

# PROMOTING SUSTAINABLE MOBILITY INTEGRATING WITH URBAN ARCHAEOLOGY

## Case Study: The Historic Downtown in Alexandria, Egypt

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### ABSTRACT

Alexandria's historic downtown consists of multilayers of history. The archaeological layers of the city always have been viewed as an obstacle to any real development in the old city. Moreover, the present urban intervention framework avoids and prevents any deep development in the historic districts due to the presence of the archaeological layers underneath. This study will explain the aspects of the present mobility problem in Alexandria downtown and discuss the possibility of constructing underground metro lines in archaeological Alexandria districts as a mass transit system integrating with urban archaeology. Alexandria Strategic Urban Plan 2032 - Alexandria SUP 2032 is proposing new urban communities to release density in the existed built city. Concerning the effectiveness of the proposed solutions for traffic congestion in the historic downtown. So, this study will take the analytical comparative method discussing the approaches of similar historic cities to cope with the city growth while displaying urban archaeology in their metro line projects as a unique and powerful point of integration. This approach is supposed to promote a sustainable mobility system that will solve traffic congestion, breakthrough reimagining, and encourage tourism while solving urban expansion issues at the same time in Alexandria's historic downtown.

*KEYWORDS: Urban Mobility, Sustainable Mobility, Urban Archaeology, Alexandria Strategic Urban Plan 2032, and Historical Cities' Downtowns.*

### 1. INTRODUCTION:

Alexandria is a historic Mediterranean metropolis and Egypt's second-largest city, with a population of around 5,163,750 people (latest CAPMAS estimate 2017). It was Egypt's capital for almost 1,000 years. The urban population is growing so quickly that housing, transportation, energy, water systems, and the entire infrastructure need to be rebuilt with a compared sequence and ideally in an integrated way, to provide the greatest public access while doing the least harm to the natural environment as long as possible with high effectiveness. Urban transit, including buses, ferries, trams, light rail, and metros describes a major part of the public transportation means in any country. Although travel patterns in most developing countries are increasingly dependent on cars. In developed countries, urban transportation

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and its services are provided by public, private or mixed companies in a highly regulated system. One of the primary elected aims of any urban mobility development is to achieve sustainability. Because transportation as such is an important component of city life, it had its side effects arose as air and sound pollution, congestions during peak hours leak in time reaching destinations. Therefore various efforts have been made to encourage the use of sustainable forms of transportation, such as (public) transit, which have not been completely successful before that.

In the historical cities, the challenge becomes greater, according to the delicate urban fabric, especially with the presence of archaeology sites underneath. In this case, there is more effort to be done with a wider range of stakeholders to provide a sensitive framework for implementing sustainable development. Otherwise, these historic districts could be turned from valuable assets into great chaos. Most developed countries started to be aware and took action on that issue earlier than others.

### 1.1. Alexandria Downtown (Limitation of The Study Zone):

Alexandria's historic downtown (the study zone) extends from the Suez Canal road east to El-Anfoushy district west, the Eastern Harbor north to Sherif street south. Passing through the major historic districts and squares of the city (such as Ramleh station, El-Mansheya square, Foad road, ..etc.). the defined study zone will not be studied with its present urban fabric but also with consideration of its historic and archaeological aspects depending on archaeological maps of the ancient city.



Fig. 1. Alexandria Downtown (limitation of the studied zone) Source: the researcher (O., Nagy, 2022) [7]

### 1.2. The Problem Definition:

The main problem is the deficiency of mobility solutions for Alexandria's historic downtown in the Alexandria Strategic Urban Plan 2032 - Alexandria SUP 2032. Lately, the archaeological existence beneath Alexandria is acting as a burden for authorities and decision-makers to step forward for any real development in the old city. While in other historic cities (i.e., Rome and Athens) it is a point of power and uniqueness.

We find in Alexandria SUP 2032, that the government is encouraging sustainable axes of development by proposing new urban communities to release dense in the existed built city. The proposal on its long-term schedule is very promising for the new districts, encouraging growth to the west coastal corridor, south-east and south of the city. But, here comes an important question, what about the old city? The historic downtown of Alexandria is fading under negligence, high dens of residence, and daily users that result in traffic congestion most of the day.

### 1.3 The Aim and objectives:

The main aim of this paper is to propose new sustainable urban mobility approaches in the historic downtown of Alexandria to support the Alexandria SUP 2032 with accumulative sustainable mobility solutions to connect the new settlements and urban extensions to the historic city center.

## **2. METHODOLOGY:**

This study will take the analytical comparative method to discuss the approaches of other historic cities similar to Alexandria – Egypt, to cope with the city’s growth. How to promote sustainable mobility in the old historic city center while displaying archaeology daily in their metro line projects as a unique and powerful point of integration.

### **2.1 Sustainable Urban Mobility Planning:**

Sustainable urban mobility planning is a more comprehensive method to address transportation-related issues in metropolitan environments. It is a planning pattern that promotes a move from a car-dependency planning strategy to one that prioritizes people and encourages the use of sustainable modes of transportation. Its policies and actions cover all modes and types of transportation mobility across the metropolitan mass.

### **2.2 Urban Archaeology:**

Archaeology of the city is the study of the process of urban expansion as well as the cultural and social histories of individuals and families who lived and died in these cities. The term "Urban Archaeology" refers to the study of archaeology in or around towns or cities. Thus defined, Urban Archaeology requires the experience and knowledge to determine the significance of exposed urban elements. Without such knowledge, urban development might come to a stop – that’s particularly missing in Alexandria.

Urban archaeology is a field of how to bridge and utilize the past ruins with the present daily activities. This integration approach will step forward in reimagining and marketing the historic cities and also encourage tourism while solving urban growth problems.

It is a field that is most commonly practiced in countries where legislation protects potential archaeological heritage from destruction by infrastructural development. This happens where the archaeological awareness is large enough to accommodate teams specializing in that kind of working environment. Such legislation differs from one country to another 10. In Egypt, there are highly qualified practitioners and experts in the archaeological fields. But then the conflict appears in the handling and implementation due to the leakage of clear legislation defining the framework of how to go through infrastructure development in archaeological sites with the best results for both.

The next part is the analytical case studies to explain ways of intervention in promoting sustainable urban mobility by integrating with the existence of archaeological sites.

#### **2.2.1 Rome; metro line “C” and ‘San Giovanni Metro station’:**

Although, it seems like a challenge in an archaeological country like Italy precisely in a city like Rome which is considered one of the most valuable world heritage sites by UNESCO, to find projects of upgrading infrastructure and two operated metro lines (A and B) running under all these archaeological assets with the construction of the third line (C). The construction of the (C) Line has taken the development in a different approach with integration with the urban archaeology of the historic city. The intervention was born as a development demonstrated by an integrated image and by standards of architectural solutions. The main issue was in digging the metro lines path under the archaeology level to the level of (-15 m.) – (fig. 2). In this way, it makes ‘stations’ the only points of digging through the historical layers to allow the connection between commuters and the metro. In other words, these areas with limited boundaries that according to layering maps of the city and experts, it is mostly could be predicted what to be found. Then comes the rule of architects and archaeologists to team up by determining levels of significance and interventions with the findings. Here, the process of

museumification takes place to revitalize levels of history for displaying in the present daily life with no restrictions. While still, the most benefit of all is going through an urban mobility development for easing of traffic, sustaining historic districts, and improving quality of life with the existence of archaeology.

Museumification of metro stations is such a challenge that once it had been done its consequences spread widely out of its real function as a metro station. This importance comes from the merging of using valuable assets on display all time. Line C in Rome in several spots on its course reveals its beauty and invites more tourists to continue their trips by showing the findings in their origin place. The colosseum station is under construction but it's already considered (as declared) to be one of the most touristic destinations for its huge scale as a museum under the footings of the colosseum (Figure 3).

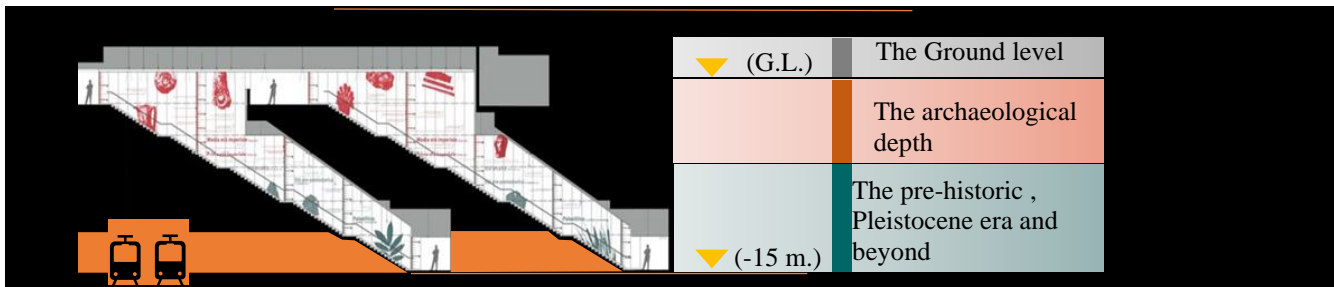


Fig. 2. San Giovanni Metro station, a longitudinal section with the stratification of ages brought to light in the background. Source: analyzed and annotated by the researcher, Lambertucci F 2018 13

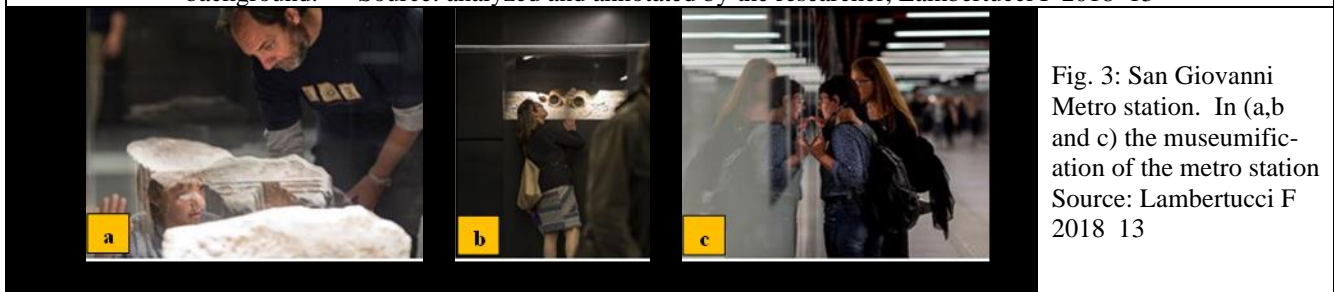


Fig. 3: San Giovanni Metro station. In (a,b and c) the museumification of the metro station Source: Lambertucci F 2018 13

### 2.2.2 Thessaloniki first metro line:

The construction of the Thessaloniki Metro has placed the city on a steady track toward expansion in trade, manufacturing, and tourism, while also protecting the city's historical identity throughout time. During the metro's construction, a huge number of significant archaeological findings, principally Roman, early Christian, and Byzantine, were uncovered. The metro runs beneath Egnatia Street, one of Thessaloniki's principal thoroughfares, which was one of the two most significant highways in the Roman and Byzantine empires. The section of the Via Egnatia that ran through Thessaloniki was the city's Decumanus Maximus (main road), and it runs 5.4 meters (18 ft) below present-day Egnatia Street. The metro was supposed to lie 8 meters (26 feet) below the earth, leaving only 2.6 meters (8.5 feet) between it and the historic road. With the completion of the metro construction by 2023, Thessaloniki will be converted into an open museum, and the metro will finally run on uniting the city's past with its future.

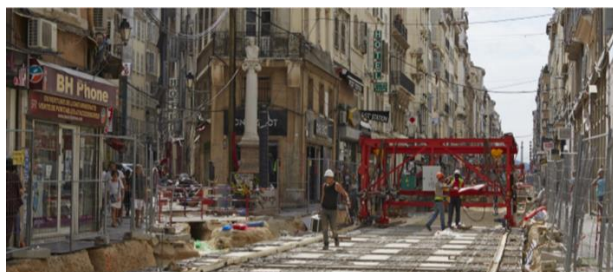


Fig. 4: Transportation and infrastructure digging process in Thessaloniki. Source: <https://www.pwc.com/gr/en/publications/greek-thought-leadership/infrastructure-projects-greece-2017.html>



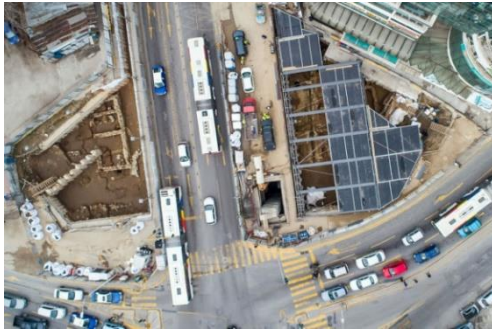


Fig. 5: Archaeological findings were revealed in Thessaloniki when a 2,300-year-old avenue was found during construction work on the city's new underground metro line. source: <https://www.greece-is.com/buried-treasure-thessalonikis-new-subway-brings-archaeological-wealth-light/>

### 2.2.3 The concluded points from Rome and Thessaloniki metro lines' projects:

From the previous analysis, we find that historic Mediterranean cities in their future planning are aiming to cope with urban growth and conserve their historic districts. This was happened by implementing sustainable urban mobility strategies which can be summarised in the main next points:

Table 1. sustainable urban mobility strategies Source: the researcher

Main Points	Remarks
Extending one or more metro lines underground in the historic city center with the existence of archaeological sites to transfer crowds of commuters with a fast, affordable, clean, and high capacity means of transport efficiently and away from surface traffic congestion on roads.	3 lines in Rome and 1 in Thessaloniki.
Reducing car dependency through the historic and touristic zones of the city center and preventing entering the city center with cars in certain periods of the day (almost all the day in some zones).	Decreasing parking areas with high parking fares
Promote Non-Motor Transit systems and support the public transport (PT) on surface roads such as BRT and LRT to transport commuters effectively through the historic districts.	Increasing PT efficiency after preventing cars.
Encourage using shared and eco-friendly means of transport (elec. Cars, bicycles, ..etc.) in the historic downtown with main stops attached to metro stations and other sub-stops scattered all over the city center.	
Encourage citizens to enjoy a healthy lifestyle by providing pedestrian and cycling zones, more fresh air, and decreasing noise and carbon emissions from motor cars.	
The archaeological sites that had been excavated while building metro stations underground, had been transformed not to be only as a terminal but also as an underground museum displaying its content daily for free in its native place.	Museumification of the metro stations

## 3. SUSTAINABLE URBAN MOBILITY SCHEMES IN ALEXANDRIA DOWNTOWN:

### 3.1. Archaeological Boundaries in Ancient Alexandria:

The historical context in Alexandria downtown had witnessed the main stages of its history. Starting from the Greco-Roman, Arab, Turkish and eighteenth-century periods (Fig. 6), then followed by the modern stage that is responsible for the morphological evolution of Alexandria which appeared in the older districts from the early nineteenth century, the early expansion that followed then with the various steps of public regulation, the later expansion in the first half of the twentieth century, and the recent transformation to the present day.

The historic layers of the city inside these boundaries are producing the city's identity. Recently it was almost panned for any kind of interventions for developing or sustaining the old center, which led

to a grey zone of un-handling maintenance neither preservation for heritage buildings nor archaeology beneath. This negligence led to chaos in the latest decades and the demolition of the city's image and collective memory for citizens before tourists. Tourism in Alexandria started to be only for local summer vacations on the eastern shores, leaving the historic city out of strict regulations to preserve. With the increase of inhabitants, the city's transit system was a big problem, especially in the historic districts which were not designed for such commuters' capacity daily. And to be more difficult, all solutions are given to solve traffic congestion the downtown was not including a mass transit system underground due to the presence of archaeology.

So according to the similar case of 'line C' metro of Rome and more elsewhere across Europe. There must be a way to take Alexandria underground metro as a priority to make the historic city districts revive again. In (fig. 7) a longitudinal ancient section of Alexandria archaeological city to determine the expected levels of archaeology and consider another under level for passing the metro lines. This will take several studies, from urban planners, archaeologists, and architects to select the course and spot the location of stations according to surface commuters' demand and according to the city layering maps to predict what to be found in the station building process.

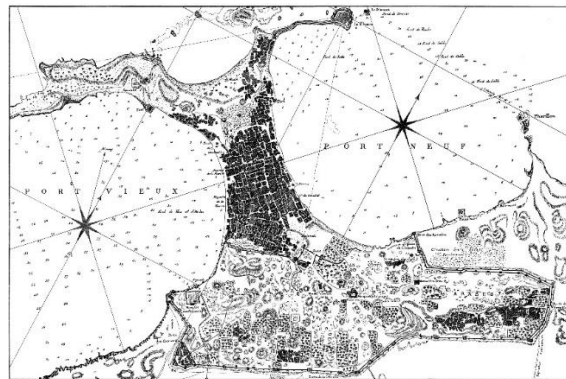


Fig. 6: Alexandria map of archaeological sites and mounds made by Mahmoud Bey El-falaky 1866 source: Alex-Med, Bibliotheca Alexandrina.

### 3.2. Alexandria Strategic Urban Plan 2032 – Alexandria SUP 2032:

The General Organization for Physical Planning (GOPP) launched Alexandria 2032 development plan in November 2019, with its final updates in June 2021. The master plan proposes extending new roads and transit corridors (like El-Mahmoudeya main road, and more...) to ease mobility and create new urban communities outside the high-density city. That is all convenient for the future expansion of the city, but the main contribution to upgrading the network of the present public transportation in the built area specially the historic downtown only depends on upgrading the existed means of transportation (buses and tram lines) in the same narrow roads with the same road capacity which will not solve traffic congestions in the downtown. These types of transportation (buses and tram lines) do not support the link between the new urban communities and the city center as a metro line does (Fig. 8).

### 3.3. Alexandria Metro Line in Alexandria SUP 2032:

The Alexandria SUP 2032 metro line will be extended on the surface path and viaduct at some crossings, extending from Abi-Qir and ending in Misr station passing through Sidi-Gaber station (Fig. 9). This route of the metro needs modification to reach the city center to release traffic capacity from the historic districts. The Alexandria SUP 2032 had no real modification for the urban mobility in the city

center except for upgrading the existed Tramlines and proposing BRT and LRT which will not operate effectively due to traffic congestion.

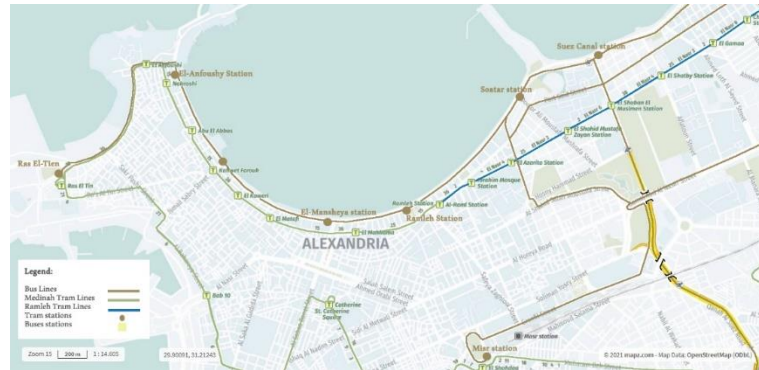


Fig. 8: The existing mobility and transportation network in the city center. It surrounds the city center not crossing it due to narrow streets. source: the researcher, edited on a map from <https://www.mapz.com/map>

#### 4. RESULTS AND DISCUSSION:

The analysis illustrates cities that are very similar to the situation of Alexandria – Egypt, and also it was essential to assess the governmental future development projects for Alexandria by 2032. In a way to discuss if it could reveal traffic congestions from the old center or not. Also determining the level of mobility proposals effectiveness and if it will be with a real solution for traffic congestion or not especially in the downtown.

Alexandria metro line is still away from the historic center that is supposed to serve, and it needs modification on its path to be more effective. Also, in Alexandria Development Plan (ASUP 2032) with its final updates only phase 1 (from Abi-Qir to Misr station) was approved for implementation on the current existing Abou-Qier Railway but the other two phases (from Misr station to 21<sup>st</sup> km Alexandria – Matrouh coastal road) were canceled and replaced with Light Rail Tram (LRT) project and upgrading to El-Madina existed tram, that can not cope the present capacity of users today and in the future.

The main idea in Alexandria SUP 2032 was to attract urban sprawl outside the built area and the historic city without proposing a real mass transit system to ensure the continuous link between the historic city center and the new extensions of Alexandria. The idea of creating mass transit corridors like metro lines it will pass through archaeological districts was not acceptable to authorities. Therefore, the development plan does not support effective schemes of urban mobility in the historic downtown that requires digging (metro line and infrastructure) to be the contribution to solving traffic in the old city center as shown in (fig. 10).

The issue that is noticed in similar cities was the effective action that was implemented much earlier than in Alexandria. The active frameworks of implementation and the cooperation between all parties were initiated to make it real. These old cities are growing and will still do but with a supportive scheme of developments that aims to achieve the best well-being standards for habitants. The awareness to flip the case and start using archaeological sites not only as attractions and landmarks but also as a part of the daily life routine for the citizens. These support different views of a belonging sense, displaying history, conserving the place's identity, and re-imagining the city through its history.

In the next table, there is an analysis of the major proposals for urban mobility that was agreed upon by authorities to be implemented by 2032 in Alexandria. Some of the mobility routes are considered an effective solution for traffic congestion as Bus Rapid Transit (BRT) and Light Rail Tram (LRT), but this

will only be achieved if there is a parallel mass transit system to support them and ensure their effectiveness.

Table 2. Mobility and Transportation proposals in the ASUP 2032 and the contribution for serving mobility in the historic downtown. Source: the researcher on data collected from (the researcher, GOPP and CAPMAS).

Name of project	Track	Comments
In the historic downtown	Rehabilitation of the existing Raml tram line	It runs on the existing local track (Raml and Madinah),
	Rehabilitation of the existing Medinah tram line	
	Bus rapid transit (BRT) on El-Geish Rout	El-Geish Road
Alexandria metro project	Abo-Quir surface rail line with (20 stops) after final edits	BRT is a fast transit means of transport and needs separated speed lanes to be effective. This can't be unless there is a parallel system deducting the crowd. There are (14 new electric buses with a good condition) already on this track but can't cope with the massive demand of passengers and had a very long delaying time due to traffic.
		<p><b>The first phase;</b> with a total length of about 21.5 km extends from Abou-Qier Railway Station to Misr Station</p> <p><b>The second phase (canceled);</b> with a total length of about 8 km. from Misr station to (El-max) with 6 underground stops.</p> <p><b>The third phase(canceled);</b> with a total length of about 13.5 km., extends from El-Max Station to K.P. 21 Matrouh Road with 9 surface stops</p> <p>Both phases were Replaced by the LRT project which is less costly than 1/6 for the metro line and to avoid archaeological excavations</p>

#### 4.1. Alexandria New Metro Line Proposal:

The new line proposal is supposed to complement the mainline under implementation from Abi-Qir to Misr station. So, it is planned to start from Abi-Qir station and pass through Sidi-Gaber on the same track before splitting away from the mainline into another track. The new route will go underground at Sidi-Gaber station on a second level and will continue underground beneath El-Horreya Road in many stations along its route. This section of the underground metro will release traffic on the surface along this narrow and significant thoroughfare -El-Horreya Road- while also servicing particularly congested and crucial areas in Alexandria as it approaches the city center. The train will then reach the city center under the Canopic Road - currently Foad Road - from the "Rosetta Gate" stop. We should emphasize here that the stations chosen for this route will be strongly related to the city's historical layers underneath -(fig. 10)- and to the metro station spacing data.

Bored Tunnel Method by using tunnel boring machines (TBM) is a very common and fast method for tunneling metro lines. Egypt recently had qualified experts, manpower, and equipment in that field after implementation and proceeding in 6 metro lines in Cairo and tunnels of the Suez Canal.



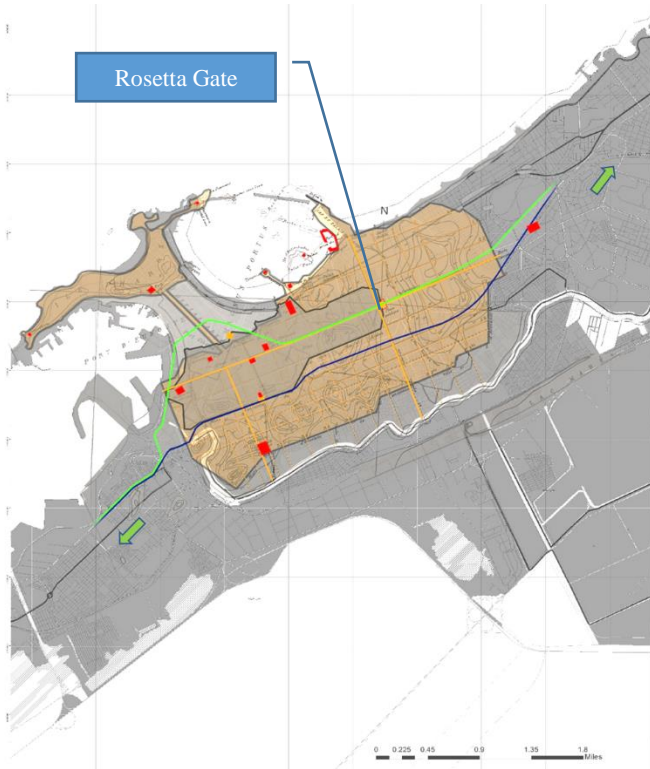


Fig. 10: The proposed metro line passing under the historic downtown is presented in green color. source: The researcher (O., Nagy, 2022) [7].

## 4.2. Alexandria New Metro Line Integrating with Urban Archaeology:

The metro line will operate at a level (-15 m. under sea level with a very big distance under archaeology level). Therefore, the main route will not be affected by the urban fabric except in station zones as these areas will be dug up to catch the metro line. The metro will pass under archaeological districts and so are its stations. In the next part, one of the proposed archaeological stations will be analyzed to show urban archaeology management.

### 4.2.1. Rosetta gate metro station:

The Alexandria Rosetta Gate is the eastern gate of the city's ancient defense walls. It is positioned on the city's major east-west axis, which runs parallel to the city's seashores. Its significance came from the commercial routes that passed through it as one of the primary connectors between the west and east trade routes. The original Arab fortifications, as well as the eastern section including the Rosetta gate, had been dismantled by the time. Historians reported about the demolition of this gate during the reign of Khedive Ismail owing this to the new building of "Seket El-Khedewy," or Elhorreya Road as it is presently called.

The proposed "Rosetta Metro station" will follow the same sequence and process as Rome and Thessaloniki. The process will determine a specific zone of excavation then followed by steps of archaeological listing the findings and deciding what parts to be displayed in the newly constructed station. then followed by the step of building the station with a museumification design aspects. Fig. 12

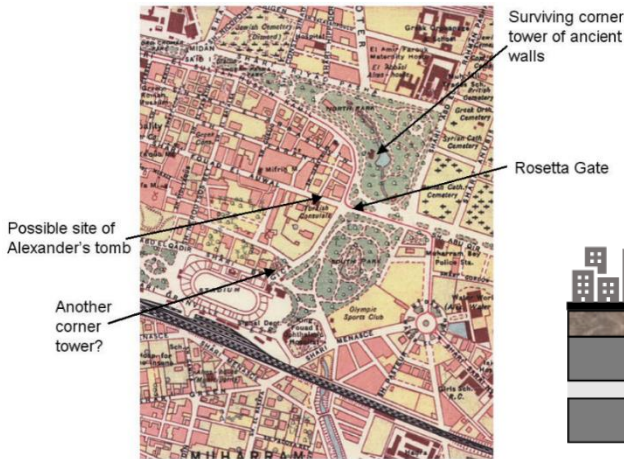


Fig. 11: location of Rosetta Gate, source:

<https://www.flickr.com/photos/cam37/1261421556>



Fig. 12: Cross-section passing through the metro station showing the excavation part in red color.

Source: the researcher

### 4.3. Guiding Lines and Possibilities for Promoting Sustainable Urban Mobility in Alexandria Historic Downtown:

Table 3. Multi-Modal Sustainable Modes of Transport

Source: the researcher

Multi-Modal Sustainable Modes of Transport	Sustainable urban mobility -Modes of transport	Impact
	Mass Transit System; Implementation of the metro project in Alexandria passing through its historic Downtown	will solve traffic congestion problems, release capacity of commuters, decrease travel time, connect the city center effectively with the new extensions of the city and support the effectiveness of BRT and LRT proposed in the downtown -Alexandria SUP 2032.
	Public transport (Buses, tram, BRT, and LRT)	By reducing cars entering the downtown zone, commuters will travel using the metro and the public transport means which will decrease car dependency.
	Shared mobility (elec. cars, bikes, scooters,...)	Providing public stops for shared mobility across the downtown especially next to the metro stations will enhance the mobility in the downtown.
	Cycling lanes and pedestrian zone	By reducing cars and supporting public transit alternatives, the city center will be a perfect place for cycling and pedestrian walkways.
	Using ferries and sea-buses	Most coastal cities had effective ferry lines and sea-buses that will decrease traffic on roads and is a pleasant mean of transport

### 5. CONCLUSIONS:

Previous, Alexandria’s historic downtown should have more effective solutions for promoting sustainable mobility. The main concluded points could be summarised as;

- Mass Transit System; metro line projects should be considered as effective mass transportation mean to cope with the huge numbers of commuters daily underground while leaving the historic urban fabric with free-flow traffic.
- Encouraging using shared mobility and public transportation within the historic urban fabric to reduce motor vehicles inside the zone.
- Design pedestrian routes, cycling lanes, and open multi-use public spaces to enhance the quality of life for residents and users.
- Decrease car dependency in the historic center by decreasing parking lots in it to be used as a cycling lane instead. Also could be decreased by raising parking charge on the side roads and to be prevented on the main roads.

- Creating legislation and an effective framework to deal with archaeological districts in historic towns will push forward toward sustainability and enhance the quality of life.
- Activating the term urban archaeology in future developments. as archaeological sites need to be preserved and utilized through any development in its context, and this should be done by expertise.
- Embracing sustainable approaches such as (Transit Oriented Development TOD) in Alexandria downtown after creating the metro line (as a longer-term strategy) can encourage non-motorized transit NMT, discourage private automobiles and motorized transport outside the historic districts, improve land use planning, pedestrian-friendly design, and increase local economic growth by enhancing tourism.

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## تعزير مبدأ الاستدامة في الانتقال الحضري بالتعامل مع المناطق الحضرية ذات الآثار دراسة حالة: وسط المدينة التاريخي في الإسكندرية ، مصر

أمنية أحمد ناجي<sup>4</sup>،<sup>5</sup> سحر الأرنأوطي<sup>6</sup> ، ريهام الرسول<sup>7</sup>

### الملخص

تعتبر مدينة الإسكندرية من أقدم مدن مصر ذات التاريخ المتفرد على مر العصور. وتتميز هذه المدينة بتعدد الحقب الزمنية التي مرت عليها مما أدى الى وجود شواهد أثرية على هذه العصور تحت المدينة الحالية. وتتمركز معظم المناطق الأثرية في مناطق المركز القديم للمدينة والذي يمتد من منطقة الشاطبي شرقا الى الجمرك والانفوشي غربا ووصولاً حتى شارع شريف جنوباً. ونتيجة لوجود هذا التمرکز الأثرى للإسكندرية داخل المنطقة الحيوية لوسط المدينة ، جعل ذلك عائقاً كبيراً في طريق مقترحات التنمية التي تشمل المركز القديم للمدينة لقيمتها الأثرية والتاريخية وخاصة حلول وسائل الانتقال الحضري داخل المنطقة. ومع النمو الطبيعي للمدينة أدى ذلك إلى تداعى حالة وسط المدينة التاريخي والذي يعتبر من أهم الواجهات المميزة للمدينة. ولذلك تقوم الدراسة باستعراض سريع لأهم مشاكل الانتقال الحضري من و إلى المركز القديم مع استعراض نماذج لمدن مشابهة وتحليلها لإستنباط أفضل أنماط التعامل مع المواقع الأثرية أثناء التنمية المستدامة لوسط المدينة التاريخي وخاصة في عملية الانتقال الحضري. وإيضاح كيفية موائمة مخطط التنمية الحالي لمدينة الإسكندرية ٢٠٣٢ ليكون حل حقيقي لمشاكل ازدحام المرور داخل المدينة. ويقوم البحث ببث مبادئ تحقيق الإستدامة في الإنتقال الحضري في وسط المدينة التاريخي لتقليل مشاكل الإزدحام المرورى به وتحقيق إنسيابية للحركة داخله في إطار مبنى مستدام وبمراعاة وجود نطاقات أثرية في محيط الدراسة.

الكلمات الدالة: النقل الحضري، الانتقال المستدام ، النطاقات الأثرية في الحيزات الحضرية، المخطط الاستراتيجي لتنمية الإسكندرية ٢٠٣٢ ، مراكز المدن التاريخية.

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