RTA

EXPO Crowd Management

(Case Study)

dipmf.ae

منتدى دبي العالمي لإدارة المشاريع

DUBAI INTERNATIONAL PROJECT MANAGEMENT FORUM

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1. RTA Background

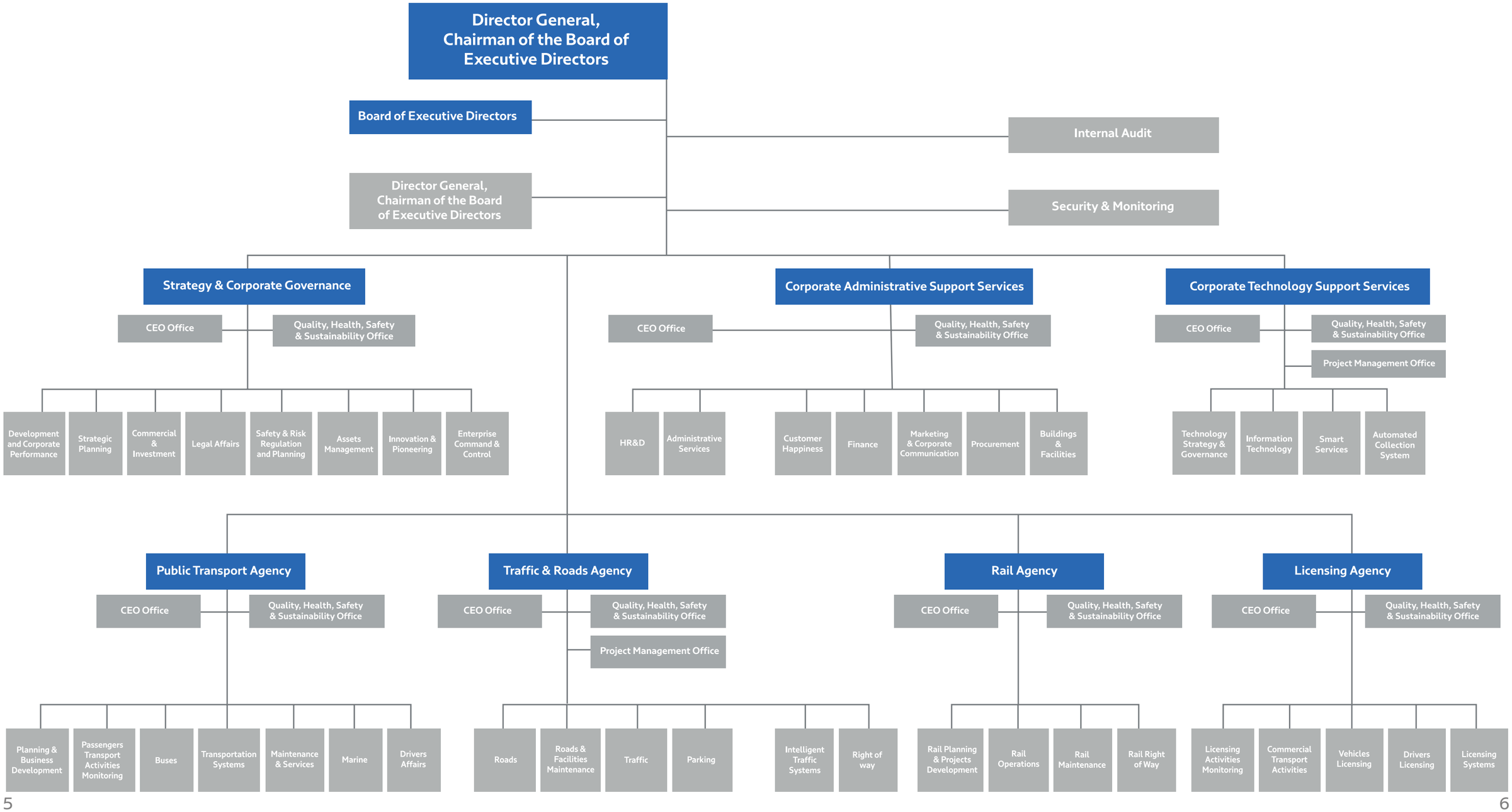
Brief History

The Roads and Transport Authority (RTA) in Dubai was established in November 2005 through decree number 17/2005. Its primary mandate is to plan, design, operate, and maintain public transport, roads, and traffic systems in Dubai and facilitate transportation connections between Dubai, other Emirates of the UAE, and neighbouring countries.

Since its establishment, the RTA has adopted a challenging vision and mission aimed at effectively contributing to Dubai's overall vision and serving the vital interests of the Emirate. The RTA strives to become the world leader in seamless and sustainable mobility, providing innovative and safe travel experiences to make every journey in Dubai a world-class experience.

Organizational Structure

The organizational structure of the RTA, as depicted, follows the “Agency Model”, designed to offer operational flexibility and separate regulatory matters from day-to-day operations. Under this model, each agency within the RTA, led by a CEO who sits on the Executive Board, governs and makes strategic decisions for their respective core business.



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2.1 Introduction

Expo 2020 Dubai World Expo was a global exhibition that brought together some of the world's greatest innovators and attracted millions of visitors worldwide.

In November 2013, Dubai won the privilege to host Expo 2020, and in the intervening years, several transport studies were undertaken, and associated plans were developed. Expo Dubai 2020 was held on a new site outside the serviced areas with no pre-existing suitable transportation services for the large number of expected visitors. The transportation management plan prepared and implemented by RTA for the event was a major multi-modal plan allowing a considerable number of visitors to visit the event zones smoothly by any transportation mode at any time.

In contrast to other events, World Expos stand out due to their extended duration spanning several weeks. Consequently, the transportation management plan may undergo multiple reviews throughout the event to ensure its effectiveness and alignment with evolving transportation needs. Expo events are typically concentrated on a single site, while other events may be distributed across multiple sites.

RTA preparation for the event
included massive investment in infrastructure
in the event area, including the extension

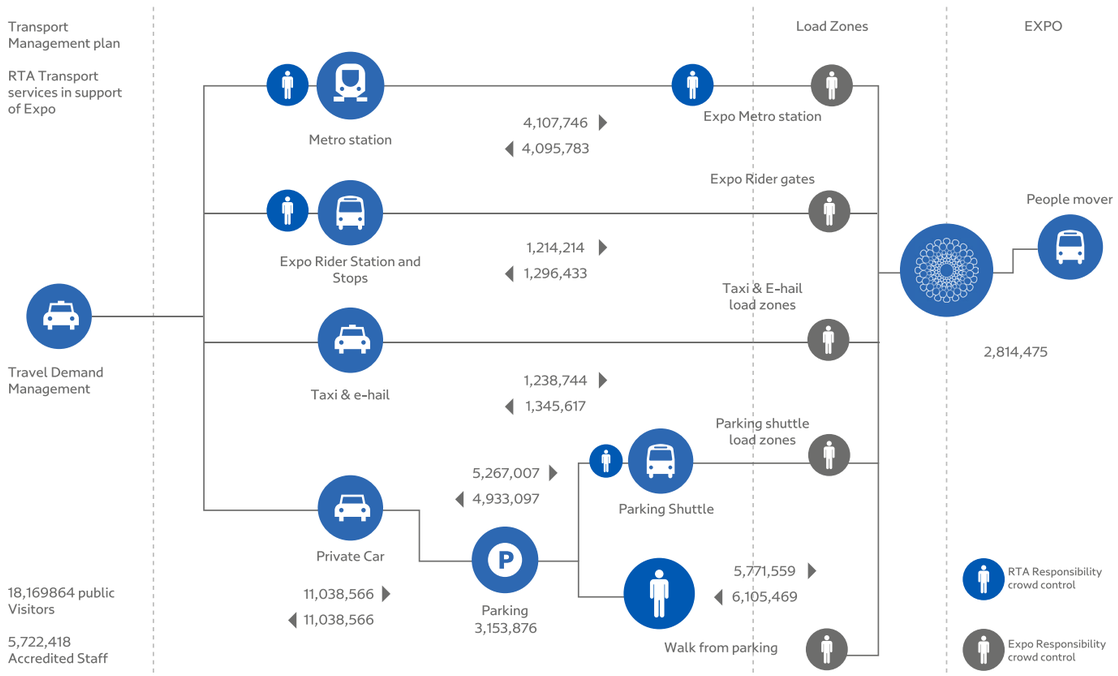
15km Metro
Extension

7 Additional Metro
Stations

60km of new
Highways

of Dubai Metro by 15 Km and seven new stations to reach the event site, Building 60 Kms of highways, including the necessary bridges and tunnels, procurement of additional bus fleet, in addition to improving and upgrading of existing bus stations to serve the expo rider in addition to many others supporting projects and systems to ensure expo event success as detailed in the coming section.

RTA planned and implemented a unique multi-modal transport management plan across the Expo site. Figure 01 summarises the transportation plan, its different modes of transportation, and how they interact to ensure enjoyable rides for expo visitors.



The key services offered by RTA for the event:

01.
Metro:

Seven-station, 15-kilometre extension of the Dubai Metro Red Line to the new terminal station of Expo 2020.

extended timetable operation,
with a peak frequency of 2.5 minutes.

02.
Expo Rider-Rapid Bus transport:

Free public bus services.

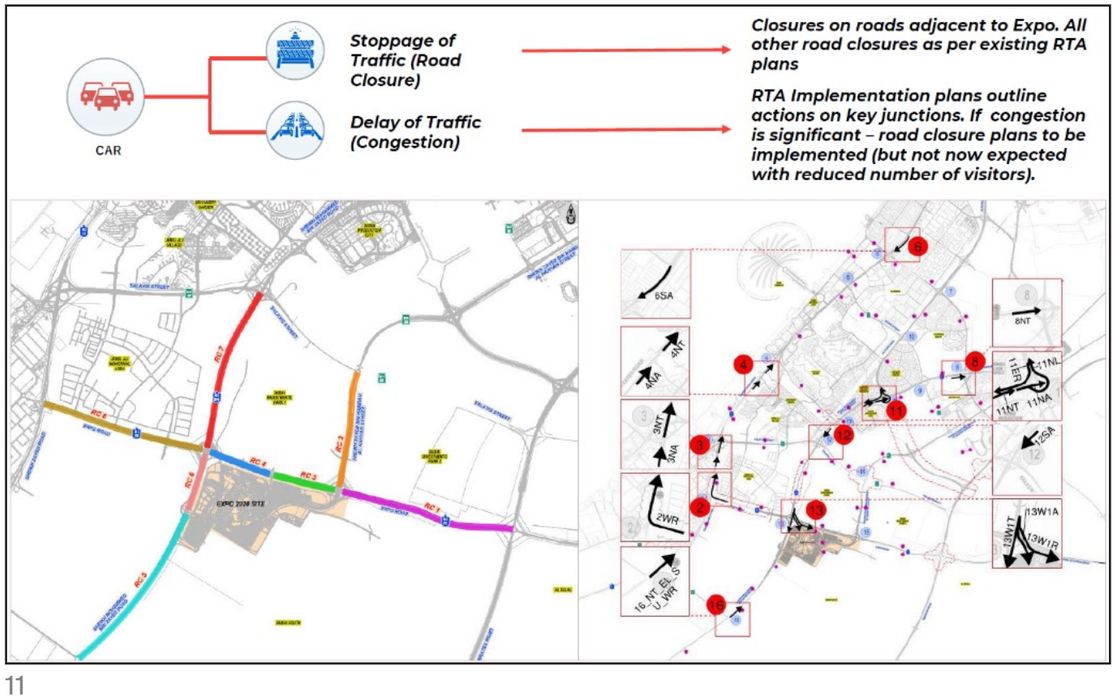
10 stations and stops in Dubai &
10 stations in other emirates.

03.
Taxi & E-hail:

24/7 operation with an auto dispatch system to optimize and increase taxi availability.

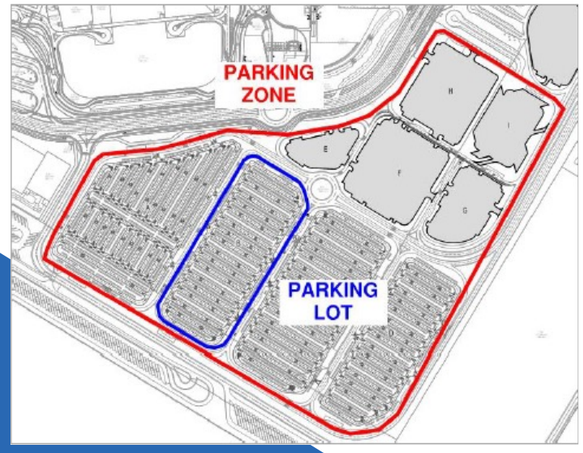
04.
Traffic & ITS Systems:

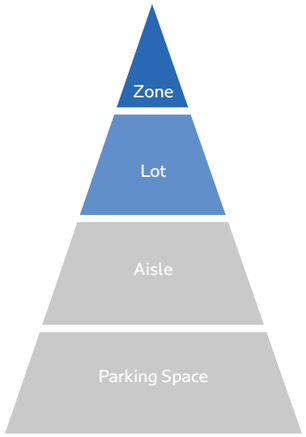
Construct 60 new kilometres of public highways, including bridges and tunnels, and a new ITS management center.



05.
Parking:

Management of 30,000 free public parking spaces across four zones.





06.
Parking Shuttle:

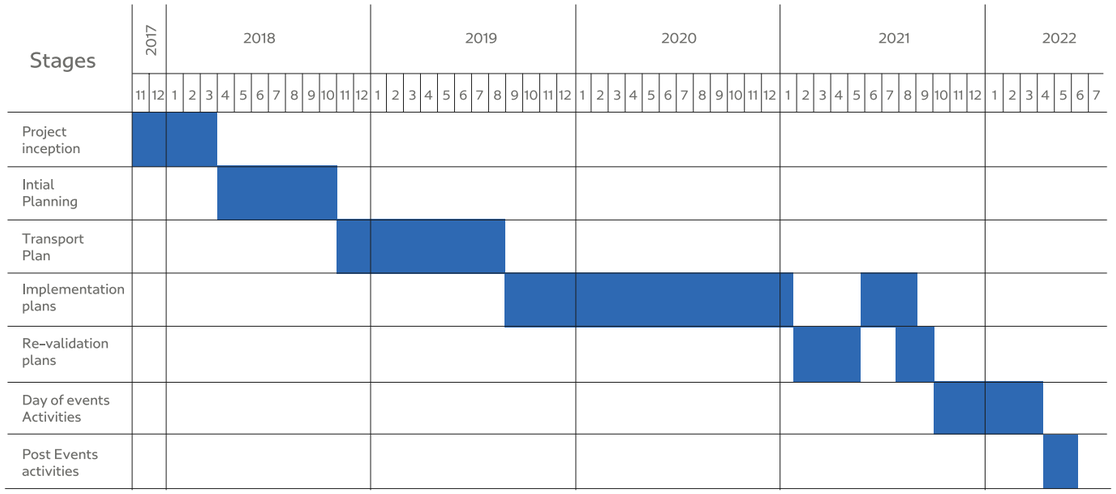
Demand-responsive bus service to transfer from public parking to Expo Plazas.

03.
People Mover:

Internal high-frequency loop bus service

2.2 Project Schedule

The project's overall plan included six main stages, in line with best practices for managing special Events. Stage R was added to re-evaluate and update the transportation plan because of COVID. Figure 02 presents the details of the project's high-level time schedule.



Stage 1
Project Inception Report
(Nov 2017 - Mar 2018)

- Role & Responsibilities Matrix
- Stakeholder Engagement & Communications
- Initial Data collection & Observations
- Action Plan/ Technical working Groups

Stage 2
Initial Planning Report
(Apr 2018 - Oct 2018)

- Transport Assessment/ Gap Analysis
- Transport Risk Register
- Best Practices Review
- Contingency Scenarios & Measures of Effectiveness
- Technical working Groups

Stage 3
Transportation Management Plan
(Nov 2018 - Mar 2019)

- Travel Demand Management
- Transit Plans
- Traffic & ITS Plans
- Access & Parking Plans
- Pedestrian Management
- Coordinated Transport Plans

Stage 4
Implementation Plans
(Sep 2019 - Aug 2021)

- Implementation Plans
- Operational Game Day Plans
- Role & Responsibilities
- Communication Strategy
- Simulation Exercises and Tabletop Exercises

Stage 5
Re-Validation of Planning
(Feb 2021 - Sep 2021)

- Role and Responsibilities
- Interim Expo Visitation Estimates
- Covid-19 Updates
- All other Updates
- Technical working groups
- Parking operator contract
- Security Risk Assesment
- 2021 Implementation plans
- Updated Expo Visitors model

Stage 6
Day of Event Activities
(Oct 2021 - Mar 2022)

Planning and Monitoring Technical Support

Stage 7
Post-Event Activities
(Apr 2022 - May 2022)

After-Action Report (Lesson Learned)

Figure 02 Project High-Level Time Schedule

2.3 Project Team Structure

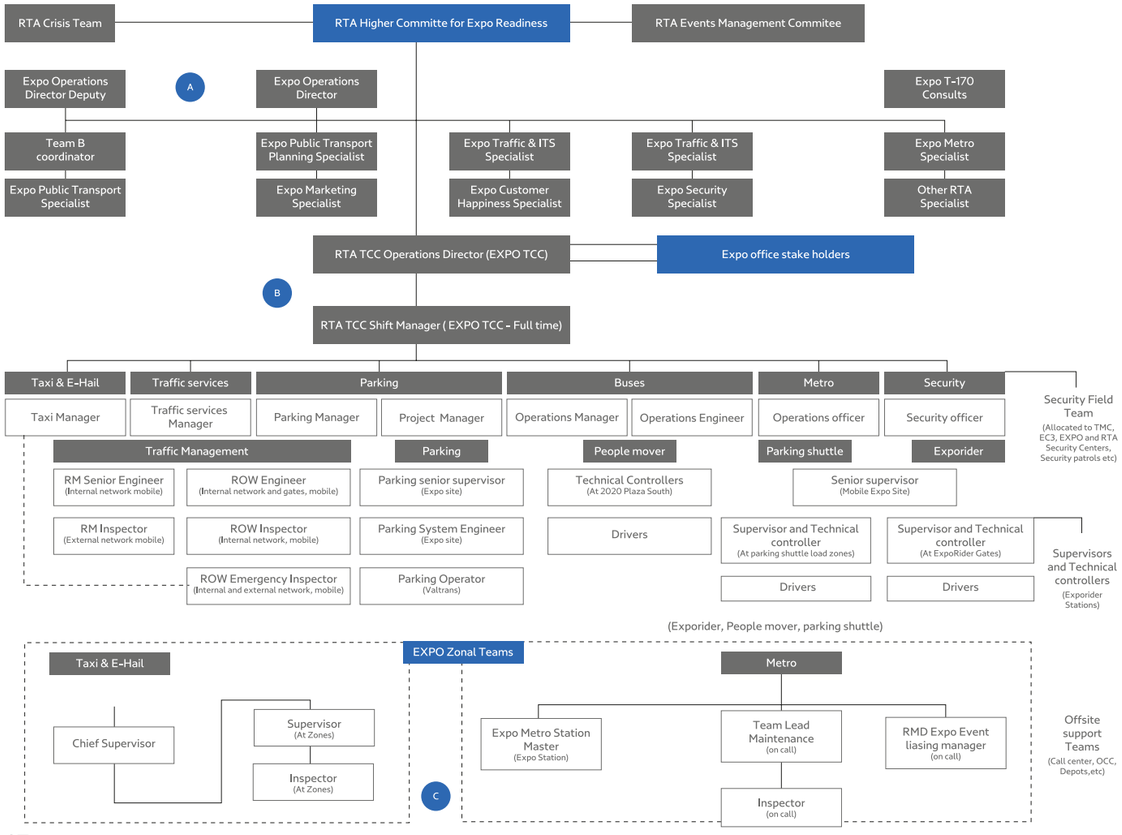
The Project Team deployed according to the multi-disciplinary needs of each respective stage, producing high-quality deliverables.

Overall RTA Expo Transport Operations Structure

A Planning and Monitoring (remote)

B Transport Operations (On-site, TCC)

C Transport Field staff (On-site, Various)



Due to the nature of the event, the tasks performed by the RTA project team needed to be highly coordinated with the Expo Event management team. Thus, a well-coordinated and cross-referenced RACI (Roles and Responsibilities Matrix) was introduced to ensure event success and early engagement. The developed RACI covered the following:

01. All aspects of the coordination between RTA and Expo teams.

02. All Actions needed for event normal operations as well as eventual operations.

03. The RACI was extended with time frames where applicable and details of contact points responsible for delivery from both sides.

The process of creating the matrix was highly valuable and engaging as it introduced the project to a broader range of stakeholders than those who directly owned the ultimate planning responsibility.

2.4 Project Risk Management

An extensive risk assessment was conducted covering all transporting modes and other internal and external risks; the Following are the Main risk categories identified in line with the transportation modes:

01. Travel Demand Management Disruption for Expo 2020 Routes

02. Rail Services Disruption for Expo 2020 route

03. RTA Bus Services Disruption for Expo 2020

04. Auto (private car) Services Disruption for Expo 2020 routes

05. Pedestrian control/management failure

06. Miscellaneous Risks to all Transport Services for Expo 2020

Across the risk groups, 99 main risks were registered, 34 high-level risks were identified, analyzed, and the related proper risk responses were identified, which resulted in a small number of risks materializing during the event and were well managed within the operation without the need for escalation or severe measures.

Each risk included in an accompanying Risk Register was categorized into one of the following planning scenarios, which were then the focus of planning activity moving forward:

As part of Emergency and crisis management, different scenarios and their related response plans were studied and planned for each mode of transportation services during the event as follows:

Transportation Services	Number of Plans
Metro	15
Expo Rider	35
Taxi & e-hail	22
Traffic & ITS	28
Parking	40
Parking Shuttle	28
People Mover	7

The worst-case scenario for parking evacuation occurred on 2nd December (National Day), where 21,849 vehicles were on site and 85.5% evacuated within an hour.

21,894
Vehicles Evacuated from expo site. within one hour

The program of Expo Test Events was planned and updated regularly if required. Soft Launch and simulation exercises were adopted for all services; this helped increase the team and equipment readiness one month before the event kick-off. It also helped strengthen working relations with counterparts and supported updating emergency and crisis scenarios.

As part of crisis management activities, a clear and detailed escalation matrix was developed with all partners and stakeholders to ensure clear actions and responsibilities upon trigger or alert of any emergency or crisis before, during, and even after the event.

2.5 Stakeholders Management

The Stakeholder Management Plan was structured around four key objectives:

01.
Engage stakeholders at the appropriate time, at the appropriate level and in the proper way to obtain cooperation, understanding and commitment to the delivery of the project and its long-term success.

02.
Unify stakeholders about the project's objectives and scope and ensure stakeholder collaboration on the approach, roles, responsibilities, and expectations.

03.
Provide accurate, timely and consistent information to stakeholders for communication purposes, as the stakeholders will routinely communicate about the progress of items related to the project to various entities and require correct information to avoid causing confusion or disseminating misinformation about the project.

04.
Provide a predictable, reliable communication platform for bringing together the multiple stakeholder agencies to resolve issues at the lowest possible level, provide a process for escalating and resolving issues, and hold stakeholders accountable for progress towards timely and successful delivery.

2.6 Change Management (Covid-19)

Given the reason for the re-scheduling of the event due to the Covid-19 pandemic, it was crucial to create an appropriate updated plan considering not only the event re-scheduling but also the additional restrictions and management measures to coop with running a safe event under the pandemic. If the pandemic had worsened substantially, it is likely that the number of visitors would have been reduced not only from international visitors but also to local visitors, and this had to be considered in the planned scenarios.

After the COVID-19 announcement on Wednesday, 15th December, new procedures were applied to scan people for potential cases from Sunday 19th December. The protocol then established was that any Expo Rider passenger who returned an adverse initial scan and was required to go for a complete test at the border would need to catch the following bus as the service would not wait for them, while the taxi would wait.

To avoid 'ineligible' passengers starting a journey and disrupting the service at the border check. The RTA response to the Abu Dhabi border controls extended to conducting PCR tests to be used on Abu Dhabi and Al Ain routes to improve operational flexibility and delivery.

2.7 Project Monitoring & Controlling

It should be noted that during COVID-19, the global position was very uncertain, especially with travel restrictions implemented at very little notice. RTA had to plan for the number of visitors under this very high level of uncertainty; in general, such planning produced very acceptable results when measured on the ground, while more variance was identified for various transport modes, but the overall visits variances from the predictions was very acceptable as shown In Table 01, especially with a high volume of daily visitors that reached 375,798 visitors at its highest level.

	School Day	Half Day	Non School Day	Special Day
Day visited - planned	67.01%	70.00%	70.00%	88.90%
Day visited - Actual	74.77%	70.59%	76.53%	73.29%

Table 1 Expo Public Visitors Distribution (Day)

375,798
Highest number of visitors

21,168
Lowest number of visitors

Measures of transportation plan effectiveness were developed and monitored across all modes to ensure proper monitoring and control during project implementation. Measures were classified under four main categories:

Safety

Reliability

Efficiency

User Experience

Figure 04:
Performance Measures

Examples of Performance Measures:

Expo Rider

Safety: Number of incidents and number of incidents per 100,000 km and number of incidents at external Expo Rider Stations.

Reliability: On-time performance, Bus availability and time taken to recover service after break-down.

Efficiency: Trip times (in minutes) relative to other modes serving Expo, Ridership growth/decline throughout the event compared to different modes servicing Expo.

User Experience: Number of complaints/compliments and Ridership throughout the event.

Parking Shuttle

Safety: Number of incidents and number of incidents per 100,000 km.

Reliability: On-time performance and average headway and average actual waiting time versus planned capacity, Bus availability and time taken to recover service after break-down.

Efficiency: Trip time (in minutes) relative to walking within Expo and ridership rate.

User Experience: Number of complaints/compliments and amount of ridership throughout duration.

People Mover

Safety: Number of incidents and number of incidents per 100,000 km.

Reliability: On-time performance and average headway, Average actual waiting time versus planned capacity, Bus availability and time taken to recover service after break-down.

Efficiency: Trip time (in minutes) relative to walking within Expo and ridership rate.

User Experience: Number of complaints/compliments and amount of ridership throughout duration.

Metro

Safety: Number of accidents, safety violations, incidents, and security incidents monitored at Expo 2020 station.

Reliability: On-time performance, Number of frequencies relative to demand (number of train insertions) and Number of frequencies relative to demand (ratio of train to number of day types).

Efficiency: Trip time (in minutes) relative to other modes serving Expo and Ridership growth/decline throughout the event compared to different modes servicing Expo.

User Experience: Number of complaints/compliments and Ridership throughout the event by type of day.

Traffic & ITS

Safety: Number of accidents, safety violations, incidents, and response time on the network.

Reliability: On-time performance – Travel Time Index Inbound & Outbound.

Efficiency: Trip time (in minutes), Cost (in AED) and Ridership growth/decline throughout the event compared to other modes servicing Expo.

User Experience: Number of complaints/compliments and trips (by cars into public parking).

Taxi & e-hail

Safety: Number of accidents, safety violations, incidents on the network and number of incidents and response time to incidents.

Reliability: Wait time (taxi availability)

Efficiency: Trip time (in minutes), Cost (in AED) and Ridership growth/decline throughout the event compared to other modes servicing Expo relative to different modes serving Expo.

User Experience: Number of complaints/compliments and Ridership throughout the event by type of day.

Parking

Safety: Number of accidents, safety violations, incidents, and response time inside parking, as well as number of incidents and response time to incidents.

Reliability: Number of spaces relative to demand.

Efficiency: Trip time (in minutes) and number of cars parked growth/decline throughout the event relative to other modes servicing Expo.

User Experience: The number of complaints/compliments and the number of cars parked grew/declined throughout the event.

2.9 Project Benefits

The project realized benefits included highlighting Dubai's advanced and civilized face and its high potential. Also, the project contributed to RTA as a pioneering public transport provider to visitors, tourists, and globally.

The project benefits extended beyond the expo event itself as the plans developed for Roads, Parking, Metro, Buses, and Taxis all considered the Expo 2020 post-event usage of the developed infrastructure. Creating a sustainable road network and ensuring the integration of elements related to traffic, public transportation, and public movement management in accordance with international requirements and specifications to ensure smooth flow, considering achieving the highest levels of security and safety, did not only serve the expo event, but it exceeded the event to support Dubai city current and future development. Another realized benefit from such a world-class event is the experience and lessons learned from the event, which enriched the management of the Authority's future projects like hosting COP28 Dubai, for example.

As always, customer happiness is an always-present benefit for RTA. Accordingly, the Expo event transportation users' opinions and satisfaction levels were surveyed many times and reported to concerned teams for their further immediate actions; additional RTA mystery shoppers were always active in reporting gaps and points of improvement to the project team. This led to high levels of customer satisfaction, where the satisfaction levels of some journeys reached (100%) for Dubai residents, (97.4%) for other Emirates residents, and (96%) for international visitors; the lowest level of satisfaction ever reported was (86.7%).

03

Top Facts :

6 PM is the Visitors Peak Hour

Metro's highest ridership was on the day when the event had the highest number of visitors, including the last day

21,186 lowest daily visitors

99,834 Average Visitors

34,657 highest daily visitors

375,798 the highest number of visitors on the last day

Top Facts

The Toatal number of cars entering the public parking lots is 3,153,876

21,711 School Visits

23:00-00:00 on Friday 18th March, was the event's peak hour for parking, with 7,335 cars leaving, while the papeak entry was on 31st March with 6,773 cars

The Peak exit hour during the event was from 22:00 to 23:00 due to this being the hour after the country pavillions closed

04

Critical Success Factors:

Several factors led to the success of this project including but not limited to:

Implementing a robust Communication plan and strategy in the crowd management of the event considering all stakeholders.

Creating an accurate visitor model anticipating ticket sales and crowd size.

Technical recommendations and agile modifications implemented on site.

Synchronized completion of activities resulted in successful and safe delivery of complex transport operations.

Other factors to take into consideration while planning and executing this type of project include:

01. There is no perfect plan– the site has design limitations, which means services operate within fixed infrastructure that ideally would have been altered.

02. There is no single plan that can fit all services – there will be always need to have a balance between the requirements and capacity of different modes of transport.

03. The existing plans and operations have undergone extensive analysis, trials, and implementation – any modifications should be carefully prepared to maximize the likelihood of success.

4.1 Post Event Activities

Post-event activities included a review of the transport operations and sharing feedback from the successful delivery of Expo 2020 Dubai, which included examining what took place over the six months of the event and comparing it with the plan and analysis of variance points. Additionally, the project team carefully identified what worked well and determined areas of lessons learned that can help deliver similar future events more successfully.

Learnings from on-site operation and applied operational techniques to balance traffic flow principles of design were captured and documented for future use.

4.2 Main Challenges

Main Challenges	Actions Taken
Re-scheduling of Expo & Re-Planning	Re-study all the plans, including the visitor model, number, type of visitors, and visiting day typesww
Metro service stopped partially for more than 5 min	Implement alternate recovery services plans and Crisis Media Communications on status updates of Metro Services
Expo Rider Bus trips impacted due to accidents	Recover 75% of Bus Trips by injecting extra buses
Expo Rider Bus Trips were impacted as fog affected routes to Abu Dhabi	Directing people in Expo internal bus station to use Metro and Temporary Route Diversions
Availability of Taxis is less than 50% at a loading zone for more than 30 minutes	coordinated with the Taxi e-hail companies to mobilize Taxis to the affected Zones on an urgent basis
Unavailability of Taxi & E-hail Dispatch Systems	Informed Customers about the outage and activated street hail (for customers), in addition to Initiating the RTA Dispatch Model to call taxis
Closure of one of the Key Roads Leading to EXPO 2020 due to multiple accidents.	Implement a diversion plan and mobilize resources to the location to clear the impacted roads.
Parking Zones were full, and Parking capacity exceeded	Redirect all incoming cars to the other Parking Zones as well as the parking shuttle bus service and activate the contingency plans
People Mover and parking Shuttle Buses trips per hour impacted due to Flooding caused service suspension and Closure of the Bus Depot	Recover 75% of Bus Trips by injecting extra buses from Expo Depot and Mobilize Staff to manage

05

Conclusion and Lessons Learnt

The following represent some of the key lessons learnt and takeaways from the project implementation:

01. Major Events need mass transit; Metro Dubai had the highest share of Expo 2020 Dubai visitors' transportation to and from the event.

02. Not all modes will act or operate the same, due to changes and differences in transport mode usage and number of visitors.

03. Applying a 'Business as usual' approach will not work for an Event; the event transport management must be specifically planned.

04. Events managed by multiple entities and including numerous stakeholders with interfering roles on the ground require that roles and responsibilities be documented more carefully with clear buy-in and awareness from all entities and team members. Early test plans strengthened the efficiency and awareness of the interfering roles and responsibilities.

05. The availability of real-time data is vital to effective control, decision-making, and quick and efficient planning responses. A proper command centre should be made available to manage such significant events.

06. Proper Site design is critical for successful people movement and crowd management.

07. Event site designers should consider enough area between the Metro ticketing line and stations to ease the crowd on site.

08. Expo rider operations differed from the planned concepts; the on-site team should have enough adaptability to adjust the operation plans according to on-ground operations.

09. Taxi and E-hail had different profiles based on availability on-site through staging or through bringing the fleet from off-site at the due time.

10. The design of traffic and the related information traffic systems for the events should consider the capacity of the external network.

11. The efficient operation of parking shuttles was essential for parking users' satisfaction as the parking area was too large.