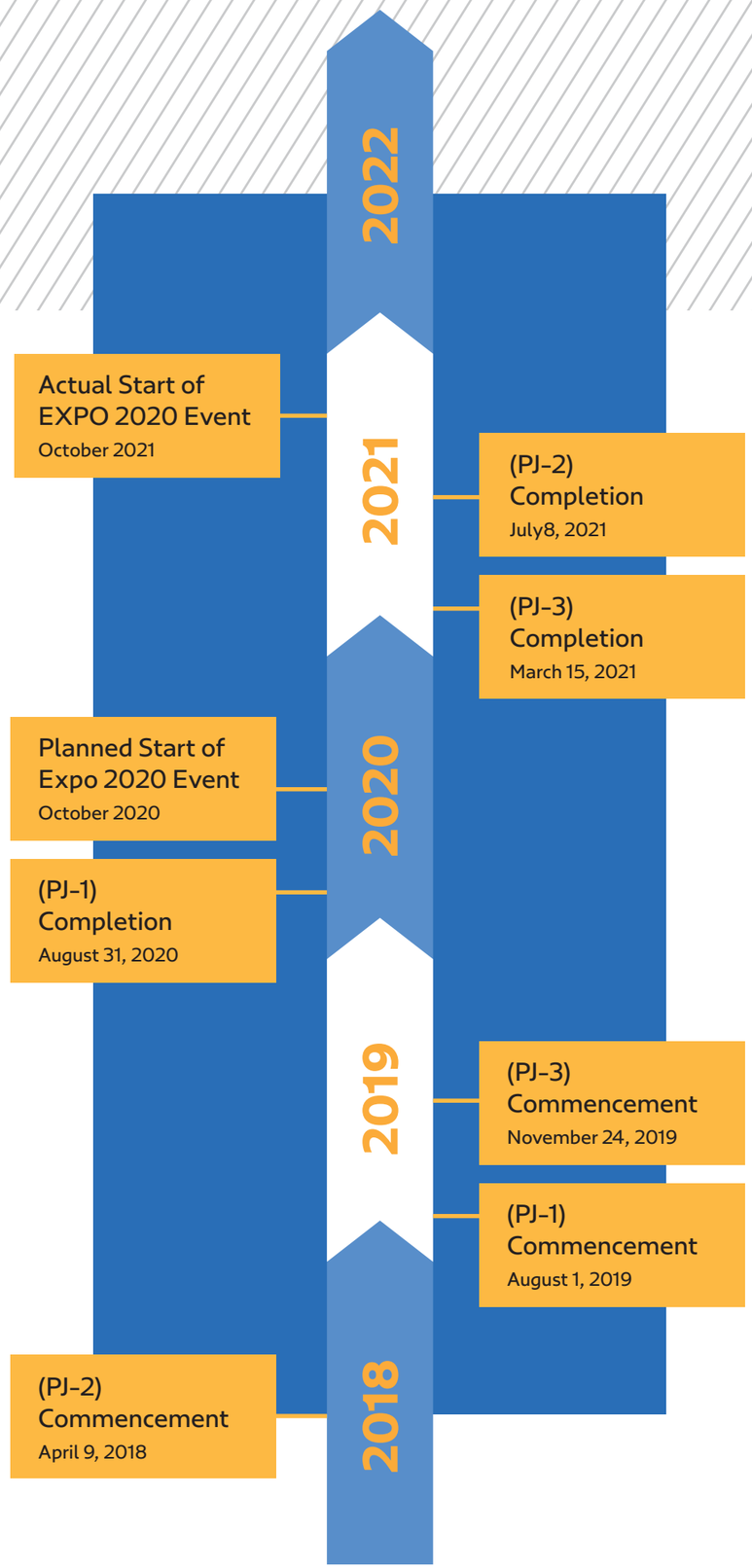
Portfolio Timeline





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Portfolio Components

4.1 Project (Pj-1) of the Portfolio: Enhancement of selected stations on Dubai Metro Redline

This 57-million $ project is a design and Build contract for the Enhancements of three Metro stations namely: DAMAC (now Sobha Realty), Dubai Internet City and UAE Exchange.

The target was to have these 3 stations open to public prior to Expo 2020 event. One of the major project requirements (constraints) was to avoid any interruption to the current metro operations and passenger's level of service which considered one of the top unprecedented challenges for project construction within a limited space.

The scope of work included the following:

- Adding a new entrance pod parallel to Road E11 "Sheikh Zayed Road".
- Relocation of existing elevator to allow for the installation of a new escalator and stair serving the Tram station platform (to improve the Tram-Metro connectivity) – Damac Station.
- Providing space for retail, a waiting area and passenger information.
- Altering the access road leading to the metro entrance (as part of the integration plan) by adding a new drop off areas for buses, taxis and private cars including disabled people parking. (In Dubai and UAE, the terminology "Disabled People" is formally replaced (by Law) with the new term "People of determination".
- Addition of street furniture, seating and bicycle parking at both east and west sides of the entrance pods.
- Developing a wide footpath allowing for future cycling networks.

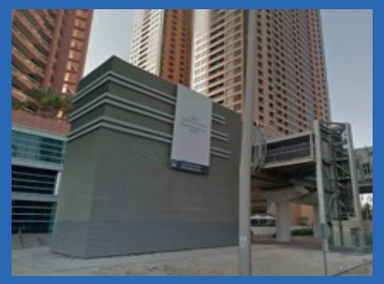
DAMAC Station (Shoba Metro Station)

Before

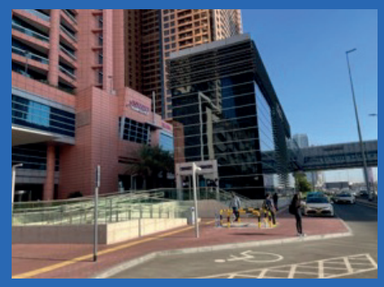
After

Dubai Internet City Station

Before



After



UAE Exchange Station

Before

After

4.2 Project (Pj-2) of the Portfolio: Development above Gold Souq (Market) Metro Station

This project is a direct implementation of Transit-Oriented Development (TOD) concept which is one of the most important principles to strengthen the urban development via the useof public transportation.

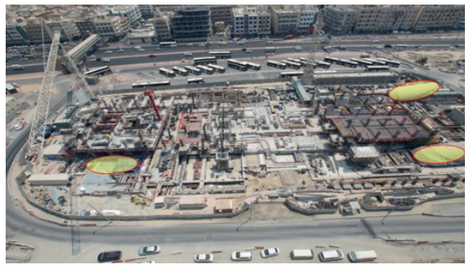
The project scope included the construction of 2-tower building that contains hotel, offices, retail shops, 3-storey carparking, bus station and the entrances to the metro station.

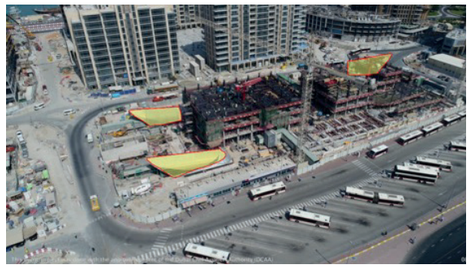
Since the owner of the project was not RTA and as a result of all construction works being executed above the Palm Deira station (underground station), RTA was a key stakeholder who was heavily involved since the early phases of design and execution until completion.

RTA Scope:

Design review, approval of Metro station Entrances design and materials, supervision of construction works, ensure the safety of Dubai Metro facilities and users during construction. Furthermore, RTA scope included ensuring the continuity of metro station operation during construction.

Before





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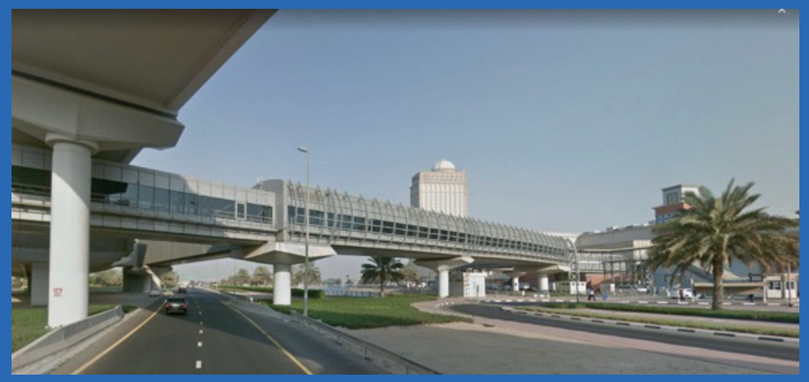
4.3 Project (Pj-3) of the Portfolio: Lifts of Mall of the Emirates Metro Station

This relatively small (1.2 Million $) and 16-month project was to provide a mean of access between the bus station with the metro station and to enable disabled passengers (People of Determination) to easily switch between the two modes of transportation. This project was initiated after some complaints were received via a VOC program (Voice of Customer) was widely implemented in the different modes of transport managed by RTA.

Before



After

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Main Challenges

The portfolio faced many unforeseen and unusual challenges. Some of which are global challenges like the Covid-19 pandemic, while the others are projects related. The prime challenges are listed below:

5.1 The COVID-19 Pandemic

Covid-19 pandemic impacted the Contractors' supply chains, the procurement of materials, reduction in the number and availability of staff and the construction workforce, restrictions to work practices during the lockdown period. Another major impact of the pandemic was on the portfolio cash flow and the need to prioritize the projects and their allocated budget.

5.2 Limited availability of pre-qualified contractors

One of the impacts of having a big event such as Expo 2020 happening in the same city and nearly same time is that the construction market is busy with most of the pre-qualified contractors heavily engaged in Expo 2020 site construction Works delivering at the same time of the projects.

For example, in some projects of the portfolio, only limited percentage out of the invited contractors accepted to participate in the tender. Furthermore, the appetite of specialist supply chain was very low for provision of some specialty works during the course of construction which limited the selection choices. On the other hand, and despite that most of the main works were Civil, but Rail systems-civil interface created some challenges to be completed on time of which many subcontractors had limited experience in this regard. Those subcontractors were the only available choice during the lockdown of Covid-19 pandemic.

5.3 Limited Duration to meet Expo 2020 opening

Limited project duration to ensure the project completion earlier than the opening of EXPO 2020 has imposed extra burden on RTA to expedite decision making. This imposed an expedited fast track process of approvals of the designs and immediate commencement with material procurement of long lead items imported from oversees.

5.4 No Objection Certificates (NOC) From Authorities and developers

No Objection Certificate (NOC) is a document, or a collection of documents; issued by service authorities and providers after having considered the impact of the proposed project on their respective existing and proposed utilities, infrastructure or property as well as their future planning requirements; indicating that they have no objection to proposed work as defined in the NOC application. In Dubai, there are various types of NOC's; Informational NOC, Preliminary Design NOC, Final Design NOC, Trial Trench NOC, Construction NOC. Generally, obtaining NOCs is a time-consuming process. However, this project portfolio followed a special path (shorter duration) to secure all types of NOC's for a design and build projects with different site locations.

5.5 Limited time to execute the daily works

In operational metro line, maintenance or construction works are only allowed to be conducted during non-operational hours (night time) to avoid any interruption to the service and to safeguard passengers. These hours are called "Engineering Hours". It normally ranges around only 4 hours daily with slight increase during the weekend. This limited working time considerably constrained the progress rate of construction works to comply with the Operator's restrictions. At some point of time, the activity of testing the new rolling stock of the metro line extension "Route 2020" resulted in further reduction in these Engineering hours which again put another constraint on the time schedule of the projects connected to the Redline.

5.6 Number of Stakeholders

Despite of identifying all stakeholders at the outset of all projects, but the interface with those stakeholders for coordination and attaining the required “No-Objection to work” was very hard task especially that two of the projects are located in the busiest main artery road in Dubai (E11 - Sheik Zayed Road). The stakeholders were too many and vary among government organizations, statutory authorities, utility and service companies, private developers and the metro operators and maintainers. For many of those stakeholders the limited time frame before the anticipated expo 2020 opening date required additional and continuous coordination, follow-up, and engagement in order to reduce the standard time limits for many of the steps.

5.7 Utilities

As previously noted, all projects were located in Dubai main vital roads. These roads had a lot of existing congested utilities with limited corridors. These utilities vary among high voltage cables, communication cables, storm and transmission water lines, sewerage, ...etc. within the site premises which necessitated many diversions and traffic management to accommodate for the new stations’ entrance pods.

5.8 Safety and ease of passenger flow during construction

The scope of work in most of this portfolio components included major changes to stations’ entrances and in some cases, totally new metro entrances. This requires dismantling existing entrance pods and disconnecting/diverting the associated systems and utilities which may affect the passenger traffic flow as well as its safety. This required additional and dynamic safety measures and precautions to ensure smooth and safe flow for passengers.

5.9 New superimposed loads on the station and tunnel structures

In project Pj-3 “Development above Gold Souq (Market) Metro Station”, additional loads on the station and tunnel structures will naturally lead to an increase of stresses on structural elements of the station and tunnel. It worth noting that this underground station was constructed in the central business district of Dubai and it was expected to have some structure above the body of the station, therefore, the station was designed to bear any additional loads resulting from the building up to 20 stories while it has been also designed not to transfer the additional load to the tunnel structure. Fortunately, the new building composed of two towers each has 5 stories only.

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Mitigation and Lessons Learnt

The teams including RTA team, the Engineer and the Contractor overcame most of the challenges by tracking issues from theaonset of the projects and via effective risk management and proactive project management with more emphasis on the priorities.

6.1 Supply chain management & expediting relevant approvals

Short durations to obtain design NOC's and procure long lead items led to redirect the efforts to proceed with the following :

- For long lead items, it was agreed to use many of the existing approved suppliers from another major rail project constructed on the same time horizon (Route 2020) to cut short the durations.
- Design NOC's were merged with construction NOC's to save time in coordination with various service authorities.
- RTA supported the Contractors' efforts and closely followed-up with the relevant stakeholders on a regular basis.

6.2 Rail interface works Challenges

- RTA and the Engineer applied the partnership concept and supported all contractors to achieve their missions and have their deliverables aligned with the project requirements. A lot of workshops were held to enlighten all project parties on the Rail interface works and work restrictions next to existing Rail assets.

6.3 Management of COVID-19 Pandemic

Covid-19 Pandemic had impacted cashflows, procurement and progress of work. The team implemented the following:

- Since most of the strategic and operational plans have been restructured, disrupted or totally altered, and to avoid the subjective selection of those projects which will continue, and others being put on hold or terminated, RTA experts has developed a technique to select the optimum mix of projects based on a budget constraint (simultaneously considers relative importance of projects and available budget). This technique succeeded in eliminating any unstructured approach to select the projects during the budget limitation time. (Simply, the technique "Chart 1" depends on developing a project score using agreed-on prioritization criteria and make the selection of projects within a specific portfolio using a chart showing the projects' score versus Cost- Chart 2).
- Strategy for delivery was re-aligned to cope with the impact from the pandemic and the timeline was amended with new completion milestones.
- For the cladding works (which is a main activity in all projects), it was jointly agreed with various contractors to order the bulk of the materials with standard sizes with non-standard 'cut' sections to follow later through a detailed delivery schedule co-agreed with suppliers.
- To accommodate mutually agreed changes in the plans with a high level of agility, while not comprising the contractual relations, supplementary agreements were introduced to accommodate extension of time, revised milestones and revised cashflow.

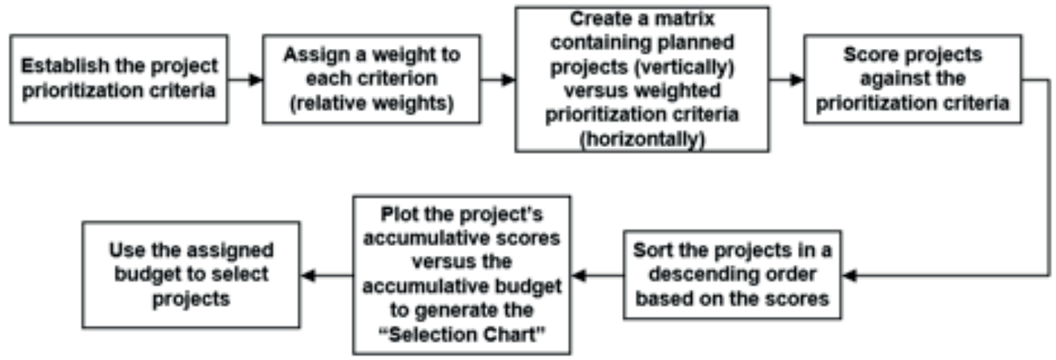

Chart (1): Projects Selection Steps

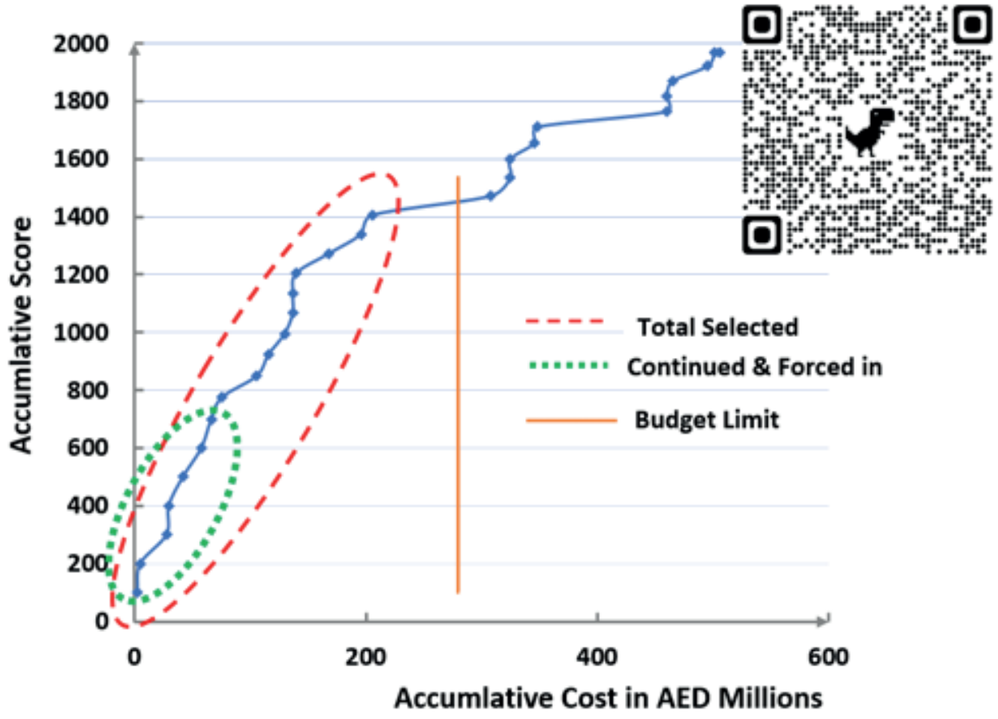

Chart (2): Projects Selection Chart for Portfolio XYZ
(Scan the QR code to download the full article)

6.4 Monitoring the existing structure

To ensure the safety of the station and tunnel structures (in project Pj-3 “Development above Gold Souq (Market) Metro Station”), a specialized institution was early appointed during the planning phase to monitor the rail facilities and infrastructure of the existing operational station. Many devices/ instruments have been installed within the station and the tunnel (6 months prior to construction- the reference baseline) to provide a tool of monitoring any settlement or deformation in the state of the facilities. These devices / instruments were installed and monitored according to a Monitoring Management Plan before and during construction till completion and the results were verified by an independent third party.

6.5 Rigorous implementation of context planning

Station Context Planning (SCP) is a concept which addresses the interfaces between the stations and the physical surrounding the station areas including, but not limited to: Metro, Tram, bus routes, pedestrian and vehicular traffic patterns, roads and landscape.

SCP was rigorously implemented in all areas around the newly developed stations’ entrances. The following areas were handled:

- Increase the entrance directional signs to ensure ease of access to the station.
- Inclusion of horticulture works around the stations.
- Integration with other modes of transport.
- Providing sufficient footpaths.
- Providing bicycle racks near the entrance of the station.
- Providing lay-by areas for taxi/bus drop-off.
- Providing enough signs / maps inside the station.

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