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Designing infrastructure beyond the urban-rural divide: Comparative lessons for the European territorial palimpsest

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This article explores how insights from past and present North American infrastructure projects can inform the rethinking of infrastructure's role in the transformation of European 'dispersed territories', i.e. low-density urban-rural configurations. Framed by the concept of the "territorial palimpsest", this paper adopts a qualitative, comparative case study approach to examine how infrastructure design can mediate the urban-rural divide. Through diachronic analysis, it considers several twentieth-century infrastructural imaginaries and contemporary projects. While acknowledging the fundamental socio-political and spatial differences between North American urban sprawl and European dispersed territories, the selected cases offer critical insights into the role of infrastructure as a catalyst for socio-ecological and spatial change. Each case is examined through a common analytical lens to uncover how infrastructure is conceived and deployed. The paper concludes by distilling lessons for the European context, including the importance of integrating design ambition with feasibility, engaging with governance structures, embracing multifunctional and hybrid strategies, and re-evaluating existing conditions as opportunities. These insights aim to support a more adaptive and interdisciplinary understanding of infrastructure as a catalyst for resilient and inclusive spatial transformation beyond the traditional urban-rural dichotomy.

Keywords: urban sprawl, dispersed territories, urban transformation, green infrastructure, landscape architecture

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Introduction: Sprawl, dispersion and the palimpsest territory

Both European and North American territories are facing spatial design challenges that are related to infrastructure and the tension between urban and rural. Global challenges such as changing climates, declining biodiversity, and renewable energy transitions are not to be solved in cities alone. Moreover, the dichotomous urban-rural divide has proven to be redundant in an age of "planetary urbanisation" (Brenner, 2014) and "horizontal metropolises" (Cavalieri & Viganò, 2019). An increasingly globalised world has given rise to literature in architecture, landscape and planning during the 1990s and 2000s that studies these 'neither urban, neither rural' conditions more often than not with their relation to infrastructure, both in North America (Bruegmann, 2005; Graham & Marvin, 2001) and Europe (Corboz, 1990; Indovina et al., 1990; Neutelings, 1990; Smets, 1986).

Notwithstanding the global attention to the urban-rural divide (Carlow, 2016), the scope of this article is narrowed down to the Euro-American context, to build further upon prominent body of literature and research on territories characterised by sprawl and dispersion and to reflect on those "travelling concepts" (Vicenzotti & Qviström, 2018). This article examines how past and present North American infrastructure projects can inform the rethinking of infrastructure's role in spatial transformation within European dispersed territories. More specifically it asks: *what insights can be gained from past and present North American infrastructure projects in rethinking infrastructure's role in the transformation of European dispersed territories?*

Despite common confusion, the post-war suburban (mostly residential) sprawl most prevalent in North America should be distinguished from some of the mixed-used dispersed patterns that have existed since the Middle Ages in Europe. The latter can be understood as a palimpsest territory, the result of historical layered systems of housing, agriculture, politics, ecology, industry and so on. We use the term palimpsest to describe the layered character of these European territories, where historical spatial, social, and infrastructural systems coexist and overlap. This palimpsest metaphor is adopted from Corboz, who stated that the land, "heavily charged with traces and with past readings, seems very similar to a palimpsest" (Corboz, 1983, p. 33). This metaphor gained prominence in the field of urban-rural development up to today, which is illustrated by the recent special issue of *Urban Planning*—"Territories in Time: Mapping Palimpsest Horizons" (Cavalieri & Cogato Lanza, 2020). As a new paradigm to understand urbanisation, the palimpsest metaphor draws attention to ever-evolving systems that shape the physical environment.

The exhibition *Countryside, The Future* and the international research collaboration behind it are examples of the re-emerging interest in the 'non-urban' in the urban design field (Koolhaas & Bantal, 2020). Even though large amounts of land are responsible for and have potential for (sustainable) energy production, growing food, ecosystem services and so on, they are often neglected in architecture, planning and landscape research. Several scholars have addressed the planetary urbanisation thesis from a rural perspective, criticizing the marginalisation of rural places (Brown & Schafft, 2019; Phillips et al., 2022; Wang et al., 2023), and explicitly drawing attention to their future (Woods, 2019). In this context, the urban-rural divide itself has been questioned, acknowledging the "spatial interdependence" of both (Lichter et al., 2021).

When attempting to classify what is urban and what is rural, it becomes clear that the rural cannot be neglected. In the United States, where only 2 % of the land use is classified as 'urban',[1] it becomes inevitable to take the other 98 % into account when addressing today's large-scale challenges (Figure 1). However, as this 2 % of the U.S. land houses 82 % of the

[1] Using the threshold of 1,000 inh/mi^2 or 386 inh/km^2, including suburban areas in this category (The McHarg Center, 2019).

population (World Bank Group, 2018), often “climate change, racial equity, access to the outdoors, immigration reform, and local production are all thought of as largely urban issues” (Burnette, n.d.). While 82 % of the total United States’ population lives in an urban area, this is 75 % for the European Union (World Bank Group, 2018) (Figure 2). This seems to suggest that the European and North American context are very similar. At the same time these numbers lack local specificity in particular for dispersed territories. For example, in the same dataset Belgium’s population is indicated at 98 % urban, the highest in the European Union group and 12th globally (World Bank Group, 2018). However, a study in Flanders, Belgium’s most populated region, indicates that only 24 % of the population lives in city centres (Vermeiren et al., 2019, p. 57).[2] Interestingly, this 24 % of the Flemish population in city centres also takes up 2 % of the land (in reference to the U.S. 82 % of the population in 2 % of the land). Although parallels can be drawn, one should be careful to not overgeneralize these quantitative observations.

This comparison suggests that the thresholds for what is considered an urban density are distinctively different (386 inh/km^2 in the U.S. vs 5,000 inh/km^2 in Flanders). Not only does this confirm that the urban-rural divide as a dominant paradigm has become redundant, but it also exemplifies the need for case study research to relate the North American discourse with the European one, putting quantitative research in a qualitative context (Vicenzotti & Qviström, 2018).

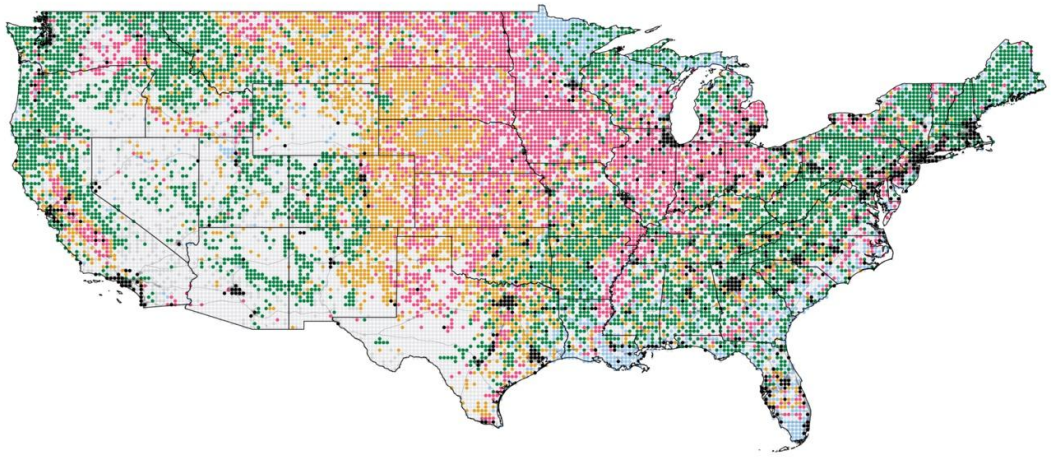

***Figure 1**. Land use in the United States mainland. Black = urban areas, green = forests, blue = wetlands, pink = agriculture, orange = grassland + pasture, light grey = shrubland, dark grey = other. Source: The McHarg Center for Urbanism and Ecology at the University of Pennsylvania (The McHarg Center, 2019) https://mcharg.upenn.edu/2100-project-atlas-green-new-deal*

[2] Using the threshold of 50 inh/ha or 5,000 inh/km^2 (Vermeiren et al., 2019).

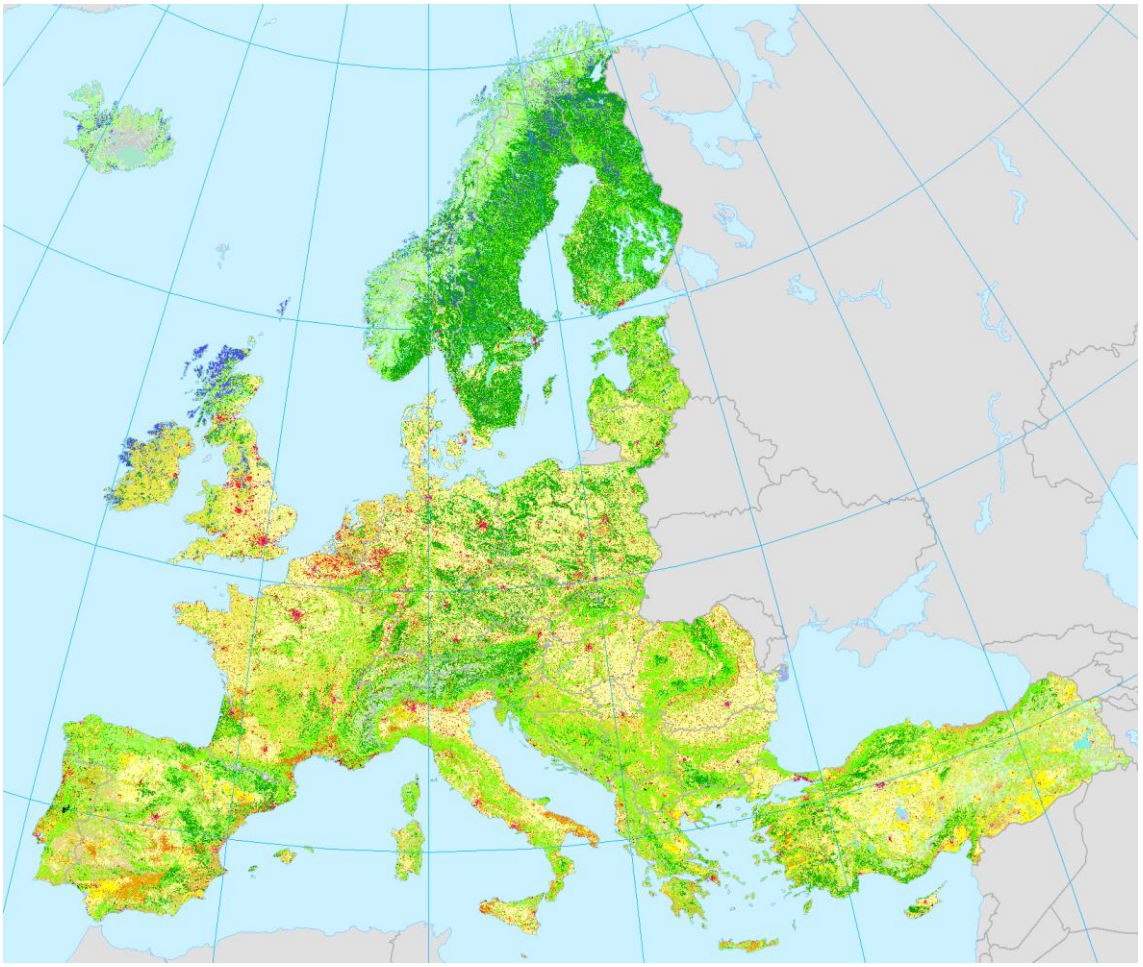

***Figure 2**. Land use in Europe through Corine Land Cover 2018. Red = urban, yellow = agriculture, dark green = forest, light green = shrubland, black/grey = open spaces with little or no vegetation, blue = wetlands, purple = industry. Source: European Environment Agency, 2018*

In the context of sprawl and dispersion, physical infrastructure is often seen as one of the main drivers of an unsustainable type of urbanisation (Bruegmann, 2005; EEA, 2016; Graham & Marvin, 2001; Vermeiren et al., 2019). As underlying systems, these infrastructures play an important role in the spatial development of dispersed territories (Leemans, 2024). This article explores this role in the urban-rural divide by studying Euro-American imaginaries and research projects dealing with design questions from a diachronic perspective. It is not meant as a systematic review or quantitative study. Rather, by making use of cases and best practices, lessons are drawn for a specific European dispersed territory characterised by dense networks of infrastructure (Figure 3). This area reaches from Rotterdam in The Netherlands through most of Belgium to Lille in the north of France and has been defined as one of the two largest clusters of sprawl in Europe: “(1) north-eastern France, Belgium, the Netherlands and part of western Germany; and (2) in the United Kingdom between London and the Midlands” (EEA, 2016, p. 14). In this context, this article will also refer to All City/All Land (AC/AL), a condition largely coinciding with this cluster that emphasises the redundance

of the urban-rural distinction as it has elements of both (Gheysen et al., 2017, 2019; Gheysen & Van Daele, 2016).

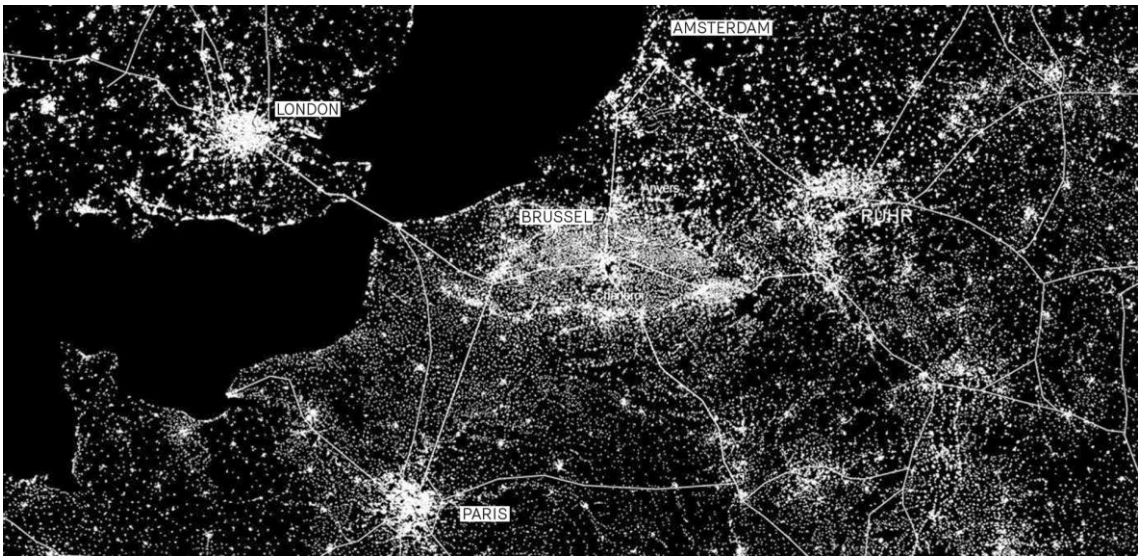

***Figure 3**. All City/All Land is a condition that emphasises the redundant urban-rural divide coinciding with one of the largest clusters of dispersion, reaching from Rotterdam in The Netherlands though most of Belgium to Lille in the north of France. Source: Studio 012 Secchi-Viganò in Dejemeppe & Périlleux, 2012, p. 31.*

Addressing the role of infrastructure imaginaries and cases: Research aims and methods

This article addresses the question: what insights can be gained from past and present North American infrastructure projects in rethinking infrastructure's role in the transformation of European dispersed territories? Through a comparative and diachronic analysis of infrastructure imaginaries and cases, from early twentieth-century visions to contemporary landscape-based interventions, the article explores how infrastructure can operate as a catalyst for socio-ecological resilience and integrated territorial planning. The aim is to reflect on the transformative potential of infrastructure in overcoming traditional urban-rural dichotomies in the specific context of European dispersed territories.

This paper adopts a qualitative, comparative case study approach to explore how infrastructure design can mediate the urban-rural divide in dispersed territories. Rather than a systematic review or quantitative analysis, the methodology is based on interpretive analysis of selected design projects and theoretical imaginaries across temporal and geographical contexts. Although there are similarities in the spatial configuration of and building typologies in American suburban sprawl and European dispersed territories, their socio-spatial and cultural context is very different. Without "over-generalising" or "over-localising" (Healey, 2012), comparative studies can still be relevant tools to learn from the different design approaches, definitions and socio-economic contexts and to look at best practices (Vicenzotti & Qviström, 2018).

The cases were selected based on three main criteria: (1) their relevance to dispersed or low-density urban-rural territories, (2) their engagement with infrastructure as a design and governance tool, and (3) their potential to yield transferable insights between the North American and European context. The following questions functioned as a guide to interpret each case:

- What is the territorial condition or spatial context in which the project or imaginary emerged?
- How is infrastructure conceived or deployed in this case: as a technical system, a social tool, a spatial design, or a hybrid?
- What socio-political or ecological challenges does the case address?
- What vision of society, territory, or urban-rural relations is embedded in the project?
- What design strategies or interdisciplinary approaches are used?
- What value or lesson does this case offer for rethinking infrastructure in the European dispersed (palimpsest) context?

The structure of this paper is threefold. First, three twentieth-century cases from North American and European research literature are put into relation with infrastructure and the urban-rural tension. Second, two contemporary cases in the United States are discussed. Third, lessons are drawn from the North American context for the European dispersed palimpsest territory.

Reflecting on three twentieth-century infrastructure imaginaries and their role in the urban-rural divide

This article builds further on earlier research that illustrated that infrastructure networks have historically played a major role in enabling territorial transformation of a dispersed territory (Leemans et al., 2023). Keeping in mind the difference between sprawl, a post-war suburban phenomenon mostly used in the North American context, and dispersion, originating from pre-industrial patterns in Europe, it is interesting to discuss literature on exemplary design projects at the intersection of architecture, planning and landscape, focusing specifically on the role infrastructure has played in the urban-rural divide. Below, three different approaches or models are discussed which make use of mobility infrastructure as a way to address (1) social inequalities, (2) democracy and (3) a changing economy in the context of the urban-rural tension.

Reframing collective mobility infrastructure as a social equaliser: Rowntree's Lessons from Belgium (1910)

Territorial condition and context. At the turn of the twentieth century, Belgium presented a unique example of a spatially dispersed territory, where industrialisation unfolded not in dense metropolitan centres, but across a fine-grained network of towns and villages. This was supported by an extensive public transport system of railways and tramways, which connected the dispersed urban-rural fabric (De Block & Polasky, 2011; De Decker, 2020).

Infrastructure as a social tool. British sociologist Benjamin Seebohm Rowntree interpreted this model as a potential solution to poverty in industrial Britain (Rowntree, 1901, 1910). He observed that Belgium's collective mobility infrastructure, combined with subsidised land tenure policies, allowed working-class families to own homes with gardens and commute affordably. Infrastructure here was not merely a functional system, it was central to a broader socio-political model that decentralised opportunity and wealth.

Socio-political challenge addressed. Rowntree's analysis responded to deep social inequalities in Britain, where urban density exacerbated poverty and limited access to housing (Thane, 2018). He saw in the Belgian model a viable alternative: a 'right to the city' reframed as the right to access, mobility, and ownership, distributed across territory rather than concentrated in urban cores.

Embedded vision of society and territory. The Belgian example reflected a vision of a more equitable society, where infrastructure was leveraged to redistribute social and economic

opportunity. It also prefigured a spatial model beyond the urban-rural divide: a networked landscape where location did not determine exclusion.

Design strategy and spatial logic. The structure of the Belgian system (high-speed railways for regional connections and tramways for local access) exemplifies an infrastructural layering that enabled a middle-class lifestyle in a low-density, semi-rural setting.

Relevance to contemporary European contexts. For today's European dispersed territories, Rowntree's reading of Belgium (Figure 4) offers a historical precedent for using infrastructure as a tool of spatial justice. While that model ultimately proved ecologically and financially unsustainable, its social ambition (to equalise access across a non-metropolitan landscape) resonates with current calls for integrated, multifunctional, and inclusive infrastructure planning in dispersed territories like AC/AL.

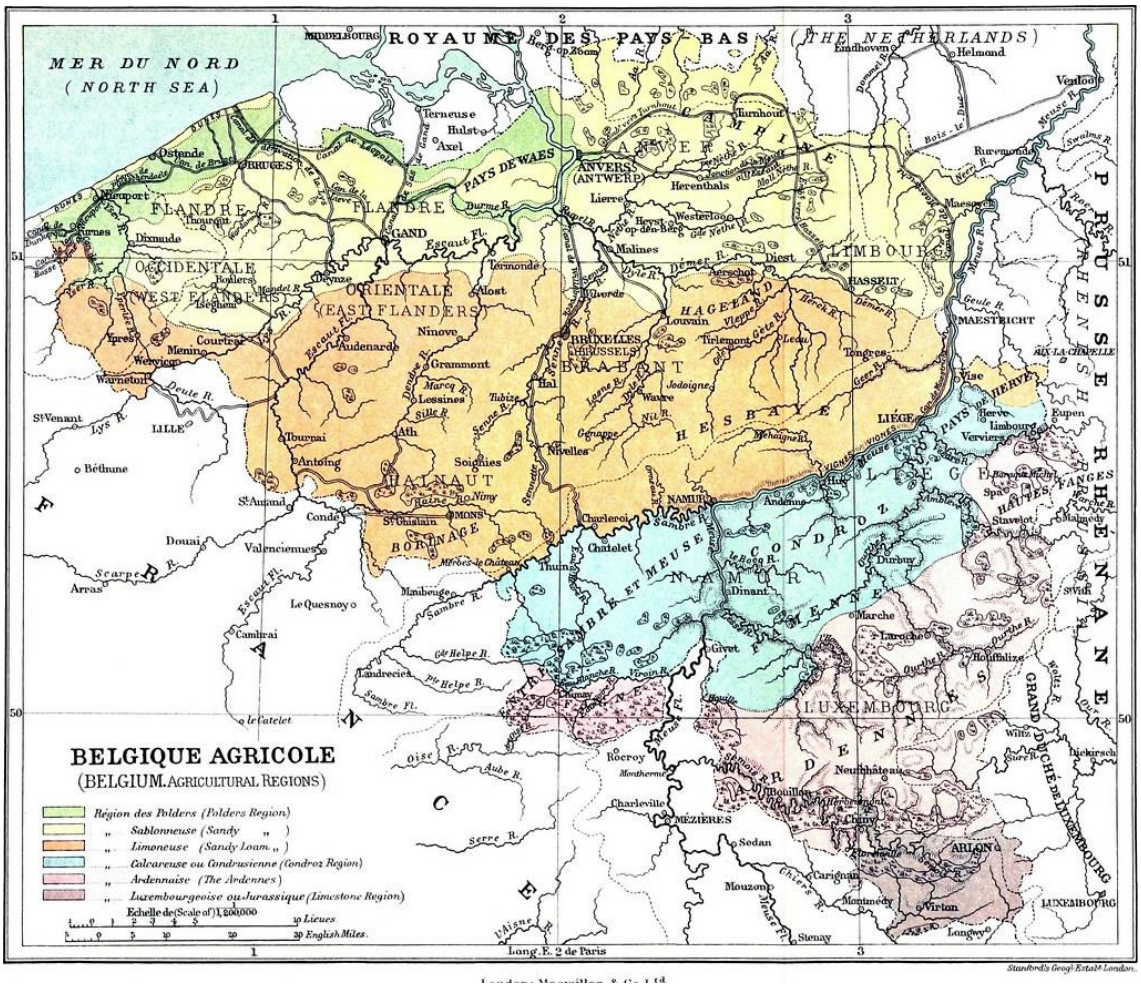

***Figure 4**. In his book "Land and Labour: Lessons from Belgium" Rowntree (1910) describes Belgium through different angles, starting with a geographical and physical study and relating this to the socio-political and economic context. He sees the combination of the land ownership system with the extensive railway infrastructure as a way to fight poverty.*

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Democracy through individual mobility: Frank Lloyd Wright's Broadacre City (1932)

Territorial condition and context. Emerging during the early twentieth century, Broadacre City was Frank Lloyd Wright's provocative response to the rise of industrialised, centralised cities and the modernist ideal of urban density (Wright, 1932a, 1932b). In a rapidly motorising United States, where suburbanisation was beginning to reshape the landscape, Wright proposed an alternative model: a territorially dispersed yet ideologically unified vision for American life.

Infrastructure as a societal vision. In Broadacre City, infrastructure (particularly the automobile and road networks) became a key enabler of individual autonomy and democratic participation. Wright envisioned a future in which every family would own at least one acre of land and rely on personal vehicles for mobility. Roads replaced rails as the connections of a low-density, horizontally distributed society, where decentralisation would ensure equal access to land, work, and self-determined lifestyles (Figure 5).

Figure 5*. Plan of The Living City (1958) by Frank Lloyd Wright, showing the territorial organisation of Broadacre City. The drawing illustrates Wright's vision of a dispersed, yet ideologically unified settlement pattern structured around individual mobility, where roads and automobiles underpin a democratic, low-density society. Source: Avery Classics, Avery Architectural & Fine Arts Library, Columbia University*

Socio-political challenge addressed. Wright's proposal sought to dissolve the hierarchical structure of the industrial city, advocating instead for a more egalitarian society grounded in property ownership, technological progress, and spatial freedom. His critique of congested metropolises positioned Broadacre as a radical vision of democracy through land and infrastructure.

Embedded vision of society and territory. Broadacre City reflected a deeply individualistic conception of democracy. One in which the citizen, empowered by car ownership, could

flourish outside the strict logic of the city. It imagined a society where decentralisation was not just spatial but political, with infrastructure enabling dispersed civic agency and freedom from centralised control.

Design strategy and spatial logic. The plan combined agricultural plots, residential areas, public services, and industrial facilities into a patchwork held together by roads. Its design strategy rejected the compactness of modernist cities in favour of a polycentric, low-density settlement pattern. Despite the fact that Broadacre City was never realised in its entirety, Wright did design and build several Usonian Houses, which can be considered as architectural "prototypes" of his larger-scale plan (Gheysen & Leemans, 2023), as an incremental mode of building the democratic landscape.

Relevance to contemporary European contexts. Although never realised at scale, Broadacre City continues to resonate in debates on infrastructure, mobility, and decentralisation. Not only in this vision, but also in reality individual mobility infrastructure played an important role in (the planning of) urban sprawl in twentieth-century North America (Graham & Marvin, 2001; Kim, 2022; Newman, 2016; Renne, 2016). For European dispersed territories the project is both cautionary and instructive. It illustrates the double-edged nature of individual mobility infrastructure: as a liberating force but also as a potential driver of ecological unsustainability and social fragmentation. Nevertheless, its attempt to redefine infrastructure as a platform for democratic life beyond the urban-rural dichotomy remains a valuable provocation.

Reclaiming industrial infrastructure for the knowledge economy: Cedric Price's Potteries Thinkbelt (1964–1966)

Territorial condition and context. The Potteries Thinkbelt project emerged in a context of economic transition: the decline of Britain's industrial manufacturing base and the rise of a post-industrial knowledge economy. Set in the dispersed, post-industrial landscape of Stoke-on-Trent (historically known as 'the Potteries') the project proposed a radical reinvention of a decaying industrial territory marked by abandoned railway infrastructure and fragmented urban settlements. Historically, the Potteries had profited from amongst others the distribution and export options that came with the construction of railways (Shaw, 1829; Thomas, 1936; Weatherill, 1971).

Infrastructure as a repurposed system. Rather than constructing something new, Cedric Price envisioned reactivating the disused railway network to host a decentralised, mobile university system. Infrastructure in this proposal was not simply transport; it became a medium for knowledge transfer, social regeneration, and spatial innovation.

Socio-political and economic challenges addressed. The project responded to two intersecting challenges: the obsolescence of centralised educational institutions in a technologically evolving society, and the spatial and economic redundancy of former industrial regions (Brick, 1992; Saumarez Smith, 2019). Price's vision critiqued the rigidity of traditional campuses and suggested that learning should be as adaptive and networked as the emerging economy it served.

Embedded vision of society and territory. The Thinkbelt projected a new model of society in which education was democratised, mobile, and embedded in the everyday life of a dispersed territory. The railways would be put back in use to connect housing, libraries, factories, and laboratories by mobile units designed as classrooms (Figure 6). It reimagined the university as a decentralised infrastructure reflecting a broader ambition to adapt industrial regions for a more knowledge-based future.

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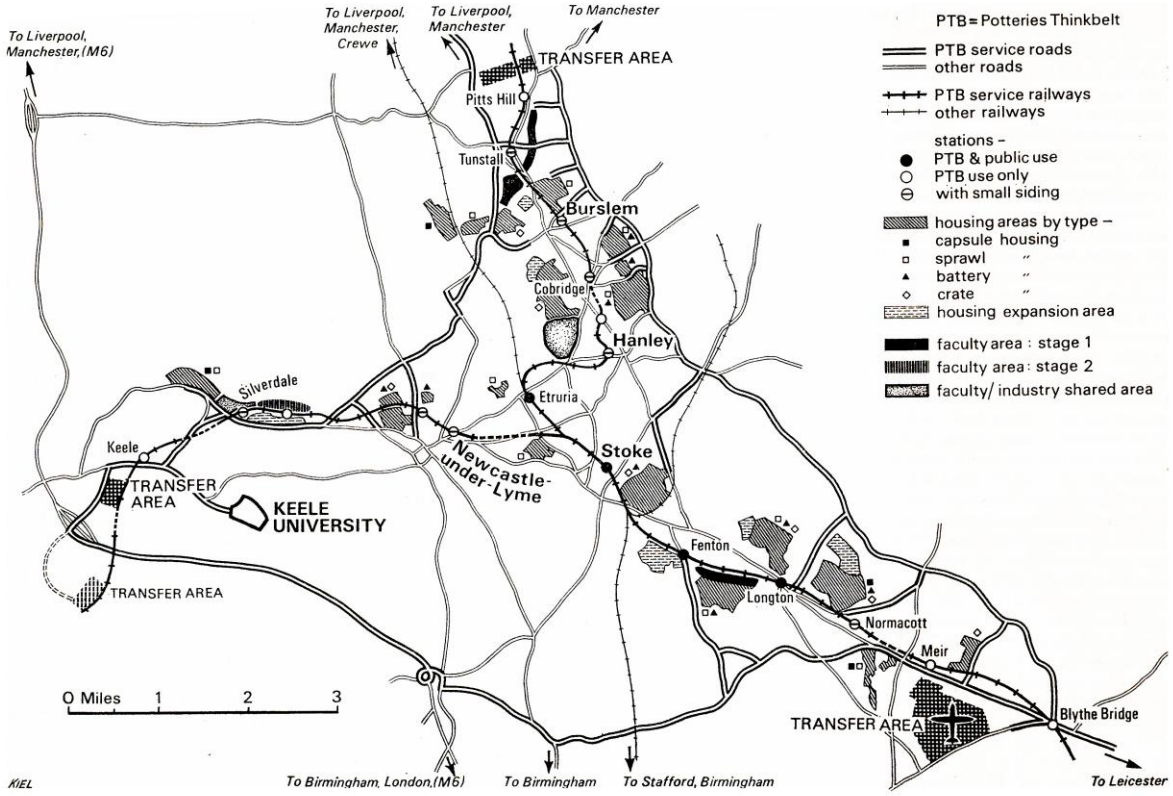

***Figure 6**. The Potteries Thinkbelt project envisioned a new university system and linked different elements in the North Staffordshire towns that formerly formed the centre of the pottery industry in England. Source: Canadian Centre for Architecture collection, 1964-1966 / Hardingham & Rattenbury (2007)*

Design strategy and spatial logic. Spatially, the project embraced dispersion as an asset rather than a constraint. It leveraged the physical distances between towns to create a modular, scalable educational system. The linearity of the railway infrastructure became a design advantage, enabling learning to move across the landscape rather than remain fixed in space. In doing so, it exemplifies an infrastructural imaginary grounded in flexibility, openness, and hybridity.

Relevance to contemporary European contexts. Although never realised, the Potteries Thinkbelt resonates strongly with contemporary European dispersed territories like AC/AL. It offers an early precedent for reimagining abandoned infrastructure system capable of supporting new forms of collective life. Unlike many current European infrastructure retrofits that focus primarily on leisure or heritage value (Leemans, 2024, pp. 158–161), Price's vision aimed to restore infrastructure's public function, not for transport, but for social and economic renewal. This conceptual shift remains highly relevant today, as planners seek to activate underutilised networks to address contemporary challenges in education, equity, and territorial cohesion.

From vision to implementation: Contemporary North American cases in infrastructure design

The historical imaginaries discussed above illustrate how infrastructure design has historically been used to project visions that move beyond the urban-rural dichotomy. While these projects were often speculative or unbuilt, they reveal how infrastructure can operate as a catalyst for broader socio-economic and territorial transformation. These imaginaries also challenge the

persistent notion that "the design of infrastructure was historically determined by problem-solving and guided by autonomous parameters such safety, feasibility and efficiency, independent of an overall urban vision" (De Block, 2016, p. 374).

Today, territories characterised by dispersion and sprawl face increasing ecological and socio-political pressures, from biodiversity loss and climate risks to increasing costs of maintenance and governance complexity. In response, the focus of infrastructure design has shifted towards ecology, giving rise to what is commonly referred to as 'green infrastructure' in planning and landscape discourse (Mell, 2008; Vitiello, 2017). However, such ecological approaches have also been criticised for operating within a narrow, "self-referential discourse" focusing on aesthetics or performative sustainability without engaging meaningfully with deeper socio-political dynamics (De Block, 2016).

As De Block (2016) argues, ecological infrastructure must be understood as a radical and contested space, one that engages with politics, equity, and governance as much as ecology. Simultaneously, design culture in North America has fostered integrated, visionary approaches, particularly within landscape architecture. The field's maturity in combining spatial design with political and ecological thinking has produced large-scale infrastructure projects that operate as multilayered tools: simultaneously spatial, social, and policy oriented. The following two cases are examined for their ability to demonstrate this integrated potential and to offer transferable insights for rethinking infrastructure in European dispersed territories.

Reconnecting the fragmented urban fabric: The Atlanta Beltline (1999-ongoing)

Territorial condition and context. Atlanta, Georgia, is often cited as the most sprawling metropolitan area in the United States (Ewing & Hamidi, 2014; Hamidi et al., 2015). Characterised by car dependency, fragmented urban development, and sharp socio-spatial inequalities, the city's urban fabric has been deeply shaped by mid-twentieth-century planning logics that privileged highways and suburban growth. Historically, infrastructure investments, particularly road systems, were used as tools of segregation, displacing communities through so-called urban renewal policies and redlining practices (Kim, 2022; Kruse, 2019; Renne, 2016).

Infrastructure as a social and ecological connector. The Atlanta Beltline project reclaims a 22-mile loop (35 km) of abandoned railway infrastructure to create a hybrid system of public trails, greenways, parks, and potential transit lines. The original four beltline railroads fell into disuse in the mid-twentieth century when trucks became more convenient for goods transportation (Badami et al., 2006). Originating from a 1999 master's thesis by Ryan Gravel, the project was envisioned not simply as a mobility upgrade, but as a socio-ecological framework to reconnect historically divided neighbourhoods and reimagine the city's future around more inclusive and sustainable infrastructure (Gravel, 1999).

Socio-political challenges addressed. The Beltline responds to a confluence of spatial and political challenges: car-centric planning, socio-economic segregation, and ecological degradation. It aims to counteract the long-term effects of infrastructural exclusion and create a 'public' infrastructure that restores spatial justice and access to green space, mobility, and economic opportunity.

Embedded vision of society and territory. At its core, the Beltline articulates a vision of collective infrastructure, one that reconnects rather than divides, and which challenges the legacy of infrastructure as a tool of control. It represents a strategic reimagining of what public infrastructure can do: not only move people, but repair urban fractures, redistribute investment, and build common ground across difference.

Design strategy and spatial logic. The project's circular form and use of existing railway corridors reflect a logic of adaptive reuse, turning former industrial infrastructure into multifunctional collective space. Its phasing over time, enabled through grassroots activism, public-private partnerships, and design competitions, illustrates a flexible yet visionary approach that balances design ambition with incremental implementation.

Relevance to contemporary European contexts. Despite facing criticism for falling short of its original equity goals, particularly in relation to affordability and gentrification (Samuel, 2022), the Beltline remains a compelling model of "strategic catalyst infrastructure" (Gravel, 2016). For European dispersed territories like AC/AL, it demonstrates how abandoned or underutilised infrastructures can be reactivated not just for environmental benefit, but also to advance social cohesion and reframe infrastructure as a societal project. It also highlights the need to embed spatial transformation within broader political processes, a key lesson for projects operating within complex, layered urban-rural contexts.

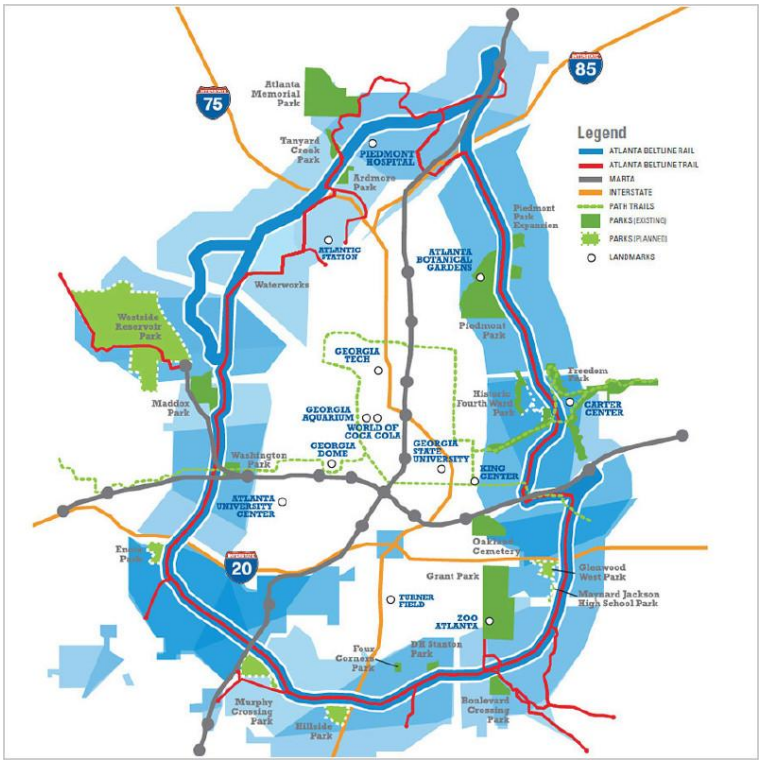

***Figure 7**. The Atlanta Beltline is a project with spatial interventions and at the same time has socio-economic and political ambitions. The map shown here is an earlier version from the early-to-mid 2010s and includes some designations and alignments that have since evolved. It nonetheless illustrates how the Beltline was envisioned to engage with its surroundings. Source: Atlanta BeltLine, Inc. (ABI)*

Recovering ecosystems while building community: Public Sediment for Alameda Creek (2018 – ongoing)

Territorial condition and context. Located in the sprawling suburban periphery of the San Francisco Bay Area, Alameda Creek occupies a transitional zone between dense residential development and ecologically significant tidal Baylands. Historically shaped by agricultural land use and later suburban expansion, the creek was canalised and disconnected from its ecological functions. This hydrological fragmentation was exacerbated by upstream dams, which trapped sediment critical for sustaining the coastal wetland ecosystems that buffer the Bay Area against sea level rise and storm impacts.

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Infrastructure as living system. Public Sediment for Alameda Creek reimagines infrastructure as a 'living system' integrating ecological restoration with social connectivity and public space. Developed for the "Resilient by Design: Bay Area Challenge" in 2018 by the landscape architecture firm SCAPE and a broad interdisciplinary team, the project aims to reconnect sediment flows, aquatic habitats, and suburban communities. Its central design feature is a reconfigured creek cross-section: a hybrid of ecological and social infrastructure that channels sediment and fish, while providing trails, seating, and access for local residents.

Socio-political challenges addressed. The project addresses both environmental degradation and social fragmentation. It challenges the legacy of exclusionary infrastructure that often cuts across socio-economic divides, proposing instead a shared space that links ecology and equity. By transforming the creek from a hard boundary into a site of public interaction and ecological regeneration, the design intervenes in the socio-political geography of suburban sprawl.

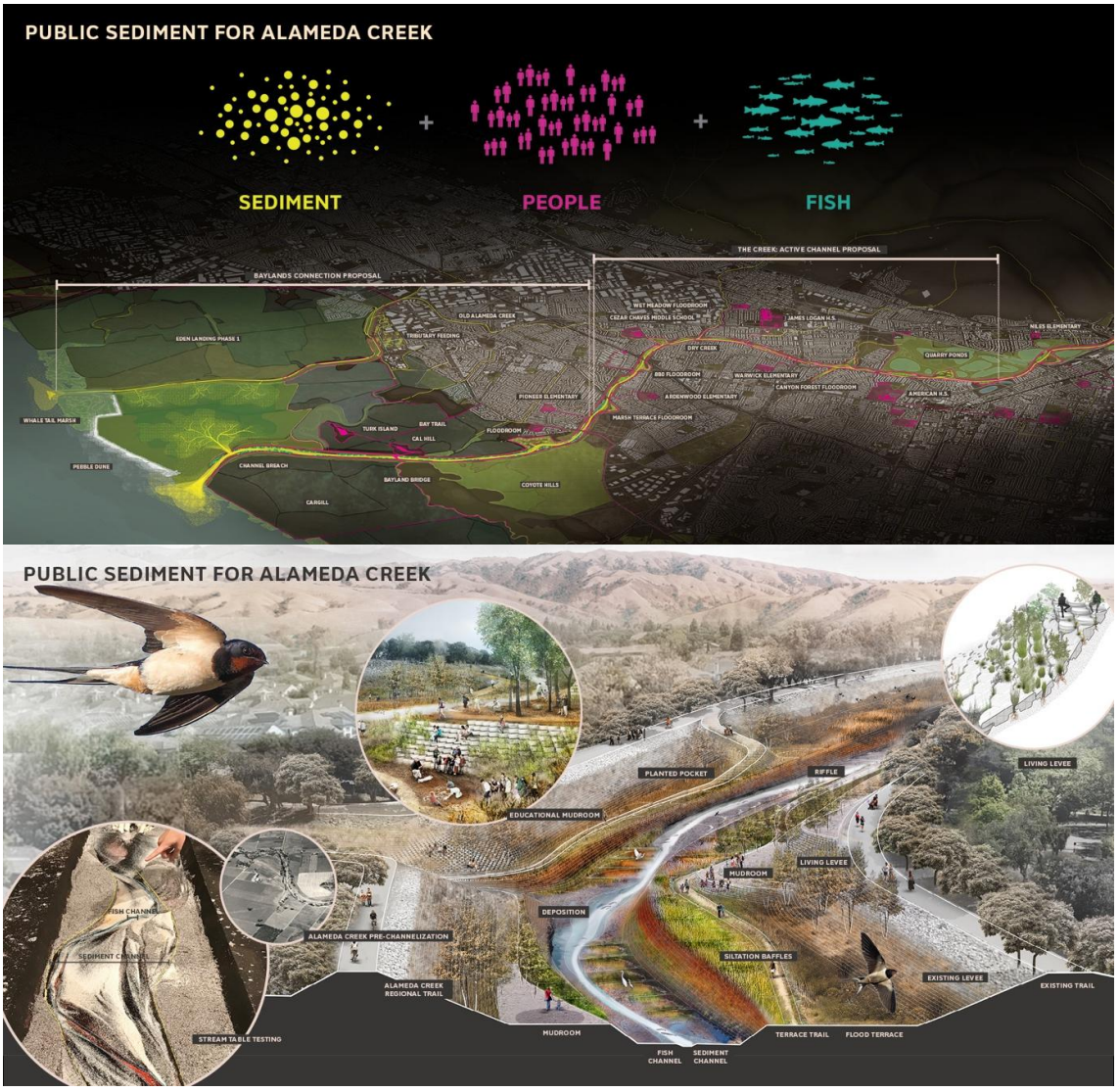

***Figure 8**. Public Sediment for Alameda Creek is a project both on the scale of the watershed (to connect with the Baylands) and the creek (to create an active channel). It brings together community engagement, flood protection, and ecological benefits. Source: SCAPE Team (www.scapestudio.com), 2019*

Embedded vision of society and territory. Public Sediment reflects a vision of infrastructure that transcends monofunctional utility. It adopts a process-based design logic: viewing infrastructure not as a fixed artefact but as a process, i.e. dynamic, participatory, and adaptive. By foregrounding sediment as a design medium, the project articulates an expanded understanding of territorial systems that are simultaneously natural, social, and political.

Design strategy and spatial logic. The intervention is modular and multi-scalar, ranging from the micro-detail of a "living levee" to a regional sediment management strategy (SCAPE, 2018). The creek is redesigned to support a narrowed sediment and fish channel, flanked by flood terraces and vegetated berms that double as public amenities. Educational initiatives, including community science tools like DIY sediment sensors, anchor the project in local stewardship and participation.

Relevance to contemporary European contexts. For European dispersed territories such as AC/AL, Public Sediment offers a model for reintegrating natural processes within suburban infrastructures through proactive, systemic design. It illustrates how ecological restoration can serve as a platform for new forms of public infrastructure that engage communities, restore landscape functions, and reconfigure urban-rural relations. Moreover, the project's participatory and multiscale design process presents a valuable precedent for rethinking infrastructure as an adaptive framework embedded in both ecological and social life.

Lessons for the European palimpsest territory

The contemporary cases of the Atlanta Beltline and Public Sediment for Alameda Creek offer valuable insights for the European dispersed context and the territory characterised by AC/AL. While the socio-political and spatial conditions differ significantly, there are also similarities to be found. Just like in Atlanta, there are many abandoned nineteenth- and twentieth-century railways still present in this territory, linking different types of land use and inhabitants. And just like in the Baylands, a lot of former agricultural territory has been redeveloped into residential allotments while waterways were canalised. Additionally, both projects were implicitly or explicitly focused on the redevelopment of infrastructure in the context of an urban-rural tension. In this regard, there are several lessons to be learned on the role of infrastructure design in dispersed territories in the twenty-first century.

1. ***From creative vision to feasible action***

A first lesson lies in the balance between ambition and feasibility. Both the Beltline and Alameda Creek projects originated in creative, open-ended design contexts (a student thesis and a design competition) yet evolved into large-scale public projects. Their initial speculative nature did not prevent eventual institutional support; rather, their boldness and clarity of vision helped gain traction among policymakers and funders. As Gravel (2016, p. 143) notes, such projects must be "bold enough to be worth […] efforts and realistic enough to be accomplished". In the European AC/AL context, this highlights the potential of design-driven explorations, especially within academic and competition settings, to initiate broader, policy-relevant conversations about infrastructural futures.

2. ***Engaging with governance and the "dark matter" of planning***

A second lesson lies in engaging with the governance systems that shape territorial transformation. Kate Orff (2016, p. 16) refers to this as a "a deep dive into dark matter", "[t]hat is, most of the hard work does not come in the form of visible landscapes that we can inhabit or photoshop, but rather as modifications to invisible regulatory, administrative, permitting, and political systems that determine how, what, and where we build".

This “dark matter” or urban governance is inevitably very different in the US from Europe. The way cities (including territories characterised by sprawl and/or dispersion) are governed and administrated are directly related to their specific history of land use, spatial transformation, power relations, social movements, and so on. This also emphasises the role of infrastructure as a public work, constructed for the ‘public good’, as a specific product of urban governance (De Block, 2016; Graham & Marvin, 2001). Considering European dispersion as a result of a *longue durée* palimpsest, and North American urban sprawl as a more recent, post-war phenomenon, this results in fundamentally different urban governance (Beghelli et al., 2020; Herrschel, 2014; Jouve, 2005). However, it is important to go beyond the post-political idea of infrastructure (De Block, 2016) and engage with the socio-economic and political context in these design projects. In the European palimpsest, where infrastructure is entangled with historical land uses and spatial fragmentation, this engagement must be context-sensitive and attuned to local power relations and administrative complexity.

Dimension	Atlanta Beltline	Public Sediment for Alameda Creek	Relevance for AC/AL, the European palimpsest territory
Origin & context	Grassroots-driven reinterpretation of former railways in a sprawling, racially segregated city	Design competition-based project in a suburban watershed disconnected from its ecological base	Existing abandoned infrastructures and canalised landscapes in AC/AL can serve as starting points for territorial regeneration
Project type	Circular greenway with transit, public space, and ecological restoration goals	Watershed-scale ecological restoration with public space integration	Supports the idea of hybrid, multifunctional infrastructure as a territorial strategy
Main challenges addressed	Spatial segregation, car-dependency, infrastructural inequality	Ecological degradation, sediment disconnect, lack of public engagement with infrastructure	Comparable issues in AC/AL: fragmented governance, ecological decline, lack of collective infrastructure vision
Design strategy	Adaptive reuse of existing infrastructure; phased implementation; overall spatial vision	Modular and multi-scalar design; sediment as a design material; participatory and interdisciplinary approach	Encourages AC/AL actors to reframe existing conditions as opportunities for adaptive design and civic engagement
Socio-political engagement	Strong grassroots advocacy and eventual policy backing; challenged by gentrification and equity concerns	Collaborative governance model; integration of community science and education	Highlights the need to navigate Europe's layered governance structures while fostering civic involvement
Key lesson	Infrastructure as a societal connector and platform for territorial justice	Infrastructure as living system integrating ecology, public space, and participation	Infrastructure in dispersed territories can become a catalyst for inclusive, ecological, and imaginative transformation when approached in an integrated way

***Table 1**. Comparative table: lessons from North American infrastructure projects for European dispersed territories*

3. Designing hybrid and multifunctional landscapes

A third lesson concerns the hybrid character of infrastructure in both case studies. Rather than having just a singlepurpose (e.g. transit or flood control), the Beltline and Alameda Creek combine ecological, spatial, and social functions. Their success is rooted in the formation of

interdisciplinary teams, blending landscape architecture, engineering, participatory design, and policy expertise, and in their ability to work across scales and disciplinary boundaries.

This resonates with emerging European discourses on multifunctional landscapes and crossing urban-rural divides (Selman, 2009) and suggests that infrastructure in AC/AL should similarly be reframed not as a technical intervention but as an integrated landscape strategy. A potential lies especially in the edges of linear infrastructures, spaces that can become active ecological and social interfaces rather than residual zones. This requires a design attitude that appreciates the design potential of particularly linear infrastructure beyond its technical functionalities, and becomes an integrated element of a landscape, interacting with and tapping into the different land uses that it crosses.

4. Reframing the existing condition as an opportunity

Finally, these North American cases offer a shift in design attitude: from viewing dispersed territories as a problem of “loss” or “lack” (Gheysen, 2020, p. 199), towards recognising their potential. Rather than erasing or replacing existing systems, both projects strategically work with what is already there (abandoned railway lines, sediment flows, social narratives) and transform them into platforms for regeneration. This is a particularly relevant shift for the AC/AL condition. Here, existing infrastructures, though often fragmented and underused, could become the foundation for resilient, adaptive, and inclusive territorial projects, if approached through the lens of transformation rather than deficiency.

Conclusions

This article explored how infrastructure can operate as a design instrument for addressing the urban-rural divide in dispersed territories, using historical and contemporary case studies from North America to draw lessons for the European palimpsest territory, particularly the AC/AL context. By analysing both speculative imaginaries from the twentieth century and critical cases of implemented projects from the twenty-first century, this article has revealed how the role and meaning of infrastructure have shifted across time and space.

Historically, infrastructures were mobilised to pursue broad socio-political ideals: from combating poverty through collective mobility (Rowntree’s Lessons from Belgium), to envisioning democratic decentralisation via car-based autonomy (Broadacre City), to supporting economic transition through educational infrastructure (Potteries Thinkbelt). These cases illustrate how infrastructure has always carried more than a technical function and served as a vehicle for societal vision.

Contemporary cases such as the Atlanta Beltline and Public Sediment for Alameda Creek demonstrate a new kind of infrastructural vision: one that merges spatial design with ecological restoration, social inclusion, and regional governance. These projects illustrate the potential of infrastructure to operate as a strategic catalyst for socio-ecological transformation, particularly in fragmented, low-density landscapes. They also show that success relies not only on physical design, but on interdisciplinary collaboration, political engagement, and integration across spatial scales.

In the context of European dispersed territories, these lessons are particularly urgent. The challenges of abandoned or ageing infrastructure, ecological degradation, and socio-spatial fragmentation are deeply embedded in the palimpsestic fabric of places like AC/AL. Yet, as this paper argues, these very conditions also hold potential for transformation, if approached through ambitious, feasible, and interdisciplinary design strategies.

Ultimately, the case studies analysed here function not as templates but rather as analytical lenses, revealing how infrastructural projects can be rethought as platforms for public life, ecological resilience, and social justice. The methodological approach (combining comparative case analysis with a diachronic lens) supports the article's broader aim: to reposition infrastructure as a flexible, political, and spatial tool capable of shaping more sustainable and inclusive futures across the urban-rural divide.

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