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PAST, PRESENT & FUTURE



COVER STORY

# CAIRO & THE BUILT ENVIRONMENT: PAST, PRESENT, AND FUTURE

By Luke Carothers



## A LAND IN TRANSITION

Egypt as a place is no stranger to the change that marches hand-in-hand with the progress of time. It is a unique place in the world. The lands made habitable by the flowing waters of the Nile River and its delta house a civilization amongst the oldest, stretching back thousands of years to leave a mark on the modern world. Throughout this long and rich history, the places where Egyptians lived shifted along the path of a shifting river delta as well as cultural and political tides.

Cairo has been populated in various stages for over 1,000 years. In its earliest history, Cairo began as a settlement near a strategic point between two of the Nile's natural features—its delta and valley. The area grew over time as rich trade routes were established across the north of the African continent. As Cairo expanded and contracted over the centuries, various settlements, forts, and communities rose and fell. The legacy of time and change can still be felt throughout Cairo's built environment. In many ways, Cairo is a patchwork example of this change—where new and old coexist simultaneously to create the area we see today. What we see today as a beautiful and often chaotic tapestry is the legacy of this coexistence.

From the perspective of this legacy and its impact on Cairo's built environment, there are several projects currently happening in Cairo that are poised to set the framework for this relationship in the future.

## A RISING GUIDEWAY—THE CAIRO MONORAIL

There are a number of ongoing large-scale infrastructure projects currently underway in Cairo and its surrounding lands—responding to the needs of a shifting population. Of these transportation and infrastructure projects, there are perhaps none bigger than the Cairo Monorail, which runs 96-km across the heart of Cairo. This ambitious project—owned by the Egyptian National Authority of Tunnels (NAT)—is intended to create a direct connection between Cairo, the New Administrative Capital, and 6th of October City via a two-line rapid transit system. When completed, this will be the longest driverless monorail system in the world. The Cairo Monorail system will represent the public transportation links between the New Administrative Capital and the 6th of October City.

The monorail's concrete guideway now rises high through the landscape of Cairo and its surrounding metropolitan area. At either end of this long-spanning system are two depots—one for the East of Nile (EoN) line and one for the West of Nile (WoN) line. Construction began on the Cairo monorail in September 2020, and engineering work is nearly 90 percent complete with work currently ongoing completing formal submissions for systems assurance documentation. The next step in regard to engineering is finishing as-built drawings as the project continues to progress through its construction phases. Additionally,





project teams are hard at work completing construction shop drawings for the monorail's final stages of civil, MEP, and architectural work.

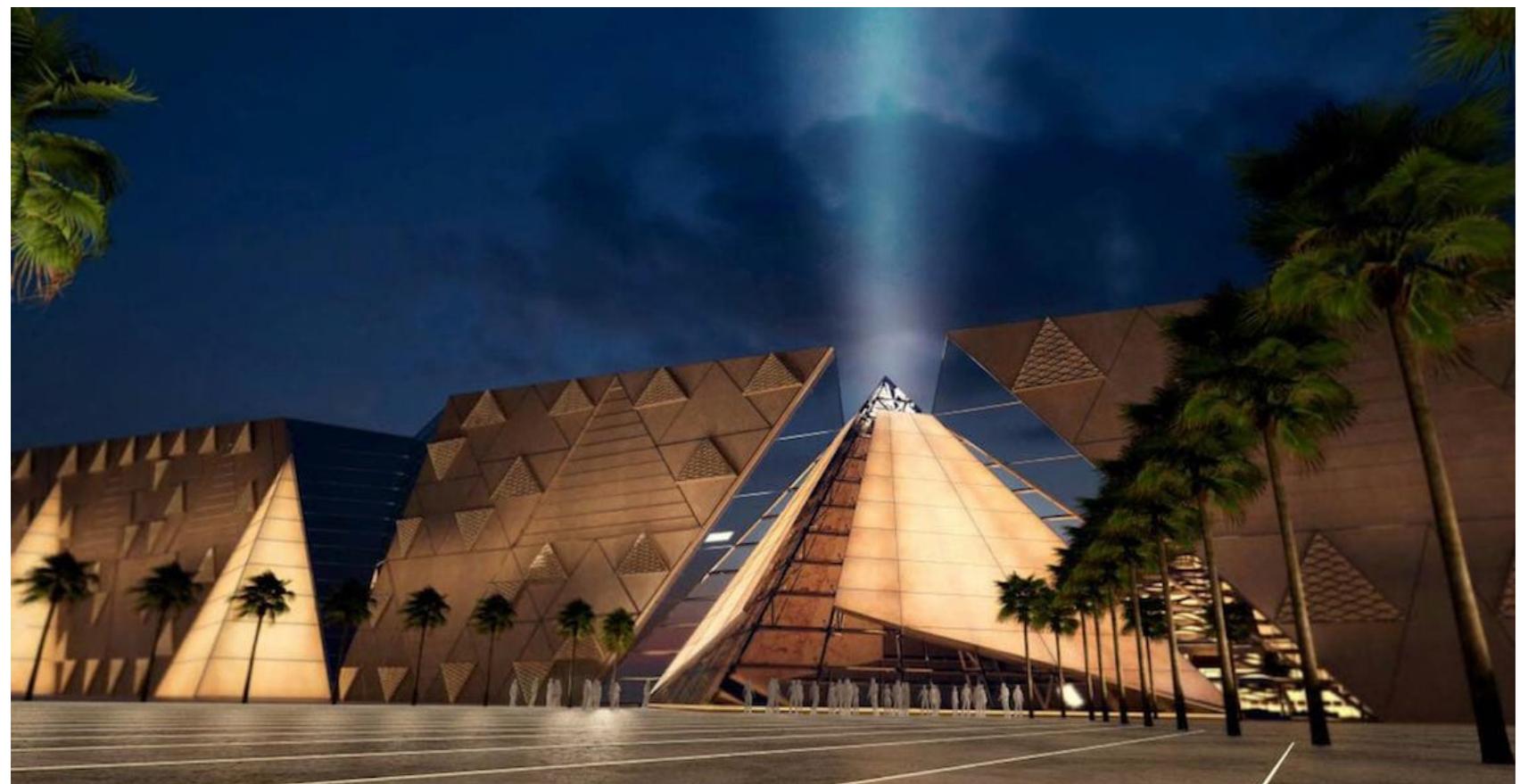
On the eastern side of the Nile River, the monorail stretches 54-km to connect Cairo with the New Administrative Capital. To see this ambitious project to fruition, NAT selected Hill International to provide project management services on the Cairo Monorail. For the EoN Line, civil work is nearing 81 percent completion, and construction of its guideway beam structure is nearing 92 percent completion. The EoN's stations are over halfway finished, and there is ongoing work for the mechanical installation for its switches—with six of 10 being installed. When the line is finished, these switches will serve a crucial

role allowing for the changing of train routes within the system. Forty trainsets will provide service for the EoN line, and all of which have been delivered. Furthermore, procurement is complete for all signaling, communications, AFC, platform screen doors, and electromechanical systems is complete, and work is in various stages installing them.

On the western side of the Nile River, the monorail will stretch 42-km and house 13 stations. Work on the West of Nile (WoN) Line is slightly behind with overall work being just over halfway completed. Of this work, the WoN Line's line segments are around 68 percent complete, and work on the line's stations is about halfway completed. Although work has been comparatively slower on the WoN line, the pace has increased in regard to its architectural works and MEP work in the stations.



Progress on both lines is expected to progress rapidly for both lines over the next six months. Important milestones—such as the completion of work on all line segments on the EoN line and seven segments on the WoN line—are on the immediate horizon for the crews working to complete the Cairo Monorail. Project crews are currently waiting for the power-on of the monorail's systems, which could potentially happen in the next few weeks pending review from local electricity authorities. Once this happens, the formal testing and commissioning phase of the EoN line will begin. The WoN line is also expected to see significant accomplishments over the next six months with crews nearing major completion on the line's depot. Crews are also poised to begin systems installation activities up to station seven. There is also significant progress as to the release of construction for the WoN Line's pending guideway sections.





Progress on the WoN line has been comparatively slower than the EoN line mainly due to challenges stemming from land acquisition and the diversion of utilities. These issues have delayed the construction of the monorail’s structural elements in the Bastheel and Wadi El-Nile areas. To begin work in these segments, work is currently ongoing to divert 220kV power lines and utilities through a highly populated area, which is described as a “painstaking” process. To expedite the diversion of utilities, Hill International and the NAT have been in constant engagement with the government bodies and companies that own the necessary utilities—with Hill supporting the NAT with land acquisition per Egypt’s legal framework. The impact of COVID-19 has been felt throughout the project with frequent fluctuations of commodity prices and supply chain disruptions cropping up regularly to disrupt acquisition and logistics for the project. To overcome these challenges, the NAT has had to work actively with the project’s contractors to ensure smooth progress on the project.

### **A HOME FOR PAST AND PRESENT TO SUPPORT THE FUTURE—THE GRAND EGYPTIAN MUSEUM**

Still west of the Nile River, rising from a site roughly 2-km west of the Giza Plateau, a massive structure, echoes the grandeur of its ancient neighbor. With full view of some of the greatest lasting legacies of Egypt’s ancient history, the Grand Egyptian Museum (GEM) is the decades-long result of a push to build a facility to house and restore Egyptian artifacts related to this tremendous history. For centuries, artifacts discovered in Egypt were shipped to facilities all over the world for restoration and display. As a means of reclaiming this cultural legacy via the built environment, the GEM is a space that provides ample space for both creating immersive cultural experiences and restoring ancient artifacts.

The concept for the Grand Egyptian Museum (GEM) began in 1998 with funding discussions, and, in 2002, the results of an architectural competition—in which over 1,500 architects submitted designs for the structure—were announced. The GEM’s design was awarded to Heneghan Peng Architects, Buro Happold, and Arup. Following the competition for the architectural design, the next major consideration became the future location for the museum. To connect the GEM both symbolically and geographically to Egypt’s rich history, surveying began on a site just west of the Giza Pyramids in 2005. This building site 2-km west of the Giza Pyramids is envisioned as an extension of the Giza Plateau. Two years later in 2007, the GEM secured funding through a \$300 million loan from the Japanese Bank for International Cooperation with an additional \$147 million coming from the Egyptian government and \$150 million from donations. In 2010, the Egyptian Ministry of Culture selected Hill International to provide project management services during the GEM’s construction, and two years later earthworks began at the selected site. The construction of the GEM was under way.

Amongst the artifacts housed in the museum are a colossal statue of Ramses II as well as King Tutankhamun’s Solar Chariots. The statue of Ramses was relocated to the museum in 2018, becoming the first artifact housed in the structure. In fact, this 82-ton, 3,000-year-old artifact is so large that it necessitated the atrium be built around it. With the statue relocated, work began on the surrounding structure. These massive artifacts represent significant moments in the GEM’s construction as the project responded to challenges from COVID-19 and the Arab Spring.

Breathtaking in both scale and design, the GEM is meant to invoke the scale and grandeur of its ancient neighbors. Visitors are able to immerse themselves in Egypt’s history in culture using curated paths

leading along a series of massive sloped terraces. Reaching the top of the sloped terraces, the experience culminates in an expansive view of the Giza Plateau. The GEM was designed to be the largest museum in the world and will encompass more than 484,000 square feet of floor space. The GEM's massive size provides ample space with enough room to house 12 exhibition halls and more than 100,000 artifacts. Along with space for visitors to engage with Egyptian artifacts, the GEM also includes a state-of-the-art conservation lab, which further supports the restoration and distribution of artifacts to other museums in Egypt. All the major pieces are in place for the grand opening of the GEM, which still remains to be announced. Once opened, museum visitors will have the opportunity to view and engage with Egyptian antiquity in a completely new way.

## AN AMBITIOUS FUTURE

Projects like the Cairo Monorail and the Grand Egyptian Museum are defining the future of Cairo's built environment, and, in doing so, are building a bridge between Cairo's past, present, and future. There are few adjectives that capture the defining characteristics of this relationship, but there is no doubt that ambitious has a place amongst that list. The history of Cairo—and of the lands that surround the modern city—is colored by this tradition of ambition. Many of these current projects have faced challenges stemming from social change and a global pandemic, but their continued progress is a marker of Egypt's investment in the future.

Infrastructure projects—such as the Cairo Monorail—have the potential to drastically reshape location and mobility for the 22 million people within the Cairo metropolitan area. Improved access to public

transportation will lessen the reliance on cars, which currently fill the region's streets, resulting in frequent traffic jams and high greenhouse gas emissions. With more public transportation options, the reliance on cars will be greatly reduced, resulting in a greater ease of mobility within the region as well as less pollution from idling vehicles.

Likewise, similarly ambitious projects within Egypt's built environment—like the Grand Egyptian Museum—are important in defining the country from a cultural and social perspective. The GEM is a museum unlike any other before it for its scale and design, and its continued progress towards opening its doors to the public, albeit delayed, shows a dedication to defining Egyptian cultural legacy for future generations. Years of work from architects, engineers, and construction crews to build this unique museum will be reciprocated in the museum's opening—when the public can enter the space and find numerous paths and tools with which they can engage with the history of Egyptian culture.

Cairo is a land where past, present, and future are in seemingly constant collaboration. As the lands and population of Cairo continue to grow and shift, its future is well defined through examples of ambitious growth, and the resulting impact on the built environment continues to build on this continuous legacy. As projects like the Cairo Monorail and the GEM are completed, they will serve as the foundation for Cairo's continued ability to adapt and change.

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