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CITY OF INNOVATIONS PROJECT

complex projects

LIVING STATIONS

The Design of Metro Stations in the (east flank) metropolitan areas of Rotterdam

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Stations as a Lever for Inclusive Growth

Manuela Triggianese

Co-creating inclusive places

While promoting sustainable mobility, stations are considered simultaneously *interchanges* (or nodes) for different types of mobilities (train, bus, tram, car, P&R, taxi, bike and on demand services) and public spaces (or places) for interactions and social networks, where to meet people and to find different urban *amenities* [1]. Stations represent a link to both global and local networks (urban, commercial and transport) and therefore they are an integral part of the built environment. They need to be accessible by all and well connected to the entire metropolitan scale. The degree of openness of the station towards the city, its urban permeability, allows for higher quality of life, more social interaction and higher level of inclusiveness. This includes a functional *mixité* in the station area, blurring station limits (physical and social) by promoting the construction of residential and commercial centers around it. The development of *transit-nodes* (or stations) has an impact on the social, economic and security issues with the changes directly involved in the urban fabric, including the railways. By reinforcing the transport network, they have to adapt to mobility transitions associated to those changes. In this context, by looking at the sustainable development goals (SDG) related to the relationship *Mobility & City*, urban transformations driven by the development of transit-nodes comply with the following SDG: *resilient city* towards an inclusive growth [2] (SDG 11), the *healthy city* towards well-being environment (SDG 3), *booster* for innovation and economy (SDG 9). Based on those considerations, the co-creation experiment presented in this book is looking at existing and new *transit-nodes* along rail-metro networks in the metropolitan area of Rotterdam. By incorporating stations in the city urban strategies, the urban designers, the students and tutors attempt to define stations as *destinations* by themselves and as **inclusive places**, in addition to their travel functions. In the academic design experiment (City of Innovations project), the potential of using the design as a tool for co-creation is explored. The approach aimed at connecting the mobility strategy with new opportunities for urban growth and neighborhoods related activities, towards an inclusive and sustainable urban environment.

This article attempts to define the paradigms associated to the notion of *inclusive stations* in future metropolitan areas. It explores the challenges on the nodes of the future identified by the Dutch Ministry of Infrastructure and Water Management in the report *Public Transport in 2040 - Outlines of a vision* [3] and by the *Grand Paris Express* [4] project, being used as references by the City of Rotterdam for the proposal of the construction of new circle metro-line and the (re)development of its transit-nodes.

The Public Transport 2040 in the Netherlands

According to the Dutch Ministry of Infrastructure and the Water Management, by 2040 the public transport network will link several urban regions, between the Netherlands' major economic hubs and reaching out across the border, including transport for goods. Demand-driven services and concepts such as car-sharing, bicycle-sharing, scooters and taxis will also evolve, leading to a shift from public and private passenger transport to shared transport, and forming a high-quality addition to the public transport network. The new mobility systems play a major role in the last mile, and in combination with public transport relieve pressure on parking spaces in cities. In 2040 people will travel reliably, safely, rapidly, easily and comfortably from A to B, including people with a disability. Door-to-Door solutions are at the core of governmental agendas and new design scenarios. The research and design experiment by Mecanoo "Journey of the Future" is an example of the new approach. [5] This research study

[1] The Node-Place model was developed by Luca Bertolini and it was based on TOD (Transit-Oriented Development) theory. For more information about the Node-Place model, please read: Bertolini, L. 1999. Spatial development patterns and public transport: The application of an analytical model in the Netherlands. Planning Practice and Research, 14(2):199–210.; Bertolini, L. 2008. Station areas as nodes and places in urban networks: An analytical tool and alternative development strategies. In F. Bruinsma, ed., Railway development: Impacts on urban dynamics, pp. 35–57. Heidelberg: Physica- Verlag. For TOD theory, please read Cervero, R. 1998. The Transit Metropolis: A Global Inquiry. Washington, D.C.: Island Press.

[2] See OECD policy franework on the concept of Inclusive Growth: https://www.oecd.org/inclusive-growth/

[3] See the full document Public Transport in 2040 - Outlines of a vision for the future [13-05-2019] by the Dutch Ministry of Infrastructure and Water Management, available on https://www.government.nl/topics/mobility-public-transport-and-road-safety/public-transport/the-future-of-public-transport

[4] Grand Paris Express, as an automated transit network, is the new metro of the Capital Region. With its 68 new stations and 200 kilometers of additional tracks, Grand Paris Express consists of a ring route around Paris (line 15) and lines connecting developing neighborhoods (lines 16, 17 and 18). More information are available on: https://www.societedugrandparis.fr/info/grand-paris-express-largest-transport-project-europe-1061

[5] Mecanoo, NS Stations (2019) Journey of the Future, a passenger's experience, available: https://www.mecanoo.nl/Projects/project/248/NS-Journey-of-the-Future?d=3&t=0

focuses on the door-to-door journey from multiple passengers perspectives, exploring how future seamless mobility systems that integrate public, shared and private transport is needed to meet ambitious targets on sustainability, passenger satisfaction and capacity as set out in the government note 'Public Transport 2040.' Here both main (big) stations and smaller transit-nodes are indispensable links in integrated mobility to ensure an optimum journey and seamless travel solutions, creating efficient and attractive multimodal interchange hubs both within and outside urban areas. Apart from various services (e.g. restaurants, shops and parcel pick-up and drop-off points) within the hubs, the immediate vicinity offers opportunities for spatial development (homes, offices and other amenities). The transit-nodes need therefore to be seen in relation to their surroundings and their role in the public space. As links between transport modes, they are also of crucial importance to regional rapid transit. Currently the government is working on the development of the action agenda for Public Transport Nodes in 2021. Together with a large number of stakeholders, an in-depth study has been carried out in the first half of 2020 by mapping 600 (existing and planned) stations within the metropolitan areas of the Netherlands and by setting certain design challenges for each category or type of stations. [6]

In this context, as in other European metropolitan cities like Paris, the major railway stations in the Randstad metropolitan area are under pressure. In order to cope with growing user numbers, a polycentric network of stations of different sizes could be considered, functioning as a system of connected services able to absorb and distribute part of the growth in passenger numbers. [7] Up to 2030, there is a need for around 240,000 new homes in the southern Randstad conurbation for example, over half of which are going to be built in the central urban area of the metropolitan region. The metropolitan region has the space to accommodate these homes at easily accessible locations along the Rotterdam-Delft-The Hague axis and, therefore, to strengthen the agglomeration force of the southern Randstad conurbation. The City of Rotterdam itself will grow by around 50,000 residents until the year 2030. There is need for mobility transition to accommodate this change, which includes an increase in the scale of public transport and investment in the infrastructure of the region. A Sustainable Urban Mobility Plan has been developed for the City which focuses on smart mobility (with active modes), zero emission development, modal shift to non-motorized transit, car-sharing, and the expansion of the City Lounge Concept. [8] The challenges associated to this growth are related to: economy, health, spatial quality and accessibility.
The Rotterdam Mobility Plan lists a number of objectives on the basis of these four perspectives: growth and densification, environment and climate, outdoor space and greenery, and **inclusiveness in mobility**. [9] To make mobility more inclusive, it is necessary to make daily facilities easily accessible and more pleasant, to make public transport locations more easily and pleasantly accessible, and to realise the increase in the scale of public transport to Zuid. The main urban development ideas of the city approach have been developed by PosadMaxwan [10]. Here public transport hubs become more accessible and attractive for pedestrians and cyclists, and a transfer point for car drivers. Furthermore, there are already proposals about a new metro (circle line) connection from Kralingse Zoom via the Feyenoord City development to Zuidplein aiming also for a better connection by metro with the Rotterdam-Den Haag airport. The circle line is presented by the City of Rotterdam and discussed in this book.

The public places 2030 in Le Grand Paris

The mega-initiative "Le Grand Paris" has the ambition to create several economic centers around Paris that are connected with a new public transport (train/metro) network and with the airports and TGV (Train à Grande Vitesse, "high-speed train") stations. Within the scope of this initiative, the "Grand Paris Express" network (GPE) will cover 200km of rail with 100% automated metro

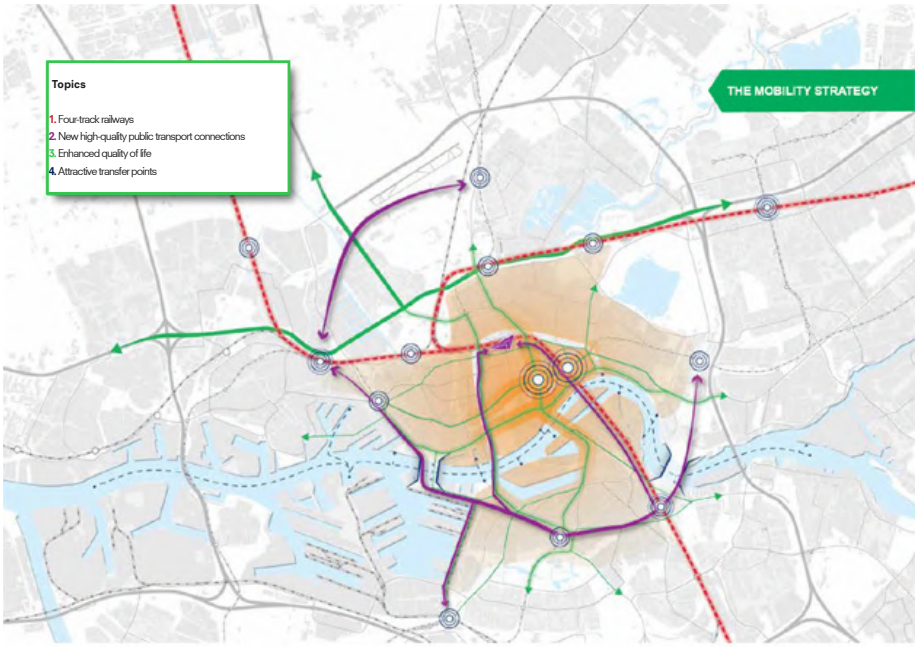
[6] The categorization of 600 (existing and planned) dutch stations can be found here: https://design.dat.nl/ov2040/ Date accessed: 21 sep. 2020

[7] Triggianese, M; Cavallo, R. The station of the future: Amsterdam's stations in transition. In OverHolland 20, p. 39-60, nov. 2019. Date accessed: 21 sep. 2020. doi: https://doi.org/10.7480/overholland.2019.20.4143.

[8] The City Lounge is the inner-city developemnt approach since 2008, aimimg for an improvement of the quality in the city center. Coolsingel is the starting point of the mobility strategy within this approach, by structurally reducing car traffic from four to three traffic lanes, that will see around 10,000 fewer cars per day in 2020. In 2015, this traffic accounted for roughly 40% of the total car traffic.

[9] The Sustainable Urban Mobility plan of the City of Rotterdam is available here: http://tda-mobility.org/wp-content/uploads/2018/11/Rotterdam_Urban-Traffic_Plan.pdf

[10] Healthy, safe and accessible with the Rotterdam Mobility Approach, available: https://posadmaxwan.nl/en/news/47/healthy-safe-and-accessible-with-the-rotterdam-mobility-approach Date accessed: 21 sep. 2020



© Rotterdam Mobility strategy. Source: Smart accessibility for a healthy, economically strong and attractive Rotterdam. Rotterdam Urban Traffic Plan 2017 - 2030+ (City of Rotterdam, 2017)

Gares mises en service entre 2025 et 2030
Source: Calendrier de mise en service de la SGP, cartographie Apur

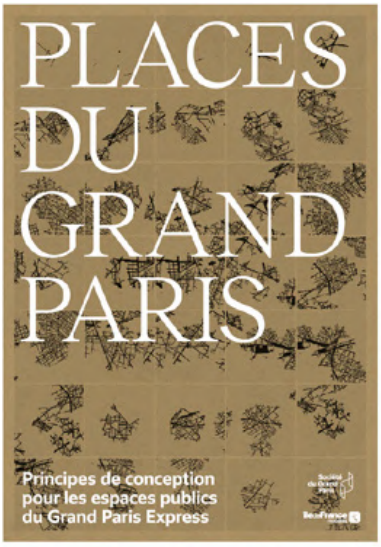
© APUR, Planning of GPE stations into service between 2025 and 2030. Source: Transformations in Grand Paris Express station neighbourhoods (2019)

system and 68 stations with the aim of providing direct connectivity between suburban districts and improving the connections to the airports. The new interconnected stations will serve 2 million passengers every day with 90% of lines built underground, representing a great opportunity for urban regeneration projects. The 68 GPE stations have very varied geographical, topographical and sociological situations and each have different intermodality issues.
Main ambition for the new transit-nodes are: development of their districts/neighborhoods and better quality of their connections with the **public space**, being the 'sensorial station' (gare sensuelle) the guiding concept adopted by the designers of all stations. [11]
The public places in Grand Paris play an essential role in the mobility chain. They constitute the joint between the city, the uses and the transport infrastructure. Currently 186 urban projects are underway in the 35 neighbourhoods around Grand Paris Express stations that will be open and running by 2025 (they cover 28% of the surface area of these neighbourhoods). In the next 10 years these projects will provide 84,000 housing units, 2.5 million m² of office space and over 2 million m² of other types of businesses. In 2019, the study conducted by the Paris Urbanism Agency (Apur), describes areas reserved for public space in the future Grand Paris station neighborhoods and underlines the necessity to plan for crossings, places for new mobility services, to reduce car parking facilities, to improve the spatial quality and activate the street levels of the urban surroundings. [12] In 2020 Apur in partnership with the Regional and Interdepartmental Directorate of Infrastructures and Development -DRIEA-, the Grand Paris Express company -SGP-, and accompanied by the public land and development establishments -EPF Ile-de-France- and -Grand Paris Aménagement-, continued the analysis of transformations in Grand Paris Express station neighbourhoods studying those of the 33 stations that will open between 2025 and 2030. From the end of 2015, in partnership with Ile-de-France Mobilités and by associating all the communities concerned, the Société du Grand Paris (SGP) initiated discussions on the development of the areas around the stations of the future metro. This approach resulted in the launch of a study in March 2017, which led to the drafting of the publication " Places du Grand Paris - Design principles for public spaces of the Grand Paris Express. [13] The work carried out by TVK agency, representative of a multidisciplinary team made up of experts, professionals of the planning and mobility, represents a guide/common understanding on the role of public spaces at station districts and not as a technical and prescriptive document. The investigation is based on three main ambitions: *continuity, availability and scalability of public spaces*. First of all, *continuity*: the squares of Grand Paris will be an extension of the existing one and will ensure the link between the city and the transport infrastructure. Then, *availability*: it is about creating public spaces accessible to all, bringing together uses and functions. Finally, *scalability* which will allow spaces to be adapted to the city's changes. These three objectives form the basis of a project approach broken down into 40 principles and 15 criteria on: mobility, wayfinding, territory, lightning, landscape, soil, networks, methods, street furniture, uses, water, ecology, materialization, management and construction site. Among others, the principle of *hospitality* is often brought together of **inclusion**, to express the capacity of certain places to welcome those who can be in difficulty in the public space: children, elderly, disabled people, young people - in groups or not -, people migrants, etc. To make a public space hospitable, is to make sure that everyone feels there welcomed and that cohabitation is possible, which goes through care given to equipment, to the seats, to the atmospheres, etc. So while being a part of the metropolitan project what is the Grand Paris Express, the train station and its public spaces are included in a neighborhood or in a development zone, in a living area of the Île-de-France today largely urbanized.

[11] Marchetti, P. La Gare Sensuelle In Triggianese, M. et al. Stations as Nodes, 2018. pag 97 https://books.bk.tudelft.nl/index.php/press/catalog/book/682

[12] APUR stands for Atelier Parisien d'Urbanisme. Recently APUR has developed an analysis on the transformations in Grand Paris Express station neighbourhoods - The 33 stations to be in service after 2025, available: https://www.apur.org/en/our-works/transformations-grand-paris-express-station-neighbourhoods-33-stations-be-service-after-2025 Date accessed: 21 sep. 2020

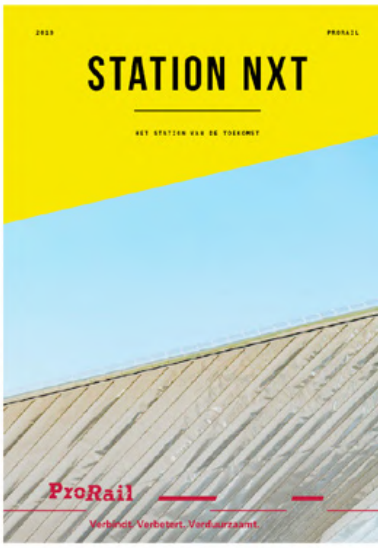
[13] Société du Grand Paris, Places du Grand Paris. Principes de conception pour les espaces publics (2019), available: https://media-mediatheque.societedugrandparis.fr/pm_1_117_117718-ja409wj20d.pdf . This book is based on a previous study conducted in 2015 by Société du Grand Paris, Les Places du Grand Paris. Repères pour l'aménagement des espaces publics autour des gares du Grand Paris Express.overholland.2019.20.4143.



Societe du Grand Paris, **Places du Grand Paris. Principes de conception pour les espaces publics** (2019), open access publication

APUR: **Transformations in Grand Paris Express station neighbourhoods** (2019), open access publication

Dutch Ministry of Infrastructure and Water Management. **Public Transport in 2040 - Outlines of a vision for the future** (2018), open access publication



Prorail, **Station Next, HET STATION VAN DE TOEKOMST** (2019), open access publication

Inclusive stations | Paradigms

By analyzing the Dutch and French cases, it becomes apparent that inter-modality, attractiveness and the roles of public space of (existing and planned) transit-stations are crucial when encountering the needs of future generations and of livability and safety in metropolitan area. In both scenarios, by 2040 public transport (PT) will have grown being highly sustainable and well on the way to becoming emission-free. Furthermore, PT aims to relieve pressure on city centers. This will free up space for urban housing development and optimize utilization of the rail network. Especially in peri-urban areas, strengthening public transport connections will help stations to become centers of movement for people, local business and healthy communities, also supporting inclusive growth. [14] The ongoing pandemic of COVID-19 is a strong reminder that urbanization has changed the way that people and communities live, work, and interact, and the need to strengthen systems and local capacities to prevent the spread of infectious diseases is urgent. The role of *stations as nodes* [15] in metropolitan networks becomes even more important in high-traffic spaces by encouraging safer public behaviors in response to pandemic situations (such as covid-19). The urban mobility challenge is to invest in and build strong preparedness systems that are better adapted to increasingly urbanized settings [16]. In this context, which spatial paradigms an **Inclusive Station** might respond to future challenges? To cite some: Investing in people and public places by promoting social urban life - travelling seamlessly – urban growth along networks - develop integrally mobility and urban spaces - high connectivity to other urban centers (domestic and international) - resilience (adaptability) with ecosystems and sustainability (nature in combination with technology) - reduction of people flows at peak hours (combination with smart working) - mix of urban functions (hybrid outdoor and indoor spaces) - safety and confidence (proper safety levels for pedestrians and increase the modal share of public transit, which requires high pedestrian service levels at city streets and high accessibility of pedestrian spaces and transfer hubs).

[14] See also 'Tomorrow's Living Station', a report created by Network Rail and Arup, explores and identifies the future role stations will play in our towns and cities: https://www.arup.com/perspectives/publications/promotional-materials/section/tomorrows-living-station [accessed on 01 September 2020]

[15] See also 'Stations as Nodes' publication [eds.Triggianese M. et al., TU Open 2018] https://books.bk.tudelft.nl/index.php/press/catalog/book/682

[16] Epidemic preparedness in urban settings: new challenges and opportunities [Published Online March 27, 2020 https://doi.org/10.1016/S1473-3099(20)30249-8]