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Brownfields in G.C.R.: A Neglected Potential for Re-development the Old City

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Brownfields are abandoned facilities available for re-use, Expansion or redevelopment. Traditionally they are considered as post-industrial sites with negative environmental impacts on- and off-site. Safety is another issue as neglected sites are a breeding ground for illegal activities. Uses in these areas have changed and left for a long time because of legal and economic impediments. However, they present an opportunity in any redevelopment plan especially; in highly populated areas as Greater Cairo region (G.C.R.). This research raises a question on how we could identify the Brownfields in G.C.R.. In addition to classifying them, and knows the role they can play in planning the old city. This research is an attempt to understand the Egyptian definition of the brownfield that accommodates the nature of the city, and analyzing types of Brownfields that can be exist in G.C.R.. The research advocates that analyzing these Brownfields will contribute in solving many urban problems in G.C.R..

Keywords: Brownfields, Cairo City, G.C.R., Urban Development

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Introduction

Brownfield redevelopment issues have been raised the attention worldwide in the past few years. Brownfields are frequently unused land or properties that would have been used as industrial buildings or at other uses that are now declining. They often exist in desirable waterfront lands, city centres and old industrial zones. However, redevelopment has become more common in the first decade of the 21st century, as developable land grows less available in highly populated areas, and Brownfields contribute to environmental stigma, which can delay, the redevelopment process. Greater Cairo region (G.C.R..) includes Cairo, Giza and Qalyoubia with population more than 20 million in 2010; faces a continuous increasing in population annually, beside a continuous migration from rural areas. Theses growing in population caused many urban problems in the city from traffic problems to the on-going development in the informal areas. In fact, Cairo is an old city where urban development started out in past decades and centuries, where the uses of urban areas have changed through time. Some old buildings exist, and others remain as vacant lands with no use. Some of these remaining sites are industrial, and others are old railways storage sites, and some of them are old marinas that were used in the Nile from years ago.

This research raises a question on how we could identify the Brownfields in G.C.R.., and how can be the problematic issue of the properties is resolved. The idea is to identify these Brownfields, classifying them, and knows the role they can play in planning the old city. This research is an attempt to understand the Egyptian definition of the Brownfield, and analysing all types of Brownfields that can exist in Egypt and G.C.R.. specifically.

Brownfields Background

The following section reviews some literature review on Brownfields definition and description.

Brownfields definitions

The blanket term 'Brownfield' is used to describe all abandoned, underused sites, or real property where redevelopment or reuse is complicated by the presence (based on the actual site testing) or perceived presence (based on information related to past use) of contamination. This contamination may include substances such as gasoline, diesel fuel, asbestos, heavy metals, solvents, lubricants, acids, polychlorinated biphenyls (PCBs), and a range of other hazardous materials (APA, 2004).

A Brownfield site is defined in New York State Environmental Conservation law as '...any real property, the redevelopment or reuse of which may be complicated by the presence or potential presence of a contaminant". Examples for sites which could qualify include: abandoned gas stations, old factory and mill complexes and foundries' (NALGP, 2006). In Canada the term 'Brownfield' refers to properties, often former industrial sites that are left underused because of environmental contamination concerns. There are about 20,000 to 30,000 of these sites across Canada, and many of them are located on prime land in this country's cities, ripe for redevelopment (CREA, 2007). The European Definition of Brownfields that 'It is a process of industrial change has resulted in the creation of so-called 'Brownfields' across Europe, Particularly in Urban Areas'. These sites present challenges to redevelopment actions. (Grimiski & Ferber, 2001)

Why Brownfields are existing

The industrial sector worldwide especially in industrial countries began shrinking in the mid-20th century. As many industrial areas were sent out old cities, they often left behind obsolete and contaminated properties.

The mid-20th century, also observed the start of population loss in older central cities, as residents moved into new homes on the urban fringe or relocated to newer population centres outside old cities.
Brownfields redevelopment is one of the major tools that widely acknowledged achieving development which is sustainable. Because the main reason for the emergence of these sites is economic, structural change and the decline of traditional industries, these sites are frequently coupled with a severe loss of jobs and, as a direct consequence, the decline of the neighbourhoods around derelict sites are even of whole cities. In addition, it is commonly recognised and documented that the presence of derelict land has adverse effects not only in the environment but also the economic and social health of the city (OECD, 1998).

Types of Brownfields

Brownfields sites can be classified based on Use, level of contamination and location and use. The following table represent the third type of classification that classify them based on their location and relative use to three main categories as shown in the next table.

Brownfields in traditional industrial area	**Brownfields in metropolitan areas**	**Brownfields in rural areas**
The massive decline in industrial jobs in the coal, steel and textile industries, at the beginning of the 1980s created a need for wider structural change in industry. This cause a lot of squared meters of Brownfields that are no longer used as industrial sites, and some of them classified as contaminated sites because of the precious industry that was there.	Cities are filled with large scale and small scales sites of unused lands. These sites were previously used for large-scale railway and harbour infrastructure facilities, small industries and buildings. Leaving these areas for years due to the change in use create these Brownfields.	Rural areas also contain individual Brownfields sites of a locally limited dimension, which may be hugely significant for the relevant local government authorities concerned. In the past few decades, the sites which were mainly connected with primary economic activities in agriculture, forestry or mining, have been undergoing a consolidation process resulting in the abandonment of many sites.

Table 1. Classification of Brownfields site according to location adapted from (Source: Grimiski & Ferber, 2001).

Benefits of Brownfields

Despite of the fact that many of Brownfields site are classified as contaminated lands, but they are vacant land inside the precious lands of the cities. Consequently, worldwide they have started to change their point of view towards Brownfields recently from being contaminated lands to assets for development of the city. (APA, 2004) The clean-up and reuse of Brownfields provides many environmental, economic, and community benefits. These benefits make many countries all over the world discovered that investment in Brownfields pays off in many ways. Some of these benefits are as follows:

Protection of public Health and the Environment: by encouraging and supporting the reuse of Brownfields, communities can facilitate the clean –up of contaminated land and avoid its negative impacts.

Location benefits: Brownfield location considered as asset itself, because Brownfields are often located in strategic places near waterfronts, railroads and transportation routes, and city centre areas.

Infrastructure advantages: Brownfields are places that have already been developed. They typically are served with existing infrastructure, which can be more efficient to upgrade when compared to extending new infrastructure into other new areas.

Economic Development/ Job creation: Brownfields clean-up and redevelopment can be a base for economic development and expand the jobs and taxes base of the government.

Negative impacts of Brownfields

Brownfields are sites that have, or are perceived to have contamination. They range in size from a single lot to a mighty lot post-industrial site. Brownfields impact communities in a variety of ways. Abandoned or dilapidated buildings on Brownfield sites signal neglect even in an otherwise well-maintained neighbourhood.

Contaminants found on Brownfield sites can pollute soil, air, and water resources on- and off-site. This poses environmental and public health threats. Safety is another issue as neglected sites are a breeding ground for illegal activities, such as dumping. Finally, Brownfields are a drain on the local economy and take a serious toll on community morale, especially in low-income neighbourhoods that suffer from a disproportionate number of Brownfield sites (APA, 2004). Yet, Brownfields are not hopeless places, and, in fact, they are often prime locations for revitalization as they considered as potential and constraint in the same time.

Obstacles and constraints of Redevelopment Brownfields Sites

Many contaminated Brownfield sites sit unused for decades because the cost of cleaning them to safe standards is more than the land would be worth after redevelopment. However, redevelopment has become more common in the first decade of the 21st century, as developable land grows less available in highly populated areas, and Brownfields contribute to environmental stigma, which can delay, redevelopment. Also, the methods of studying contaminated land have become more sophisticated and established.

Brownfield sites present a challenge to redevelopers because they have to be cleaned up before they are ready to be put to better uses. Contaminant levels vary between sites, and in some cases the full extent of contamination only becomes clear after builders start digging into the ground. For this reason, developers have historically been hesitant to develop these risky properties.

The obstacles consistently identified by the proponents of brownfield redevelopment can be summarized as follows (Paull, 2008):

- The land is extremely contaminated and present a highly pollutant area.
- Unacceptable from people owns the land or live by it to change, use or develop it.
- The requirement for large capital investment;
- Absence of adequate and consistently accessible expertise within government agencies dedicated to the development of Brownfields;
- Lack of a common vision, and a consistent system for development.

Greater Cairo Region

Overview of Greater Cairo Region

The importance of Cairo, the capital of Egypt, is highlighted by several names like Al-Qahirah (the Victorious), Umm Al-Dunia (Mother of the World). (Kipper, 2009) Al-Qahira, simply dominates most of aspects of national identity, the reason that everybody calls it Misr, as it is the microcosm of Egypt. (Piffero, 2009) Misr is the Arabic name for Egypt as a whole. (Kipper, 2009) Nothing best testifies its supremacy, and it reflects Egypt's balances and unbalances, social, economic and political pressures and cleavages. (Piffero, 2009) It is the largest city in the Middle East, with age that extended to more than 1,000 years old, with date back to the time of the Pharaohs at some parts of it. (El Naggar & others, 2006) Cairo also was the origin of various foreign eras in Egypt (Fatimids, Ayubids, Mamluks, Ottomans, the French occupation, Albanian Mohamed Aly, Khedive Ismail and the British occupation), and it was the container for their maternity concepts and deeds. (Safey Eldeen, 2008) It was praised as the main centre of heritage, culture, education, in addition to, style in the Arab world, with iconic status in the region and throughout the world (UN-Habitat, 2011).

Figure 1. Greater Cairo Region (Source: ElKhorazaty & Eid, 2006)

'G.C.R.' Greater Cairo region's current population reaches about 16 million; it is expected to reach 24 million in 2022. With an area of 850,000 acres, through connected urban form on the River Nile banks in (GOPP, 2009) "Greater Cairo Region" (G.C.R.) was defined by the General Organization for Physical Planning 'GOPP' in 1982, which is the urban agglomerate that consists of the whole governorate of Cairo. In addition to, the city of Giza and Shubra El-Kheima, nine rural districts of Giza and Qaliobeya governorates, besides another eight new towns located around Cairo. The presidential Decree of 17 April 2008 reorganized the administrative subdivision of Egypt by creation of new governorates of Helwan and sixth of October (Piffero, 2009). The administrative divisions of G.C.R. have been changed to encompass 5 governorates: Cairo, parts of Giza and Qaluobya, in addition to, 6th of October and Helwan, and after January revolution in 2011, the Decree was canceled. (Khalifa & Elshafie, 2008) Each governorate has its own administrative structure separately without administrative body in charge of the whole region. (UN-Habitat, 2011) Or macro administrative structure that covers G.C.R.. as a distinct entity. (Sims, 2003).
Greater Cairo region has been the main attraction point in the country, and the main terminus for internal migration from rural areas and small-size cities, almost 40% of job opportunities and major educational, health and other facilities exist in the region. (Madbouly, 2010) Two third of the country's gross national product is generating in Greater Cairo, and almost 25 per cent of the population occupies in G.C.R. governorates. (UN-Habitat, 2011) As the capital and prelate city of Egypt, the economy of Greater Cairo is probably contributing half of the Gross Domestic Product. (Sims, 2003).
G.C.R.. has a population of about 17.85 million people; Cairo is the most populous metropolitan in Africa and the sixteenth most populous metropolitan area in the world. (Khalifa & Elshafie, 2008) The region, has a relatively stable share of Egypt's total population (approximately 25%), the main agglomeration had a population density of extremely high density in 2006. (Koei CO., and others, 2008) That expresses the densest in terms of population per km2, with an average of 400 persons per hectare and peaks of more than 2000 persons per hectare (Piffero, 2009).
The global dynamics of urbanization has deeply transformed Cairo, which have increased the city's population six times in the past 60 years. (Vignal & Denis, 2006) The fast expansion of G.C.R.. agglomeration has not been met with effective use of limited financial resources allocated to the region. Besides, the governance of the agglomeration has been always an elaborated issue given the intervention between central ministries responsibilities with the local government roles (Madbouly, 2010). G.C.R. as one of the world's most densely populated areas, with one of the lowest road space per capita percentage and spectacular growth in the number of private vehicles; this was aggravated by constructing bridges and flyovers by the government. (El Naggar & others, 2006) The green area per capita is 1.5 m2 in the total agglomeration which is much bounded compared with other metropolitan areas, such as London (27 m2 in 1997) and Paris (12 m2 in 1997). In addition, a significant part of that green area is not allowed for public users as it comprises private facilities that have a closed membership. (Koei CO., and others, 2008)

Brownfields in G.C.R.

G.C.R. represents a fascinating case study of "urban upgrading", as it is radically transformed massive urbanization process that have increased its population in the last decades, ensuing in plucking of informal settlements in its outer boundaries (Piffero, 2009). It has also come to represent urban chaos, typified by areas of privation, rising crime, contamination and congestion (UN-Habitat, 2011). The life is characterized by extremes, both of tradition and modernity (Kipper, 2009). It is facing significant challenges in terms of urban texture and most importantly the potential, various lifestyles it offers to its habitant (El Khorazaty & Eid, 2006).

G.C.R. was already endured as an amalgam of various cultures (and nationalities) waiting for guidance and/or melding. (Safey Eldeen, 2008) It had entered a long period of decline; it was only in the mid-19th century, when it began to reassert itself politically and to enter into a process of economic growth and modernization, dependent mainly on European enterprisers and technicians. (Sims, 2003) So it became a focal point for most modern manufacturing. It also has a vast informal economy besides the formal one, made up of hundreds of thousands of small and microenterprises which absorbs over half of the city's labour force. (Sims, 2003) Factories and industrial zones occupy 10% of the total land area; some of these are the source of environmental pollution and inapplicable for their place inside the agglomeration. The Ministry of Trade and Industry has identified 21 environmentally unfavorable factories that are to be resettled away from the main agglomeration so as to improve the land use efficiency, and rejuvenate the living environment (Koei CO., and others, 2008). According to the final results of the census for year 2006 about (Housing and establishments) issued by the Central Agency for Public Mobilization and Statistics (CAPMAS), no statistical data represent the areas or numbers for Brownfields.
However, only numbers of unoccupied buildings and other category which is (Unused) that can be defined as occupied buildings without activities practiced like military campuses or deserted lands that contained old infrastructure buildings used in the past as shown in table (2). (CAPMAS, 2012)
When the survey was done, Greater Cairo Region was consisted of the five governorates. Statistics for Helwan and 6th of October were included, for Cairo, about 0.5 % of the total number of buildings are regular buildings occupied without activities done inside that made from stable structure (Steel - Concrete structure), while about 0.3 % are Permissibility buildings that made from temporarily structure. The percentage in urban locations of Giza is lower: (0.3, 0.2) % respectively for regular and permissibility buildings, while the urban locations (Helwan, 6th of October and Qaliobeya) acquired the higher percentage for regular buildings.

Governorate		Regular buildings				Permissibility building				All
		Unoccupied	%	Unused (Occupied without activity practiced)	%	Unoccupied	%	Unused (Occupied without activity practiced)	%	
Cairo	urban	26434	6.2	2103	0.5	424	0.1	1183	0.3	426392
	rural	0	0.0	0	0.0	0	0.0	0	0.0	0
Helwan	urban	20344	16.3	1409	1.1	278	0.2	372	0.3	124879
	rural	11439	11.9	945	1.0	29	0.0	88	0.1	96250
6th of October	urban	32823	30.8	1016	1.0	126	0.1	183	0.2	106648
	rural	50624	17.7	996	0.3	437	0.2	417	0.1	286375
Qaliobeya	urban	18121	10.0	1752	1.0	196	0.1	196	0.1	180673
	rural	59479	14.8	2187	0.5	189	0.0	360	0.1	401511
Giza	urban	14563	6.9	619	0.3	250	0.1	331	0.2	210936
	rural	2897	11.5	46	0.2	30	0.1	18	0.1	25135

Table 2. Unoccupied and Unused buildings inside Greater Cairo Region (Source: CAPMAS, 2012).

Example for this type is the railway sheds and depot in Ramsis street, which occupied large areas in a highly distinctive location inside G.C.R. agglomeration, and storage, ship industry uses, and old ports that exist in the western bank of the Nile River in G.C.R. as shown in figures (2) (3).

Figure 2. Infrastructure brownfields. Railway depots in Ramsis square - Cairo downtown. (www.panoramio.com, 2012) (Google Earth, 2012)

Figure 3. Depositories and infrastructure brownfields. Warehouses in Qorsaya island and old ship industry centres in Embaba waterfront at Nile River inside G.C.R. (Researcher, 2011)

Definition of Brownfields in Egypt

There is no definition specifies the term (Brownfields) in the Egyptian laws, and even after the issuance of laws through the Ministry of Housing in 2008 which is the Unified Construction Law no. 119, however, the law identified areas to be renovated and developed through the strategic plan of the city. Article (64) identified re-planning areas that maximize the benefits to both city and region's population, and amendments contribute to carrying out the overall strategic plan and its outputs (MHUUD, 2008).

In order to build a common understanding of the meaning of Brownfields in Egypt a structured interview was done with different planning experts and academics. The aim is to collect not only the definition but also their classification of these areas.

According to Prof. Ghada Farouk (The head of technical office) in General Organization for Physical Planning (GOPP) the "Brownfield" term had not been used before in any of the previous governmental studies or plans work except in the physical survey for (Cairo 2050) that was previous regime's 'national urban scheme'. According to Ghada Farouk the definition "Brownfield" used to identify the sites that are not optimally used according the poor utilization of the land. According to Prof. Mohab El-Refaie' (The head of the Information Centre) in General Organization for Physical Planning (GOPP), while the definition "Brownfield" used before in the survey of (Cairo 2050) project, yet, there was no common agreement on the criteria that can be used to define the relevant sites or buildings. However, it was known between the members of the survey as "ignored / unused lands or buildings", and the best use of it can be determined according the location specification. From the academic perspective; Brownfield is a planning terminology that is used recently in city planning Courses, the term is explained as an international definition that refers as mentioned before to contaminated land. But locally this term is identified as; a vacant land or unused building inside the boundary of the city which properties might be known or not. Cairo as an old city that as mentioned before had a long development history contains many vacant and abandoned lands, these lands were used in the beginning of the century or older than that and due to many circumstances it is closed and remained for years as it is a vacant land within the city.
For most of experts; Brownfields can be vacant lands, the abandoned buildings, with ownership varied from case to another. Most of them found that the huge Brownfields areas in Egypt are located on river banks, old industrial areas, train station old storage, residential buildings. They are not fully destroyed building but some of them are fully existed but only left after the uses were decline. Most of them don't connect between the Brownfields and contamination of the land; they found that most of these lands are not industrial lands only. They differ in use as mentioned above. Furthermore, it is impossible to prove whether this land is contaminated or not without measure the amount of pollution in land or underground water, as there is no studies or current measurement of this.

Statistical analysis of Brownfields in G.C.R. / classification of Brownfields
In 2009, the latest survey contained all parts of G.C.R. made by GOPP and sponsored by UN-Habitat, where the "Brownfield" term was identified for the first time. According to survey the total areas of Brownfields inside the region are about 2,484,305 meters squares, with land values range between 1,000 to 40,000 Egyptian pounds per meter square.

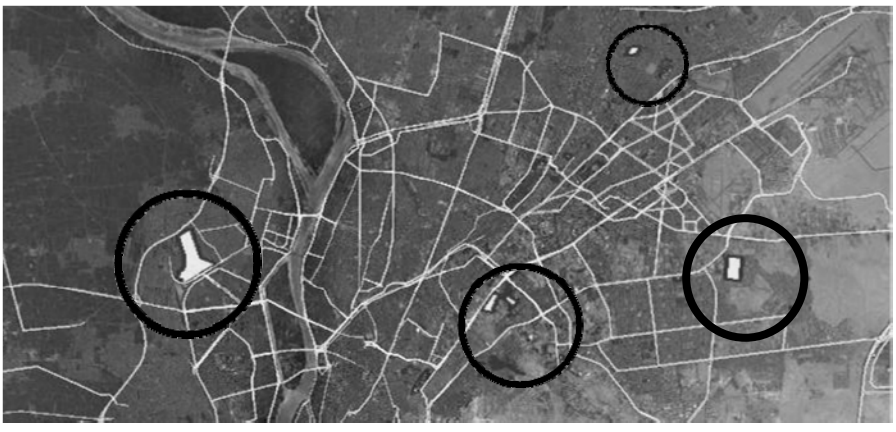

Figure 4. Some Brownfields inside G.C.R. (Source: GOPP,UN-Habitat, 2009)

Original use	Area (meter square)
Residential	273,620.70
Commercial	39,442.80
Industrial	588,843.00
Utilities	158,328.50
Educational	315,432.40
Transportation	982,044.50
Storage	125,457.00
Mixed Use	1,136.10
Total	2,484,305.00

Table 3. Classification of Brownfields according to original land use inside Greater Cairo Region (Source: UN-Habitat, 2009)

Ownerships	Area (meter square)
Ministerial	702,897.90
Local Governorate	872,071.00
Associations	96,857.40
Private	812,478.70
Total	2,484,305.00

Table 4. Classification of Brownfields according to ownership inside Greater Cairo Region (Source: UN-Habitat, 2009)

land Price (L.E. / meter square)	Area (meter square)
Between 500 / 1000	205,415.10
Less than 2000	927,877.80
Less than 4000	325,478.10
Less than 6000	578,479.40
Less than 8000	29,122.10
Less than 10000	294.4
Less than 20000	395,489.90
Less than 40000	22,148.20
Total	2,484,305.00

Table 5. Classification of Brownfields according to land prices inside Greater Cairo Region (Source: UN-Habitat, 2009)

From the above analysis it is clear that Brownfields in G.C.R. is a real potential, because they are located in lands which are inside the city, have infrastructure and near to services. The area according to ownership inside Greater Cairo Region (UN-Habitat, 2009) is 2,484,305.00 m2 divided into different uses and properties, and varied in land prices. These Brownfields cannot be neglected anymore because they represent opportunity for the future development of the city.

Classification brown field in Cairo

Based on the previous definition Brownfields in Egypt can be defined as; a piece of industrial or commercial property that is abandoned or underused and often environmentally contaminated, and considered as a potential site for redevelopment**.** The uses of these areas can be classified by use and by property.

The uses of Brownfields in Egypt are varied between industrial areas, commercial areas, and the ownership of these Brownfields is varied between governmental bodies, private sector and associations. The governmental bodies represent the most percentage among other areas, as it represents more than 60% of the total areas of Brownfields in Egypt. This is can be explained in the light of the political shape in Egypt starting from 1952 revolution which issued the concept of Nationalization of private buildings to be owned by the government. In the last years the government strategy was to empower the Privatization strategy which aims to transfer most of public ownership to private ownership which cause in many cases that these building abandoned with no use.

Concluding Remarks

From the discussion above, G.C.R. is an old region that is currently full of urban, social and economic problems. The appearance of Brownfields in G.C.R. is not only an urban problem but it extended to cover many other problems. Leaving Brownfields areas away from any development will cause many social, economic and environmental problems as well. The solution is to merge these lands in the development plans, because they are not only presenting a problematic issue but additionally the value of the land is a potential for attract investors and developers.

Developing Brownfields is a necessary issue, Instead of leaving them in the centre of the old city without any contribution from the government or local authorities. Developing them under the national developing plans of the G.C.R. is a must. This will not happen easily; there is a great demand for certain changes in many fields to make planners capable to merge them in the planning process.

These changes will be done in different disciplines, starting from changing in the legislation itself. There must be a section in the Unified Building law to define what is meant by Brownfields, and how we can classify them. In addition to that there must be a solution for the property problematic issue, as one of the major constraints of developing Brownfields in Egypt are the Lack of clarity in the ownership of these lands. Additionally most of them are owned by the government and this is not only mean one ministry or authority but it might be different authorities that owned Brownfields inside the capital and completely neglecting them and leaving them without any maintenance or future developing plan.

In order to merge brownfield in the planning strategies of the G.C.R. the following points must be achieved;

- Conduct a detailed survey on all Brownfields land in G.C.R.
- Establish an organisation responsible for brownfields in G.C.R. can adopt all future projects and manage the public participation with the residents.
- Update the planning law (unified law) to identity what is meant by this term.

- Classify Brownfields by use and level of pollution and contamination in order to have an action plan of how we can solve their environmental problems and the best ways of contribution.
- Merge the Brownfields with development plans of the city; this can be happened by Compensate landowners' amounts by money for abandoned state.
- Involve public participation with the government in the planning strategies of Brownfields especially huge areas like; old rail ways in Cairo.
- Facilitate the cooperation between planning authorities and local authorities through establishing the mentioned organisation body.
- Encourage developers and investors to develop project in Brownfield areas in G.C.R.

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