Invisible Architecture; Integrating Subterranean Brussels in Active Neighbourhood Revitalization

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Abstract

Brussels is a city with immense potentials and opportunities. Being at the heart of Europe, it is coherently connected with rest of the world both physically and figuratively. However, these opportunities and connections constantly attract people from around the world; giving way to a heterogenic society of diverse ethnicities and cultures. This heterogenic society creates a strong tension in some quarters of Brussels – especially when there is a prominent arrival magnet as with the case of neighbourhood Fountains with Brussels south railway station in close proximity. As with any infrastructure project, the proposed metro and tram station of Lemonier, is a potential for not only the neighbourhood of Fountains but also for entire metropolis of Brussels. The proposed MetCom program incorporating the Brussels underground gives these commonly mono-functional mobility infrastructure projects a new meaning; transforming them into effective urban public spaces. Introduction of this proposed novel logistic system for urban freight transportation allows new possibilities for the use of existing unused space within the metro stations as well as in the adjoining gray buildings. The project not only helps revitalize the neighbourhood by introducing a new economy but also encourages better interaction of the heterogenic society by providing a place for activity. The project however does not create an architectural object; on the contrary, it creates an invisible architecture.

Keywords: Invisible Architecture, Neighbourhood revitalization, Brussels, Logistic system, Mobility infrastructure

Introduction

Brussels is characterized by its numerous infrastructures from the 20th century; the north – south railway junction, the car tunnels on the city boulevards, the subway network, the ring expressway, etc. Even today several projects are in the pipeline, such as new tram and metro lines. In addition there is especially a need for rehabilitation of the existing transport infrastructures in the city. Although it may seem a technical discourse, infrastructure design also engages social and imaginative dimension as much as engineering; giving way for innovative proposals and programs.

The proposed MetCom logistic system for urban freight transportation is a novel program which has the potential of expanding throughout the highly congested cities as a sustainable logistics system which would eventually prevent the heavy logistic vehicles entering the city centres. In

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the MetCom system, the metro transportation system is used for transportation of goods within the inner city. The existing metro stations, cars and lines are modified to accommodate handling the freight transportation. While the passenger transportation continues undisturbed, frequency gaps in the off-peak hours are used for transportation of freights. This MetCom system not only makes the cities less congested, it also adds value in a neighbourhood scale providing employment opportunities within the city for the youth and the blue collar workers.

Apart from the MetCom system, the project consists of a metro station, tram station, a parking facility and also an urban square. The complexity of the infrastructure program is dealt with simple architectural solutions, giving as little emphasis as possible to creating an architectural object. Although the object receives less prominence, most of the attention is given to creating qualitative architectural spaces, encouraging interaction between the seemingly diverse activities. For example, the workshop areas of the MetCom have a direct visual connection with the public square vice versa, while the cafeteria is even accessible for the public. Such interactions are considered with utmost importance as creating an industrial working environment within a dense urban quarter might lead into repulsion generated through the neighbourhood itself.

The literature study allows for understanding not only the concepts behind the architectural quality of the spaces created, but also of the intelligence of the system which binds the whole project together. The detailed design of the process, program and the space relating to the project allows for a comprehensive understanding of this novel initiative as much as possible.

Neighbourhood of Fountains

Brussels is also not a city with a clear city centre and its outskirts; it is rather a city with multiple centres connected with a proper transportation network which acts as the vessels. International, national and metropolitan transportation networks meets together in a seamless way at the Brussels south station which is a prominent arrival magnet in the neighbourhood of Fountains.

Neighbourhood of Fountains, which lays just outside the historical city of Brussels, is located mainly in the valley of the former river Senne. During the 16^{th} – 19^{th} century, located largely in swampy areas, the neighbourhood was serving as crop and livestock supply to the city.

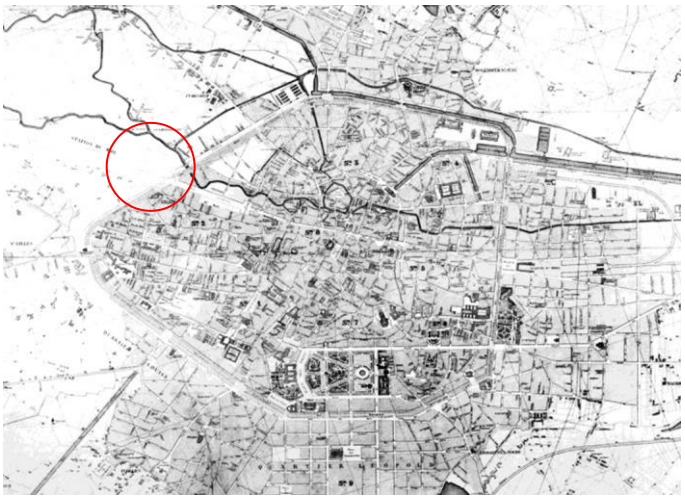

Fig 1: Historical map of Brussels indicating the neighbourhood of Fountains
Source: Brussels archives

In the 20th century however, the growth of the city due to its new status as the capital of Belgium and the rise of industrialization helped radically transform these neighbourhoods. In the outcome of this revitalization two factors were decisive. The first factor was conducting the channel between Brussels and Charleroi, completed in 1832, which provided access to the Hainaut basin and coal and contributed greatly to the industrial development of Brussels. The development of the railway parallel to the channel axis, subsequently leading to the Brussels south railway station, is the second factor resulted in the neighbourhood regeneration of Fountains.

Gare du Midi (Brussels south railway station) was created with a vast space called "the constitution", playing the role of a station forecourt and an entrance to the City. Designed by the architect Auguste Payen, the forecourt generates a feeling of a city gate as well as the monumentality of the station. Actually staged in the urban fabric, the station was the centre of view from drève du Midi, now Avenue Stalingrad.

The neighbourhood Fountains has a high immigrant population. The population consists of mainly Belgian, Moroccan, Portuguese, Spanish, Greeks and Italian ethnicities. Further research into the demographics reviles that the proportion of young people aged 0 to 17 years is greater in the three sectors of the perimeter than in the municipality as a whole and in the Brussels region (28 to 33 % of the total population, compared with 23% for the municipality and 21 % for the region). Conversely, the ratio of elderly is smaller inside the pentagon perimeter compared to the municipal and regional average. This character is directly related to the presence of foreign families or families of foreign origin, which have a higher birth rate than the Belgian birth-rate.

The whole neighbourhood is characterized by a large number of unemployed people. The main reason for this situation is the low educational attainment. The proportion of 18-24 year olds in higher education between 5.3 and 16.8 % is one of the lowest percentages in Brussels.

Infrastructure as an integrated design project

Objectives and research question

As Manuel De Sola Morales (2008) explains, in urban centres, land is undoubtedly the scarcest commodity; doubling it in the form of infrastructure permits a more intensive use to be made of it and simultaneously an enrichment of its image, a multiplication of the possibilities for movement for combining the most complex of the activities.

There is a growing need for rehabilitation of the existing transport infrastructures of Brussels, which creates opportunities to give these commonly mono-functional mobility infrastructures a new meaning; to transform them into effective urban public spaces, which could integrate other uses, as functions for which no affordable space is available in the city centre or which are perceived as generating nuisance to the common function of the city. In order to transform the current pre-metro north-south line 1 into a part of the programmed automated metro system, the segment connecting the south station with the city centre has to be redesigned.

The main objective of the project is to test how the subterranean urban mobility infrastructure of Brussels could be integrated in active neighbourhood revitalization. To answer this question, a fourfold vision is put forward in different scales of urban interaction. At the global scale the

project tests the manipulation of metro transportation systems in cities as means of urban logistics – a new economy. In the city scale the aim is to not only revitalize the neighbourhood of Fountains, Brussels with the introduction of a new economy, but also to encourage a diverse range of activities in the mono-functional landscape. Finally, the architectural vision is to encourage place for activity and interaction, not create an architectural object; thus creating an invisible architecture.

Research methodology

All the buildings, even the highly private buildings, come into contact with, and help shape, aspects of the public domain. The start point of research is through primary observation of the city in action. The approach then is to focus down on a narrow set of urban relationships to understand them with precision and depth. Here, the metro system of Brussels is identified as a potential for generating neighbourhood revitalization by introducing a new economy. The design strategy starts by selectively amplifying the often subtle and fragile trends found within the existing urban context.

Graham Crist (2004) says that when a project is socially driven and focused on programs and processes, the way a building 'looks' has a tendency to slide down the list of priorities. Such a project begins with social processes and it asserts that the architecture participates in, accommodates and gives form to these processes. Social process ranges from real and pressing needs, to particular community situations, or to broader cultural and global issues. This is rather true in this project as it is neither building nor architectural object – it is a continuation of the existing urban fabric mould in a way to make a quality place of action.

Infrastructure as an integrated design project

Infrastructure could be understood as a chance to free architecture and urban planning from their seemingly separate categories and to link them together to create a coherent urban solution. Although it may seem a technical discourse, infrastructure design also engages social and imaginative dimension as much as engineering.

Unlike in previous generations where engineering offices were engaged for the entire management of the building process of infrastructure – from preliminary design to the control of execution drawings, tendering etc – there is now a growing tendency to involve multiple disciplines from the outset. The architect or urban designer is no longer simply there to beautify a project which is primarily based on technical considerations. To arrive at a satisfactory proposal, the work is undertaken in close collaboration with specialized firms in construction or traffic management, but the emphasis on architecture is evident from the start.

Public authorities around the world view transport infrastructure as their primary field of investment. However, infrastructure design is still mostly a last resort for authorities to give structure to haphazard developments. Urban contributions and settlements are repositioned on the basis of new economies, proximities and hierarchies while landscapes and ecologies are radically altered. Landscape and infrastructure merge and movement corridors are (re)worked as new vessels of collective life. An entire new spectrum of the public realm becomes a terrain of investigation. In order to function, fit and be acceptable, infrastructure needs to enhance the quality of this terrain.

Architectural object and the 'place'

The common understanding is that 'architecture' is supposed to be dealing with buildings; thus creating objects. However, Henri Lefebvre (1995) posits that space is a social product; that "spaces are produced". For Lefebvre, space is an entity experienced by people intersecting, interacting, producing and reproducing relationships to and with each other; producing a social space. A similar theory of understanding place as a social space is also put forward by Michel Foucault (1986), expanding Lefebvre's interpretation by repositioning the social construction of space – the performed communication – on a larger context. He observes that the interactions are performed in multiple sites (places), where each site is in turn defined by the social interactions that exist within them individually.

The architectural object of both classicism and modernism contains the idea of original perfection. That is, the significance of any specific object is, in part, understood by some references to simple type forms. Eisenman (1986) explains the specific object does not so much represent type form as it is significant of this relationship; it is in fact a collection of smaller objects which inherit their own importance in reciting the story of the whole.

Architecture of the cities is always a combination of objects. Hence the objects, in the sense of both materialistic and spiritual, seemingly carry a huge significance in the outcome of architecture. Peter Eisenman (1984) contradicts this importance, by misplacing the object in a forward moving time; where the objects origin is the start of its end.

Invisible architecture

The things we cannot see are invisible. For instance the underground is invisible from above ground unless looking through a hole. However, the invisibility discussed here is not the lack of visual connection; on the contrary, it is the lack of sense of existence.

The ground today has become an ecology of architecture; filed with various kinds and patterns of structures and forms. Now seems so familiar to us this concept, that we find it hard to imagine this was not the case before man started conquering earth. However, the architects have also been trying to defy the sense of solid existence.

The house on pilots (1922-27), by Le Corbusier, became the architectural icon of this lose of existence by liberation from the ground. As the house has no direct contact with the ground, it detaches itself from the physical surroundings. The ground ceases to define the architecture as the building practically creates its own ground in the form of a platform resting on pilots. The ground is left behind on the earth. Further into the modernistic architecture, the conceptual neutralisation of the ground is more clearly carried out by Mies van der Rohe. In his Barcelona Pavilion, the podium creates its own micro context for the composition of walls and roof. Thus the building is loses the sense of solid existence on the ground. The French communist party building in Pars, by Oscar Niemeyer, is an instance of contradiction whether to touch the ground or not. He gives the ground – which is normally indefinitely continuous – a distinct form. Within this form, the building itself is again visually dethatched from the ground. It is as if the well developed above-ground and underground are loosely tied with an invisible architecture without a horizon. The quasi-topological ground level keeps you in suspension like in an Alfred Hitchcock movie.

In his Spiritual Retreat House, Emilio Ambasz uses two techniques to make the architecture invisible. Firstly he hides the building in a layer of vegetation on top and secondly he sinks the volume of the building into the topography of the site. Although both Oscar Niemeyer and Emilio Ambasz lose the importance of the architectural object to the ground; still the ground is treated as a tool of camouflage. However Peter Eisenman in his theoretical discourse "Cities of Artificial Excavation", attempts to develop an architecture deriving from the ground.

In his theoritical discourse, Manuel de sola Morales describes that his projects are not connected with the design of objects, ensembles or spaces as such; neither are they landscapes, in the synthetic, combinatory sense of the world. Rather they are ment to be true reinterpritations of the cities and sincere proposals for their transformation.

City as wisdom

If the objects lose their value completely what makes the city breath? Morales (2004) explain that the surface of the city, the urban skin, as 'superficial', that is light, inconsistent and insignificant. The skin, therefore, is an inanimate object which shapes the life inside – it is the point of contact with indoors and outdoors. The infrastructure, both mobility and services, are the vessels of a city; pumping life and binding together the functions to one another. The benches, the garbage bins, the lamp posts, the traffic lights they do not stand out as objects, but makes the composition nonetheless. Morales thinks that paying attention to urban stuff (he mentions as things) is what enables us to make the urban quantity translated into variety the main characteristics of the metropolitan territory. Not the aesthetics of the buildings and or history.

Brussels metro system – analysis and comparisons

Brussels Metro transportation system started as a pre-metro system which could be compared to German Stadtbahn systems of Cologne, Stuttgart, Essen, Hannover, etc, with important sections of underground tunnels used by various tram routes. In 1969, the first tram tunnel along line 1 was opened between Schuman and De Brouckère, and in 1970 line 2 between Madou and Porte de Namur was constructed. Currently lines 1, 2, 5 and 6 are operated as full metro lines, whereas the north-south city tunnel and the outer ring tunnel in the east are still used by trams stopping at low-level platforms.

In September 2003, a 2.7 km extension of Line 1 from Bizet to Erasme Hospital opened with 4 new stations of which the last 800m and Erasmus station are on the surface. All stations have an island platform which is directly accessible from street level without a mezzanine.

Although the Brussels underground mobility system covers most of the urban areas there are few portions, such as Schaarbeek to the North and Uccle to the south, which are loosely connected. According to the future development and expansion plan for the year 2030 however, the loosely connected areas would be integrated to create a more comprehensive mobility network. The Brussels national airport is also to be connected with the Metro network as well as the proposed logistic centre in Schaarbeek.

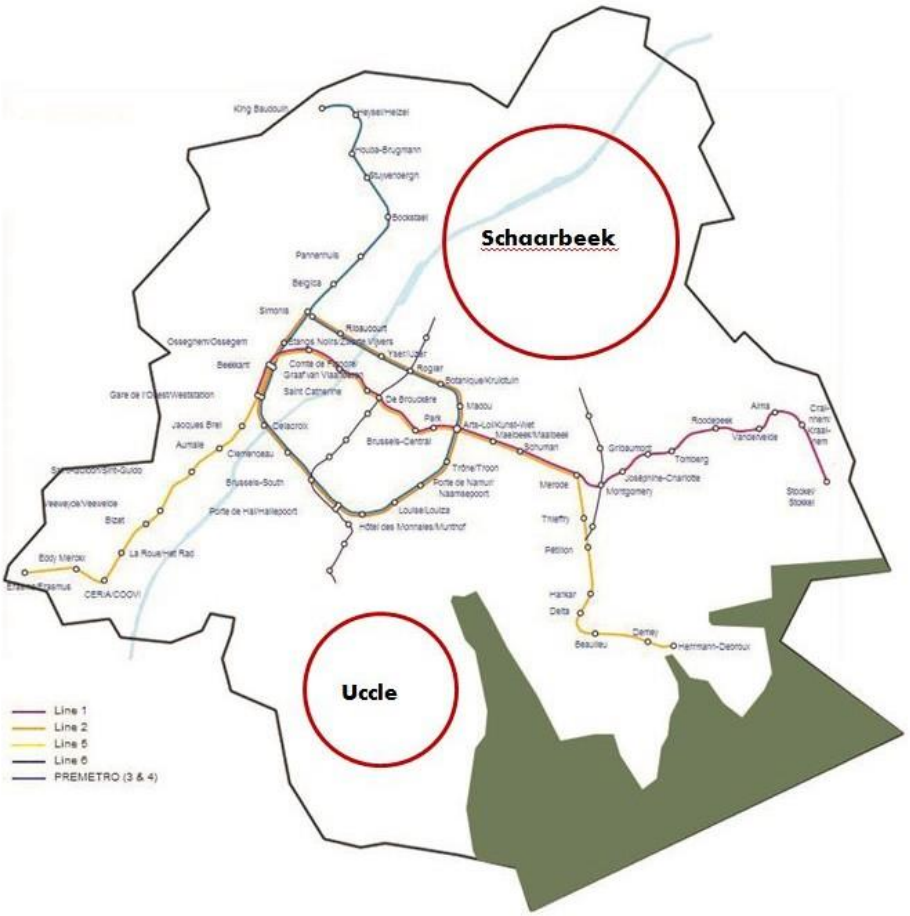

Fig 2: Brussels metro network
Source: MITB Brussels

The Brussels metro network is also properly connected with the bus, tram and train networks, with cross over points from one means of transportation to the other in multiple instances making the commute using public transportation a hassle free experience. The intercity train system is very convenient for making day trips from Brussels to the other major cities in Belgium as well as Ito other regions of Europe. Trains run frequently throughout the day. Although not frequently used, the canal running through the city also has immense potential in re-emerging as a main means of freight transportation, especially across the border to France.

Frequency of the metro

The Brussels Metro system (underground train) is of one the most convenient and fastest ways to travel to the main destinations of the city centre. There are 4 metro lines and 2 tram lines that service the Brussels city centre. Metros run frequently; every 3 minutes at peak, every 10 minutes after 8pm and every 5 minutes on weekends.

Urban logistics

Road traffic in many urban areas continues to grow at a faster rate than road capacity; which results in congestion, delay and unreliability of the network (Freight Transport Association, 1996). Limited accessibility to properties, narrow roads and parking on pavements may present

another serious problem from freight vehicles. Their extra width often leads to congestion, accidents, delays and manoeuvring difficulties that affect lorries as well as other traffic. The biggest contribution of freight transport to urban congestion can be noticed within older urban areas and city centres with narrow roads and shortage of parking space (Hicks, 1977; Civic Trust et al, 1990). These areas urgently require new sustainable solutions to existing problems associated with freight transport operations.

To assist traffic flow at those times when deliveries are permitted, co-ordination of urban freight policy with other policies is important. For example the pedestrianisation and traffic calming schemes need careful designing. The popularity of totally traffic-free areas for shoppers and pedestrians is acknowledged by transport operators but it is also apparent that the practical effect of these measures has been to reduce significantly the time available for deliveries, and the cumulative effect of applying these measures in successive town centres is making it increasingly difficult to achieve daytime deliveries (Freight Transport Association, 1996). These operating difficulties are especially severe for organisations attempting to carry out multi-drop work in towns and cities.

Urban logistics and distribution are a key element in creating mobility problems for both people (congestion, accidents etc) and goods (lost time, horrendous work conditions for deliverers etc). They also have an impact on quality of life in the city (pollution, noise,..). Nonetheless, Brussels policy in this regard is hardly out of the garage.

Urban Freight Transportation

Hicks (1977) noted that any urban area depends for its existence on a massive flow of commodities into, out of, and within its boundaries. Yet the transport of goods remains a forgotten aspect of urban transportation study. Although consideration of freight transport in urban areas continues to lag behind the analysis of the movement of people, there has been a significant increase in the attention paid to urban goods movement in recent years. The extra attention has been mainly the result of growing awareness and concern about the environmental impact of transport and the implications for the economic vitality of towns and cities caused by congestion problems.

Road freight vehicle movements clearly play an important role in the functioning of towns and cities, distributing goods to numerous locations that are vital to urban life. Urban locations served by goods vehicles include shops, restaurants, fuel to petrol stations, equipment and office supplies to commercial premises, raw materials and finished goods to manufacturers and wholesalers, supplies to schools, hospitals and public buildings, refuse collection and disposal and domestic deliveries (Freight Transport Association, 1996).

The trend of increasing demand for urban freight transport is linked directly to population and economic growth within urban areas. Furthermore, as noted by Stantchev and Whiteing (2006), urban freight transport deals primarily with the distribution of goods at the end of the supply chain; therefore many deliveries tend to be made in small loads and in frequent trips, resulting in many vehicle kilometers. As a result urban areas suffer from constantly increasing number of trucks involved in freight transport operations. By using the MetCom freight distribution system however, these vehicle kilometers can be reduced to a minimum.

Most freight in cities moves by road and goods vehicle movements clearly play an important role in the functioning of towns and cities, distributing goods to numerous locations that are vital to

urban life. The main commercial trends the MetCom targets include retail, hospitality industry, construction industry, e-commerce and home shopping.

MetCom freight distribution system

In the MetCom system, the metro transportation system is used for transportation of goods within the inner city. The existing metro stations, cars and lines are modified to accommodate to handle the freight transportation. While the passenger transportation continues undisturbed, the gaps in the frequency in the off-peak hours are used for transportation of freights.

The freights are dropped off at the goods drop off platforms adjoining the passenger drop off. However there is no connection between the two platforms, thus preventing the activities from clashing with one another. The platforms are only for loading and unloading the goods as it is a high frequency activity. The goods are then quickly moved to the safe zone to clear the drop –off zone for the next batch. From the safe zone, the goods are transported into the freight sorting unit at -3 level, using the freight elevators, where they will be sorted according to the type and size. The next stop for the goods is either the stores, located in the Palis Du Midi building or the workshops where value addition processes would take place. Activities run in the workshops include unpacking of products, preparing items for display in retail outlets, product pricing and labelling and assemblage.

Parking facility

Identifying parking facilities and access routes is important, not only because they are necessary functions, but also because they are authentic communal spaces, forming a visual continuity with open air public spaces and the symbolic places of everything that constitutes the 'urban'. Finding room for 300 vehicles in a superstructure is vastly unsustainable in a tight urban context. As the metro tunnel construction already requires digging up to 20m below ground, the volume is already created; it is just a matter of introducing the function. The functional duality of the car park encourages immediate connectivity with the surface. While the 40 slot parking unit at the -1 level caters for short stay, giving prominent access to the open market, and the MetCom drop-off and pick-up functions, the parking levels of -2 and -3 are for long stay, giving access to the metro for park and ride facilities.

Metro and tram station

The metro drop-off is at the -4 level from which there is possibility to exit in two directions. The automatic ticket controls are situated in the -2 level in either side. From the south exit there is the possibility to exit to -1 level from where there is connection towards the ramps to get to the ground level. The north exit lands you directly in the ground level. The two tram platforms accommodate three tram lines. Each of the platforms has direct access from a staircase, elevator or escalator preventing from the commuters crossing the tramlines to reach the next platform.

Urban square

The urban square gives space for different activities ranging from sports such as mini football or basketball to leisure hanging out around the reflection ponds. The atmosphere in the different portions of the urban square is designed to be different from one another. the first quarter, where the open every day market and the outdoor sports areas allows for high frequency activity whereas the second quarter of the reflective ponds and the stairwells allows for a

relaxed atmosphere. The cafes in the Palis du Midi have the possibility of extending out into the square so they can also benefit from the soothing atmosphere of the surrounding.

Landscape

The landscape strategy is derived out of the intention to establish a place – not an architectural object. The soft edges created by lines of trees direct pedestrian flow down from the ramp either towards the metro or tram stations or towards the above ground. Pedestrian and vehicle movement patterns are created in the most natural way possible. The internal islands, which are now only used as parking spaces, are taken out and space is given to the pedestrian pathways either side of the road. Trees are planted only in natural soil 3m away from the building facades, so the careful observer could know on which ground he is standing on. The outdoor paving is the usual granite paving all over giving a unifying effect.

City scale

With the introduction of the MetCom system unwanted goods transportation vehicles are kept out of the city centre. While this helps reduce congestion it is not an invitation for excessive private vehicles entering the city. On the contrary the metro transportation network encourages private vehicle users in using the metro system more for mobility within the city.

Reduced number of vehicles means more roads dedicated to the pedestrians. Though this idea sounds utopian, a city without cars, when the city is portioned into sections and with careful planning of the traffic flow there could be indeed vehicle free zones which encourage pedestrians. The project identifies ‘activity’ as the catalyst for this pedestrian movement. Though the majority of people’s daily commute is from point A to B, the walk could still be made interesting and fruitful.

Neighbourhood scale

The project makes the connection from Brussels south station towards the city centre a stretch of activity. Unlike a wide pedestrian boulevard, which Houseman would have been proud of, the project creates streetscape which encourages activity. The staircases leading to and from the underground parking lot, not only acts as a continuation of the landscape but also provides space for a small snack break. The cafes either side of the stairwell produces the necessary catalyst for the space to achieve functional coherence. The small platforms embedded with the staircase meanwhile organize the flow pattern. The second set of stairs in this eventful journey of the quarter mile leads directly to the metro station. Though they are also stairs, the ergonomics and the width of the staircase does not allow for a break. Walking down the next stairwell suddenly leads you to a public toilet; like Alice, from Alice in Wonderland, you are awestruck at this finding.

A market always attracts people of all cultures and ages, not only because of economical goods but also because of the ambiance and the atmosphere it generates. While the open every day market is connected with the MetCom for smooth functionality, it undoubtedly creates an interesting pass-through for the pedestrians.

Architectural strategy

Although the general program of the MetCom accounts for a straight forward technical solution, the architectural program give added value to the neighbourhood. While the metro, MetCom facility and car park are the main functions of the program, the architectural program includes an open market and an urban park to make the main functions glue together.

Activities, even the once usually happen behind closed factory doors, adds to the urban drama. Consequently, though the architecture is invisible, the activities are not; on the contrary, even the consolidation activities, which are normally hidden from public view, are made visible.

The workshops situated at the -1 level have visual connection with the public square at 0 level. The cafeteria of the workshops is also accessible for the general public allowing for interaction. However the employees have to go through a security check area before entering and exiting the cafeteria and the security check also prevents general public attending the work area. the reflective shallow ponds at the ground level makes ripples so that the silvery reflection is casted inside the workshop area.

Daylight is a scarce commodity in underground construction. However, in the project penetration of daylight into the underground is considered with utmost importance. Voids of 5m diameter in the roof of the metro station allow penetration of sunlight to the platforms. The commuters inside the metro station could not only see the sky and get light, but also see the activities happening outside makes the interactions ever more interesting. This quality is achieved by carefully using the staircases to create angles in the floors above.

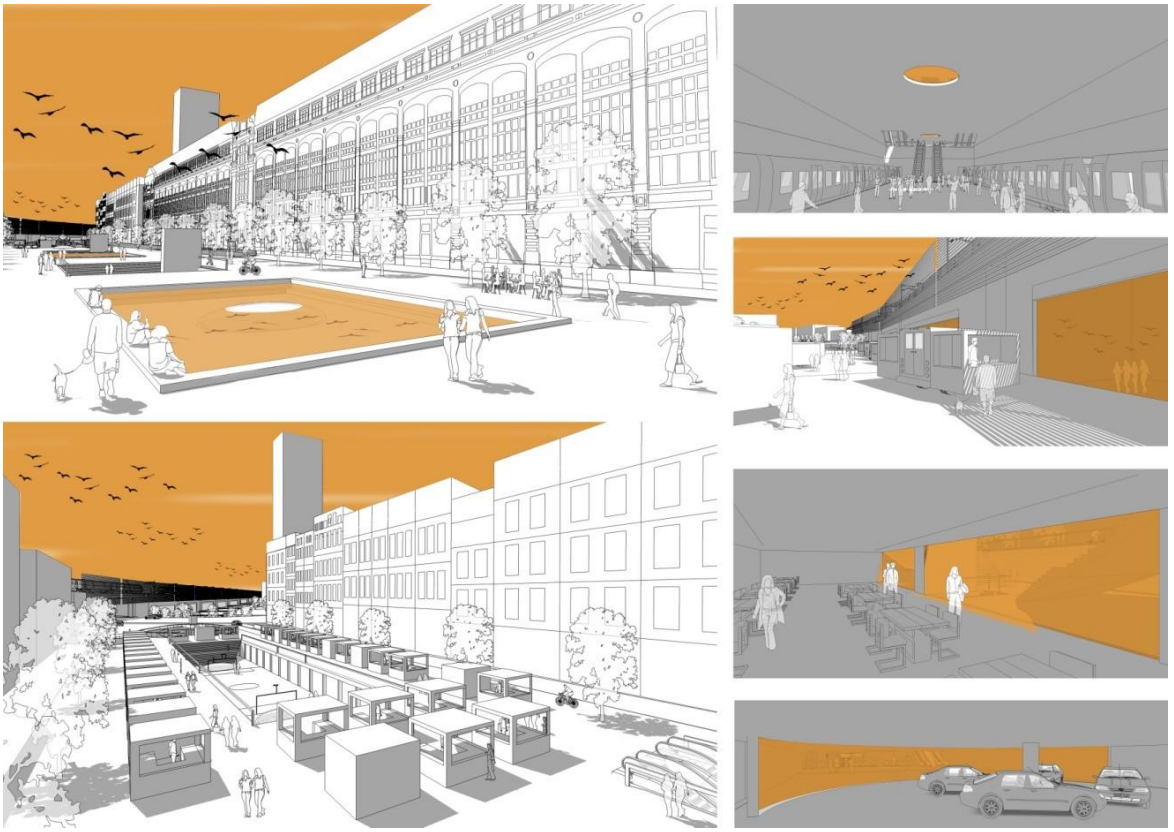

Fig 3: Proposed MetCom Facility
Source: Author

Conclusion

Although it is basically an infrastructure project, the added functions and architectural and urban design qualities makes it more of a comprehensive urban solution. The novelty of the idea of a system such as the MetCom might prevent the project becoming actually realized in the near future, however with intensive research and implementation of actual pilot projects would lead into possible breakthroughs. The hardest would be to encourage the authorities to look into the possibilities of reducing vehicular traffic in the cities; accomplishing this feat would encourage the logistics and transport companies to take up the economical MetCom system.

The MetCom system in the neighbourhood of Fountains gives rise to interesting architectural interventions. In an era where the factories move away from the cities, to bring production back into the heart of the city is rather tricky. However, the architectural intelligence, while creating a productive work environment, also helps to ease the potential tensions of the heterogenic community.

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