

Transit-oriented Development in asymmetrical context: Learning from cross-border paradoxes in the Great Geneva.

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Abstract

Transit-oriented Development (TOD) is hailed as a solution to sustainable urban growth; yet research often overlooks its impact in asymmetrical contexts like cross-border metropolises. This study challenges this gap, examining public transport and urbanisation projects in Great Geneva. The region, nestled between Switzerland and France, faces significant socio-economic and institutional asymmetry. While the Agglomeration Project aims for cohesion, local conflicts abound. Through critical analysis, three paradoxes emerge: the metropolitan, radio-centric, and development paradoxes. These paradoxes question TOD's agency in an asymmetrical context. Understanding these paradoxes is necessary to inform future planning in such regions beyond rhetorical discourses.

keywords: TOD, cross-border metropolis, asymmetry, planning, conflicts

Introduction

Transit-oriented Development (TOD) is pictured as a pivotal strategy to accommodate growth while ending car dependency in metropolitan areas. However, prevailing TOD research is often embedded in normative and progressive assumptions, failing to address the complexity of the model's impact in asymmetrical context such as cross-border metropolis. Meanwhile, border studies which focus on such context tend to view cross-border cooperation project, specially concerning public transport network, as a manifestation of cross-border functional and institutional integration but fail to question their impact in asymmetrical metropolitan context. This contribution challenges these gaps in sustainable development discourse by adopting a critical perspective on public transport infrastructure and urbanisation development in the asymmetrical cross-border contexts of the Great Geneva.

Nestled between Switzerland and France, the case study of the Great Geneva Agglomeration is characterised by its strong functional integration, supported by a strong socio-economic asymmetry across-the border. Since 2006, the agglomeration's institutional integration is manifesting through the definition of a cross-border territorial vision, which is nevertheless impacted by institutional asymmetry across the border. Setting a radio-centric model of coordination of new transport axes and urban development at the centre of its cross-border cooperation vision, the *Projet d'Agglomération* (PA) intention is to foster territorial cohesion in the cross-border metropolis. Nevertheless, in the last 10 years, conflicts and contestations around the implementation of this vision multiply.

Critically analyzing conflicting cases, alongside socio-spatial and economic dynamics, financing tools and legal frameworks, the study highlights three paradoxes in the current implementation of TOD model as a support to territorial cohesion—the metropolitan paradox, the radio-centric paradox, and the development paradox.

1- TOD in cross-border context

1.1 TOD

TOD, understood here as coordinated planning of public transport infrastructure and densification projects around station nodes, is actively promoted in international reports (OECD, UN-habitat, EEA), as a pivotal strategy reach sustainable metropolitan development (Newman and Kenworthy, 2015). Through the combination of transit infrastructure, promoting regional accessibility to employment hubs, and a mixed-use, compact, and pedestrian-friendly station environment, it intends to mitigate car dependency in suburban contexts, while stemming sprawl and reduce arable land consumption. Hence, the model actively supports metropolitan functioning while mitigating its externalities.

From this standpoint, several research studies from the American school of thought have focused on demonstrating TOD's benefits (Cervero, 2007; Renne, 2013), and assessing its performances (Renne, 2009; Bertolini, 1999). More recently, a dense body of literature has focused on "making TOD happen" (Curtis et al., 2009) though the identification of challenges and good practices of land-use and transport integration (Lierop et al., 2016). However, these contributions are marked by intrinsic normative and progressive assumptions around the implementation of the TOD model (Angelo et Wachsmuth, 2015).

Despite the wide acceptance of the benefit of the model, another branch of research stresses the singularities of both implementation processes and the impact of the TOD model in different contexts (Staricco et Vital Brovarone, 2018; Thomas et al., 2016). As some authors point out, the model generalisation went along with the development of site-specific tools and policies at both state, regional, metropolitan, and local levels, which, generated different applications and outcomes (Gallez et al., 2013). This line of research has, therefore, dived into the social-spatial, economic, and political conditions in which the model is being designed and implemented (Grillet-Aubert, 2015; Gallez et al., 2015). Such research participated to interrogate the model's role in the promotion of spatial (in)justices (Mollé et al., 2019; Derakhti et al., 2020) and showing some of the contradictions embedded in TOD discourse (Roy-Baillargeon, 2017). These input challenge TOD's ready-made normative assumptions, bringing transport and land development projects back into political spheres. To this intent, critical scholars, particularly Fillion and Keil (2016), engage and look at conflicts that emerge from this development to understand the « shortcomings of the current age».

1.2 Border Studies

As « in-between » territories (Grosjean, 2019), cross-border metropolis are particular cases, to observe TOD's agency in metropolitan construction. In Border Studies the notion of integration has been dominant to frame cross-border metropolis analysis (Van Houtum, 2000). Sohn et Walther (2009) propose a grid to articulate the institution and functional dimensions of metropolitan cross-border integration. Defining both notion as such 'functional integration then relates to the form and intensity of socio-economic interactions observed on either side of a border, through the extension of the metropolitan area, while institutional integration concerns the form and intensity of interactions between political actors possibly willing to collaborate'¹. In their paper, imbalance between functional and institutional integration are critically reflected upon as an enabler of metropolisation process.

In the field of Border Studies, public transport lines crossing the border epitomise the institutional integration of functional integration, as their realisation demand strong cooperation from the different

¹ Authors' translation

territorial actors while aiming at facilitating functional relation between the two regions (Medeiros, 2019). As a result, a lot of contributions reflect on the obstacles to overcome and opportunities to increase these developments (Medeiros et al, 2021). However, less contributions reflect on the condition of implementation of such project and their impact. As a matter of fact, transport infrastructure is even broadly assumed to entail territorial cohesion (Lopez et al, 2008), understood in EU terms, as policies aiming to rebalance socio, economical and environment inequalities (Durán Laguna, 2024). However, asymmetries inherent to cross-border context, though often underlined (Decoville et al, 2011) are little problematised with regards to transport provision, despite empirical evidence that they support rebordering movement at the local level (Herzog et Sohn, 2014).

This contribution aims to analyze conflicts arising from the implementation of cross-border transport and urbanisation projects in the Grand Geneva metropolis. The first part examines the asymmetrical nature of functional and institutional integration in the region. The second part focuses on analyzing conflicts surrounding the implementation of the TOD model. Rather than viewing conflicts in isolation, they are contextualised within a relational perspective to transcend a narrow interpretation of these disputes. The definition of paradoxes draws on a hybrid methodology, combining quantitative and cartographic data analysis, examination of planning documents and alternative proposals, and semi-structured interviews with various stakeholders, including public and private actors and citizen associations.

2- Framing cross-border cooperation in socio-economic and institutional asymmetry

2.1 Functional integration and socio-economic asymmetry

The Grand Geneva agglomeration stands as one of the most dynamic regions in Europe in terms of the labor market. Daily, the number of workers crossing the border to work in the Canton de Genève exceeds 100,000, which represents one-quarter of Geneva's work force. In addition, according to the Frontier Observatory, the number of cross-border workers could nearly double within the next decade. This functional integration is inseparable from the cross-border socio-economical differential, which is one of the highest in Europe. As in most cross-border cases, cross-border flows are generated by enterprises and individuals utilizing the differentials across the border to maximise socio-economic opportunities.

Due to both Swiss and local conditions, including taxation mechanisms, the Geneva Canton is significantly more attractive to enterprises than the French part of the agglomeration. From an individual perspective, Swiss-based salaries are much higher than French ones for the same position, and accordingly, Swiss living costs are significantly higher than French ones. Land value and housing prices also vary significantly across the border. Geneva has one of the most expensive housing markets in Switzerland. Despite a recent rebound in housing construction, buildable land scarcity due to cantonal and federal protection laws and the accumulation of delays in housing generated a long-standing housing crisis. On the French side of the agglomeration, the entire Haute-Savoie department and the Pays de Gex have some of France's most expensive housing market. Nevertheless, the rupture at the border in terms of housing cost is clearly readable. Hence, the French neighboring region remains significantly more affordable in terms of housing than the Swiss part of the agglomeration. Finally, a much more recent and much more volatile aspect heightened each of these phenomena in recent years. In 2015, the Swiss National Bank abolished the minimum exchange rate that pegged the Swiss franc at 1.2 to 1 euro. Consequently, the parity between the franc and the euro, in favor of the franc, had a direct impact on widening the cross-border differential between the two parts of the metropolis, as well as within French territories, between the population working within the national territory and the border population.

These asymmetrical socio-economic conditions support a metropolitan functional integration by specialisation. As demonstrated by Decoville et al. (2013), this dynamic « leads to a process of cross-border suburbanisation, involves a process of functional specialisation of space, with the centre concentrating economic activity and jobs while the periphery, which is attractive in residential terms, is relegated to the role of a dormitory area. ». As the authors point out, in such a configuration, exceptionally competitive in economic terms, functional integration feeds and is fed by cross-border socio-economical differential and, therefore, does not lead to territorial ‘convergence’ but digs the differential between territories (Decoville et al, 2013).

2.2 Cross-border cooperation ...

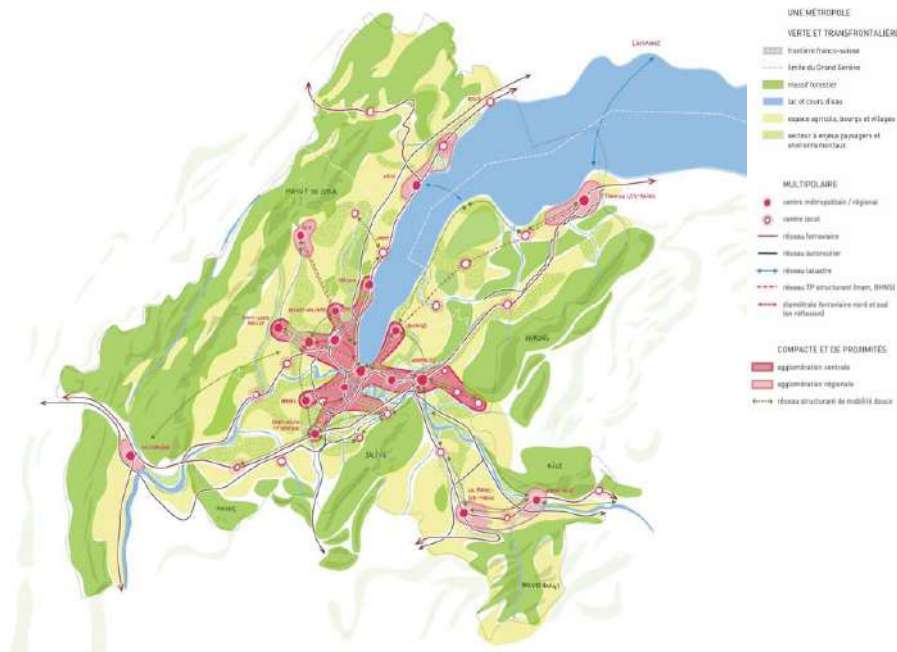


Figure 1. Vision d'ensemble de l'Agglomération, 2021. Source : Plan d'Agglomération Grand Genève (PA4), 2021.

Since 2006, cross-border cooperation in the Great Geneva metropolis took a new turn with the development of the *Projet d'Agglomération* (PA). The PA is a Swiss planning devices developed at the agglomeration level by member entities. This tool was accompanied by the creation of the program in favor of agglomeration traffic (PTA), which allows the agglomeration, including cross-border ones, to benefit from federal funding of up to 45% to support transport projects. However, this financing is subordinated to the compliance to the federal spatial planning law (LAT) and to the coherent coordination of transport and urbanisation. Constituted into a GLCT (*Groupement Local de Cooperation Transfrontalière*) in 2012, the Grand Genève is the autonomous entity responsible for the development of these plans. The four generations of PA aim to produce a coherent vision coordinating transport, urbanisation, and environment on both side of the border. Since the very first PA, the sated goal is to promote territorial cohesion. Formally, all the plans promote the development of radio-centric transport axes from Geneva, organizing the urban development in corridors and hierarchal poles (Figure 1). Thus, model of cross-border cooperation and the modality of territorial

cross-border cohesion, understood as the rebalancing of territorial inequalities, is materialised through the radio-centric TOD model. The rise of metropolitan planning in the form of TOD, in recent years is therefore closely intertwined with the evolution of cross-border cooperation modes and mechanisms. These modes of metropolitan cross-border governance are designed and implemented by actors with diverse interests and capacities to assert them, which inevitably affects power dynamics among the various territorial. Therefore, beyond socio-economic asymmetries, understanding the current development projects necessitates an examination of cross-border institutional relationships.

2.3 ...and institutional asymmetry

The PA encompasses numerous territorial entities, both intra- and supra-metropolitan. The emergence of the PA and the establishment of the GLCT contributed to the diminishing role of both national states in favor of local entities. However, the substantial proportion of funding that the Swiss Confederation allocates to the PA, coupled with a compliance examination of these plans with the Federal policies and development objectives, bestows upon the Swiss state a passive yet dominant role in the directions taken by territorial development.

At the regional level, the two primary entities are the Geneva Canton and the *Pôle Métropolitain du Genevois Français*. Despite their balanced voting capacity in the GLCT, these entities have a fundamentally unbalanced relationship depending on their legitimacy, material, and immaterial capital. The Canton of Geneva stands as an anomaly within Switzerland. As a Canton-city it has a leading role in planning, marginalizing the autonomy of municipalities. The Canton of Geneva is thus an extremely integrated and autonomous entity regarding spatial planning. In addition to the financial capital, the Canton's long planning history give it significant symbolic and knowledge capital. Lastly, the Canton possesses substantial human resources in numbers, abilities, qualifications, and experiences dedicated to its spatial development. Thus, the Canton of Geneva combines financial, symbolic, and human capital with substantial autonomy and legitimacy in planning matters.

On the French side of the agglomeration the strength and competencies of the different territorial entities are much more fragmented. The *Pôle Métropolitain* is a relatively recent entity that emerged from the *Assemblée Générale de Coopération* (ARC) in 2018. Its explicit goal is to 'elevate' the French part of the territory to the metropolitan scale to assert the French region's interests within the agglomeration.² However, this entity has a limited budgetary capacity as it is financed mainly by intercommunal contribution, in addition to INTERREG financial support. Hence, as a young structure with relatively low financial capacity, it still lacks sufficient expertise and human resources. The *Pôle Métropolitain* is the assemblage of eight EPCI (*Etablissement Public de Coopération Intercommunale*), each with planning competencies within their respective territories. The collaboration within the *Pôle Métropolitain* and the delegation of competencies are thus voluntary. According to French law, the designation *Pôle Métropolitain* is given to entities 'unable to become metropolises'³, therefore, showcasing the French state's inability to recognise the existence of the cross-border metropolis, contrary to Switzerland. Furthermore, the legitimacy of the *Pôle* is far from established. As such, it competes with the departments and the region competencies, as well as their desire to be the primary interlocutor for cross-border interactions. Hence, despite the *Pôle Métropolitain* federating the fragmented French part of the agglomeration to constitute a stronger interlocutor with Geneva, its fragile assembly and challenging position in the region contributes to its marginalisation and weakening and to the asymmetry in the relationship with the Canton de Genève. Finally, the *Compensation Financière Genevoise* agreed upon in 1973, and which set a financial

² Statuts du Pole Métropolitain, Comité syndical, 2018. Available at <https://www.genevoisfrancais.org/wp-content/uploads/statuts-pole-metropolitain-genevois-francais-2018-1.pdf>

³ LOI n° 2010-1563 du 16 décembre 2010 de réforme des collectivités territoriales, République Française, 2010.

retrocession from the Canton of Geneva to French department and communes, determined by the number of cross-border workers, remains an essential agent in the subordination of French departments and municipalities to the Canton of Geneva.

Hence, the territorial project emerging from the cross-border cooperation cannot be separated from the power (im)balance and hierarchisation that characterises the metropolis. The question raised by this contribution is the agency of the current TOD project in this dynamic and its impacts.

4- Local conflicts for regional paradoxes

4.1 Metropolitan paradox: between accessibility and specialisation.

The first paradox explored pertains to the mechanism of metropolitan development in the cross-border context. The map (Figure 2) illustrates the gap between resident workforce and job provision per commune in the metropolis, more pronounced in France than in Switzerland, but reflecting the typical centre-periphery. However, this gap has notably widened over the past 20 years, with job-resident ratios doubling or more in most communes of the Canton of Geneva while stagnating or decreasing on the French side of the agglomeration. Over 35% of the population in many French communes are now cross-border workers, a figure that has notably risen in those farthest from Geneva over the past eight years. Thus, the mechanism of functional specialisation remains prevalent, with job positions concentrated in the centre and the French periphery evolving into dormitory communities, despite the stated political desire to rebalance the employment-resident ratio since the first PA in 2007. As a result, there is a perpetual increase in cross-border flows in overall volume and the distances traveled by cross-border workers.

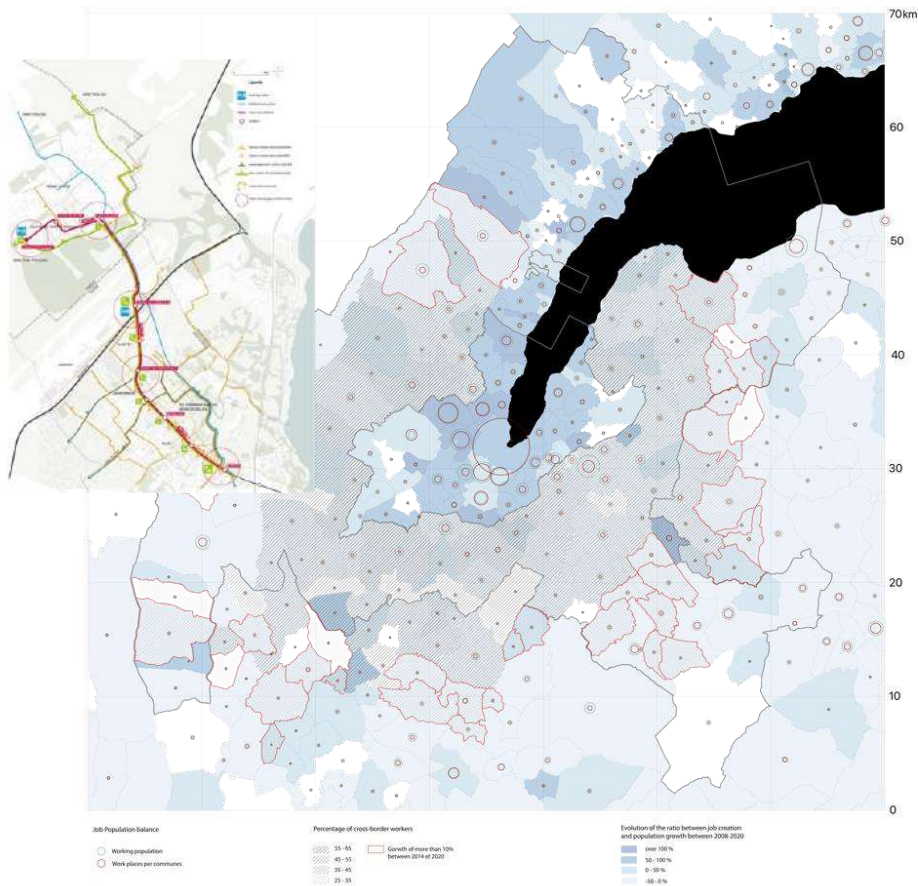


Figure 2. A specialised metropolis, author's production, 2024. Sources: INSEE-OST-ge.ch

An essential notion of the TOD model is the development of functionally diverse zones around transit nodes to foster pedestrian-friendly local community life (Ogra et Ndebele, 2014). However, diversity within the TOD framework lacks a clear spatial definition, particularly in scale and relation to the local context. Mixed land use is a challenging concept in a metropolis such as the Great Geneva where functional integration is done through specialisation.

Hence, this is where the paradox emerges when using the TOD model in the asymmetric metropolis of Great Geneva. Without the capacity to rebalance the territory, the establishment of transport axes intending to alleviate the externalities associated with cross-border worker flow, reinforces, and increases the functional specialisation of each side of the metropolis and therefore transport need. This paradox will be illustrated through the cross-border development of the tram des Nations.

4.1.1 Tram des Nations : a cross-border infrastructure

Since the first PA, a structuring transport axe was imagined connecting the centre of Geneva to the municipality of Ferney-Voltaire and Gex. This project was materialised through a tramline toward Ferney (Figure 3, in red) and a BRT connecting Geneva to Gex (Figure 3, in bleu), both passing through Grand-Saconnex in Switzerland. The project's total budget is 40 million euros, with 35% funded by the Swiss Confederation and 11% by the French state. On the Swiss side, the remaining

54% on the Swiss side are covered by the canton and municipality. While no formal urban densification is tied to the Swiss project, Confederation financing requires a coherent development of transport and urbanisation. On the French side, the tram project is bundled to the development of a ZAC (*Zone d'Aménagement Concerté*), in Ferney-Voltaire. To finance and manage this coordinated development, the inter-communality of Pays de Gex established, a private law structure, *Société Publique Locale* (SPL), owned 60% by Pays de Gex Agglomeration and 40% by the Ain Department and local municipalities. Thus, Ferney-Voltaire, where the new development is located, holds a mere 5% representation in the SPL. This structure oversees the tram project and Ferney Innovation ZAC, with competencies in urban planning, property management, and socio-economic development.

Figure 3. Tram des Nation, author's production, 2021. Sources: Participer.ge.ch



Figure 4. Posters, 2022. Sources: Association Poterie Ripost

4.1.2 La ZAC de Ferney-Voltaire: Specialisation against sustainability

The municipality of Ferney-Voltaire, located next to the Franco-Swiss border, has nearly 11,000 residents. Like many in the Pays de Gex, its population has doubled in the past 25 years, with almost half its workforce commuting to Geneva. The ZAC Ferney innovation project, launched in 2012 and managed by *SPL Terrinov* since 2016, is located on the last agricultural land in the commune. Combine with the tramline expansion, it includes a mixed-use development on a 64-hectare plot, featuring 195,000 square meters of economic activity space, 63,000 square meters of leisure and cultural amenities, and 2,500 housing units (Figure 5).

Opposition to the project emerged after Ferney-Voltaire's Municipality issued the building permit in 2020. The *Poterie Riposte* association, formed by residents, mobilized against the commercial zone development within the ZAC, known as the Poterie zone. They initiated legal action, organised community protests, and raised awareness campaigns. Collaborating with local and Geneva-based architects, they also proposed an alternative project. Currently, the Poterie commercial centre project is on hold following the withdrawal of the *Altarea Cogedim group*, tasked with the development, leaving the ZAC's future uncertain. Poterie Riposte represents one of the first instances of citizen mobilisation against current urban development policies in the region, viewing the commercial centre as emblematic of an unsustainable development model geared toward Geneva. While the contestations' focus is on the commercial centre for legal reasons, the association opposes the entire ZAC project, challenging its

form, function, and impact on the city's existing structure.

Opposition to the project centres on several concerns. Firstly, residents are alarmed by the planned new commercial zone adjacent to the border, designed with direct access to the customs office, expected to cause a significant increase in traffic and pollution between Ferney and Geneva, as evidenced by the planned 1,600 parking spaces. The association points out the incoherence of developing this new car-oriented specialised zone with the simultaneous significant investment in public transport. Secondly, they fear the competition this facility will pose to local activities in the city centre and the already fragile local social and economic fabric in the cross-border context,

encapsulated in the slogan ‘city-centre or commercial centre.’ (Figure 4). Additionally, discontent arises from the design of the new tramline, which diverges after the border, prioritizing access to future residential zones over Ferney’s city centre. Finally, the *international city of knowledge*, encompassing approximately 130,000 square meters of office and tertiary activity development, intended to promote employment on the French side, is seen as the project's adjustable variable according to SPL *Terrinov* and will be realised last.

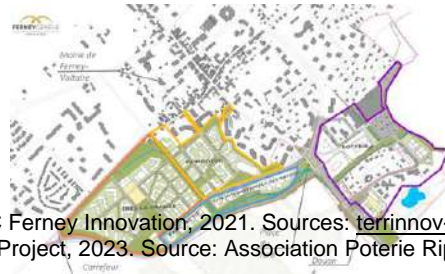


Figure 6. Left (a): ZAC Ferney Innovation, 2021. Sources: terrinnov-spl.fr, Right (b,c): Counter-Project, 2023. Source: Association Poterie Riposte



Figure 5. ZAC Ferney Innovation, 2021. Sources: terrinnov-spl.fr

For the inhabitants of Ferney, this comfort the idea of the creation of a « Ville-dortoir » aimed solely at hosting Geneva's workforce (Figure 4). The current design reinforces the perception of the project autarkic mixed zone, composed of « mono-functional fragments directed towards and for Geneva. », disconnected from Ferney's existing fabric and sacrificing local quality of life for metropolitan functionality. The association's counter project aims to reduce total square footage and prioritise space for local economic activities and workshops, alongside enhancing connectivity to the existing city centre (Figure 6.b.c). While its feasibility is questioned, the proposal underscores the importance of considering site-specific functional complementarity and diversity in the asymmetric cross-border



context.

4.1.3 Grand-Saconnex : metropolitan infrastructure vs local implications

On the Canton de Genève side, the tramline development has stirred tensions among the local population. Following the Municipality of Grand-Saconnex's approval of the project, a committee of residents, along with other local and cantonal associations, gathered enough signatures to organise a referendum opposing the tramline extension. Put to communal popular vote in 2022, the construction was narrowly approved by the Grand-Saconnex population, with 51.54% of the votes.

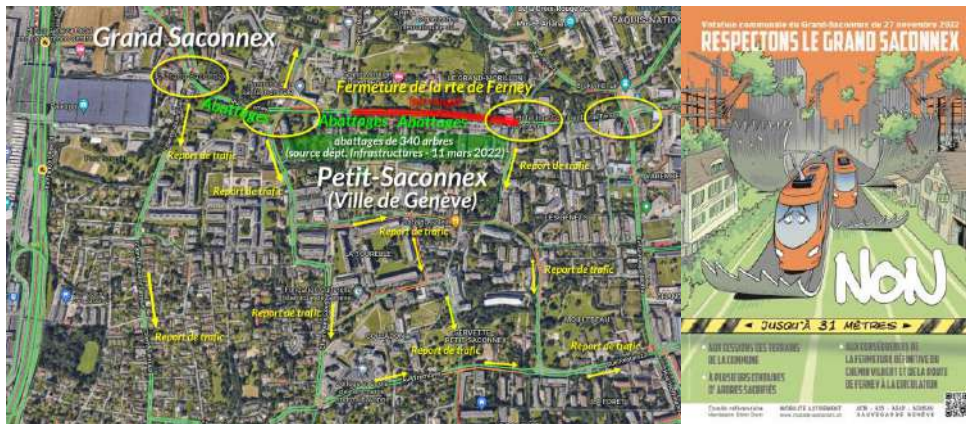


Figure 7. Left (a): traffic map, 2022. Right (b) : Poster, 2022. Source : enjeux.sauvegarde-geneve.ch

The referendum committee presented several arguments against the tram's implementation. Firstly, they raised concerns about the loss of municipal lands covered with a tree canopy for tram infrastructure construction. Secondly, they highlighted the transformation of the mobility scheme required for the tram's implementation and the resulting nuisances in the municipality. The tram's implantation and express cycle lanes necessitate the closure of a part of the main axis leading to Geneva, with the Tunnel des Nations constructed to redirect car traffic. However, with 22,000 vehicles crossing the municipality daily and a projected modal shift ranging from 1,300 to 6,000 vehicles per day, and the tunnel capacity of 20,000 vehicle per day, there are concerns about infrastructure saturation leading to parallel routes through neighborhoods (Figure 7b). Additionally, the opponents to the project perceives the cycle path design prioritizing major axes as detrimental to the local network. Finally, the refusal of tram development is also attributed to its perceived 'Gigantism' or the metropolitan scale of the infrastructure, reaching up to 35 meters in width. Furthermore, although not legally linked, the Confederation's financing of the tram project implies an implicit commitment from municipalities to densify around the infrastructure, which the inhabitants fear (Figure 7a). In this context, despite acknowledging the municipality's status as a 'transit city,' residents feel sacrificed to the metropolitan scale and to the preservation of the city-centre's quality.

The conflicts surrounding the development of the Nations tram highlight the paradoxes inherent in implementing a TOD-like project in an asymmetrical metropolis characterised by functional integration through specialisation. The specialisation paradox leads to escalating flows and the overflow of new infrastructure capacities, creating conflicting rationales between metropolitan and local scales. While the tram project aims to enhance local accessibility through decarbonised modes, it is perceived by both Swiss and French populations as sacrificing local quality of life in the periphery for the benefit of the centre. Consequently, the current project exacerbates divides between local and regional areas and between centre and periphery, with significant disparities on each side of the border.

4.2 Radio-centric paradox: between interdependency and autonomy.

The second paradox concerns the border relationship, formal development of the model, and functional interplay between territories, balancing interdependence, and autonomy. In Greater Geneva, the TOD model has historically taken a radio-centric form, characterised by radial connections from Geneva to residential centres in France, following major flows between employment and residential poles.

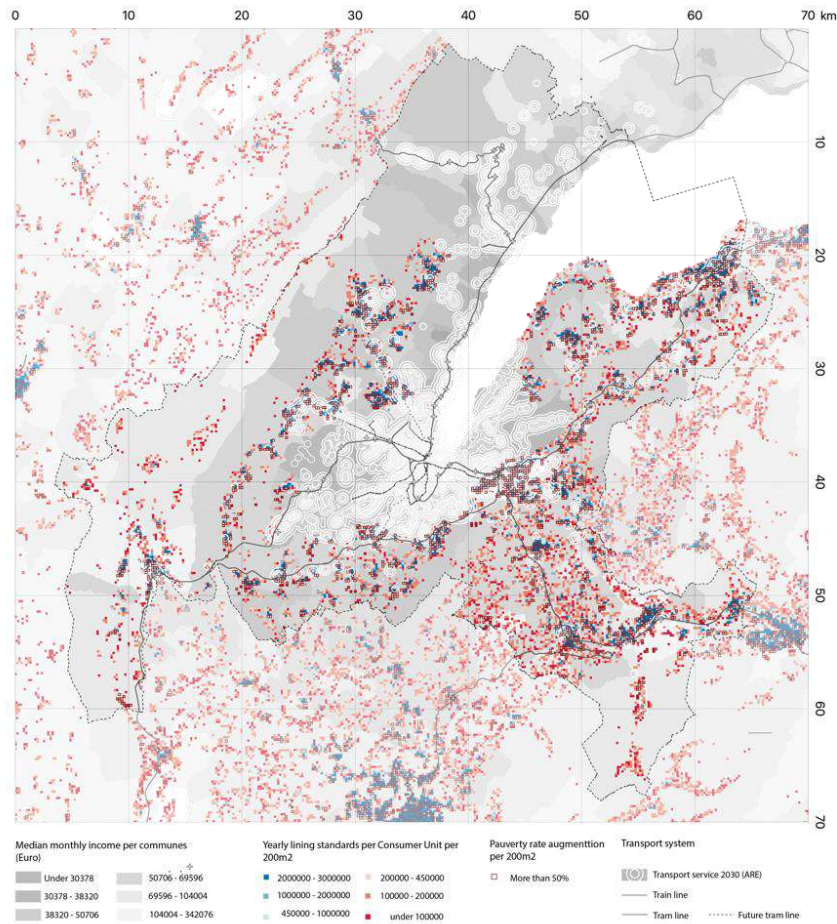
The map (Figure 8) illustrates the projected public transport service quality by the *Office fédéral de l'aménagement du territoire (LAT)* for 2030, based on planned transport axes. Implementing the radio-centric model is expected to provide good service to 54.6% of the agglomeration's population, leaving 45.4% unaffected. As the model radiates from the centre, service diminishes towards the French periphery, with only 13.7% expected to have good service and 22.3% with average service. Consequently, 77.7% of the French population will have poor or no public transport service. Logically, the bordering communes, with a high proportion of cross-border workers, are both the wealthiest and best served. However, there is significant disparity in living standards within the French part of the agglomeration. Core cities and villages, well-served areas, also have the highest living standards but are experiencing the fastest increase in poverty due to rising costs driven by cross-border worker concentration. This exacerbates the gap between French-based salaries and local living standards, correlating selective public transport connectivity with wealth disparity and poverty. Consequently, there's a structural inequality between connected and unconnected areas while at the same time increasing socio-spatial differentiation within the connected poles.

The TOD model, as advocated by Bertolini (1999), prioritises regional accessibility to employment hubs, which is perceived as inherently beneficial for supporting regional functional integration between poles. However, in the asymmetrical context of Greater Geneva, the disparity between Swiss and French salaries creates a polarisation of employment attractiveness towards Geneva. This reinforces the integration of territories and the dependence of French areas on Geneva. Consequently,

Figure 8. Living standards and connectivity. Author's production, 2024. Sources: INSEE-OST-ge.ch

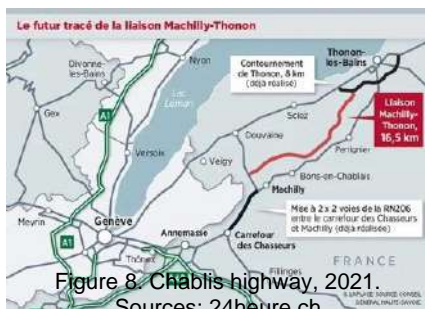
French municipalities struggle to fill public service positions, leading to a decline in residents' quality of life. Moreover, the proximity to Geneva and cross-border purchasing power have led to increased living costs and rents, widening the social gap between Swiss and French employees.

Therefore, a paradox arises from the TOD model's selective nature and its formal implementation in a mono-oriented, radio-centric fashion, and the pursuit of territorial cohesion. In Greater Geneva, this



implementation, focused on connectivity via sustainable modes, results in the centre's saturation while deepening dependency and vulnerability in neighboring French territories. To illustrate this paradox, two conflicting projects will be discussed: the Autoroute du Chablais and the Mobility pricing project around Geneva. Although they are independent national projects, they underscore the two facets of the same paradox in the centre-periphery relationship within an asymmetrical metropolitan context.

4.2.1 The Chablais Highway: French Territories Seeking Autonomy.



The first project under discussion is the proposed highway connection from Thonon-les-Bains to Machilly in the French Chablais region. This highway segment aims to link existing road networks, providing an eastern bypass around Geneva (Figure 8). Initially conceived as part of the *Désenclavement du Chablais* policies since 1999, the project encountered various hurdles before being revived as an independent highway concession in 2010. In 2019, the French government declared the highway as a public utility. However, this decision sparked opposition from the cities of Geneva and Carouge, along with the French Green Party (EELV), leading to appeals filed with the French *Conseil d'Etat*.

Despite the rejection of these appeals in 2021, local authorities, favoring the project, viewed them as Swiss interference in French national territory. This conflict between Geneva and Carouge and French municipalities has escalated, resulting in the exclusion of the highway project from the 2021 PA4 plan, despite being closer to realisation than ever before.

Beyond the institutional dispute, the proposed highway project from Thonon-les-Bains to Machilly has spurred involvement from citizen associations, creating a complex debate. On one side, the association *OUI au désenclavement du Chablais* advocates for the highway's construction, while groups like *Action abandon autoroute* (3AC) oppose it. Despite appeals and demonstrations against the project, the French Constitutional Council approved it in July 2023.

The project's opponents denounce the infrastructure for its local impact, including the downgrading of agricultural land and the destruction of ecologically valuable environments. They also point out the increase in traffic resulting from the creation of this infrastructure, labeled as a 'car vacuum', and its impact on both health and climate. Conversely, residents see the highway as a solution to redirect heavy goods traffic, going towards the Arve Valley, away from village centres, benefiting community health and quality of life. On the regional scale, organisations opposing the project, as well as the Geneva Canton's authorities, argue that this new infrastructure competes with the recent connection of Thonon-les-Bains, Perrignier and Machilly to Geneva as part of the *Léman Express* network. However, these two projects do not address the same demand. For the French municipalities and local associations, supporting the project is a means to reconnect to their national territory and reduce the unique influence towards Geneva, which they hold responsible for rent increases, labor shortages, and dormitory towns development. The *OUI au désenclavement du Chablais* association supports the highway as well as all multimodal projects to develop new orientations for the region and break away from Geneva's mono-attraction. Similar discourses reflect the municipalities' desire to create a more sustainable local economy by emancipating themselves from Geneva. However, regarding the highway associations opposing the project argue that, as a private concession despite significant public participation, the highway will support a financially selective opening of the region (Figure 9).



Figure 9. Le Chablais libéré sous caution, 2023. Sources: Le Fauigny

Thus, beyond the respective perspectives and divisions generated by this infrastructure, the project highlights functional and symbolic issues for the French regions that still need to be addressed and may even be intensified by the current radio-centric development project.

4.2.3 Urban toll: protecting the city from the metropolis.

The second project discussed here involves the Canton of Geneva's urban toll initiative, initially conceived as a response to a Swiss Confederation pilot project call in 2014. Selected for federal co-financing and legal exemptions, the project evolved into a mobility pricing strategy. The significant difference lies in the intention to reduce mobility, which no longer applies solely to individual motorised modes but to all forms of mobility during peak hours. This involves combining an entry fee for cars, applicable at all hours but higher during off-peak hours, with a discounted pricing scheme for public transport during off-peak hours. The latest studies published by the Canton de Genève

demonstrating the viability and progress of the project's deliberation. However, the future of this project remains uncertain due to recent federal political changes.

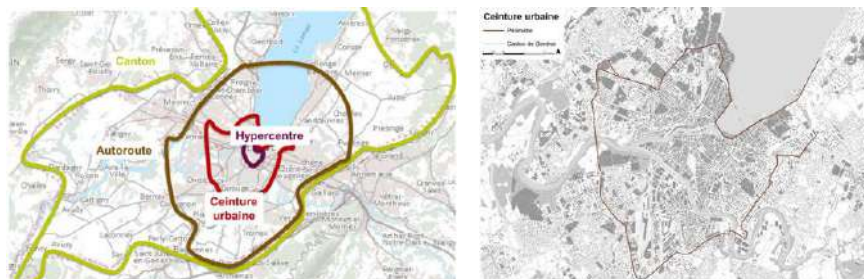


Figure 10. Left(a) four possible perimeters of the urban toll, 2023 Source : Grand conseil de la République et du canton de Genève. Right : Urban toll cordon, 2022. Source : Tribune de Genève

The project entails a cordoned toll system, with fees linked to both entry and exit from the urban core. Four perimeter options were considered, with the chosen option being at the Geneva urban belt level, selected for technical reasons (Figure 10 a.b). Nevertheless, as emphasised by Geneva's Transport Office, the aim is not to restrict the entry of workers essential for Geneva's economy but to limit non-constrained mobility. The report on the matter even specifies that this scheme should not affect the economic attractiveness of the urban core⁴. Hence, the project seeks to alleviate road congestion and public transportation strain without compromising economic attractiveness. By incentivizing temporal shifting of travel demand, it addresses the centre's infrastructure saturation. At the same time, it is clearly targeted at addressing residents growing discontent with network congestion and associated nuisances. This is demonstrated by the intention to provide a discount for toll use exclusively to residents rather than frequent users as initially proposed.

The Geneva branch of the Swiss populist party (UDC) vehemently opposes the project, labeling it as discriminatory against the periphery and an infringement on the right to access the city centre. They argue that this device will contribute to the deterioration of living quality in the periphery and its construction⁵. Regarding public opinion, consultations indicate that the population is slightly favorable to the project. However, the study was conducted within a panel of French public transport user much higher than the current percentage of those with access to public transportation⁶.

This project signifies a re-enclosure of the city centre, admittedly oriented towards car mobility, but indicative of a re-division of metropolitan issues between the periphery and the centre. By implementing the urban toll and radio-centric TOD model, the centre would be able to insulate itself from metropolitan externalities while sustaining economic growth. However, in the cross-border context, such a toll system will affect Swiss-based and French-based populations differently, particularly since public transport discounts have little chance to extend to the French side. These risks exacerbating social-spatial selectivity between metropolitan populations earning Swiss and French base salaries, while further delineating the division between those well-connected by public transport and the rest of the agglomeration.

⁴ Rapport du Conseil d'État au Grand Conseil sur la tarification de la mobilité, Grand conseil de la République et du canton de Genève, February 2023

⁵ NON au péage urbain qui veut mettre Genève sous cloche!, UDC Genève, December 2022. Available at: <https://www.udc-ge.ch/publication/non-au-peage-urbain-qui-veut-mettre-geneve-sous-cloche/>

⁶ Péage urbain à Genève: enquête auprès de la population, OCT, 2017

The debates sparked by these two projects illustrate the paradox of implementing the TOD model in a radio-centric manner. While new connections are being established from the center to the periphery, they create spatial differentiation and increase dependencies, leading to a desire for autonomy in the periphery and fortification of the center. Whether aimed at preserving areas from metropolitan externalities while maximizing economic opportunities, or mitigating socio-spatial inequities, these movements contribute to weakening territorial cohesion.

4.3 Development paradox. Between preservation and growth.

The final paradox emerges from the differing capacities for implementing the TOD model on each side of the border, shaped by distinct democratic and legal systems. These differences directly influence the development strategies of each national territory. To grasp the present context, it's crucial to dive into the historical morphological evolution of the metropolitan area. The development of the Geneva metropolitan area followed a typical process of "rurbanisation," with unique consequences due to the border and early land protection policies by the Canton of Geneva and the Confederation. As early as the 1950s, the Canton enacted laws to safeguard its rural landscape, reinforced by LAT in 1979 and the first sectoral plan for agricultural land use (SDA). With this plan, the Swiss Confederation defined a minimum area of quality agricultural land, which each Canton must preserve. These measures limited urban expansion within Geneva, leading to the export of growth to French territories. Meanwhile, French municipalities, autonomous in urban planning, were encouraged to host a growing number of cross-border populations by financial compensation. The current metropolitan structure is thus that of a core city surrounded by a rural green belt and a periphery with a predominantly rural imaginary, along with a French periphery more distant from the city centre but more assertive in its urban imagery. Today, a key aim of the Greater Geneva project is to address this growth imbalance and its associated externalities.

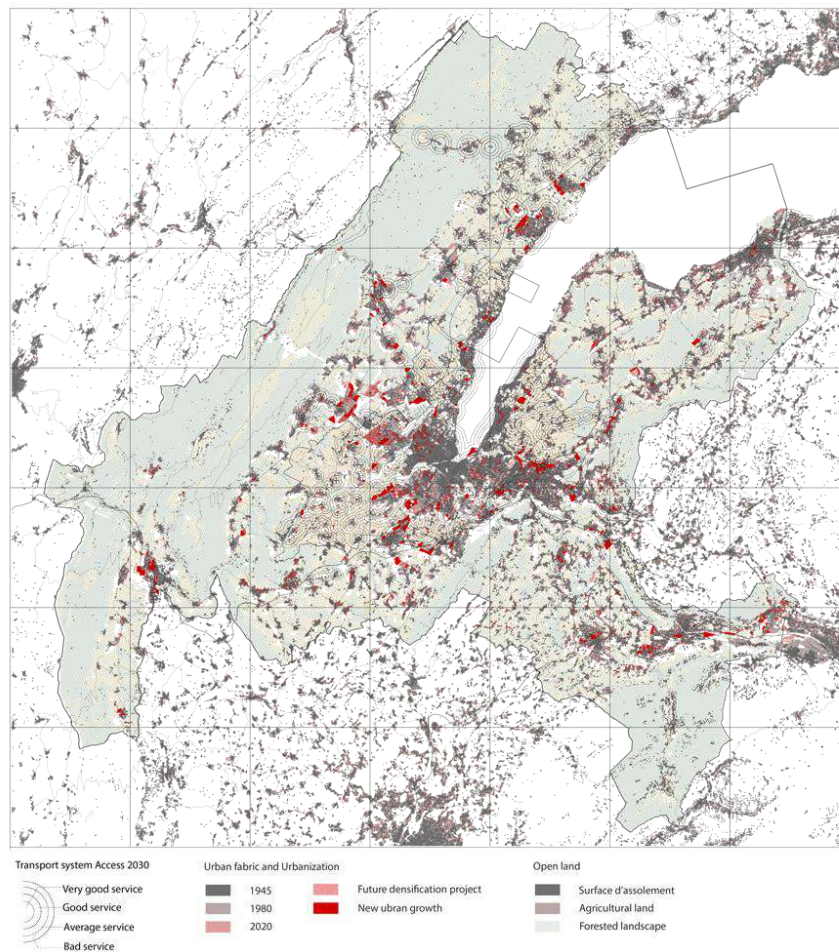


Figure 11. Development and preservation. Author's production, 2024. Sources: SITG

The map illustrates the evolution of built-up areas on both sides of the border from 1945 to 2020, incorporating future development zones outlined in the PA4. The map clearly illustrates the significant role played by densification in the French periphery since the 1950s, mainly around village nodes, forming multiple poles with little hierarchy. The cross-border vision clearly aims to evenly distribute new population growth between the Swiss and French sides, with developments oriented towards future public transport-serviced areas. However, most projects are on existing built-up areas in Switzerland and open spaces in France.

TOD model is an organisational framework of urban growth towards the periphery. Combine with green development, its effectiveness relies on developing compact urbanisation around key transport nodes along structuring axes (Cervero et Sullivan, 2011). This approach fosters new development over existing urban fabric. However, the idea that urbanisation should adapt to transportation is increasingly challenging to uphold in a context where ecological, normative, or ideological awareness tends to make ex-nihilo urbanisation less acceptable.

The limitations of this development model are exacerbated in a border context, where territories differ in their capacity to develop or preserve open spaces. The paradox lies in implementing a model centred on organizing new transport axes to redirect urbanisation, aiming for territorial rebalancing within an asymmetrical morphological, legal, and institutional framework, ultimately reinforcing development disparities on both sides of the border.

Bernex- Transport without urbanity?



Figure 12. Grand Bernex's evolution, 2015. Source : Le Grand projet de Bernex Nord et Est, Les Verts Genève.

Bernex is a municipality of the Geneva Canton, located west of the city centre, with approximately 10,000 inhabitants. The concept of connecting the municipality of Bernex to Geneva via a tramline was initially introduced in the Canton of Geneva's master plan of 2001. The urban development initiative for Bernex emerged in the Plan Guide of 2010, subsequently confirmed as a priority project. in *Plan Directeur* of 2013 with a significantly wider footprint (Figure 12). The project aimed to establish a nearly continuous corridor of urban expansion along the tramline from Geneva's centre to the outskirts of Bernex. This entailed developing the northern part of the municipality, primarily consisting of agricultural land. The Canton envisioned the new development with intermediate to high density. Named *Grand Bernex*, the plan encompassed 150 hectares divided into two zones: Bernex-Nord and Bernex-Est. The proposed development aimed to accommodate 12,000 new residents and create 5,000 jobs by 2030, doubling the municipality's current population. Concurrently, the tramway extension, co-financed by the Confederation, commenced with the initial extension to the municipality's entrance, completed in 2011 and reached the end of the commune ten years later. As early as 2013, certain municipalities, the Green Party of Geneva, and the ASBEC (Association Qualité de vie à Bernex et Confignon) initiated opposition against the project.

The opponent of the Green Party expresses the inconsistency of attempting to transform this end-of-line municipality into a 'regional centre', envisioned to lead to suburbanisation⁷. Despite the acknowledging the need to house new populations in the Canton, the association formally opposes the excessive reclassification of agricultural land, highlighting the inherent tension between preserving open spaces and increasing density. Additionally, they criticise the municipality's car-centric development plan, particularly the construction of a new 2x2 lane road to Geneva despite the availability of direct tram access to new neighborhoods.

The approval of Geneva's *Plan Directeur* by the Swiss Confederation in 2015 came with reservations, requiring the canton to reduce the projected impact on agricultural

⁷ LE GRAND PROJET DE BERNEX NORD / EST, La transformation des territoires bernésiens entre ville et campagne. Vision et orientation d'aménagement. Les Verts Genève, February 2015.

land. Consequently, the footprint of planned developments, including the *Grand Bernex* project, had to be diminished. This led to a reduction in the project's size and a postponement of the Bernex-Nord development. While the reduction in parcel size occurred, the population objectives remained the same, necessitating increased density. Current plans involve the construction of 2,800 new housing units and 2,550 jobs in the Bernex-Est and Vailly sectors, with the municipality committed to completing an initial phase of 1,600 housing units and 1,600 jobs by 2030. The remaining densification is expected to be pursued after 2030 without a specific timeline. Ultimately, Bernex-Nord is still projected to accommodate 5,700 housing units and 5,700 jobs, although no timeframe has been set for this densification due to current feasibility issues.



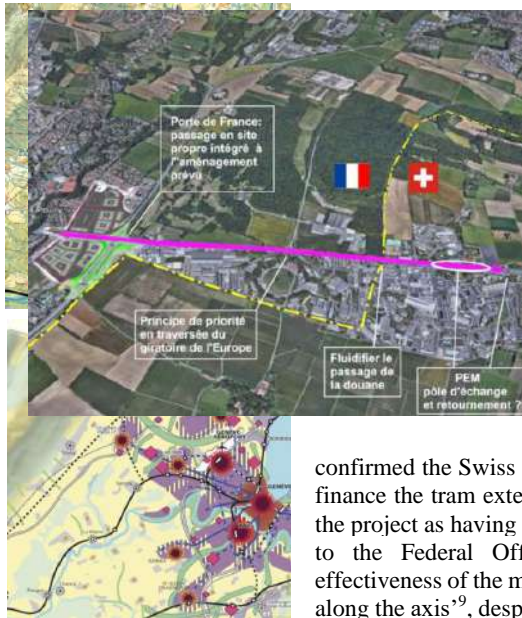
Figure 13. First development phase, 2024.
Source: ge.ch

For the first development phase (Figure 13), every parcel for which the commune publishes a localised neighborhood plan, local associations oppose through referendums. The oppositions highlight concerns about transforming agricultural or natural land into urban development zones, objections to perceived excessive density, and criticisms of the quality of new neighborhoods. The last referendum initiated by the Association Communale Bernésienne (ACB) opposes the development of Bernex-Vailly, characterizing it as a 'hyper-urban' project in a peri-urban context. Central to the criticism are the proposed density and building height, with the suggested limit of 29 meters seen as 'destroying the villages quality'. This opposition underscores the clash between the entrenched village imagery within the municipality and the proposed urban development, despite an acknowledgment of the commune's peri-urban nature.

The current situation in Bernex illustrates a challenge where a cul-de-sac tram infrastructure intended to stimulate urbanisation faces obstacles due to the imperative to preserve agricultural land. Contribute to housing construction delays in the Canton of Geneva, this problematic emphasises the imbalanced development between both sides of the agglomeration. The case highlights the complexity of steering urbanisation through large-scale projects in the Swiss context.

Saint-Genis-Pouilly - Urbanity without transport

Saint-Genis-Pouilly is a municipality of the Pays de Gex located on the French side of the agglomeration bordering Switzerland. Since the institution of the first PA, this town, with a population of 12,000 and the triangle it forms with the municipalities of Thoiry (6,000 inhabitants) and Sergy (2,500 inhabitants), was identified as a regional centre earmarked for the development of a structuring public transportation axe toward Geneva. In 2012, with the second PA2, the GLCT reduced the project by abandoning Thoiry and a new terminus in Saint-Genis (Figure 14). Concurrently, already deferred to a horizon of 2050 in PA2, the line's rehabilitation intended to connect the municipalities of Pays de Gex disappears in the third PA. Co-funded by the Swiss Confederation, the Swiss portion of the tramway line connecting the Geneva train station to CERN



via the Swiss municipality of Meyrin was inaugurated in sections between 2007 and 2011. As of today, the line terminates at CERN, the European research hub located 300m from the border.

In 2015, during discussions on co-financing agglomeration measures, the Swiss Confederation downgraded the tram section intended to connect CERN to the centre of Saint-Genis-Pouilly to a non-priority project. As a result, the Pays de Gex intermunicipality removed the project from its spatial development plan. Furthermore, the agreements regarding the third-generation urban development project

confirmed the Swiss Federal Council's definitive decision not to co-finance the tram extension. This decision was justified by assessing the project as having an 'insufficient degree of maturity'⁸. According to the Federal Office for Spatial Development (ARE), 'the effectiveness of the measure is low due to insufficient current density along the axis'⁹, despite this corridor being subject to a *contrat d'axe* since 2012. With the *contrat d'axe*, in exchange of the financing of the infrastructure by the Ain Department, the inter-communality of the Pays de Gex and the municipality of St-Genis-Pouilly commit to

focus urban growth within a radius of 500 meters around tram stops. Hence, in addition to densification projects in the urban core, an operation involving the construction of 1,400 housing units and associated public facilities just after the customs checkpoint is currently under construction (Figure 15).

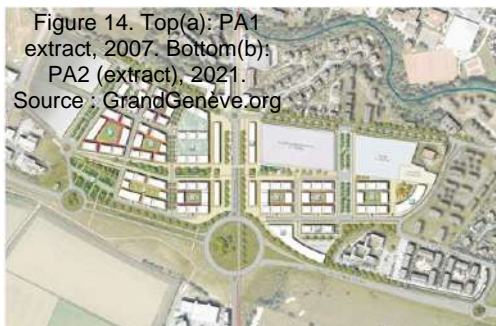


Figure 14. Top(a): PA1 extract, 2007. Bottom(b): PA2 (extract), 2021. Source : GrandGenève.org

to contest the abandonment of the tramway project

Figure 15. urban extension around the tramway, 2012. Source : RR&A

and advocate for its necessity to improve the quality of life for the city's residents. In response to this mobilisation, the Conseil Départemental de l'Ain, along with the municipalities, committed to financing the 2.1-kilometer extension of the tramline between CERN and the centre of Saint-Genis-Pouilly. However, Geneva was left responsible for completing the missing 300 meters on the Swiss side. After being repeatedly postponed due to political discord, lack of funding, and Geneva Canton's prioritisation of

⁸ Accord sur les prestations entre la confédération suisse, le canton de Genève et le Canton de Vaud concernant le projet d'agglomération Grand Genève, 2^e génération 2011-2012, 2012. (Authors' translation)

⁹ *Ibidem*

projects on the other side of Pays de Gex, which were co-financed by the Confederation, the project was eventually scaled down. In 2019, France and Swiss representatives signed a new partnership, in which the Ain Department along with the Pays de Gex inter-communality committed to constructing a BRT connecting the border to the centre of Saint-Genis (Figure 16). Its completion is scheduled for 2026. The primary reason for this decision is budgetary since the implementation of the BRT is approximately 2.8 times less costly than the tram. Moreover, the former can be implemented with or without the Swiss

Figure 16. BRT project, 2023. Source : Pays de Gex Agglo

connection, which was not the case with the tram. However, the Geneva Canton has committed to creating dedicated bus lanes on its side of the border. Therefore, a BRT will be delayed compared to the ongoing development, resulting in a transit rupture between Geneva and Saint-Genis.

The rejection of the tramway extension toward France in favor of prioritizing Switzerland's national territory and international connectivity symbolises a clear reluctance to meet cross-border metropolis needs, both from the Confederation and the Canton of Geneva, while still benefiting from its international advantages.

These examples reveal how transport and urbanisation strategies differ across the border. Cross-border cooperation fails to eliminate inequalities of treatment between national territories, with urbanisation subordinated to transportation on the Swiss side, and transportation subordinated to development on the French side. This disparity is further reinforced by disparities in citizen's capacity and institutional differences. However, in both cases the growth-oriented corridor vision, which neglects historical, morphological, and perspective contexts, shows its limits with the growing awareness toward land preservation.

Conclusion

The implementation of the current radio-centric TOD regional vision in Great Geneva reveals paradoxes that outline internal tensions within the asymmetrical cross-border metropolis between territorial cohesion discourse and metropolisation processes.

The projects discussed here illustrate discrepancies between political discourse, cross-border cooperation intentions, national priorities, and local reception. They underscore how technical and economic rationales behind the regional vision tends to overlook the bi-national and local realities, leading to the re-emergence of divides between rural and urban imaginaries, centre and periphery, and national territories, in the interplay between classic metropolitan divisions and transborder asymmetry.

These projects and their contestations demonstrate the entanglement of scales and the complex relationship between involved actors. Beyond institutional and socioeconomic asymmetry, national policies and regulatory systems significantly impact metropolitan development. Moreover, differences in democratic structures and planning expertise question the cohesive implementation of the model. Hence, conflicting political interests manifest in the metropolis in addition to different capacities among actors, leading to differences in treatment.

But more fundamentally, the paradoxes that emerge between connectivity and specialisation, autonomy and interdependence, and preservation and growth reflect conflicting ideals about the metropolis' future. They challenge the implicit hierarchical relationships and roles assigned to different metropolitan entities by the current development model. While TOD offers regional accessibility, intended to connect the different part of the agglomeration through sustainable modes of transport, its implementation supports classical metropolisation processes, growth through functional

specialization, spatial differentiation through selectivity and hierarchization. Hence, the paradoxes illustrate the role of the current radio-centric TOD model in perpetuating and even enforcing socio-spatial inequalities, rather than striving for territorial cohesion. Overcoming these paradoxes, therefore not only demand to homogenize development modalities and policies, but to address current development lack of attention to contextual dimensions and divides that are being reproduced by it.

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