



An Ghníomhaireacht  
Tithíochta  
The Housing Agency

# Sustainable Compact Development International Case Study Analysis



Prepared for the Housing Agency by  
**Indecon International Economic Consultants**

**Indecon**  
*www.indecon.ie*

**November 2024**

Indecon would like to acknowledge the guidance provided by the Housing Agency in undertaking this research. Particular thanks are due to Shane Burke and Adele Lacey for their valuable assistance throughout the project. Thanks are also due to members of the Department of Housing, Local Government and Heritage; the Land Development Agency; The National Economic and Social Council; and the Office of the Planning Regulator, who provided valuable feedback on the interim findings.

The Indecon team is also very appreciative of the inputs provided by the numerous stakeholders contacted as part of this research study. Many of these stakeholders were kind enough to meet with the Indecon team to discuss various aspects of compact developments in their cities. Thanks are due to Jill Sherman, Peter Hinterkörner, Kristian Winther, Mads Birgens, Nicholas Falk, Kurt Hofstetter, Andrew Kinsella and Claire McManus.

*The usual disclaimer applies and the views and analysis in this report represent the independent opinions of Indecon.*

**Cover image – Vauban, Freiberg, Germany.**  
Alamy – Werner Dieterich.

## Contents

<b>Executive Summary</b>	5
Introduction and Background	5
Background and Policy Context	6
Case Studies	7
<b>1. Introduction</b>	14
1.1. Context	14
1.2. Methodological Approach	15
1.3. Report Structure	15
<b>2. Background and Policy Context</b>	16
2.1. Introduction	16
2.2. Compact Development and Urban Sprawl	16
2.3. Irish Policy Context	18
<b>3. Case Study 1: Vienna - Aspern Seestadt</b>	22
3.1. Introduction	22
3.2. Aspern Seestadt	24
3.3. Key Takeaways	32
<b>4. Case Study 2: Copenhagen – Nordhavn</b>	33
4.1. Introduction	33
4.2. Nordhavn	35
4.3. Key Takeaways	42
<b>5. Case Study 3: Portland – Pearl District</b>	43
5.1. Introduction	43
5.2. Pearl District	45
5.3. Key Takeaways	54
<b>6. Case Study 4: Freiburg – Vauban</b>	55
6.1. Introduction	55
6.2. Vauban	56
6.3. Key Takeaways	61
<b>7. Lessons Learned &amp; Application in an Irish Context</b>	62
<b>8. Conclusions</b>	69
Appendix 1	71

## Tables and Figures

Table 2.1: Targeted Pattern of Growth, 2040	19
Table 3.1: Environmental Impact Assessment: Aspern Seestadt South	31
Table 5.1: Portland: Compact Urban Growth and Guiding Principles	44
Table 5.2: Portland City and Pearl District Affordability	53
Table 7.1: Area Statistics	62
Table 7.2: Development Characteristics	68
Figure 2.1: The Share of Urban Land Allocated to Low Population Density Areas	17
Figure 3.1: Social Rented Dwellings as Percentage of Total Dwelling Stock	22
Figure 3.2: Provision of housing units in Vienna 2014-2025	23
Figure 3.3: Phased Approach to Aspern Seestadt Development	25
Figure 4.1: Copenhagen 'Finger Plan'	34
Figure 4.2: Nordhavn 2009	35
Figure 4.3: Future Plan of Nordhavn (Post Project Completion)	36
Figure 4.4: Development Projects of the Copenhagen City & Port Corporation	38
Figure 4.5: Sustainability Tool Scoring	42
Figure 5.1: Pearl District within Portland Area	46
Figure 5.2: Pearl District Then	47
Figure 5.3: Pearl District Now	48
Figure 6.1: Location of Freiburg (left) and the Vauban district (right)	56
Figure 6.2: The Masterplan Drawing of the District of Vauban	57

# Executive Summary

## Introduction and Background

Indecon International Consultants (Indecon) was appointed by the Housing Agency to undertake a case study analysis of international examples of successful compact residential development. The purpose of this analysis is to explore how these compact residential projects were developed and made viable, and to examine the features of these case studies that makes them successful as areas of compact urban growth.

Together with the Housing Agency, four examples of compact urban growth were selected for the case study analysis. These four case studies are all examples of brownfield development i.e. developments on sites which were previously purposed for industrial use. Although compact urban growth can take different forms, such as infill development, development on greenfield sites next to transport nodes, consolidation of existing development etc., some of the most prominent examples of successful compact developments on a large scale are on brownfield sites within existing settlement areas. The focus of the case studies in this analysis on brownfield sites is driven by the prominence of brownfield developments amongst international examples of compact urban growth initiatives, and the requirement in the terms of reference for this work to focus on examples in or near large urban centres. These specific case studies were selected as they are regarded internationally as exemplars of compact urban growth on brownfield sites.

The case studies chosen were:

- Aspern Seestadt in Vienna, Austria
- Nordhavn in Copenhagen, Denmark
- The Pearl District in Portland, Oregon, USA
- Vauban in Freiburg, Germany

The case study analysis examined the development process for each site, from the initial inception to the latest developments. This included research on the stakeholders involved in the development, how the development was financed, the obstacles faced in the development process and how these obstacles were overcome, the compact design features of the development, the externalities considered and whether any policy incentives were used to encourage development on the brownfield site. Each of these elements was considered in the context of the wider approach to compact development in the relevant city.



## Background and Policy Context

The antithesis of compact growth is urban sprawl which refers to the rapid outward expansion of built-up areas such as cities and towns. It is characterised by low density and discontinuous development. The phenomenon is often associated with haphazard urban development and poor spatial planning.<sup>1</sup>

There are a range of negative consequences and costs associated with urban sprawl. This includes longer commuting distances between residences, places of work, and amenities. This makes public transport less viable and car transport is typically more heavily relied upon. Ultimately, this leads to greater output of greenhouse gas emissions with knock-on impacts for climate change and air quality. It also typically results in greater levels of noise pollution associated with traffic. Longer commuting distances also reduce the opportunity for individuals to walk and cycle, modes of active transport which have well established advantages over driving for people's health. Urban sprawl by definition is associated with greater land use and often comes at the expense of green spaces. Green spaces around urban areas are vital in providing ecological benefits including fresh air, recreational activity, and water filtration. Urban sprawl also results in encroachment on agricultural land, threatening food supply and livelihoods. From the perspective of the State, urban sprawl requires the provision of new services and infrastructure on top of that which is already available within existing built-up areas. This increases the direct costs to the exchequer. It also reduces the likelihood of the State benefiting from economies of scale in relation to other services such as schools and hospitals.

In order to successfully contain urban sprawl a viable alternative is needed. This is particularly pertinent in countries like Ireland, in which the population is expected to expand significantly in the coming years. The development of existing built-up areas, adding density to cities, towns and villages is known as compact growth.<sup>2</sup> This form of development alleviates many of the associated costs of urban sprawl. Compact growth can take a number of different forms, from small scale development such as the conversion of an existing building within a built-up area into a higher density unit, to large scale development where existing brownfield sites within cities are transformed into new residential and commercial districts. This study focuses on the latter and explores four examples of large-scale compact growth projects on existing brownfield sites, highlighting the key policies implemented to facilitate these developments and identifying areas which may be of relevance in an Irish context.

---

<sup>1</sup> In "Rethinking Urban Sprawl: Moving towards Sustainable Cities", the OECD defines urban sprawl as an "*urban development pattern characterised by low population density that can be manifested in multiple ways... Urban sprawl can also be manifested in development that is discontinuous, strongly scattered and decentralised, where a large number of unconnected fragments are separated by large parts of non-artificial surfaces*". For further detail on issues of urban sprawl see: Thompson, David (2013). *Suburban Sprawl: Exposing Hidden Costs, Identifying Innovations*. Available at:

[https://institute.smartprosperity.ca/sites/default/files/publications/files/SP\\_SuburbanSprawl\\_Oct2013\\_opt.pdf](https://institute.smartprosperity.ca/sites/default/files/publications/files/SP_SuburbanSprawl_Oct2013_opt.pdf)

<sup>2</sup> Compact growth is a central objective of spatial planning in Ireland with goals around compact growth set out in various policy documents including the National Planning Framework, the Climate Action Plan and Housing for All.

## Case Studies

### Vienna – Aspern Seestadt

Vienna is a city which has had success in containing urban sprawl in recent decades. The city development plan sets out goals for high density urban growth and identifies areas suitable for “compact, urban and resource-efficient development.”<sup>3</sup> The development plan ties high quality urban design with density of development and outlines a range of positive impacts of compact growth, including:

- Functional social infrastructure;
- High quality housing with short distances to surrounding facilities;
- Barrier free<sup>4</sup>, lively streetscapes;
- Access to public squares, green and open spaces;
- Maintaining green spaces in outlying districts; and
- Conservation of natural resources.

The development plan states that legal conditions and standards should be put in place in order to ensure that high density urban quarters are established and maintained in Vienna. For the case study analysis we explore an ongoing urban development project in Vienna, Aspern Seestadt which embodies many of the concepts of brownfield compact development as set out in the development plan.

Aspern Seestadt is a large-scale development on a site of 97 hectares around 10km northeast of Vienna city centre. When completed it will contain 11,500 housing units with 83 hectares of residential floor space and nearly 100 hectares of commercial/industrial floor space. The success of the project from both a sustainability and compact growth viewpoint requires cohesion behind the development of each individual building lot. In order to coordinate the planning and building of Aspern Seestadt and to overcome many of the challenges that are typically faced in the development of a brownfield site for non-industrial use, a new development company, Wien 3420 AG was established. The development company is tasked with bringing together the different stakeholders required to make the project a success, from the private development companies to the local community.

While the initial funding of Wien 3420 AG was from State and city funds, in 2011 a number of partners from the private sector including a bank and insurance company became shareholders in the development company. The buy-in of these additional partners provided both a cash injection for the initial development and expertise in financing which were crucial for this large-scale project. This financing was used to prepare the site for future development and for funding the initial infrastructure, including public green spaces and streets. Bringing private stakeholders into the development company changed how it operated, from a fully public entity to a public/private partnership. Members of Wien 3420 AG consider this company structure to be advantageous for stakeholder engagement as it facilitates the company working closely with private developers and public sector organisations alike.

The financing of the company is now primarily from the sale of land to private developers. Aspern Seestadt is a development area in which there is high demand for both residential

---

<sup>3</sup> STEP 2025 Urban Development Plan Vienna. Available at: <https://www.wien.gv.at/stadtentwicklung/strategien/step/step2025/>

<sup>4</sup> I.e. easily traversable and permeable for pedestrians.

and commercial units. This makes development plots highly desirable for private developers and Wien 3420 AG operates an auction process to sell land to the highest bidder<sup>5</sup>. The income from these sales is then used to fund further infrastructure projects, in turn increasing land value further. This model of funding ensures that future land sales will continue to generate significant revenue for the company which can be put towards generating the development further.

Consultations with stakeholders suggested that very limited direct incentives were provided to developers to encourage development in Aspern Seestadt. The demand from both individuals and businesses to locate to Aspern Seestadt has meant that policy makers have not had to implement significant policy incentives to encourage private developers to develop plots in the area. On the contrary, because the area is so desirable, the development company has been able to put in place more stringent, higher building standards on private developers than those that are typically faced in other parts of Vienna. These standards are enforced as the development company must provide final approval for all development within Aspern Seestadt.

The environmental impact assessments undertaken for Aspern Seestadt considered many of the benefits that one might highlight when appraising urban density versus greenfield development such as the impact on biodiversity, accessibility and social infrastructure<sup>6</sup>.

## Copenhagen – Nordhavn

Copenhagen is commonly cited as an exemplar of smart urban design and development. The city has a long history of strategic urban planning which encompasses principles of compact growth. In recent years it has been to the global forefront of urban sustainability, setting out a range of ambitious sustainability objectives and putting in place innovative practices to achieve them.

The Nordhavn project is situated on the site of a former harbour, four kilometres north of Copenhagen city centre. Historically the site had been primarily used for industrial purposes which is reflected in the nature of the existing infrastructure and buildings such as factories, warehouses, silos and storage yards. As the shipping industry gradually moved out of the area, an increasing amount of the site became unused. Given the central location of the site, its attractiveness as a waterfront location and the potential for further expansion through land reclamation, the site was seen as an ideal location for a new urban district. An agreement in principle was reached between the city authorities and the Danish State in 2005 for the urban development of Nordhavn. This agreement was formally adopted in an act of parliament in 2007. Following this, a yearlong international urban design competition was launched with the winning bid selected in March 2009 and the planning phase of the development commencing later in the year.

The planning phase set out a number of themes for the development, one of which was the 'Five-minute City'.<sup>7</sup> This is the premise that housing, workplaces, places of education,

---

<sup>5</sup> Sales to private developers are made on the basis of the highest bidder. Land for social housing developments is subject to maximum land values.

<sup>6</sup> Aspern Seestadt environmental impact assessments. Available at: [https://www.strategischeumweltpruefung.at/fileadmin/inhalte/sup/sup-sammlung\\_2010/oerp/sup\\_seestadt-aspern\\_wien\\_ub.pdf](https://www.strategischeumweltpruefung.at/fileadmin/inhalte/sup/sup-sammlung_2010/oerp/sup_seestadt-aspern_wien_ub.pdf) (In German)

<sup>7</sup> Nordhavn Urban Strategy 2023. More information on Nordhavn available here: <https://www.cobe.dk/projects/nordhavn>



recreational, cultural and public institutions should all be within a five-minute reach of each resident. In order to achieve this aim, it was required that the Nordhavn be designed and zoned in line with compact growth principles. This includes the development of public transport connections and bicycle lanes, high density residential apartment blocks, mixed use zoning and local retail and public amenities distributed throughout the development.

The development of Nordhavn is being constructed in phases over a 50-year time period. At present there are approximately 4,000 people living in Nordhavn with plans for this to increase to 40,000 when the area is fully developed. Nordhavn will also accommodate workspace for 40,000 people including offices, retail outlets and creative industry spaces. The development of Nordhavn has been overseen and managed by the Copenhagen City and Port Development Corporation. The corporation is entirely publicly owned with the majority of shares owned by Copenhagen Municipality and the rest by the national government. It is tasked with the development of large-scale urban districts in Copenhagen and takes a long-term view of development which is facilitated through its ownership and financial structure. Approximately half of the redevelopment projects which have been undertaken in the city since 2007 have been through the company.

The success of the Copenhagen City and Port Development Corporation is in partly owed to the self-sustaining method of finance utilised for each development project. This starts with the transfer of the development land and assets to the company from the State at the outset of the development project. Following the transfer of land, the city authorities rezone the land for residential or commercial use. This results in an uplift in the value of land which the company utilises as collateral against which to drawdown loans on favourable terms. These funds are then used to deliver infrastructure within the development which increases the value of the development land further. In the case of Nordhavn, this included financing the extension of the metro lines and the construction of the new metro stations. The company sells individual plots of land to private developers with these funds being used to pay back loans and finance further infrastructure. While private developers have scope to implement their own designs on these plots, all new development must align with the overarching plans of the City and Port Development Corporation. At each stage of the process land value is increasing which facilitates the next phase of development.

Due to the demand from residents to live in the area and large- and small-scale businesses to locate there, stakeholders noted that there is little need for policy incentives to encourage development in Nordhavn. However, the initial groundwork that is undertaken by the City & Port company to decontaminate the soil, build the connecting infrastructure and make plots suitable for development essentially acts as an incentive for development as it reduces the initial development costs for private developers. While Nordhavn is at a relatively early stage of its implementation, it is planned that there will be significant commercial space capable of hosting larger commercial operations as well as SMEs.

The overall environmental assessment undertaken at the outset of the development was deemed to be positive. Amongst the factors that were deemed to have a net positive impact on the environment were the density of the development near public transport. The assessment stated that if urban development of a similar scale was spread over Copenhagen or outside of the city that it would lead to increased car traffic, with associated negative effects for the climate and for people's health (noise pollution). Where negative impacts of the development on the environment were identified, mitigation measures were

introduced, these include green roofs, sluice gates, a recycling station, coastal protection, rainwater diversion, green space development, and other measures.

## Portland – Pearl District

Portland has largely sought to avoid the sort of urban sprawl that has occurred in many other US cities and is known for the particular emphasis it has placed on concentrating its population growth to within a compact, urban centre. Portland's compact growth strategy is largely shaped by its 'Urban Growth Boundary', "a land use planning line to control urban expansion onto farm and forest lands ... responsible for managing the Portland metropolitan area's urban growth boundary."<sup>8</sup>

In the early 1980s, the area surrounding NW 13<sup>th</sup> Avenue, adjacent to downtown Portland, Oregon, was a largely abandoned brownfield site. The city authorities pursued a strategy of compact urban growth in the area that was to become known as the Pearl District. The development of the Pearl District had to manage and overcome a number of obstacles. These obstacles include a lack of existing residential properties in the area, the presence of industrial infrastructure within the neighbourhood, physical barriers that divided the area, a lack of greenspace and a lack of public transport and other infrastructure in the area. The development also faced the typical challenges with regards to the development and financing of necessary enabling infrastructure, as well as viability concerns for many developers considering investment in the area.

The city of Portland's urban renewal agency and development company, Prosper Portland (originally founded as the *Portland Development Commission*) is responsible for driving the redevelopment of the area and overcoming obstacles to development.<sup>9</sup> Prosper Portland is headed by an executive director who reports to a five-member, volunteer board of local citizens appointed by the mayor and approved by City Council.<sup>10</sup> The Board is authorized by the City Charter to administer the business activities of the agency and reports directly to the Mayor of the City. This structure aims to allow Prosper Portland to exercise independence in program implementation and resource allocation. Investment in amenities and infrastructure in the area were financed by the development company in exchange for commitments made by the developer. These commitments included minimum housing densities and minimum affordability requirements. The development company was also responsible for administering other incentives to developers in the area.

Several incentives were put in place to encourage development within the Pearl District. This includes property tax exemptions, the classification of the area as an urban renewal area, allowing the use of tax-increment financing and other approaches to finance public investment.

Portland has a history of demonstrating its consideration of externalities in its planning and development. The current development plans for the city explicitly cite the benefits of compact growth in environmental, economic and human health terms. This consideration of

---

<sup>8</sup> City of Portland. 2035 Comprehensive Plan. Available at: <https://www.portland.gov/bps/planning/comp-plan-2035/about-comprehensive-plan/2035-comprehensive-plan-and-supporting>

<sup>9</sup>Wollner, Craig et al (2019). Brief History of Urban Renewal in Portland, Oregon. Available at: [prosperportland.us/wp-content/uploads/2019/07/Brief-History-of-Urban-Renewal-in-Portland-2005-Wollner-Provo-Schablisky.pdf](https://prosperportland.us/wp-content/uploads/2019/07/Brief-History-of-Urban-Renewal-in-Portland-2005-Wollner-Provo-Schablisky.pdf)

<sup>10</sup> Prosper Portland. Available at: [prosperportland.us/about-us/](https://prosperportland.us/about-us/)

externalities was also present in its development of the Pearl District, notably its emphasis on compact growth, walkability, public transport, accessibility, and its ethos of creating a neighbourhood within which all residents can fulfil their essential needs through the provision of essential and non-essential services and amenities. These wider objectives were evident in the development plan for the Pearl District which noted that the objective for the project was to develop a high-density, mixed-use development with active and pedestrian friendly streets with less dependence on cars.

While the objectives cited at the outset of the project are clearly aligned with the concepts of compact growth, from engagement with stakeholders and reviewing the available research and documentation, no attempt was made to quantify these benefits of reduced congestion, more sustainable travel modes, reducing commuting times etc. either prior to the development of the Pearl District or in the years since its completion.

In the context of the urban growth boundary within which the development of Portland must be considered, the potential for significant urban sprawl as an alternative to more high-density urban growth was significantly lower than in cities without a constraint on greenfield expansion. As such, as has been the case in the other cities considered here, a quantified case for the development of compact cities seems not to have been required in order to support the development plans. To a significant extent, the benefits of compact growth are largely seen as self-evident in the documentation around both the Pearl District and plans for the future development of Portland more widely.

## Freiburg – Vauban

The city of Freiburg in southwest Germany is renowned worldwide as an exemplar of sustainable urban development. The success of Freiburg as a sustainable city aligns with its development as a compact city. As part of the Freiburg strategy to grow by developing on existing urban areas, the city has developed a number of new districts.<sup>11</sup> For example, Rieselfeld was a new district that was built on the site of a former wastewater facility and now has a population of over 10,000. Gutleutmatten is an even more recent district that was developed on the site of a former allotment site and now houses 1,200 residents. Another residential district that was developed on an existing urban site and is the focus of this case study analysis is Vauban.

Covering an area of 41 hectares, the district has a population of over 5,000 with a population density of around 12,500 per km<sup>2</sup>. This is significantly higher than the wider population density of Freiburg (4,900 per km<sup>2</sup>) and the capital city Berlin (4,200 per km<sup>2</sup>). The compactness of Vauban was an intentional element of the design of the district, and it facilitates the ambitious environmental goals that the local community and planners set for the area.

Even by the high eco-standards of Freiburg, Vauban is considered to be the epitome of green urban development. The district was built as a model of what an environmentally conscious development could look like, and it is characterised by its low energy buildings, renewable energy sources, and the rarity of privately owned cars on its streets. The planning and development of the district offers lessons for how compact developments such as Vauban can successfully involve the local community in the development process.

---

<sup>11</sup> Freiburg Land use plan 2020. Available at: <https://www.freiburg.de/pb/208148.html> (in German)

The development of Vauban was managed by Project Group Vauban, a working group established and run by the Freiburg city authority. It should be noted that unlike the other case studies considered in this report, a separate development company was not established for the development of Vauban. This is partially due to the smaller scale of Vauban relative to the other case studies, mitigating the need for the establishment of a new independent entity. The city authorities set out the initial goals for the development, chose the masterplan and co-ordinated the planning of the district. The city authority was also the primary funder for the development with additional funding sourced from Federal agencies and the EU.

From the outset of the project, the local community actively sought to have input into the planning of the development. In order to facilitate the co-ordination of the views of the local community, an NGO body, Forum Vauban, was established. This group liaised directly with the city authorities to convey the thoughts and concerns of the future residents of the district. While the city authorities were ultimately mandated with the development of the district, Forum Vauban facilitated a means by which the community groups could provide input into its development. In addition to Forum Vauban, there were other locals who were also given the opportunity to have their say on how the development should proceed. The input that the local stakeholders ultimately had into the development resulted in changes made to the development plans from the original specifications set out by the city administration. This included the push for the district to be a 'car-free' district focused on walking, cycling and public transport. It also included more buildings to be built at a passive energy specification and increased shared social spaces.

The community led development in Vauban extended beyond the planning phase and into the construction of the district. Residential building in Vauban was undertaken by community building groups known as Baugruppen. Baugruppen are legally recognised groups of citizens who come together to undertake the construction of their own homes. In Vauban, these groups were given preference for building on city owned land ahead of private developers. By not allocating land through a highest bidder process, the Baugruppen had significantly lower site costs than would be typically faced by private developers. When multiple Baugruppen were interested in building on the same site, rather than competing on the price paid for land, the land allocation was decided based on which group had the greatest sustainability and social plans. As non-profit entities, the Baugruppen could develop buildings at a lower cost than the private sector who have profit maximisation mandates. Members of the Baugruppen were also able to receive preferential mortgage rates with mortgages drawn down in stages. Ultimately this approach to residential building reduced the final price of homes for those in the Baugruppen.

The Vauban district has had ambitious social and environmental goals at the core of its development since its initiation. A major part of the strategy to achieve its aims in these areas has been through compact growth. This is evidenced by the original Vauban masterplan which puts compact growth to the forefront of the districts long-term objectives.

## Conclusions

1. The examples of successful compact urban growth outlined in this report have been undertaken in a context in which greenfield development of a similar scale was not considered a viable alternative. The culture and legislative environment in these cities ensure that compact growth is the only viable means of accommodating ongoing growth. Typically, these cities have imposed greenbelts which make growth via development on greenfield sites challenging. The benefits of compact growth have been embedded in the planning and urban design systems in these cities.
2. The case studies in this report have all been undertaken with an explicit focus on ensuring that the benefits of compact growth in the form of reducing commuting times, improved liveability, reduced car dependency, and wider environmental benefits are realised via the design, location, and density requirements of the developments.
3. Significant public investment in transport and other enabling infrastructure is typically required to facilitate large scale compact urban growth developments and ensure that the objectives of these developments with regard to reduced car journeys and sustainable development are to be achieved.
4. Successful compact urban growth internationally ensures that districts contain a mix of residential and commercial developments, as well as an appropriate mix of private and social/affordable housing. It is also typically the case that development of both is staged to ensure an element of 'organic' growth in both areas rather than development of one aspect in its entirety followed by the other. Ensuring that designs also include street level retail services has also been seen as important to improving overall liveability of meeting wider objectives in terms of reduced car dependency.
5. New large-scale compact urban growth developments benefit from the establishment of a development company with the remit and resources to overcome coordination and financing challenges to completing large scale new developments.
6. In each case study a high level of public involvement throughout the planning phase of each development was highlighted by stakeholders as an important element contributing to its success. Public consultations gave future residents input into the planning and design of the districts, making them more suitable for the needs of residents and fostering good relations with existing residents in the areas.
7. Public investment via development companies financed via a form of land value sharing has allowed the developments considered in this research to finance infrastructure development, pooling of land, land remediation, and other site preparation costs.
8. Successful compact urban growth developments typically centre around a significant public amenity such as, in examples studied here, the lakeshore, the riverside, or the harbour. The presence of a central public amenity provides a sense of identity and improves the placemaking and liveability of the developments.
9. Viability challenges have not typically been encountered in the case study cities. Generally, the provision of supporting infrastructure and rezoning of the lands have provided a sufficient incentive for private developers to provide residential and commercial development. Mandating lower parking spaces per unit was cited by stakeholders as a policy that both aligned with wider sustainable development goals while also improving development viability.



# 1. Introduction

## 1.1. Context

Indecon International Consultants (Indecon) was appointed by The Housing Agency to undertake a case study analysis of international examples of successful compact residential development on brownfield sites. The purpose of this analysis is to explore how these brownfield sites were developed and made viable in line with the principles of compact growth. Ultimately, this research will be used to inform Irish policymakers as to how compact residential development can be successfully undertaken in an Irish context.

Together with the Housing Agency, four examples of compact urban growth were selected for the case study analysis. These four case studies are all examples of brownfield development i.e. developments on sites which were previously purposed for industrial use. Although compact urban growth can take different forms, such as infill development, development on greenfield sites next to transport nodes, consolidation of existing development etc., some of the most prominent examples of successful compact developments on a large scale are on brownfield sites within existing settlement areas. The focus of the case studies in this analysis on brownfield sites is driven by the prominence of brownfield developments amongst international examples of compact urban growth initiatives, and the requirement in terms of reference for this work to focus on examples in or near large urban centres. These specific case studies were selected as they are regarded internationally as exemplars of compact urban growth on brownfield sites.

The case studies chosen were:

- Aspern Seestadt in Vienna, Austria
- Nordhavn in Copenhagen, Denmark
- The Pearl District in Portland, Oregon, USA
- Vauban in Freiburg, Germany

The case study analysis examined the development process for each site, from the initial inception to the latest developments. This included research of the stakeholders involved in the development, how the development was financed, the obstacles faced in the development process and how these obstacles were overcome, the compact design features of the development, the externalities considered and whether any policy incentives were used to encourage development on the brownfield site. Each of these elements was considered in the context of the wider approach to compact development in the relevant city. As this work is intended to inform future Irish policy on issues of compact growth, consideration is given to the policy context in Ireland. The final sections consider the main findings of the case study analysis in the context of Ireland.

The rest of this section outlines the data sources and methodology utilised by Indecon in completing this research and summarises the structure of the wider report.

## 1.2. Methodological Approach

In completing this analysis, Indecon has relied on evidence from a number of sources and methodological approaches. The key inputs to the review have included:

- Literature review of compact growth and urban sprawl;
- Review of the policy framework for compact growth in each of the case study cities;
- Review of the existing research of each case study development;
- Analysis of the background documents and development plans for each of the case studies;
- Direct engagement with relevant stakeholders with knowledge of the development process for each of the case studies; and
- Review of policy documentation on compact growth in Ireland.

The analysis contained in this report has been informed by each of the above evidence sources.

## 1.3. Report Structure

The remainder of this report is structured as follows:

- Section 2 outlines the background and policy context;
- Section 3 presents the analysis of the case study Aspern Seestadt in Vienna;
- Section 4 presents the analysis of the case study Nordhavn in Copenhagen;
- Section 5 presents the analysis of the case study the Pearl District in Portland;
- Section 6 presents the analysis of the case study Vauban in Freiburg;
- Section 7 details the lessons learned and the applications in the Irish context; and
- Section 8 concludes.

## 2. Background and Policy Context

### 2.1. Introduction

Compact growth is a central element of the long-term development strategy of the Irish government. Promoting a more compact form of urban development is set out as National Strategic Outcome in the National Planning Framework (NPF). To achieve this outcome, objectives for compact growth are set out in the NPF, including objective 3a to “Deliver at least 40% of all new homes nationally, within the built-up footprint of existing settlements.” The emphasis on compact growth in the NPF feeds into the housing policy objectives set out in *Housing for All*, the housing strategy for Ireland to 2030.

Before examining the case studies of successful compact developments in other countries, this chapter briefly explores the concepts of compact development and urban sprawl to provide some wider context. This includes a discussion of how these concepts are defined and measured, the theoretical benefits of compact growth over urban sprawl, and the wider Irish policy context around these issues.

### 2.2. Compact Development and Urban Sprawl

The antithesis of compact growth is urban sprawl which refers to the rapid outward expansion of built-up areas such as cities and towns. It is characterised by low density and discontinuous development. ‘Leapfrogging’, whereby development is undertaken past existing urban development, and the creation of undeveloped gaps in-between developments are common features. The phenomenon is often associated with haphazard urban development and poor spatial planning.<sup>12</sup>

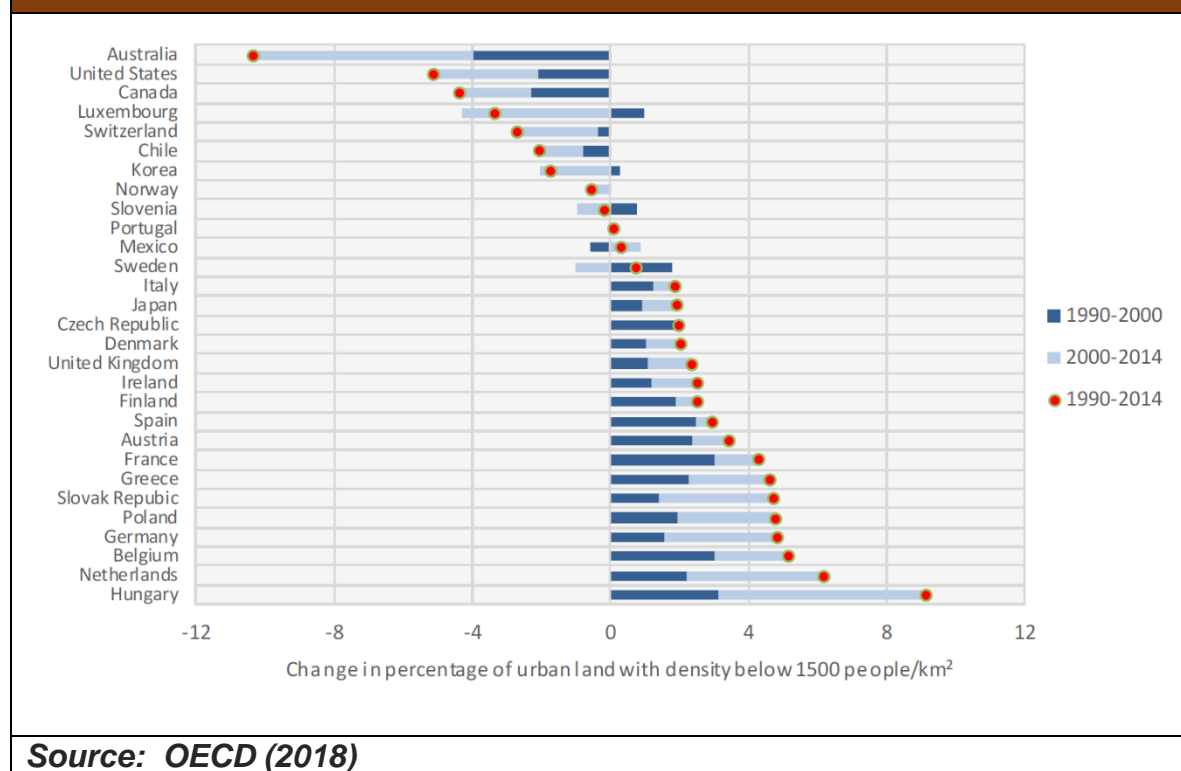
While the overarching concept of urban sprawl is generally understood, measuring the degree of sprawl in a given urban area is challenging. A 2018 paper by the OECD highlighted the multidimensionality of urban sprawl and put forward an array of metrics that should be used to measure each dimension.<sup>13</sup> Amongst the indicators used in the report were urban population density, variance in density across the urban area, the degree of land fragmentation and the number of peak-density areas. Using these metrics the authors showed that urban sprawl differs significantly both across countries and within the same country. The results also showed how urban sprawl metrics have evolved in recent years and that urban sprawl has grown rapidly in some countries over a relatively short period of time (Figure 2.1).

---

<sup>12</sup> For further discussion of these issues see: Thompson, David (2013). Suburban Sprawl: Exposing Hidden Costs, Identifying Innovations. Available at:

[https://institute.smartprosperity.ca/sites/default/files/publications/files/SP\\_SuburbanSprawl\\_Oct2013\\_opt.pdf](https://institute.smartprosperity.ca/sites/default/files/publications/files/SP_SuburbanSprawl_Oct2013_opt.pdf)

<sup>13</sup> OECD (2018), Rethinking Urban Sprawl: Moving Towards Sustainable Cities. Available at: [https://www.oecd.org/en/publications/rethinking-urban-sprawl\\_9789264189881-en.html](https://www.oecd.org/en/publications/rethinking-urban-sprawl_9789264189881-en.html)

**Figure 2.1: The Share of Urban Land Allocated to Low Population Density Areas**

**Source: OECD (2018)**

There is no singular factor that explains the occurrence of urban sprawl, but a number of potential explanatory causes have been analysed in the literature. This includes population growth, preferences of residents for low density and space, increases in car ownership rates and higher relative land prices and construction cost in existing urban areas.<sup>14</sup> OECD (2018) also highlights that urban sprawl has been driven by policy. Not only have policymakers often failed to take action to encourage density of development, on the contrary they have often facilitated urban sprawl through the development of infrastructure which has promoted the use of cars over public transport and cycling, zoned land which encourages development outside of existing built-up areas and in general underestimated the wider costs of urban sprawl.

There are a range of negative consequences and costs associated with urban sprawl. This includes longer commuting distances between residences, places of work and amenities. This makes public transport less viable and car transport is typically more heavily relied upon. Ultimately, this leads to greater output of greenhouse gas emissions with knock-on impacts for climate change and air quality. It also typically results in greater levels of noise pollution associated with traffic. Longer commuting distances also reduce the opportunity for individuals to walk and cycle, modes of active transport which have well established advantages over driving for people's health. Urban sprawl by definition is associated with greater land use and often comes at the expense of green spaces. Green spaces around urban areas are vital in providing ecological benefits including fresh air, recreational activity and water filtration. Urban sprawl also results in encroachment on agricultural land, threatening food supply and livelihoods. From the perspective of the State, urban sprawl requires the provision of new services and infrastructure on top of that which is already

<sup>14</sup> S. Habibi, N. Asadi (2011), Causes, Results and Methods of Controlling Urban Sprawl, Procedia Engineering, Volume 21. ISSN 1877-7058, <https://doi.org/10.1016/j.proeng.2011.11.1996>.

available within existing built-up areas. This increases the direct costs to the exchequer and reduces the likelihood of the State benefiting from economies of scale in relation to other services such as schools and hospitals.

From a policy perspective, one of the main contentions with urban sprawl is who pays for the associated negative costs as these are often borne by society at large. As the producers and consumers of urban sprawl often do not bear the full cost of these consequences, they are considered to be negative externalities. As with most negative externalities, policymakers have a range of levers available to contain urban sprawl. Potential solutions include levying taxes on the producers of urban sprawl to account for the associated negative externalities, imposing strict urban zoning rules and greenbelts around existing urban areas where further development is restricted and reducing spend on public infrastructure which facilitates urban sprawl. These measures seek to internalise the wider costs of urban sprawl and, by increasing the costs of urban sprawl to consumers and developers, make more intensive development of existing urban lands relatively more attractive and feasible.

In order to successfully contain urban sprawl a viable alternative is needed. This is particularly pertinent in countries like Ireland, in which the population is expected to expand significantly in the coming years. The development of existing built-up areas, adding density to cities, towns, and villages is known as compact growth. This form of development alleviates many of the associated costs of urban sprawl. Compact growth can take a number of different forms, from small scale development such as the conversion of an existing building within a built-up area into a higher density unit, to large scale development where existing brownfield sites within cities are transformed into new residential/commercial districts. This study focuses on the latter and explores four examples of large-scale compact growth developments on existing brownfield sites, highlighting the key policies implemented to facilitate these developments and identifying areas which may be of relevance in an Irish context.

## 2.3. Irish Policy Context

Compact growth is a central objective of spatial planning in Ireland and aligns with the long-term sustainable development goals and wider objectives of the Climate Action Plan. What follows in this sub-section is a brief review of how compact growth fits in the wider policy context.

### National Planning Framework<sup>15</sup>

Ireland's National Planning Framework (NPF) is the Government's "high-level strategic plan for shaping the future growth and development of Ireland out to the year 2040." As part of the framework, the NPF lays out 10 National Strategic Outcomes (NSOs), the first of which is *Compact Growth*. Beyond its inclusion as an NSO, compact growth is additionally included as a key element of the NPF's 'A New Way Forward' section, wherein *Securing Compact and Sustainable Growth* lays out four key focus areas for Ireland's urban development: liveability, the continuous regeneration of built-up areas, tackling legacies (concentrated disadvantage in urban areas), linking regeneration to climate action.

---

<sup>15</sup> Department of Housing, Local Government and Heritage. Project 2040 National Planning Framework, December 2020. Available at: [www.gov.ie/en/publication/daa56-national-planning-framework-ireland-2040-our-plan-npf-2018/](http://www.gov.ie/en/publication/daa56-national-planning-framework-ireland-2040-our-plan-npf-2018/).



The NPF additionally provides growth targets for Ireland through 2040, with the compact urban growth targets shown here in Table 2.1. The NPF is currently being revised. This offers further opportunity to align growth targets in Ireland with compact growth objectives. The first draft revision of the NPF published in July 2024 noted as one of the key recommendations of the Expert Group set up to review the NPF that “compact growth targets should be more ambitious and more clearly defined”.

**Table 2.1: Targeted Pattern of Growth, 2040**

National Policy Objective	Eastern and Midland Region	Southern Region	Northern and Western Region
Compact, Smart, Sustainable Growth	50% of new city housing within existing Dublin City and suburbs footprint	50% of new city housing within existing Cork, Limerick and Waterford Cities and suburbs footprints	50% of new city housing within existing Galway city and suburbs footprint
	30% of all new housing elsewhere, within existing urban footprints	30% of all new housing elsewhere, within existing urban footprints	30% of all new housing elsewhere, within existing urban footprints

**Source: National Planning Framework**

### National Development Plan 2021-2030<sup>16</sup>

Ireland’s National Development Plan (NDP) (which, together with the NPF, make up *Project Ireland 2040*), details the major public investment projects in the country out to 2030. These projects are aimed at addressing “the opportunities and challenges faced by Ireland over the coming years,” including housing and the climate. The NDP is guided by the same NSOs as the NPF, the first of which is *Compact Growth*.

Strategic investment priorities in the NDP are designed around compact growth objectives including those of social and affordable housing. These objectives are to be aided by the actions of the Land Development Agency and the Croí Cónaithe Cities and Town schemes. In addition, the NDP also highlights the important role that the Urban Regeneration and Development Fund plays in “the promotion of co-ordinated investment in the renewal and redevelopment of ... cities and towns.” This scheme provides funding for urban regeneration projects, with a particular emphasis on compact growth, that foster the development of attractive urban environments.

<sup>16</sup> Department of Public Expenditure, NDP Delivery and Reform. National Development Plan 2021-2030, October 2021. Available at: [www.gov.ie/en/publication/774e2-national-development-plan-2021-2030/](http://www.gov.ie/en/publication/774e2-national-development-plan-2021-2030/).

## Climate Action Plan 2024<sup>17</sup>

Ireland's Climate Action Plan outlines the Government's "roadmap for taking decisive action to halve Ireland's emissions by 2030 and reach net zero by no later than 2050," and achieve its other climate-related objectives.

The document identifies compact growth as a strategy to assist in reaching these goals, particularly highlighting the importance of "implement[ing] sustainable settlement patterns and compact growth and ... the delivery of EV charging infrastructure networks and other sustainable transport infrastructure." As part of the Climate Action Plan, the Department of Housing, Local Government and Heritage funds two dedicated staff in each non-city local authority to implement the 'Town Centre First' initiative, in which compact growth and urban regeneration are a key aspect.

One of the six 'vital high impact sectors' identified by Government is transport, with a 50% reduction in emissions targeted for 2030 under the Climate Action Plan. Some of the actions set out to deliver on these ceilings include reducing the total distance driven across all car journeys by 20% and for walking, cycling and public transport to account for 50% of all journeys. These targets require a major shift in land-use planning policy if they are to support and compliment the achievement of more compact development patterns in cities and towns rather than further urban sprawl.

## Housing for All<sup>18</sup>

*Housing for All* is the Government's housing plan through to 2030. It outlines the Government's key housing objectives with the overarching objective that everyone in Ireland should be able to purchase or rent a home in a sustainable manner and at an affordable price, with nearby access to essential services and essential infrastructure. *Housing for All* aligns with the NPF and NDP documents including in its emphasis on compact growth, stating "concentrating efforts in our urban centres is in keeping with a compact growth agenda, where housing is located close to public transport routes and where walking and cycling will become the dominant form[s] of mobility within ... town centres."

## Sustainable Residential Development and Compact Settlements – Guidelines for Planning Authorities<sup>19</sup>

The Sustainable Residential Development and Compact Settlements document provides guidelines to authorities in the planning and development of urban and rural residential developments, with a particular focus on sustainable, compact growth. This document outlines the characteristics of compact developments, and methods for their implementation and development.

---

<sup>17</sup> Department of the Environment, Climate and Communications. Climate Action Plan 2024, December 2023. Available at: [www.gov.ie/en/publication/79659-climate-action-plan-2024/](http://www.gov.ie/en/publication/79659-climate-action-plan-2024/).

<sup>18</sup> Department of Housing, Local Government and Heritage. Housing for All, September 2021. Available at: [www.gov.ie/en/publication/ef5ec-housing-for-all-a-new-housing-plan-for-ireland/](http://www.gov.ie/en/publication/ef5ec-housing-for-all-a-new-housing-plan-for-ireland/).

<sup>19</sup> Department of Housing, Local Government and Heritage. Sustainable Residential Development and Compact Settlements Guidelines for Planning Authorities, January 2024. Available at: [www.gov.ie/en/publication/aaea6-sustainable-residential-development-and-compact-settlements-guidelines-for-planning-authorities/](http://www.gov.ie/en/publication/aaea6-sustainable-residential-development-and-compact-settlements-guidelines-for-planning-authorities/).

## National Sustainable Mobility Policy<sup>20</sup>

Ireland's National Sustainable Mobility Policy outlines the Government's strategic framework to promote active travel and public transport usage in order to help achieve Ireland's climate emissions goals. The document highlights the role that compact growth can play in the promotion of sustainable mobility, as "compact communities will allow people to reach local amenities by a short walk or cycle" and "higher-density urban neighbourhoods located along frequent public transport routes can facilitate longer journeys without reliance on a private car."

## Policy Initiatives

Reflecting the importance of compact growth in wider policy, there have been a range of funding initiatives and policy supports focussed on incentivising and enabling town and city centre residential development since the adoption of the NPF:

- The Croí Cónaithe Cities Scheme is a fund to support the building of apartments for sale to owner-occupiers. The Scheme aims to bridge the current viability gap between the cost of building apartments and the market sale price.
- The Croí Cónaithe Towns Fund comprises two schemes which are delivered by local authorities, the 'Vacant Property Refurbishment Grant' which provides people with a grant to support the refurbishment of vacant properties while under the 'Ready to Build Scheme', local authorities make serviced sites available in towns and villages at a discounted rate to individuals who want to build their own home.
- Project Tosaigh, which was launched in November 2021, is a market engagement initiative aimed at accelerating delivery by the Land Development Agency of housing on sites with full planning permission that are not currently being developed by private sector owners due to financing and other constraints.
- The Town Centre First Policy provides a co-ordinated, whole-of-government policy framework to proactively address the decline in towns across Ireland and support measures to regenerate and revitalise these areas.
- The Residential Zoned Land Tax (RZLT) was introduced in the Finance Act (2021) with the purpose of activating land that is serviced and zoned for residential or mixed use including residential in order to increase housing supply and to ensure regeneration of vacant and idle lands in urban locations.

It is in this wider policy context and the development of the funding schemes and initiatives outlined above that the following case studies are being undertaken. The emphasis on compact growth in national policy is evident. The provision of funding to support compact growth objectives is also reflective of the challenges of incentivising compact growth in a time of both acute housing supply shortages and viability challenges. The case studies in this report seek to demonstrate how large-scale investment in compact urban growth has been undertaken in other countries, why these investments have been successful and how policies have been designed and implemented to support this success.

A summary of Policy Development in Compact Growth in Ireland is set out in Appendix 1.

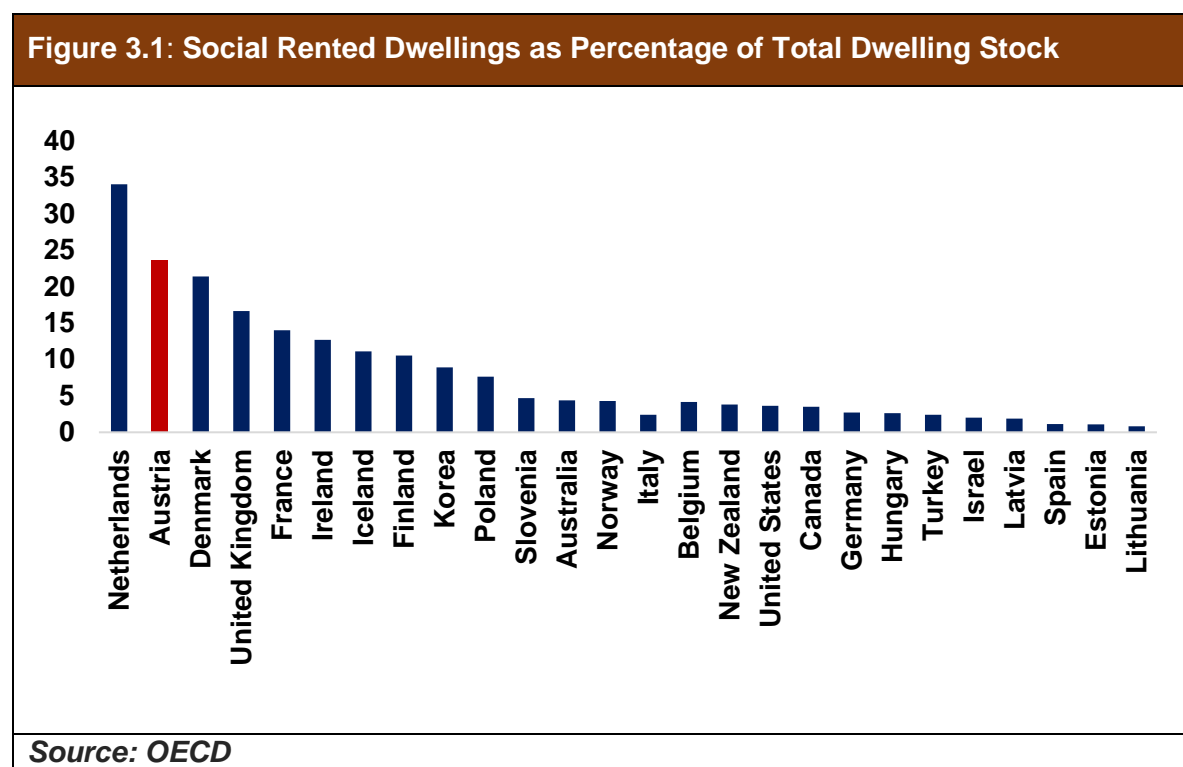
---

<sup>20</sup> Department of Transport. National Sustainable Mobility Policy, April 2022. Available at: [www.gov.ie/en/publication/848df-national-sustainable-mobility-policy/](http://www.gov.ie/en/publication/848df-national-sustainable-mobility-policy/).

### 3. Case Study 1: Vienna - Aspern Seestadt

#### 3.1. Introduction

The housing market in Austria is characterised by high levels of social and rental accommodation. As of 2022, over 49% of the country's population were living in rented accommodation, significantly higher than the EU average of 31%.<sup>21</sup> Amongst countries in the OECD, Austria also has the second highest rate of social rental housing stock at 24% as of 2020 (Figure 3.1).



This social/rental model of housing is exemplified in the capital city, Vienna. Here, social housing is available to residents on incomes up to €53,000 for an individual and €79,000 for a couple.<sup>22</sup> These relatively high-income thresholds mean that about 75% of the city's population qualify for social housing and it is estimated that over 60% of Viennese residents live in some form of social accommodation. This includes those paying municipal rents and those renting from Limited Project Housing Associations. The majority of this social housing is municipal flats with apartment living being the predominant form of accommodation in the city. Approximately 90% of the city's residential buildings are apartments.<sup>23</sup> This compares to 27% in Dublin.

Vienna is a city which has had success in containing urban sprawl in recent decades. A 2024 paper explored the historical drivers of sprawl and densification in Vienna and showed that regulation, particularly around building in greenbelt zoning had been very effective in

<sup>21</sup> Eurostat. Housing in Europe – 2023 Edition. Available at: <https://ec.europa.eu/eurostat/web/interactive-publications/housing-2023#house-of-flat-owning-or-renting>

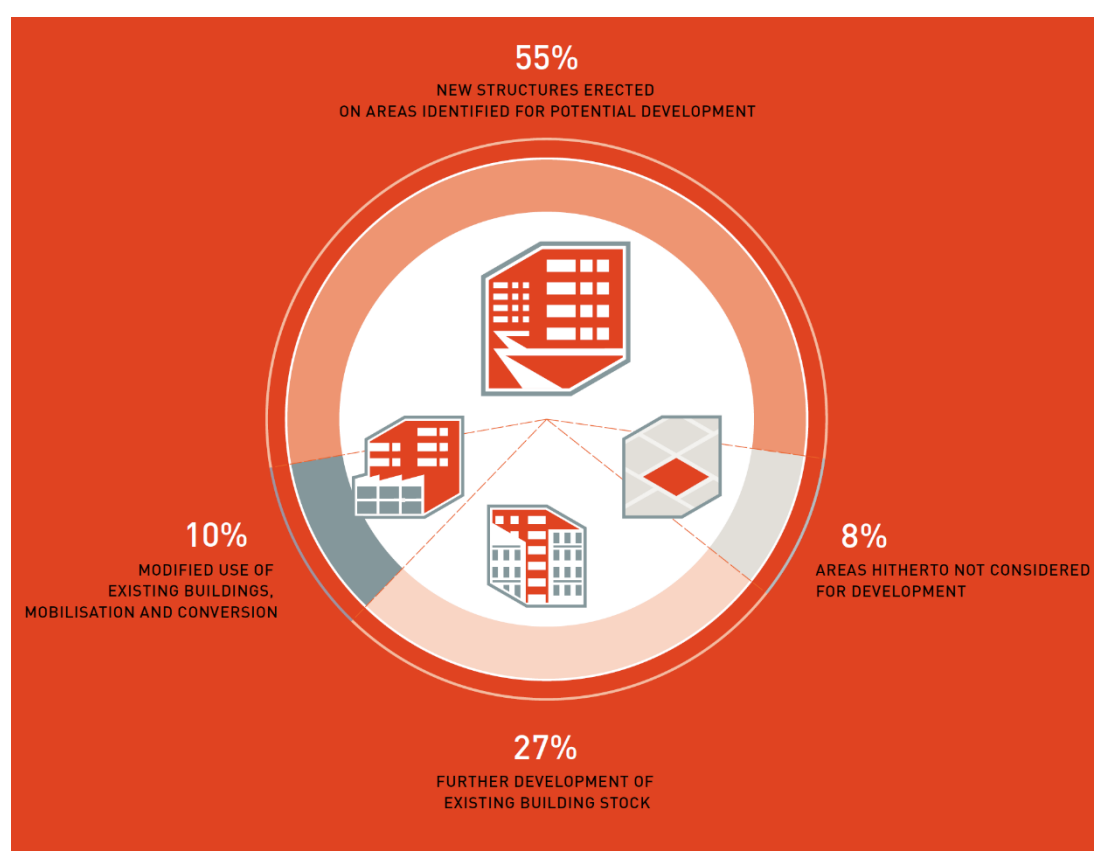
<sup>22</sup> City of Vienna. Flat Allocation Criteria. Available at: <https://socialhousing.wien/tools/flat-allocation-criteria>

<sup>23</sup> Statistics Austria. Stock of Dwellings. Available at: <https://www.statistik.at/en/statistics/population-and-society/housing/stock-of-dwellings>

curbing sprawl.<sup>24</sup> The city development plan sets out goals for high density urban growth and identifies areas suitable for “compact, urban and resource-efficient development.”<sup>25</sup> The plan states that growth of the urban area should be internal over external, focus on built up areas and upgrading of existing structure and be along existing infrastructure lines.

According to the development plan, areas within the existing urban area of Vienna have space for 135,000 dwellings in addition to millions of square metres for commercial and public spaces. This does not include the many small scale infill sites in Vienna that are also suitable for additional compact development. Figure 3.2 shows the provision of new housing units in Vienna from 2014-2025. Thirty-seven per cent of new housing is through the development/modification of existing buildings.

**Figure 3.2: Provision of housing units in Vienna 2014-2025**



**Source: Urban Planning Vienna**

<sup>24</sup> Anna-Katharina Brenner, Willi Haas, Tobias Krüger, Sarah Matej, Helmut Haberl, Franz Schug, Dominik Wiedenhofer, Martin Behnisch, Jochen A.G. Jaeger, Melanie Pichler, *What drives densification and sprawl in cities? A spatially explicit assessment for Vienna, between 1984 and 2018*. Land Use Policy, Volume 138, 2024, 107037, ISSN 0264-8377, <https://doi.org/10.1016/j.landusepol.2023.107037>.

<sup>25</sup> City of Vienna. STEP 2025 Urban Development Plan Vienna. Available at: <https://smartcity.wien.gv.at/en/urban-development-plan-2025/#:-:text=Clearly%20defined%20planning>



The development plan ties high quality urban design with density of development and outlines a range of positive impacts of compact growth, including:

- Functional social infrastructure;
- High quality housing with short distances to surrounding facilities;
- Barrier free<sup>26</sup>, lively streetscapes;
- Access to public squares, green and open spaces;
- Maintaining green spaces in outlying districts; and
- Conservation of resources.

The development plan states that legal conditions and standards should be put in place in order to ensure that high density urban quarters are established and maintained in Vienna. For the case study analysis we explore Aspern Seestadt, an ongoing urban development project in Vienna which embodies many of the concepts of brownfield compact development as set out in the city's development plan.

## 3.2. Aspern Seestadt

### Background

Aspern Seestadt is a major mixed-use brownfield development project being undertaken in Vienna. The 240-hectare development is located on the site of a former airfield to the Northeast of the city in the 22nd Donaustadt district. It is a multi-phased development, with the first stage completed and the second stage currently in development. Aspern Seestadt is currently home to 12,000 residents with this projected to rise to over 25,000 inhabitants when the development is completed in 2030. By the time of its completion the population density of Aspern Seestadt will be over 10,000 people per km<sup>2</sup>. This compares to 4,300 people per km<sup>2</sup> in the rest of Vienna.

Aspern Seestadt is the forefront of the 'Smart City Vienna' initiative for urban development. This initiative sets out a strategy for urban development that encompasses goals for sustainability and quality of life in Vienna. The strategy places emphasis on density of development through compact neighbourhoods, expansion of public transport and cycling networks and smart building design. Developers in the city refer to Aspern Seestadt as an 'Urban Lab' where new approaches to urban development are tried and tested out. If a certain approach or initiative fails, developers in the area are willing to take learnings from this and undertake a new approach.

---

<sup>26</sup> I.e. easily traversable and permeable for pedestrians

**Figure 3.3: Phased Approach to Aspern Seestadt Development**

**Source: Aspern Seestadt Masterplan**

### Development of the Project

The design competition for the Aspern Seestadt masterplan commenced in 2005 with submissions from companies across the EU. The winning entry, which emphasised shared public spaces, was approved by the municipality in 2007 and from this further planning specifications and evaluations were undertaken, including the land use and zoning plans and environmental impact assessments. The masterplan set out the timeframe for the development, with the scale of the project entailing a multidecade long construction process. This necessitated flexibility to be integrated into the masterplan, to allow for the development process to adapt to changing circumstances and preferences over the lifetime of the project. A key feature of the project timeframe was that before any residential or commercial buildings were constructed, transport connection with Vienna city would already be established.

The intention of the planners was that residents and commercial vendors would be encouraged to move into the development if there was easy access to other metropolitan areas in Vienna. It also encompassed the intention of the city planners to move away from the reliance on cars. As such, the initial construction in Aspern Seestadt began in 2009 with the extension of the Vienna U-Bahn U2 line to Aspern. The underground station in Aspern went into operation in 2013. This extension was undertaken by the city's public transit network company and required a high level of co-ordination between the project developers and the city authorities. Co-ordination between both parties has been a recurring theme in the development of Aspern Seestadt.

Another central feature which was constructed early in the development was the man-made lake at the heart of the development. Constructed in 2010, the lake and the surrounding parklands are public amenities that draw residents into the centre of Aspern. The excavation of the lake also allowed for the gravel extracted to be used for other elements of the initial construction process.

The first residential buildings were completed in 2014, followed shortly thereafter by the first commercial entities to service these residents. Since then, the construction of further residential and commercial buildings has continued apace and as of 2023, over 5,000 housing units have been built and there are 500 enterprises in operation. These enterprises are composed of large and small companies and include both start-ups and established firms. Businesses operate across a diverse mix of sectors from crafts and trades, technology and retail to the arts, education and healthcare. Significant employers operating in Aspern Seestadt include global biotech companies BIOMAY and HOOKIPA. International technology group HOERBIGER Holding AG established its regional headquarters at Seestadt, with capacity for 500 workplaces. "Kasnudl Stadtküche" ("Foodmakers' Quarter") are an anchor business for Seestadt and operate as a new centre for innovative food producers. Vienna Business Agency's Seestadt Technology Centre also offers 13,000 square metres of floor space for R&D and tech-based companies<sup>27</sup>.

Phase 2 of the development is due to be completed in 2024, at which point Phase 3 will commence. In this final phase, existing areas will be densified further with more housing and commercial units and the area will provide homes and workplaces for approximately 25,000 people by 2030.

## Obstacles to Development

Building the 'city within a city' as Aspern Seestadt has become known in Vienna, presented a range of challenges for development. Many of these challenges are common to brownfield sites but others were more particular to Aspern Seestadt given its large scale and the ambitious targets that were set out in the masterplan.

One potential challenge that is common to a lot of urban development projects is resistance to new development from existing residents in the surrounding area. The source of this resistance can come from a number of perspectives such as potential disruption during the construction phase, the removal of existing infrastructure and apprehension about the strain on existing services and amenities.

Another challenge that is typically faced in the development of brownfield sites is existing contamination and pollution of the site itself. The cost of clearing brownfield sites of such waste can be prohibitive to development. As the site of a former airfield, soil contamination was one of the early challenges faced in Aspern Seestadt.

One advantage that brownfield sites can have over greenfield is the existing buildings in the area. Smart urban design can often make use of these buildings and convert them to other purposes which can help keep the existing character of the area. However, as this particular

---

<sup>27</sup> Aspern Seestadt (2023). Living in Vienna + Working in Europa. Available at: [https://www.aspern-seestadt.at/jart/prj3/aspern/data/downloads/202306\\_Factsheet\\_EN.pdf](https://www.aspern-seestadt.at/jart/prj3/aspern/data/downloads/202306_Factsheet_EN.pdf)

development was essentially starting from a clean slate on a flat airfield, there was potential for Aspern Seestadt to be a homogenous development lacking in character or identity.

Another challenge with a development of this scale is the coordination of the project. Aspern Seestadt is on a site of 97 hectares and when completed it will have 83 hectares of residential floor space and nearly 100 hectares of commercial/industrial floor space. The success of the project requires from both a sustainability and compact growth viewpoint requires cohesion behind the development of each individual building lot.

Stakeholders noted that a typical challenge in undertaking brownfield development of significant scale is avoiding fractured ownership of relevant sites. This can lead to coordination challenges and issues with developing infrastructure and implementing a coherent development plan. Aspern Seestadt largely avoided this issue given that the land was already largely in public ownership as the site of a former airfield. The development company did acquire some parcels of land to facilitate the wider development but, to a large extent, pooling of land ownership was in place from the outset at Aspern Seestadt. Many of these obstacles to development were overcome via the establishment of the development company to oversee the development process, as discussed in more detail below.

## Development Company

In order to coordinate the planning and building of Aspern Seestadt and to overcome many of the challenges that are typically faced in the development of a brownfield site for non-industrial use, a new development company, Wien 3420 AG was established. The company was initially founded by the Vienna Business Agency (an entity owned by the Vienna municipality) and the Federal Real Estate Company who owned the airfield. The development company is tasked with bringing together the different stakeholders required to make the project a success, from the private development companies to the local community.

While most of the development land was publicly owned, which was a significant advantage in ensuring cohesion in the early stages, in order to ensure the success of the development it was important to get buy in from residents in the surrounding area. The development company co-ordinated the public consultation programmes which formed an integral part of the process. Before the masterplan was drafted, questionnaires were distributed, and meetings were held with residents of nearby communities. This consultation gave these residents an opportunity to convey what features they would like to see implemented in the development with their inputs integrated into the masterplan. The interests of these residents were represented further with specific personnel in the planning team chosen to represent the interests of the local population through the planning process.

While the initial funding of Wien 3420 AG was from State and city funds, in 2011 a number of partners from the private sector including a bank and insurance company became shareholders in the development company. The buy-in of these additional partners provided both a cash injection for the initial development and expertise in financing which were crucial for this large-scale project. This financing was used to prepare the site for future development and for funding the initial infrastructure, including public green spaces and streets. The remit for infrastructure development in the area does not rest solely with the development company but also with the city authorities. This includes the underground water

and sewerage networks, a lot of which was already developed before the development company was founded. It also includes the development of the metro line extension which was financed by the city authorities and the federal government.<sup>28</sup> The fact that the development company did not have to finance the development of the Metro is significant as avoiding the significant costs involved in this investment allows lands to be sold at more competitive prices in the area, with knock-on implications for viability and affordability.

Bringing private stakeholders into the development company changed how it operated, from a fully public entity to a public/private partnership. Members of Wien 3420 AG consider this company structure to be advantageous for stakeholder engagement as it facilitates the company working closely with private developers and public sector organisations alike. The financing of the company is now primarily from the sale of land to private developers. Aspern Seestadt is a development area in which there is high demand for both residential and commercial units. This makes development plots highly desirable for private developers and Wien 3420 AG operates an auction process to sell land to the highest bidder<sup>29</sup>. The income from these sales is then used to fund further infrastructure projects, in turn increasing land value. This model of funding ensures that future land sales will continue to generate significant revenue for the company which can be put towards generating the development further.

## Design Features and Initiatives

Some of the design features and initiatives which have contributed to the success of Aspern Seestadt as a functional and liveable compact development include:

- Two rail stations were constructed in the city which connected the metro line from Vienna. The extension of the underground line began operation in 2013. Stakeholders noted that the initial use of the train was as access for the construction workers of the initial residential and commercial buildings.
- This is a residential development that focuses on compact growth, and this is reflected in the type of housing that has been constructed. All housing in the development are apartments/flats accommodated in a range of medium to high rise developments.
- Residential development and density are concentrated around particular public amenities such as the catchment area of the subway stations.
- The priority for pedestrians and cyclists is encompassed in the design of the development with wide pavements and cycle lanes and public spaces that do not allow motorised vehicles.
- Half of the land area of the site is dedicated to green space, streets and cycle paths.
- Local amenities, including shops, schools and parks have been planned in order that they are a short distance from residences, again to encourage residents to walk or cycle rather than drive. From the outset the planners made the decision not to have large shopping centres. Rather the focus was to have shops evenly distributed along the street within local areas.

---

<sup>28</sup> For further discussion of the infrastructural development of Aspern Seestadt see: Astrid Krisch & Johannes Suitner (2020) Aspern Explained: How the Discursive Institutionalisation of Infrastructure Planning Shaped North-Eastern Vienna's Urban Transformation, *disP - The Planning Review*, 56:2, 51-66, DOI: 10.1080/02513625.2020.1794126

<sup>29</sup> Sales to private developers are made on the basis of the highest bidder. Land for social housing developments is subject to maximum land values.



- One of the initiatives to reduce the reliance on cars in Aspern Seestadt is the mobility fund. The mobility fund is aimed at funding projects that help residents get around the city on foot, by bicycle or by public transport. The fund finances an array of projects including the SeestadtFLOTTE bike hire scheme, the household shopping trolley scheme and the Mobility Advisory Service which informs residents on various matters of transportation and mobility.
- Aspern Seestadt embodies what is known as 'Gender Mainstreaming', a practice that aims to make sure that the design and planning of the development involves and takes account of the needs of both men and women. A conscious effort has been made to ensure that the various roles in the development are held by women, as traditionally the urban design profession has been dominated by men. This filters down into the design of the development through features such as more street lighting enhancing the safety of public spaces and wider footpaths to accommodate prams.
- Stakeholders referred to the development as a laboratory where planners were willing to try new ideas out, going beyond typical development approaches. Further to this, there are processes in place to receive feedback from residents as to what is working and what is not and there is willingness to listen to residents and correct mistakes.

## Policy Incentives

Consultations with stakeholders suggested that very limited direct incentives were provided to developers to encourage development in Aspern Seestadt. The demand from both individuals and businesses to locate to Aspern Seestadt has meant that policy makers have not had to implement significant policy incentives to encourage private developers to develop plots in the area. On the contrary, because the area is so desirable, the development company has actually been able to enforce more stringent, higher building standards on private developers than those that are typically faced in other parts of Vienna.

However, one provision of development in Aspern Seestadt that reduces costs for private developers is the requirements for fewer private carparking spaces than in typical apartment block developments. Car parking spaces reduce the amount of floor area remaining for the apartments themselves or requires costly underground car parks to be constructed. In Aspern Seestadt, private car parking space was intentionally limited by the planners so that individuals were less reliant on cars for mobility. This acts as a cost saving to developers who in exchange are required to make a contribution to the mobility fund. The development plan provides for clustering of parking spaces in communal car parks. All street-level parking is short stay only, ensuring more room in the public space for pedestrians and cyclists. There are currently 8 communal underground car garages in the Aspern Seestadt. Parking spaces in these communal garages can be rented on a short or long stay basis.

The number of car parks and their distribution is governed by the following criteria:

- The communal car parks are sited so as to be a maximum of 300 metres away, thus complying with the principle of equidistance with the catchment area of public transport stops. 300 metres linear distance is roughly equivalent to a five-minute walk.
- Wherever possible, access to the communal car parks is directly from the circular boulevard or the access roads from the S1 Seestadt Spur.

## Affordability & Social Housing Provision

While the sale of land to private developers is the most significant source of funding for the Wien 3420 AG, not all land is sold to the highest bidder. One of the key partners of Wien 3420 AG is the Vienna Housing Fund (Wohnfonds Wien), the organisation mandated with managing social housing in the wider city. The development company has a binding contract with the Vienna Housing Fund to deliver a target amount of social and subsidised housing. Wohnfonds\_Wien is a co-owner in the development area with around 250,000 m<sup>2</sup> of net building land and is also responsible for the quality assurance of the subsidised residential construction projects within the framework of the developers' competitions.

Under the subsidised housing model, public-private development corporations build apartments with funding partially sourced from the city. In turn residents are charged a lower rate of rent than they would face on the private market. 60% of the residential development in Aspern Seestadt is allocated for social/subsidised housing with the remainder sold on the private market. This puts the development in line with social and subsidised provision in the rest of Vienna.

## Consideration of Externalities

In 2003, a strategic environmental assessment was undertaken for the northeastern area of Vienna in which Aspern Seestadt is situated. This document outlined objectives which any future development on the airfield should meet, including an urban area that incorporated both a compact and mixed-use design.

A number of environmental impact assessments were then carried out as part of the planning process for Aspern Seestadt specifically. Each of these assessments was carried out across different areas of the development. The first to be completed was for the southern part of the development in 2010. The urban density of this part of the development was cited as having a positive impact on both the environment and on the quality of life of the population. Further environmental impact assessments were carried out for other parts of the development again emphasising and grading these developments against compact development goals.

The environmental impact assessments graded these areas based on how they would impact on various social and environmental categories. A four-tier scale between 'A' and 'D' was used where 'A' indicated that the development was deemed to have a positive impact on that category and 'D' that the development was deemed to have a significantly negative impact. The categories against which the development was scored included 'Density' and 'Accessibility'. As an example, the grades for each category for Aspern Seestadt south are shown in Table 3.1. The development here received an 'A' grade for density of development.

<b>Table 3.1: Environmental Impact Assessment: Aspern Seestadt South</b>			
<b>Category</b>	<b>Grade</b>	<b>Category</b>	<b>Grade</b>
Density	A	Living and Green Spaces	A
Public Room	A	Endangered Species	B
Green Space Provision	A	Biodiversity	A
Accessibility	A	Pollutant Input	B
Social Infrastructure	A	Sealing	B
Leisure/Culture	A	Soil Water Balance	B
Noise Pollution	C	Air Pollutants and Fresh Air	B
Air Quality	B	Temperature	B
Other Health Effects	A	Wind	B
Architecturally Valuable Buildings	A	Landscape Image	A
Cultural Heritage	A	Landscape Context	A
<b>Source: Wien 3420 AG</b>			

While studies of this nature aim to assess the impact of compact development in Aspern Seestadt and consider many of the benefits of high-density urban development, they do not assess these benefits in a quantified and monetised manner in relation to a counterfactual scenario under which the population was housed in developments on greenfield sites. The environmental impact assessment undertaken for Aspern Seestadt considers many of the benefits that one might highlight when appraising urban density versus greenfield development such as the impact on biodiversity, accessibility and social infrastructure. Aspern Seestadt scores well on these metrics.

However, as was evident from the outline at the beginning of this section of the wider urban planning objectives for Vienna, Aspern Seestadt is being measured on these metrics not relative to an alternative greenfield development model, but to assess its compliance with the wider objectives for compact urban development in Vienna.

### 3.3. Key Takeaways

- Aspern Seestadt is a high-density brownfield development in which property is much sought after by both Viennese residents and commercial entities.
- Compact growth objectives, set out in the development plan and assessed in the Environmental Assessment fed through to the delivery of the project.
- The establishment of Wien 3420 AG, the development company with a sole mandate for the development of Aspern Seestadt has played a central role in the planning and co-ordination of the project.
- The private-public partnership model of the development company has been key to the company's ability to work efficiently and effectively with both private and public stakeholders.
- The early-stage development of transport links, particularly the metro connection, gave impetus for the initial residents to move into the development and for the reduced reliance on cars in the district.
- Land sales were used to fund further infrastructure development which in turn increased the value of land for future sales creating a self-sustaining form of finance.
- A significant portion of plots in the development were reserved for social/subsidised housing which has improved social diversity in Aspern Seestadt.

## 4. Case Study 2: Copenhagen – Nordhavn

### 4.1. Introduction

Copenhagen is commonly cited as an exemplar of smart urban design and development.<sup>30</sup> The city has a long history of strategic urban planning which encompasses principles of compact growth. In recent years it has been to the global forefront of urban sustainability, setting out a range of ambitious sustainability objectives and putting in place innovative practices to achieve them. With a population of approximately 660,000 (1.4 million in the wider metropolitan area) it is similar in size to Dublin and bears a number of topographical similarities including the dissection of the city by a major waterway and being bound to the East by sea. The development plans of the city highlight many of the same challenges faced by Dublin such as a growing population, housing supply issues and a particular susceptibility to issues of climate change given its coastal location. The capital of Denmark offers an example to its Irish counterpart of how to meet these challenges through compact development.

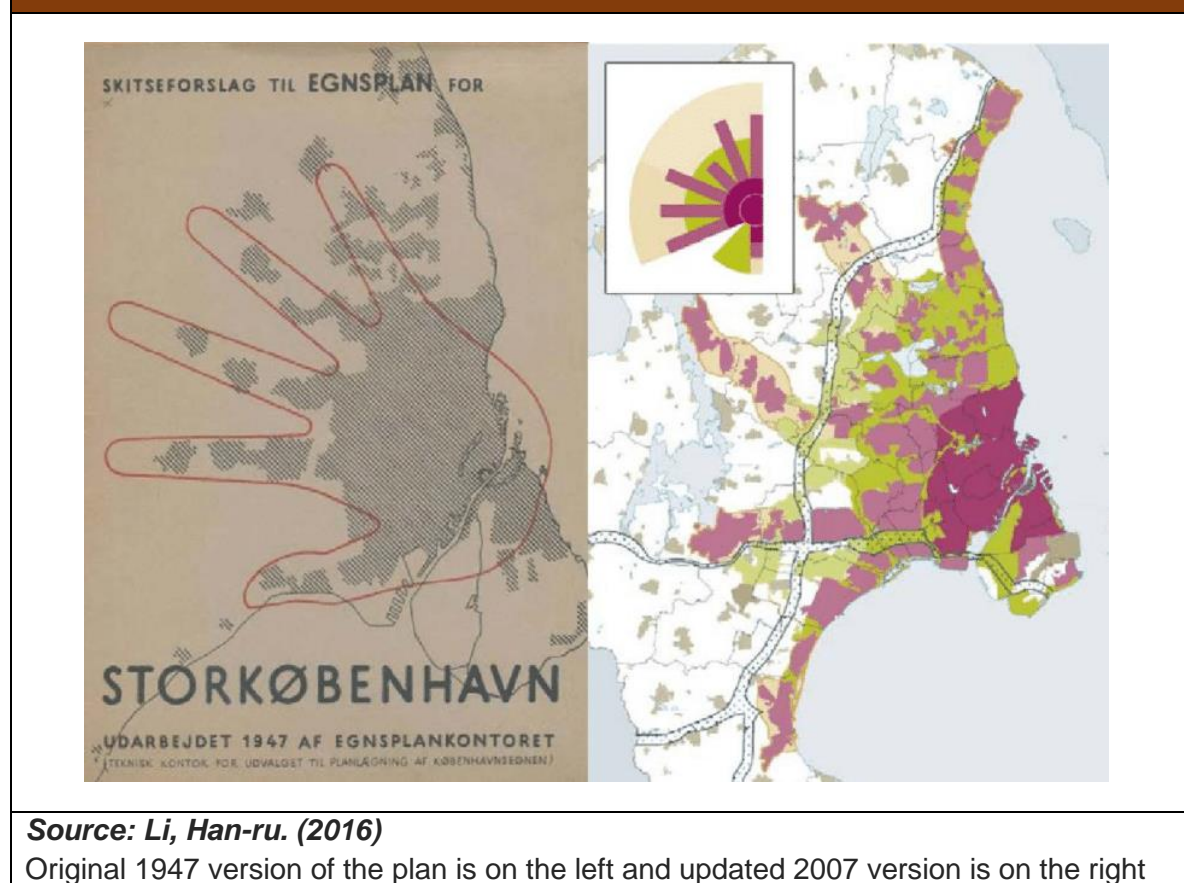
Long-term compact urban development in Copenhagen has been strongly influenced by the city's 'Finger Plan' which was established in 1947. The development plan was designed in recognition of the fact that the population of Copenhagen was increasing, and the city would need to expand to accommodate this. It set out a long-term holistic approach to urban development which would avoid potential risks around unstructured, incremental and inefficient urban sprawl. The 'Finger Plan' derives its name from the five distinct transport corridors including rail and road that residential, commercial and local amenities would be built around. Each of these corridors led back to the centre of the city and was to be separated from each other by dedicated green space where no construction was permitted, giving residents significant room for recreation and maintaining the urban/environmental balance.

Since its inception, the 'Finger Plan' has evolved to meet a growing population and increased urbanisation in Copenhagen. The transport corridors along each finger have been extended over time but in general the original principles of the plan have remained in place. The 'Finger Plan' demonstrates the influence that a well-designed urban plan can have on the long-term compact development of a city.<sup>31</sup>

---

<sup>30</sup> See for example Hall, P. (2013). *Good Cities, Better Lives: How Europe Discovered the Lost Art of Urbanism* (1st ed.). Routledge. <https://doi.org/10.4324/9781315888446>

<sup>31</sup> For further information on the history of the 'Finger Plan' see: Sørensen, Eva & Torfing, Jacob. (2019). *The Copenhagen Metropolitan 'Finger Plan': A Robust Urban Planning Success Based on Collaborative Governance*. 10.1093/oso/9780198843719.003.0012.

**Figure 4.1: Copenhagen 'Finger Plan'**

**Source: Li, Han-ru. (2016)**

Original 1947 version of the plan is on the left and updated 2007 version is on the right

A more recent undertaking that has contributed to Copenhagen's compact development was the goal the city set itself to be carbon neutral by 2025.<sup>32</sup> As discussed in Section 2, there are a range of environmental benefits associated with compact development and in order to achieve this goal the city would require development through compact growth. The alignment of compact growth with the city's environmental goals can be seen in the objectives set out in the Copenhagen climate plan:<sup>33</sup>

- 75% of trips in Copenhagen to be made on foot, by bicycle or by public transport;
- Half of commutes to work or school are by bicycle; and
- An increase of public transport use by 20%.

Central to recent regeneration has been the Copenhagen City and Port Development Corporation. The corporation has been mandated with the development of a number of brownfield sites in the city. The development of brownfield sites is part of the city's goal to 'grow inward', i.e., to use land within the existing urban boundaries to meet the needs of its growing population.

A number of large development projects which follow the ethos of compact growth have been undertaken in Copenhagen in recent years. This includes the Carlsberg City District, Jernbanebyen, Ørestad, Refshaleøen, and Nordhavn. The ongoing development of Nordhavn is explored in more depth as a case study.

<sup>32</sup> This is no longer set as a goal due to lack of funding. However, the city has achieved a number of objectives along the initial path to this goal such as reducing emissions by 80%.

<sup>33</sup> For more detail see The CPH 2024 Climate Plan: <https://urbandevlopmentcph.kk.dk/climate>



## 4.2. Nordhavn

### Background

The Nordhavn development is situated on the site of a former harbour, four kilometres north of Copenhagen city centre. The harbour was originally constructed on reclaimed land in the 1890s. Historically the site had been primarily used for industrial purposes which is reflected in the nature of the existing infrastructure and buildings such as factories, warehouses, silos and storage yards. As the shipping industry gradually moved out of the area, an increasing amount of the site became unused. Given the central location of the site, its attractiveness as a waterfront location and the potential for further expansion through land reclamation, the site was seen as an ideal location for a new urban district.

Figure 4.2: Nordhavn 2009



Source: COBE Architects

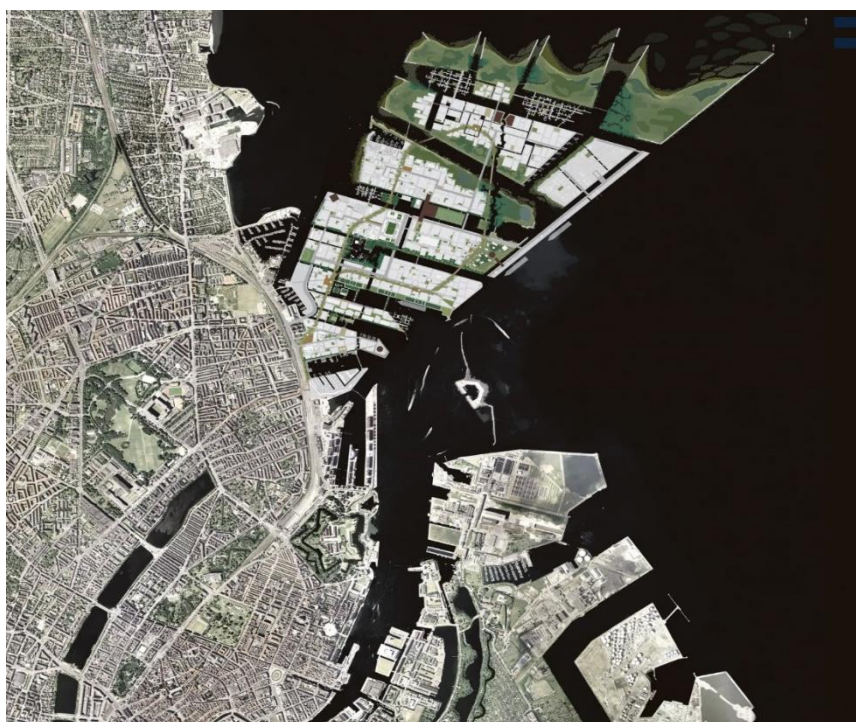
### Development of the project

An agreement in principle was reached between the city authorities and the Danish State in 2005 for the urban development of Nordhavn. This agreement was formally adopted in an act of parliament in 2007. Following this, a yearlong international urban design competition was launched with the winning bid selected in March 2009 and the planning phase of the development commencing later in the year. The planning phase set out a number of themes for the development, one of which was the 'Five-minute City'. This is the premise that housing, workplaces, places of education, recreational, cultural and public institutions should all be within a five-minute reach of each resident. In order to achieve this aim, it was required that Nordhavn be designed and zoned in line with compact growth principles. This includes the development of public transport connections and bicycle lanes, high density residential apartment blocks, mixed use zoning and local retail and public amenities.

The development of Nordhavn is being constructed in phases over a 50-year time period. The phased development is facilitated by the division of the area into separate islets each of which will be developed in stages as self-contained neighbourhoods. This development is continuing the tradition of Nordhavn as a sea reclamation project, with each new islet being built on reclaimed land. This ongoing reclamation of land is illustrated in Figure 4.3, where the area of the projected Nordhavn site in 2060 is shown to be significantly larger than it was pre-development in 2009 (Figure 4.2).

The first phase of the development began in 2013 with the inner Nordhavn area. In keeping with the 'Five-minute City' theme of Nordhavn, inner Nordhavn has been developed as a self-contained area and even as the development is ongoing people have moved in and are working in the area. In 2020 two new metro stations were opened, an underground station in inner Nordhavn and an overground station in Orientkaj. Both of these metro stations connect the new district with Copenhagen city centre. At present there are approximately 4,000 people living in Nordhavn with plans for this to increase to 40,000 when the area is fully developed. Nordhavn will also accommodate workspace for 40,000 people.

**Figure 4.3: Future Plan of Nordhavn (Post Project Completion)**



**Source: COBE Architects**

## Obstacles to Development

Nordhavn is a development project that faces a range of challenges due to its scale, the site on which its being developed and the ambitious goals set out for the development at the outset of the project.

The initial challenge for the development was co-ordinating the roles between the different stakeholders of Nordhavn. This led to delays at the outset of the development and, as a result, the development took longer than expected to commence. A lot of these problems resulted from difficulty in aligning the public and private stakeholders, an issue often faced on large scale developments of this nature. While the development site is entirely publicly owned, most of the development of the individual plots is undertaken by private developers.

Another challenge faced by developers was making the existing site suitable for residential development. The nature of the existing site of Nordhavn as a working port meant that there was a significant number of buildings and plots on the site that were originally designed for industrial use. This created a dilemma at the outset and pre-design stages of the project for the developers as to whether these buildings should be demolished or converted for the needs of the new development. Ultimately, an effort was made where feasible to integrate existing structures into the new development as a means of developing character and identity in the Nordhavn development.

The previous industrial usage of the site meant that green space in the area was limited. In order to make the district a liveable area, new green space would need to be developed. The industrial use of the site also meant that soil contamination was an issue in the district. Dealing with existing contamination issues in brownfields sites can often be costly and time-consuming processes.

The masterplan set out goals for the district to be an environmentally sustainable development. Limiting the use of cars in the new district would play a central role in achieving this aim. However, integrating public transport into the development was challenging due to the layout of the proposed site. Much of the final development will be situated on land that has yet to be reclaimed and will feature a number of small islets and canals. Designing a public transport network to connect these islets and the development as a whole with the rest of the city was not a straightforward process.

The Copenhagen City and Port Corporation has been central to overcoming these obstacles and in co-ordinating the ongoing development of Nordhavn. In the next section the background of the company and an overview of its operations is discussed.

## Development Company

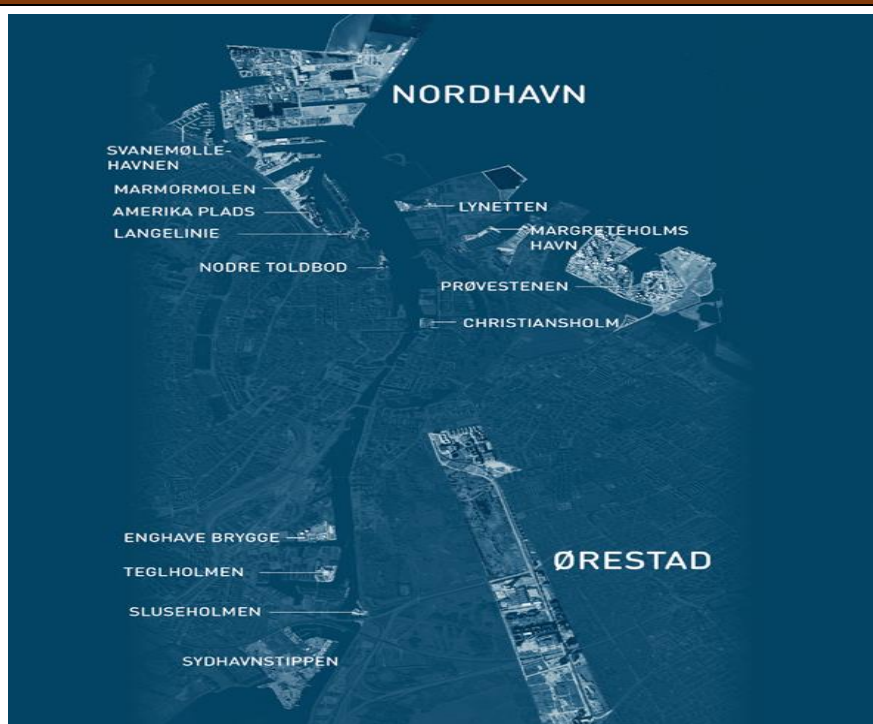
The development of Nordhavn has been overseen and managed by the Copenhagen City and Port Corporation. Founded in 2007, the company was formed from the merger of two existing public entities, Ørestad Development Corporation and the Port of Copenhagen Ltd. The company is entirely publicly owned with the majority of shares owned by Copenhagen Municipality and the rest by the national government. It is tasked with the development of large-scale urban districts in Copenhagen and takes a long-term view of development which is facilitated through its ownership and financial structure. Approximately half of the



redevelopment projects which have been undertaken in the city since 2007 have been through the company.<sup>34</sup>

The public nature of the company allows it to work in conjunction with the national government and local government and State bodies such as the Denmark National Bank. It operates as a separate entity to other public institutions, with a sole mandate for the development of specific projects within Copenhagen. The ongoing and completed development projects of the Copenhagen City and Port Corporation are shown in Figure 4.4.

**Figure 4.4: Development Projects of the Copenhagen City & Port Corporation**



**Source: Katz and Noring (2017)**

The success of the Copenhagen City and Port Corporation is in part owed to the self-sustaining method of finance utilised for each development project. This starts with the transfer of the development land and assets to the company from the State at the outset of the development project. Following the transfer of land, the city authorities rezone the land for residential or commercial use. This results in an uplift in the value of land which the company utilises as collateral against which to drawdown loans on favourable terms. These funds are then used to deliver infrastructure within the development which increases the value of the development land further. In the case of Nordhavn, this included financing the extension of the metro lines and the construction of the new metro stations. The company sells individual plots of land to private developers with these funds being used to pay back loans and finance further infrastructure. While private developers have scope to implement their own designs on these plots, all new development must align with the overarching plans of the City and Port Development Corporation. At each stage of this process land value is increasing which facilitates the next phase of development.

<sup>34</sup> For more information see: Katz, Bruce; Noring, Luise. *The Copenhagen City and Port Development Corporation : A Model for Regenerating Cities*. Washington DC: The Brookings Institution, 2017. 42 p. (City Solution; No. 1).

Though a state-owned company, the corporation operates in a similar fashion to a private company in many ways. This includes its mandate to be a profit maximising entity. This approach was taken as it facilitates the long-term development mindset that is required for successful large scale urban development such as that of Nordhavn. The structure of the company also ensures that it is free from political influence and enhances its ability to work closely with private developers.

The role of the Copenhagen City and Port Corporation in financing infrastructure and public amenities, engaging with private developers and coordinating the implementation of the development plan has been vital in overcoming many of the challenges cited above.

## Design Features

An outline of the design features which the Copenhagen City and Port Corporation have integrated into the Nordhavn development are given below:

- One of the themes of the Nordhavn development is 'Identity and History'. This theme pertains to the goal of the planners to maintain the existing culture and atmosphere of the area and incorporate this into the design of the new development. This is achieved by maintaining existing buildings and structures in the harbour, designing new buildings to fit with the existing aesthetic and the usage of the existing road network.
- The local plans put caps on the number of parking spaces allowed in the area. For example, in Inner Nordhavn a maximum of 1,900 parking spaces are allowed with most of these being constructed in central parking lots. This design feature encourages people to rely less on cars and more on public transport/cycling.
- As shown in Figure 4.4, Nordhavn is one of several projects that the Copenhagen City and Port Corporation have managed in recent years. Stakeholders noted that in some previous projects, urban design mistakes were made which the company has drawn lessons from and has integrated these lessons into the design of Nordhavn. This includes selling plots of land in smaller packages than in previous developments in order to have diversity in building design.
- In order to achieve density of development in previous projects, large residential buildings were constructed. However, in hindsight, these buildings were deemed to be too large and spaced out for an effective compact design. In Nordhavn density of development is achieved through closely packed smaller buildings on smaller plots. This makes the buildings less visually imposing and is more in line with the concept of the 'five-minute city'.
- Nordhavn is implementing a model of local retail in which shops are located along streetscapes. This is in contrast to some of the earlier districts developed by the City & Port company where centralised shopping districts and shopping centres were developed. Street level retail ensures that amenities are kept close to residents, reducing their reliance on cars. Street level retail also aims to ensure an active street life in the area. Stakeholders consulted also noted that in order to make local independent retail stores viable in the early stages of the development, corporation provided subvention schemes to the initial retailers who moved into the district.
- The waterfront area has been developed as a public amenity and focal point for the wider development.

## Policy Incentives

Due to the demand from residents to live and businesses to operate in Nordhavn, stakeholders noted that there is little need for policy incentives to encourage development in Nordhavn. However, the initial groundwork that is undertaken by Copenhagen City and Port Corporation to decontaminate the soil, build the connecting infrastructure and make plots suitable for development essentially acts as an incentive for development as it reduces the initial development costs for private developers.

## Affordability & Social Housing Provision

The liveability of Nordhavn, with its efficient public transport connections, access to the harbour and range of local amenities, has made it a highly sought-after residential area. While it is encouraging that this mode of compact growth development has a high level of demand, it has also brought to the fore issues of affordability that are often faced in new developments such as this.

As discussed earlier in this section, the Copenhagen City and Port Corporation has made significant investment in Nordhavn. This has included the financing of the metro network in the area which is estimated to have cost the company approximately \$2 billion.<sup>35</sup> The company has a mandate for profit maximization and in order to recoup the investment it has made in Nordhavn, building plots have been sold to private developers on a highest bidder basis. This has driven up the cost of housing in the area and has made it difficult for social housing companies to purchase land for social housing developments. The typical model for the delivery of social housing in Denmark is that nonprofit housing organizations develop and own the buildings. Capital for building social housing comes from a national funding institution known as the Landsbyggefonden (National Building Fund or Revolving Renovation Fund) and other private financing.

The affordability issue in Nordhavn is being alleviated to some extent by regulation that was adopted in 2019 giving the municipality the right to require that 25% of all new residential development be used for social housing. This regulation, however, was brought in after the commencement of inner Nordhavn. This is reflected in the estimates of social housing in the initial phase of the Nordhavn development, estimated to be below 10%.<sup>36</sup>

---

<sup>35</sup> Katz, Bruce ; Noring, Luise. *The Copenhagen City and Port Development Corporation : A Model for Regenerating Cities*. Washington DC : The Brookings Institution, 2017. 42 p. (City Solution; No. 1).

<sup>36</sup> Benjamin Wells. *Constructing Diversity*. Available at: <https://benjaminwells.eu/constructing-diversity>



## Consideration of Externalities

An environmental assessment was undertaken for the local plan of Inner Nordhavn, the first phase of the Nordhavn development. This was undertaken in 2011 and concurrently with the planning process so as to maintain the possibility of having an influence on the Inner Nordhavn local plan. The environmental assessment covers a number of areas of assessment including biological diversity, human health, climate impacts, cultural heritage and landscape, and resource consumption. The assessment provides an outlook on how the development impacts on each of these areas and compares this to a counterfactual of the status quo where no development is undertaken. It also puts forward a range of measures, both promotional and mitigating to improve the environmental impact as well as proposals for monitoring environmental performance.

In general, the overall assessment of the development was deemed to be positive. Amongst the factors that were deemed to have a net positive impact on the environment were the density of the development near public transport. The development could also lead to improved health outcomes through increased active transport and additional outdoor recreational opportunities. The assessment stated that if urban development of a similar scale was spread over Copenhagen or outside of the city in the manner of urban sprawl, that it would lead to increased car traffic, with associated negative effects for the climate and for people's health (noise pollution).

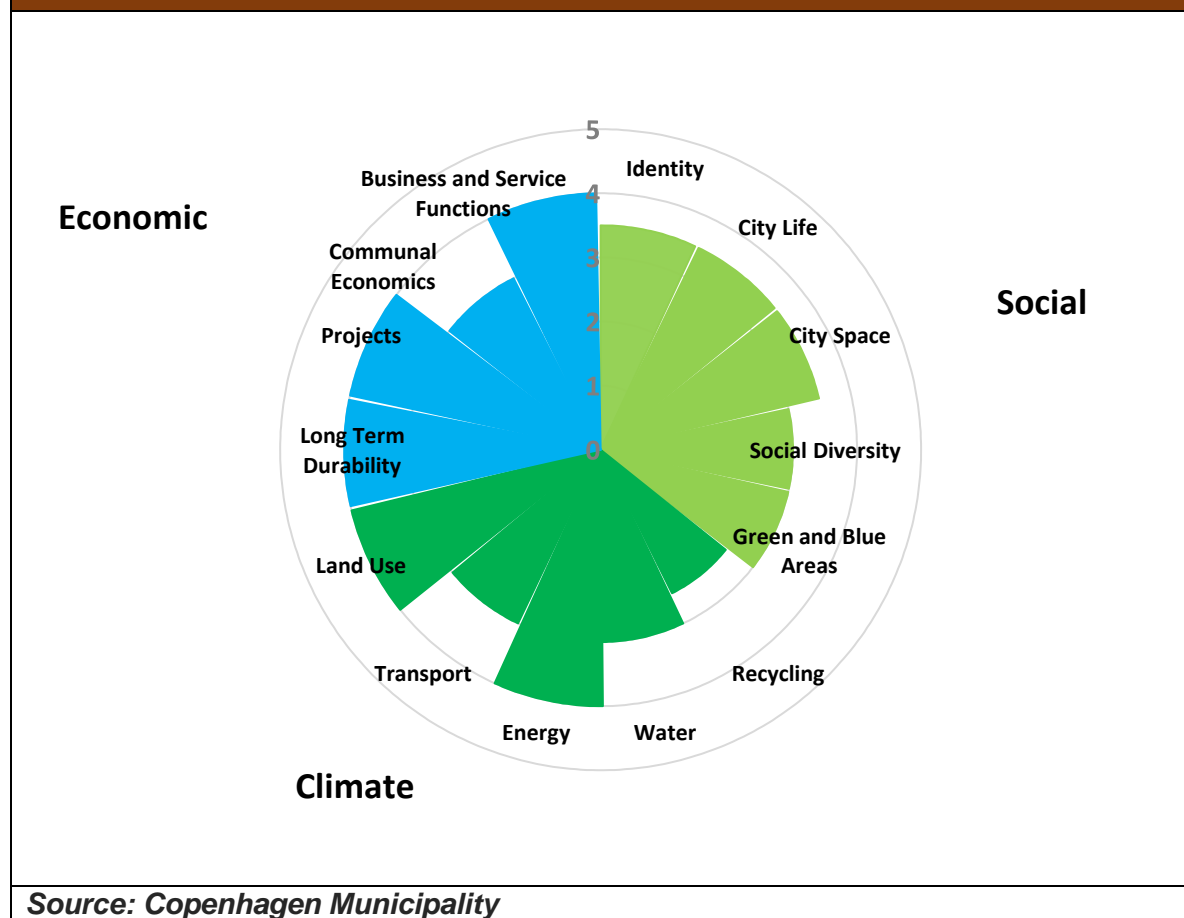
The development was also assessed using the sustainability tool of the Copenhagen municipality<sup>37</sup>. This tool was developed for use by the municipality, planners and advisors to assess sustainability of local plans across, social, economic and environmental sustainability. The purpose of the tool is to facilitate communication between the different actors of the development, e.g., the city authorities, Copenhagen City and Port Corporation, and private developers. The latest version of the tool has six themes, a number of which encompass the themes of compact development such as mixed-use spaces, circular construction and mobility. The sustainability tool is used to link the goals of sustainability as set out by the municipality with the design of local development plans. Elements in the local plan of Inner Nordhavn were scored on a scale of 1-5 based on how well they address sustainability considerations. The local plan for Inner Nordhavn scored highly for its land use due to its dense urban structure.

Where negative impacts of the development on the environment were identified, mitigation measures were introduced, these include green roofs, sluice gates, a recycling station, coastal protection, rainwater diversion, green space development, and other measures.

---

<sup>37</sup> Copenhagen's Municipality's sustainability tool. Available at: <https://www.kk.dk/sites/default/files/agenda/bfbd9bd2-7e58-41cd-bd7c-78e5d83b86c4/bb9a835e-6419-495d-925d-788ce708389c-bilag-4.pdf> (in Danish)

**Figure 4.5: Sustainability Tool Scoring**



### 4.3. Key Takeaways

- Nordhavn is being developed in Copenhagen, a city with a strong history of urban development which seeks to limit urban sprawl. This is evidenced by the long term 'Fingerplan' development strategy.
- The masterplan of Nordhavn emphasises the importance of compact growth in its design through the 'five-minute city' concept.
- The development company, Copenhagen City and Port Corporation, is mandated with the co-ordination of all development in Nordhavn and financed all infrastructure, including the extension of the metro.
- The company utilised a self-sustaining financing model whereby the uplift of land values at each stage were used to finance further infrastructure projects which in turn increased the land value.
- The Copenhagen City and Port Corporation took learnings from mistakes on previous developments and applied these to the design of Nordhavn.
- The design team of Nordhavn worked with the existing layout and buildings of the harbour rather than starting from scratch, helping to maintain the character of the area.

## 5. Case Study 3: Portland – Pearl District

### 5.1. Introduction

Portland, the largest city in the North-West American state of Oregon, is known for its parks, thriving art scene, small business-based economy, and focus on compact growth. It is the second largest city (after Seattle) in America's Pacific Northwest region and is a major port city on the Pacific Ocean. Outside of Portland and its other cities, Oregon is a largely rural state, with agriculture, fishing, timber, and farming being important industries for the state historically.

Portland is known amongst US cities for the particular emphasis it has placed on concentrating its population growth to within a compact, urban centre. Portland has largely sought to avoid the sort of urban sprawl that has occurred in many other cities that has led to widespread losses of agricultural land and greenspaces. Portland aims to grow up, rather than out and Portland's compact growth strategy is largely shaped by its 'Urban Growth Boundary', "a land use planning line to control urban expansion onto farm and forest lands ... responsible for managing the Portland metropolitan area's urban growth boundary."<sup>38</sup> This Urban Growth Boundary was introduced in the late 1970s to meet the requirements of Oregon state law after Oregon became the first state to adopt statewide land use planning laws.

Portland's urban growth boundary aims to manage, though not completely stop, urban sprawl. As such, its boundaries can expand when and where necessary in accordance with statewide planning goals. "Since the late 1970s, the Portland metropolitan area boundary has been expanded about three dozen times. Most moves were small – 20 acres or less", with larger expansions taking place less frequently, with a notable recent example being in 2018 when 2,181 acres were opened up to development in a proposal calling for the construction of over 9,000 new homes.<sup>39</sup>

While the Urban Growth Boundary was originally intended to protect agricultural and farmland, today the city focuses on compact urban growth for many additional reasons.<sup>40</sup> In its '2035 Comprehensive Plan', the city outlined five guiding principles that have shaped their planning, namely economic prosperity, human health, environmental health, equity, and resilience. The city of Portland, through its emphasis on compact urban growth, aims to achieve optimal outcomes in each of these five guiding principles, as explained in Table 5.1 overleaf.

---

<sup>38</sup> City of Portland. 2035 Comprehensive Plan. Available at: [www.portland.gov/bps/planning/comp-plan-2035/about-comprehensive-plan/2035-comprehensive-plan-and-supporting#toc-2035-comprehensive-plan-as-amended-through-may-2023-](http://www.portland.gov/bps/planning/comp-plan-2035/about-comprehensive-plan/2035-comprehensive-plan-and-supporting#toc-2035-comprehensive-plan-as-amended-through-may-2023-).

<sup>39</sup> Oregon Metro. Urban Growth Boundary. Available at: [www.oregonmetro.gov/urban-growth-boundary](http://www.oregonmetro.gov/urban-growth-boundary).

<sup>40</sup> City of Portland. 2035 Comprehensive Plan. Available at: [www.portland.gov/bps/planning/comp-plan-2035/about-comprehensive-plan/2035-comprehensive-plan-and-supporting#toc-2035-comprehensive-plan-as-amended-through-may-2023-](http://www.portland.gov/bps/planning/comp-plan-2035/about-comprehensive-plan/2035-comprehensive-plan-and-supporting#toc-2035-comprehensive-plan-as-amended-through-may-2023-).

**Table 5.1: Portland: Compact Urban Growth and Guiding Principles**

<b>Guiding Principle</b>	<b>Relation to Compact Urban Growth</b>
Economic Prosperity	Investment into industrial, brownfield sites, as well as increased sites for businesses in urban environments, will provide access to employment opportunities within the city for Portland's increasingly urban population.
Human Health	Compact urban growth aims to ensure that more residents of Portland have access to 'complete neighbourhoods' that will allow "people of all ages and abilities [to] have safe and convenient access to more of the goods and services needed in daily life", "[making] it easier for people to have active lifestyles and integrate exercise into their daily lives". This, as well as closer proximity to healthcare centres, could improve health outcomes for Portland residents.
Environmental Health	Increased urban density will likely lead to more people walking, using public transportation, and cycling, as forms of transportation, reducing emissions from motor vehicles. Additionally, concentrating growth to urban environments minimises the impact of population growth on the surrounding natural environment, and urban "multifamily buildings are less carbon intensive than single family homes". These in combination mean that compact urban growth could produce better environmental outcomes for the Portland area.
Equity	Compact urban growth will allow the city to more easily ensure that all residents have access to required services and amenities, including core infrastructure. Increased housing density can also make the provision of affordable housing units more achievable.
Resilience	Increased urban density will allow for the provision of 'complete neighbourhoods', which are capable of providing required services and amenities to residents. This will make the city of Portland more resilient to potential hazardous events, as impacts would be more localised. Additionally, compact urban growth has the potential to reduce the carbon impact of the city, reducing the risk of hazardous events related to climate change.
<b>Source: City of Portland, 2035 Comprehensive Plan</b>	

In addition to its urban growth boundary reducing urban sprawl, Portland has also taken steps to limit carbon emissions through prioritising compact urban growth. In 1993, Portland became the first major American city to "adopt a plan aimed at preventing global warming."<sup>41</sup> More recently, Portland has continued this emphasis on compact growth through its '20-Minute Neighbourhood' initiative. Portland defines twenty-minute neighbourhoods as residential areas where all key amenities and essential services – including grocery stores, parks, schools, public transportation, pharmacies – are all within a twenty-minute walking radius of residents. In 2009, Portland set a goal for 90% of its residents to live in one of

<sup>41</sup> Langdon, P (2008). "Portland pursues the '20-minute neighborhood'". Available at: [www.cnu.org/publicsquare/portland-pursues-20-minute-neighborhood](http://www.cnu.org/publicsquare/portland-pursues-20-minute-neighborhood).

these 20-minute neighbourhoods in order that more walkable neighbourhoods will reduce the city's carbon emissions.<sup>42</sup>

Portland's focus on making its urban growth compact has succeeded in many ways. As of 2019, Portland has the highest percentage of people who commute to work by bicycle of any major American city.<sup>43</sup> Compact urban growth, and the associated benefits, have been an integral part of Portland's urban planning to date and remain at the core of compact future urban planning in the city. While this section has outlined the focus on compact growth more widely in Portland, the remainder of this chapter outlines how these compact urban growth objectives were reflected in the development of the Pearl District.

## 5.2. Pearl District

### Background

The Pearl District is a neighbourhood in Portland located just to the north-west of the city's downtown core. Although it previously served as a railyard and warehouse centre, the area is now one of the most vibrant neighbourhoods in all of Portland, and a well-known example of compact growth worldwide. The neighbourhood's population has rapidly expanded from under 2,000 in the year 2000, to over 11,000 today (spread across just over 7,000 households), making it the most densely populated neighbourhood in Portland today.<sup>44, 45, 46</sup>

Residents of the neighbourhood have access to all essential services and amenities within easy walking distance, including parks and greenspaces. This 'walkability' had been identified as key to the growth of the Pearl District, as developers and city officials have focused on "building high-quality human capital, ... putting liveability and sustainability at the forefront."<sup>47</sup>

---

<sup>42</sup> City of Portland Bureau of Planning and Sustainability. Climate Action Plan 2009. Available at: [www.portland.gov/sites/default/files/2019-08/cap\\_may\\_2010\\_web\\_0.pdf](http://www.portland.gov/sites/default/files/2019-08/cap_may_2010_web_0.pdf).

<sup>43</sup> Roberts, J. "US Cities with the Most Bicycle Commuters per Capita". Available at: [www.move.org/cities-most-bicycle-commuters/](http://www.move.org/cities-most-bicycle-commuters/).

<sup>44</sup> City of Portland Profile, 2023. Available at: [www.portland.gov/civic/documents/city-portland-profile-2023](http://www.portland.gov/civic/documents/city-portland-profile-2023).

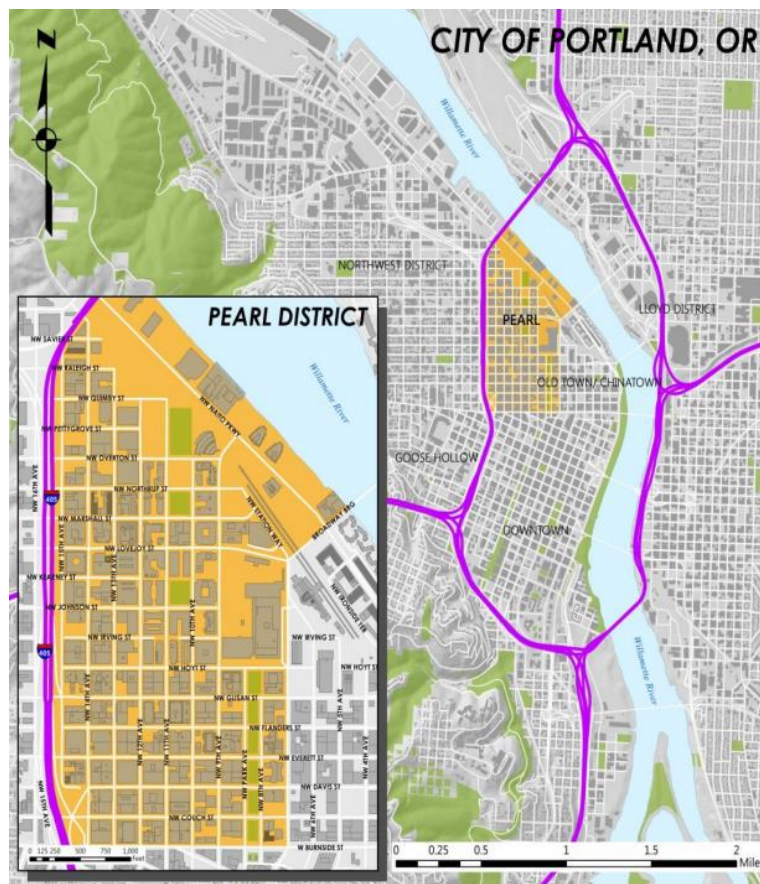
<sup>45</sup> Potiowsky, Thomas and Stewart, Scott, "Pearl District Market Study" (2012). Northwest Economic Research Center Publications and Reports. 22. Available at: [pdxscholar.library.pdx.edu/cgi/viewcontent.cgi?article=1022&context=nerc\\_pub](http://pdxscholar.library.pdx.edu/cgi/viewcontent.cgi?article=1022&context=nerc_pub).

<sup>46</sup> City of Portland. Portland Neighborhoods: 2020 Data Profiles. Available at: [www.portland.gov/civic/documents/data-rankings-2023/download](http://www.portland.gov/civic/documents/data-rankings-2023/download).

<sup>47</sup> Levenda A., and CC. Huang. The Pearl District, 2015. Available at: [energyinnovation.org/wp-content/uploads/2015/11/Pearl-District-Case-Study.pdf](http://energyinnovation.org/wp-content/uploads/2015/11/Pearl-District-Case-Study.pdf).



**Figure 5.1: Pearl District within Portland Area**



**Source: Jeremy R. Young, Institute of Portland Metropolitan Studies, Portland State University.**

### Development of the project

In the early 1980s, the area surrounding NW 13<sup>th</sup> Avenue, adjacent to downtown Portland, Oregon, was a largely abandoned brownfield site. With the advent of the interstate highway system and trucking as the primary vehicle for freight transport, the area surrounding NW 13<sup>th</sup> Avenue, originally a railyard and warehousing area, had become an eyesore on the outskirts of downtown Portland – an area that locals avoided for the most part. The condition of the Pearl District prior to its rejuvenation is illustrated in Figure 5.2. In keeping with the City of Portland’s overall vision and compact growth guiding principles a strategy of compact urban growth has been pursued that has been crucial to the development of the Pearl District.

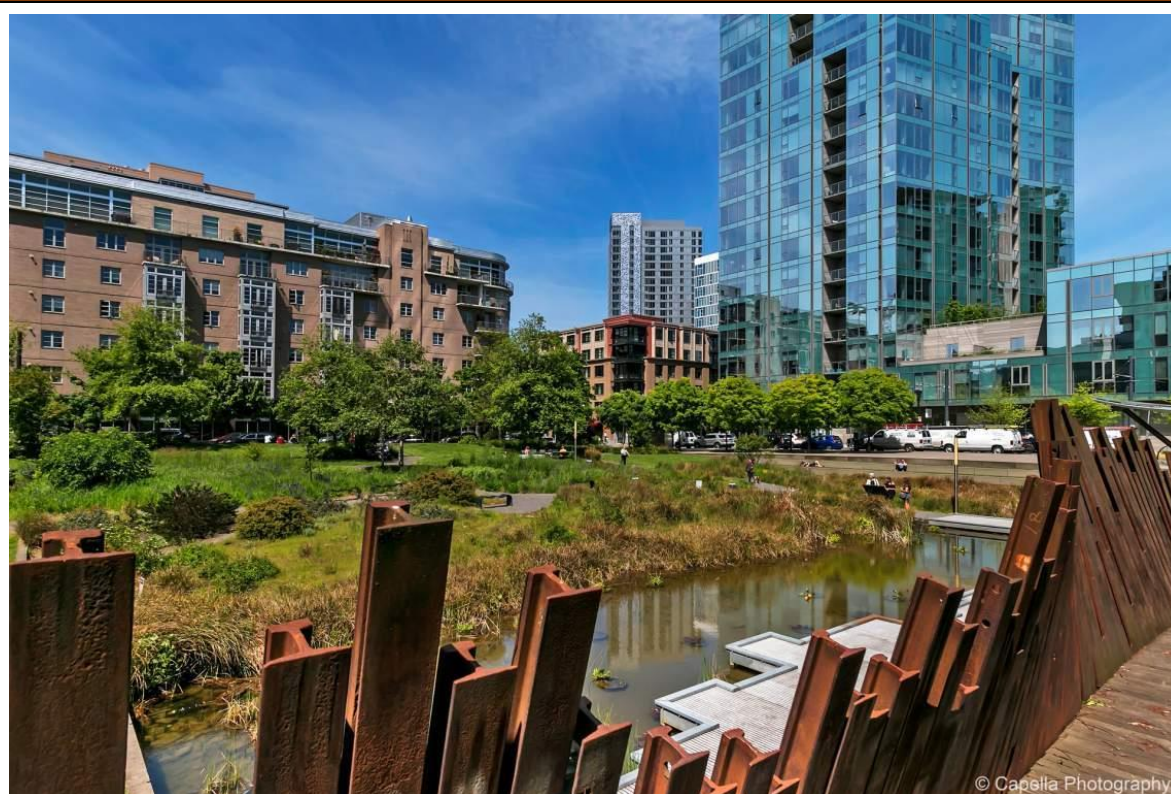


**Figure 5.2: Pearl District Then**



**Source: *The Oregonian*.**

Within decades, through collaboration between public and private entities, the redubbed 'Pearl District' has become one of the most sought-after neighbourhoods in the city, as well as one of the most well-known examples of 'urban renewal' and 'compact growth' in the United States. The area is characterized by the preservation and rejuvenation of many of its original buildings, as well as the presence of trees and small green spaces within its densely populated, urban environment. The district is zoned as mixed-use, and is home to apartment blocks, grocery stores, and coffee shops, as well as office buildings, loft conversions, and recreational spaces. Figure 5.3 shows the vibrant environment of the Pearl District today, where residential buildings are adjacent to commercial entities and public amenities.

**Figure 5.3: Pearl District Now**

**Source:** *The Portland Life.*

An important takeaway from the development of the Pearl District is the role of planning and coordination in successful compact growth and urban renewal projects. A steering committee comprised of city officials, developers, planners, designers and others developed the ‘Pearl District Development Plan, A Future Vision for a Neighbourhood in Transition’ in the year 2000. This document reevaluated previous plans and visions for the area and focused on potential policies to promote the redevelopment of the district. The 105-page document was adopted by the City Council in October 2001.

This development plan contains detailed information on objectives across key categories of city development, identifies specific improvement projects, and details a “block-by-block analysis of redevelopment potential of each sub-area; including details on planned housing units and residents, commercial office space and employees, and retail space. It also contained details on redevelopments and retaining of gyms, warehouses, lofts, hotels, commercial, retail and residential spaces.”<sup>48</sup>

Partnership and collaboration between developers and the city were crucial in creating the environment that has allowed the Pearl District to develop into the vibrant neighbourhood it is today. Examples of this include the city tearing down the Lovejoy Ramp, a piece of infrastructure that represented a major barrier to neighbourhood connectivity, the city building a streetcar transit system for the neighbourhood, and the city building three new public parks in the area. In exchange for this and other public investment, developers agreed to meet the city’s housing density requests and both parties agreed that 30% of housing

<sup>48</sup> Portland Development Commission. Pearl District Development Plan, 2001. Available at: [prosperportland.us/wp-content/uploads/2016/07/Pearl-District-Development-Plan-Appendix-1.pdf](http://prosperportland.us/wp-content/uploads/2016/07/Pearl-District-Development-Plan-Appendix-1.pdf).



would be affordable.<sup>49</sup> This collaboration, consisting of negotiations and compromises was instrumental in the development of the Pearl District.

One of the key factors in the success of the Pearl District, and one of the reasons that it has grown into the thriving neighbourhood that it is today, has been its “ability to attract and retain highly skilled, creative, and talented labor.”<sup>50</sup> The way that the new development was planned, being a mixed-use area with residential, commercial, and social spaces, as well as essential and non-essential (quality of life) amenities “*attracted high-income, young, and middle age populations who wanted to invest in the area. Portland economist Joe Cortright explains that the single most important factor driving urban economic success is the educational attainment of a city’s population. The Pearl District, for example, attracts young, college-educated adults who have greater incomes and are able to invest in the local economy*”, both in financial (through, among other things, setting up and supporting local businesses) and non-financial terms (getting involved in local community building, etc.), “[t]hese factors have contributed to the success of the district and its long-term strategy for growth.”<sup>51</sup>

## Obstacles to Development

The development of the Pearl District had to manage and overcome a number of obstacles. These obstacles include a lack of existing residential properties in the area, the presence of industrial infrastructure within the neighbourhood, physical barriers (namely the Lovejoy Ramp) that divided the area, a lack of greenspace and a lack of public transport and other infrastructure in the area. The development also faced the typical challenges with regards to the development and financing of necessary enabling infrastructure, as well as viability concerns for many developers considering investment in the area.

In addition to physical barriers and infrastructural issues, the development also raised safety concerns, with the discovery of significant soil contamination. Taking steps to remove and safely dispose of this soil was cost prohibitive, leaving the future of the development uncertain. Through emerging scientific knowledge and mitigation techniques, a much less costly alternative method was identified which allowed the development to proceed, subject to necessary safety measures.

As the development continued, developers realised that the type of construction required to meet the targeted housing density threshold in a cost-effective manner, which would have required five stories of wood-frame construction being built over a concrete base, was precluded by the city of Portland’s Uniform Building Code. To address this issue, “the development team successfully petitioned for a change in the code that made this construction type allowable in Portland, as it is in nearby Seattle,” convincing the city that altering the business code (allowing for the housing density targets to be achieved) was a net positive for the city, as it would enable the continuation of the development, and allow for

---

<sup>49</sup> Mills, J. “Lessons from the Pearl District: Designing Complete Places”, 2020. Available at: [network.aia.org/blogs/joel-mills1/2020/10/28/lessons-from-the-pearl-district-designing-complete](https://network.aia.org/blogs/joel-mills1/2020/10/28/lessons-from-the-pearl-district-designing-complete).

<sup>50</sup> Levenda A., and CC. Huang. The Pearl District, 2015. Available at: [energyinnovation.org/wp-content/uploads/2015/11/Pearl-District-Case-Study.pdf](https://energyinnovation.org/wp-content/uploads/2015/11/Pearl-District-Case-Study.pdf).

<sup>51</sup> Levenda A., and CC. Huang. The Pearl District, 2015. Available at: [energyinnovation.org/wp-content/uploads/2015/11/Pearl-District-Case-Study.pdf](https://energyinnovation.org/wp-content/uploads/2015/11/Pearl-District-Case-Study.pdf).

the transformation of a largely abandoned industrial area into one of the most thriving compact neighbourhoods in Portland.<sup>52</sup>

The issue of a lack of existing residential development and the challenge of developing a functioning residential environment was largely addressed through creative planning, as well as collaboration between the city and developers, via a focus converting existing buildings into lofts and using the existing infrastructure and its industrial façade where possible at the core of many developments in the area.

## Development Company

Prosper Portland is the economic and urban development agency for the city of Portland. Formerly known as the Portland Development Commission (PDC), the organisation is responsible for implementing and carrying out policies and programs that lead to the creation of vibrant neighbourhoods and communities, improve job opportunities for residents, and increase prosperity within Portland (among other responsibilities).<sup>53</sup> The PDC was responsible for projects in specific urban renewable areas (URAs) in Portland. The largest of which was the River District URA, which contains the Pearl District.

Prosper Portland is headed by an executive director who reports to a five-member, volunteer board of local citizens appointed by the mayor and approved by City Council.<sup>54</sup> The Board is authorized by the City Charter to administer the business activities of the agency and reports directly to the Mayor of the City. This structure aims to allow Prosper Portland to exercise independence in program implementation and resource allocation.

The PDC first got involved in the rejuvenation of the Pearl District in 1987 when it acquired land around the historic train station in the area.<sup>55</sup> It played a major role in the development of the Pearl District as it planned and oversaw the development and entered into development agreements with private developers (namely Hoyt Street Properties LLC., among others). The PDC's primary role was the provision of infrastructure to facilitate private development. It has been estimated that 90% of the investment costs<sup>56</sup> for the development of the district have come from private sources, demonstrating the important role that public financing has had in leveraging private investment in the area.

The PDC primarily financed the public investment in the Pearl District via 'Tax Incremental Finance' (TIF). This involves the PDC taking out debt that will be subsequently paid off via the increased revenues from property taxes in the area after the regeneration is complete. Public investment funded in this manner in the Pearl District included the streetcar project, the removal of the Lovejoy Viaduct, parks and greenspace, brownfield remediation and investments in the streetscape and lighting.

The PDC changed its name to Prosper Portland in 2017, and today continues to oversee the development of the Pearl District and surrounding area according to its River District URA

---

<sup>52</sup> Enlow, C. ULI Development Case Studies – The Yards. Available at: [casestudies.uli.org/wp-content/uploads/2015/12/C034005.pdf](https://casestudies.uli.org/wp-content/uploads/2015/12/C034005.pdf).

<sup>53</sup> Prosper Portland. What We Do. Available at: [prosperportland.us/what-we-do/](https://prosperportland.us/what-we-do/).

<sup>54</sup> [prosperportland.us/about-us/](https://prosperportland.us/about-us/)

<sup>55</sup> Enlow, C. ULI Development Case Studies – The Yards. Available at: [casestudies.uli.org/wp-content/uploads/2015/12/C034005.pdf](https://casestudies.uli.org/wp-content/uploads/2015/12/C034005.pdf).

<sup>56</sup> This includes the costs to developers of providing social and affordable housing units, which developers agreed via development agreements to provide in exchange for the PDC's investment in enabling infrastructure to facilitate private development.

Plan.<sup>57</sup> Through this plan, Prosper Portland “focuses on the creation of a high density urban residential neighbourhood with a mix of multi-family housing, major office facilities, regional attractions, retail businesses, parks and open space that balances new development with existing structures,” and aims to:

- Make the most of underutilised land, developing new housing units, commercial units, and open spaces;
- Foster a self-sufficient urban environment for residents, workers, and visitors, and;
- Promote linkages with surrounding neighbourhoods as well as the Willamette river.

## Design Features

Key design features that make the Pearl District the vibrant, compact, prosperous neighbourhood that it is include:

- Access (within walking distance) to parks, green areas, and other public outdoor spaces;
- Maintenance of the area’s original urban, industrial façades;
- Convenient public transit, including a streetcar system;
- Connectivity throughout the neighbourhood, lack of physical barriers/dividers that would serve as an impediment to residents easily accessing the entire neighbourhood;
- Small block sizes and a commitment to maintain a human scale in the area; and
- Designation of the area as a ‘mixed-used’ zone, which created the correct conditions for a vibrant neighbourhood to emerge and allowed for bars, coffee shops, and other key quality-of-life, as well as essential, amenities and service-providers to move into the neighbourhood.

## Policy Incentives

Several incentives were put in place to encourage development within the Pearl District. For example, a number of 10-year property tax exemptions were granted to investors for individual developments. Although it should be noted that this abatement could be revoked if the return from the investment exceeds an agreed threshold. Abatements of this nature were originally only available for rental properties but were extended to include housing within a quarter mile of light rail. These abatements were granted if judged necessary for the financial viability of a specific project by the PDC and subsequently by the city council.

As noted above, the PDC entered a number of commitments with developers which led to developers meeting minimum density and affordability levels as a condition of public investment in the streetcar system, public parks and other public infrastructure.

In addition to creating the right environment for the Pearl District’s rejuvenation, the city incentivised the development through a number of policies that made the financing of the project possible. These include the following policies:

- The classification of the area as an urban renewal area, allowing the use of tax-increment financing and other approaches to finance public investment;
- Involvement in Local Improvement Districts (LIDs), within which a number of property owners can share the cost of infrastructural improvements that mutually benefit all parties. Under LIDs, the city undertakes the investment works and the property owners do not pay until the work is complete. Financing under LIDs was available for up to 20 years in the Pearl District;

---

<sup>57</sup> Prosper Portland. River District. Available at: [prosperportland.us/portfolio-items/river-district/](https://prosperportland.us/portfolio-items/river-district/).



- Developers were able to avail of the Commercial Property Redevelopment Loan Program offered by the PDC. This initiative aimed to improve the feasibility of investments for private developers by filling gaps between available financing and construction costs. Financing was typically available on flexible terms and could be subordinate to primary financing;
- A number of tax incentives were also available for investment in the Pearl District:
  - Property tax exemptions (discussed above).
  - New Market Tax Credits - Incentivised companies to invest in redevelopment projects in exchange for tax credits.
  - Historic Preservation Tax Incentive – Tax credits of up to 20% of capital costs were available when projects involved the redevelopment of historic buildings in the area.
  - Business Energy Tax Credit – Credits of up to 35% were available for investments related to energy conservation and green building initiatives; and
- Maximum parking ratios were placed on developments. Requiring fewer parking spaces per residential and commercial unit increased the viability and profitability of these developments.

### Affordability & Social Housing Provision

As part of arrangements between property developers and the city, it was agreed that 30% of housing built in the Pearl District would be affordable. However, reaching this goal has been challenging in many developments.<sup>58</sup> Although significant quantities of affordable housing had been constructed, developers and the city have been struggling to meet targets, largely due to the success of the District and the associated increases in land and property values. The Pearl District has struggled to meet its original targets related to housing affordability. However, the area has succeeded in providing affordable housing options, for instance, close to 30% of Hoyt Street Properties homes were affordable.<sup>59</sup>

Although there is a significant supply of affordable housing within the Pearl District, it is important to view this in the wider context of the city. The Pearl District is unquestionably an affluent neighbourhood, which is reflected in Table 5.2. Households within the Pearl District have higher median incomes, higher median home values, and pay more in gross rent; this all indicates that although the Pearl District does have affordable housing options, overall, the neighbourhood is an affluent area. The presence of a population earning significantly higher than median incomes is indicative of the success of the Pearl District in creating an attractive urban environment. Partly as a result of this success however, it can be seen that affordable housing targets have not been met. Ensuring the delivery and viability of social and affordable housing delivery in scenarios in which wider compact growth projects succeed in raising land and property values should be an important consideration for an such developments in an Irish context.

---

<sup>58</sup> Gragg, R. "Reflecting on the Past, Present, and Future of Portland's Pearl District", 2015. Portland Monthly. Available at: [www.pdxmonthly.com/news-and-city-life/2015/10/past-present-and-future-of-portlands-pearl-district](http://www.pdxmonthly.com/news-and-city-life/2015/10/past-present-and-future-of-portlands-pearl-district).

<sup>59</sup> Levenda A., and CC. Huang. The Pearl District, 2015. Available at: [energyinnovation.org/wp-content/uploads/2015/11/Pearl-District-Case-Study.pdf](http://energyinnovation.org/wp-content/uploads/2015/11/Pearl-District-Case-Study.pdf).

**Table 5.2: Portland City and Pearl District Affordability**

	<b>Portland City</b>	<b>Pearl District</b>
<b>Median Household Income</b>	\$78,000	\$100,000
<b>Median Home Value (of owned homes)</b>	\$462,800	\$611,184
<b>Median Gross Rent</b>	\$1,406	\$1,610
<i>Source: City of Portland Documents<sup>60</sup>.</i>		

### Consideration of Externalities

Portland has a history of considering externalities in its planning and development. As noted above, the current development plans for the city explicitly cite the benefits of compact growth in environmental, economic and human health terms. This consideration of externalities was also present in the development of the Pearl District, notably the emphasis on compact growth, walkability, public transport, accessibility, and its ethos of creating a neighbourhood within which all residents can fulfil their essential needs through the provision of essential and non-essential services and amenities. These wider objectives were evident in the original plan for the Pearl District<sup>61</sup> which noted that the objective for the project was to develop a high-density, mixed-use development with active and pedestrian friendly streets and less dependence on cars.

While the objectives cited at the outset of the project are clearly aligned with the concepts of compact growth, from engagement with stakeholders and reviewing the available research and documentation, no attempt was made to quantify these benefits of reduced congestion, more sustainable travel modes, reducing commuting times etc. either prior to the development of the Pearl District or in the years since its completion.

In the context of the urban growth boundary within which the development of Portland must be considered, the potential for significant urban sprawl as an alternative to high-density urban development was significantly lower than in cities without a constraint on greenfield development. As such, as has been the case in the other cities considered here, a quantified case for the development of compact cities does not seem to have been required in order to support the development plans. To a significant extent, the benefits of compact growth are largely seen as self-evident in the documentation around both the Pearl District and plans for the future development of Portland more widely.

<sup>60</sup>City of Portland. Available at: <https://www.portland.gov/civic/documents/pearl-district-neighborhood-profile-2023/download>, <https://www.portland.gov/civic/documents/city-portland-profile-2023/download>

<sup>61</sup>Portland Development Commission. Pearl District Development Plan, 2001. Available at: [prosperportland.us/wp-content/uploads/2016/07/Pearl-District-Development-Plan-Appendix-1.pdf](https://prosperportland.us/wp-content/uploads/2016/07/Pearl-District-Development-Plan-Appendix-1.pdf)

### 5.3. Key Takeaways

- The Pearl District is an example of successful compact growth on a brownfield site within a city that has historically sought to emphasize compact growth and minimise the impact of urban growth on rural areas and green spaces;
- Collaboration between public and private entities was vital in ensuring that the required infrastructure was provided to support development, and that the development was built in a way that was aligned with the city's objectives (the construction of dense housing, of which some was affordable);
- The PDC was an important driver of development in terms of providing and administering incentives to developers, financing infrastructure development and ensuring that development was completed in line with the objectives for the District;
- In addition to the provision of public infrastructure, a number of incentives were also available to developers to promote high-density, mixed-use development in the area including tax incentives and supports for accessing project financing;
- The provision of public transport infrastructure was a vital component of incentivising development in the area and ensuring that the objectives for a high-density and less car dependent area were achieved; and
- Planning the growth and development of the area, including its infrastructural and business needs and opportunities was vital in ensuring the neighbourhood reached its potential.

## 6. Case Study 4: Freiburg – Vauban

### 6.1. Introduction

The city of Freiburg im Breisgau (hereafter referred to as Freiburg) in southwest Germany is renowned worldwide as an exemplar of sustainable urban development. The city has received multiple domestic and international awards for its innovation in urban design including winning Germany's most sustainable major city award in 2012 and being a previous finalist of the European Green Capital award. The success of Freiburg as a sustainable city aligns with its development as a compact city. With a population of approximately 240,000 the city is similar in size to Cork City. What makes it a compact city is that 90% of residents live within a 5km radius of the central city plaza (Münsterplatz). The prominence of Freiburg in urban design planning is evidenced by the 25,000 'expert visitors' who visit the city each year to take learnings from this model city.

Freiburg's history of sustainable development was initiated through the 1970's and 80's, prompted by local resistance to federal plans to build a nuclear power plant in the vicinity. The local community organised a grassroots movement to block this project and ultimately it never went ahead. The success of a community movement in achieving what was viewed in Freiburg as a victory for environmentalism gave impetus for further drives for environmental activism in the municipality. This has fed into the ethos of the municipality authorities who have implemented a range of regulations and initiatives around energy usage and sustainability.<sup>62</sup> This includes the protected greenbelt which incorporates the surrounding Black Forest. A central tenet of the city's growth strategy has been compact development, densifying the existing urban area rather than expanding outward.

The urban planning office of Freiburg is responsible for long-term planning in the municipality. Set out in the most recent Long-term Development Plan is the aim to reduce the additional use of land for structural uses through densification. The urban planning office is also in the process of developing a specific Land Use Plan to 2040 which will set out what each part of the urban area will ultimately be used for. The Land Use Plan will also include a detailed housing market analysis. This analysis integrates population projections out to 2040, informing long-term estimates of housing demand and how this demand is to be met while still maintaining the core aim of density of development.

Developed in conjunction with the Land Use Plan is a Landscape Plan which sets out the goals and objectives for nature conservation, landscape conservation and recreational provision on currently undeveloped land. Setting out a separate plan for the use of undeveloped land acts as a guard against the encroachment of urban development into this space. Significant public consultation is undertaken in the development of these plans. The public consultation that has been undertaken so far has included a range of questionnaires, civil working groups and information events. Events were undertaken at both a local area level and at a higher city-wide level.<sup>63</sup>

---

<sup>62</sup> For further information on the history of Freiburg see: <https://greencity.freiburg.de/pb/,Len/milestones.html>

<sup>63</sup> More information on long-term urban planning in Freiburg can be found here: <https://greencity.freiburg.de/pb/,Len/1592989.html>

As part of the Freiburg strategy to grow by developing on existing urban areas, the city has developed a number of new districts. For example, Rieselfeld was a new district that was built on the site of a former wastewater facility and now has a population of over 10,000. Gutleutmatten is an even more recent district that was developed on the site of a former allotment site and now houses 1,200 residents. Another residential district that was developed on an existing urban site and the focus of this case study analysis is Vauban.

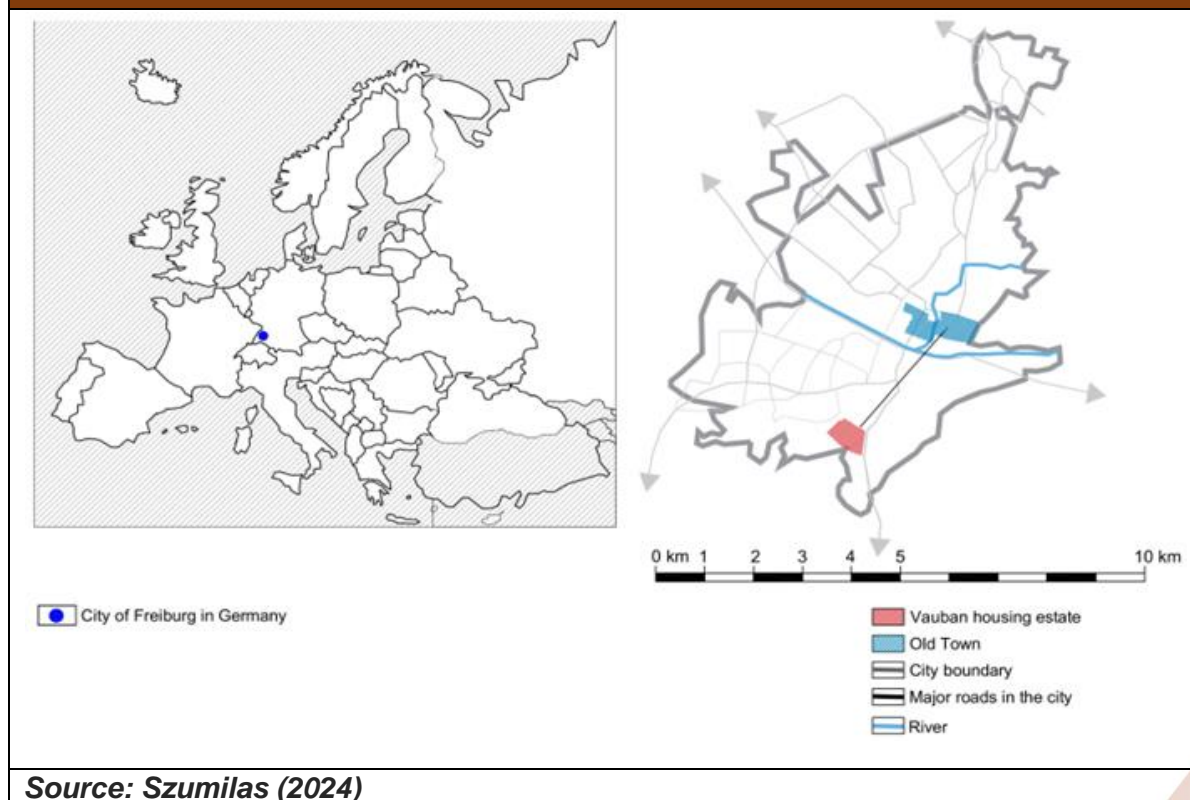
## 6.2. Vauban

### Background

In comparison to the other case studies analysed in this report, the Vauban district in southern Freiburg is a compact brownfield development on a small scale. Covering an area of 41 hectares, the district has a population of over 5,000 with a population density of around 12,500 per km<sup>2</sup>. This is significantly higher than the wider population density of Freiburg (4,900 per km<sup>2</sup>) and the capital city Berlin (4,200 per km<sup>2</sup>). The compactness of Vauban was an intentional element of the design of the district, and it facilitates the ambitious environmental goals that the local community and planners set for the area.

Even by the high eco-standards of Freiburg, Vauban is considered to be the epitome of green urban development. The district was built as a model of what an environmentally conscious development could look like, and it is characterised by its low energy buildings, renewable energy sources and the rarity of privately owned cars on its streets. The planning and development of the district offers lessons for how compact developments such as Vauban can successfully involve the local community in the development process.

**Figure 6.1: Location of Freiburg (left) and the Vauban district (right)**



**Source: Szumilas (2024)**



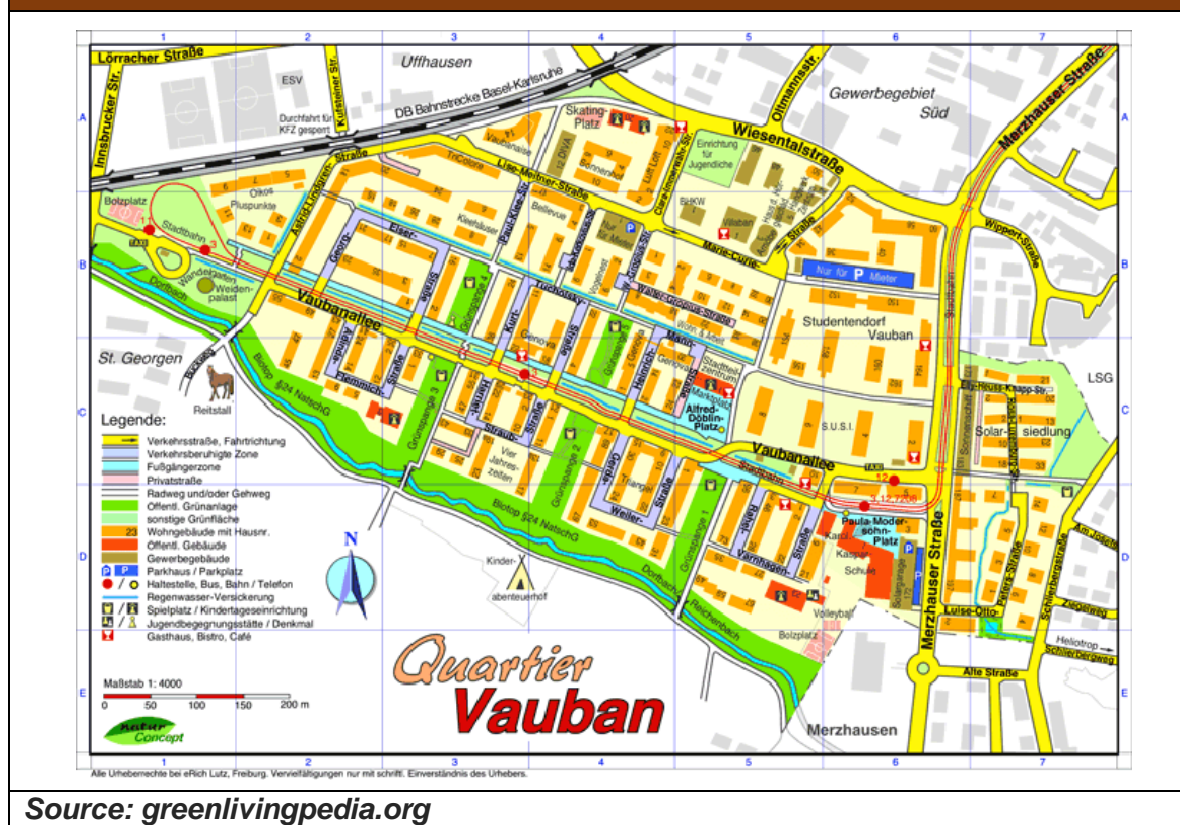
## Development of the Project

Like the city of Freiburg itself, the history of the development of Vauban is rooted in community-led movements. The district was originally an army barracks that was left unoccupied following the withdrawal of the French Army from the area in the early 1990s. The land was subsequently transferred to the German State and was then bought by the city of Freiburg. In view of the growing population in the city, the city authorities put in place plans to develop Vauban as a new residential district.

Concurrently and independently of the city authorities, a number of different citizen groups including the Student Services Department and the Independent Settlement Initiative (SUSI) were developing their own plans for the future of the site. These groups were focused on developing community housing that had an emphasis on sustainability. The city administration recognised the importance of having local community buy-in to the project and gave these groups significant input into the planning and development.

Following a design competition, the masterplan for Vauban was adopted in 1996. In the same year, the development was selected as a model of best practice for sustainable urban development by the United Nations Conference in Istanbul on Human Settlements. The implementation of the masterplan began in 1998, with the construction of the first residential buildings. Construction continued over the next eight years and by 2006 the development, as set out in the masterplan, was essentially completed. However, in the years following this there have been a range of projects undertaken in the district aimed at furthering the environmental sustainability of Vauban.

Figure 6.2: The Masterplan Drawing of the District of Vauban





## Obstacles to Development

One of the main challenges in the development of Vauban arose from the number of stakeholder groups involved in the development process. This included the initial squatters who moved into the barracks, the student and SUSI groups, private developers and the city authorities themselves. Throughout the planning and development there were ongoing disagreements between the local community and the city authorities. The initial conflict arose around the rights of the various squatter groups to remain in the buildings they occupied. When the planning phase of the development commenced there was also often significant disagreement between the different parties as to the end goals for the district. While the local community groups were often keen to set out ambitious environmental and social goals for the development, the city administration was generally more reserved.<sup>64</sup>

## Development Organisations

The development of Vauban was managed by Project Group Vauban, a working group established and run by the Freiburg city authority. It should be noted that unlike the other case studies considered in this report, a separate development company was not established for the development of Vauban. This is at least partially due to the smaller scale of Vauban relative to the other case studies, mitigating the need for the establishment of a new independent entity. The city authorities set out the initial goals for the development, chose the masterplan and co-ordinated the planning of the district. The city authority was also the primary funder for the development with additional funding sourced from Federal agencies and the EU.

From the outset of the project, the local community actively sought to have input into the planning of the development. In order to facilitate the co-ordination of the views of the local community, an NGO body, Forum Vauban, was established in 1994.<sup>65</sup> This group liaised directly with the city authorities to convey the thoughts and concerns of the future residents of the district. While the city authorities were ultimately mandated with the development of the district, Forum Vauban facilitated a means by which the community groups could provide input into its development. In addition to Forum Vauban, there were other local stakeholders such as student and SUSI groups who were also given the opportunity to have their say on how the development should proceed.

The input of the local stakeholders ultimately resulted in changes to the development plans from the original specifications set out by the city administration. This included the push for the district to be a 'car-free' district focused on walking, cycling and public transport. It also included more buildings to be built at a passive energy specification and increased shared social spaces.

As discussed in detail in Little (2007),<sup>66</sup> the community led development in Vauban extended beyond the planning phase and into the construction of the district. Residential building in Vauban was undertaken by community building groups known as Baugruppen.

---

<sup>64</sup> Coates, Gary. (2013). The sustainable Urban district of Vauban in Freiburg, Germany. *International Journal of Design & Nature and Ecodynamics*. 8. 265-286. 10.2495/DNE-V8-N4-265-286.

<sup>65</sup> Primož Medved (2018) Exploring the 'Just City principles' within two European sustainable neighbourhoods, *Journal of Urban Design*, 23:3, 414-431, DOI:

<sup>66</sup> Little, J. (2007) *Baugruppe - Lessons from Freiburg on cooperative housing* : Lessons from Freiburg on Cooperative Housing, Self Published.

Baugruppen are legally recognised groups of citizens who come together to undertake the construction of their own homes. In Vauban, these groups were given preference for building on city owned land ahead of private developers. By not allocating land through a highest bidder process, the Baugruppen had significantly lower site costs than would be typically faced by private developers. When multiple Baugruppen were interested in building on the same site, rather than competing on the price paid for land, the land allocation was decided based on which group had the greatest sustainability and social plans.

As non-profit entities, the Baugruppen could develop buildings at a lower cost than the private sector who have profit maximisation mandates. They also faced reduced costs in other areas that are typically costly for private developers such as marketing. Members of the Baugruppen were also able to receive preferential mortgage rates with mortgages drawn down in stages. Ultimately this approach to residential building reduced the final price of homes for those in the Baugruppen. The Baugruppen approach to buildings has been successful in Vauban and other areas of Freiburg and has been adopted by other cities in Germany including Berlin.

## Design Features

More than any other district in Freiburg the development of Vauban is geared towards sustainability and environmentalism. This is reflected in a range of design features of the district.

- One of the most striking features of the district in this regard is how it has been designed to significantly reduce car dependency. It is estimated that there are around 200 cars per 1000 residents in Vauban compared to 382 per 1000 in Freiburg and 584 per 1000 in Germany.<sup>67</sup> This has been achieved by making alternative means of travel more accessible while reducing incentives for using cars.
- The design of the district is in keeping with that of a compact development. The different areas of the district are developed as mixed used spaces which puts homes, amenities and workplaces in close distances of each other. This facilitates the primary modes of transport in the district to be walking and cycling. These active modes of transport are further encouraged through the design of wide footpaths and bicycle lanes and the designation of a number of pedestrian only areas.
- The district also has strong public transport networks, serviced by both bus and tram. In order to disincentivise the use of cars, on-street car parking spaces are extremely limited. Instead, there are two centralised car parks in which residents can rent a space for an annual fee.
- The Baugruppen approach to development lends itself to the heterogeneous design of buildings due to the different building groups each taking only a single project. This gives the district a more vibrant feel than might otherwise be the case if a new residential development is undertaken by a small number of private developers.

The buildings in Vauban all encompass the central tenants of the district including environmentally sustainable building practices and energy usage. All buildings in Vauban must not exceed the energy output of 65kWh/m<sup>2</sup> as set out by the Freiburg city standards. While these standards are much higher than those typically required in Germany, many

---

<sup>67</sup> Szumilas, A. Implementation of Solutions Reducing the Number of Cars in Polish Housing Estates—Based on the Experience of the Vauban Estate in Freiburg, Case of the City of Wrocław. *Buildings* 2024, 14, 712. <https://doi.org/10.3390/buildings14030712>

buildings in the district go further than this. A large number of buildings meet the passive housing standard for ultra-low energy usage and produce surplus energy through renewable sources such as solar power to be sold back to the city.

## Affordability & Social Housing Provision

Affordability and social inclusivity were key objectives set out for Vauban by the city authorities, Forum Vauban and other stakeholders. As part of the of the initial masterplan, a target was set for at least a quarter of all housing to be social/subsidised. Rent controls were also put in place, which were designed to enhance the affordability of the district.<sup>68</sup> However, over the past decade affordability issues in Vauban have become increasingly prevalent.

German property experts have stated that these affordability issues stem from the success of Vauban as an eco-friendly and highly liveable district. This has created high demand for property in the area and as a result led to an increase in house prices.<sup>69</sup> The expiration of the rent controls which were set for a period of 10 years has also worked against affordability in the area. Further to this, the original targets for social housing were significantly undershot. In 2014 it was estimated that just 10% of housing was social housing.<sup>70</sup>

## Consideration of Externalities

The Vauban district has had ambitious social and environmental goals at the core of its development since its initiation. A major part of the strategy to achieve its aims in these areas has been through compact growth. This is evidenced by the original Vauban masterplan which puts compact growth to the forefront of the districts long-term objectives.<sup>71</sup> This included:

- To offer high quality building spaces for young families within the city's limits and to counteract urban sprawl.
- A dense urban design concept comprising low energy standard for all buildings, green spaces, good public access (including a new tram) and further infrastructure.

The negative externalities of sprawl which the planners in Freiburg are actively seeking to avoid are qualitatively set out in the Land Use and Landscape plans. These include:

- Underutilization of the existing infrastructure;
- Social segregation as those on high incomes tend to move away from the city centre;
- Cost burden for the remaining residents in the city centre;
- Visual disturbances in existing natural landscape;
- Loss of resources for agriculture and forestry;
- Negative impacts on air quality;
- Ground water contamination; and
- Negative impacts on the local fauna.

---

<sup>68</sup> Schwer, S. (2017) 'Only for the rich? Low-carbon energy transition in the Vauban. The International Institute for Industrial Environmental Economics.

<sup>69</sup> Susanne Osadnik (2014) 'In den Städten wird die Wohnwelt 3.0 Wirklichkeit'. Welt

<sup>70</sup> Laufer, Benjamin (2012) 'Citizen participation. We build the world the way we like it.' Hinz&Kunz non-profit publishing and sales GmbH;

<sup>71</sup> Sourced from: Little, J. (2007) Baugruppe - Lessons from Freiburg on cooperative housing : Lessons from Freiburg on Cooperative Housing, Self-Published.

### **6.3. Key Takeaways**

- The Vauban district is a community-led development that put an emphasis on compact growth.
- Vauban is situated in Freiburg, a city with a history and culture of environmentalism that has put in place measures at a municipal level to curtail urban sprawl.
- The compact design of the Vauban has enabled residents to have amongst the lowest rate of car ownership in Germany.
- The formation of the NGO Forum Vauban facilitated the co-ordination of the input of the future residents in the district.
- The Baugruppen approach to construction allowed residents to build their own homes at a lower cost than would have been the case through a private developer.

## 7. Lessons Learned & Application in an Irish Context

An important element of the terms of reference for this study was to consider potential lessons from the case studies undertaken for the promotion and implementation of compact urban growth in an Irish context. This section outlines some of the common practices and policies used in the four case studies. Consideration is given to all elements of the case studies including project planning, design, and implementation.

Table 7.1 illustrates some wider comparative statistics across the case study areas in terms of the relative size of the projects, their approach to social and affordable housing and their aims with regard to sustainable transport practices. For context when considering this final column, the targets set out in the Climate Action Plan for Ireland with regards to modal shift are:

- Reducing the total distance driven across all car journeys by 20%
- 50% increase in daily active travel journeys
- 130% increase in daily public transport journeys
- 25% reduction in daily car journeys.

	<b>Vienna – Aspern Seestadt</b>	<b>Copenhagen – Nordhavn</b>	<b>Portland – Pearl District</b>	<b>Freiburg – Vauban</b>
<b>Population</b>	12,000 (Current) >25,000 (Projected)	c. 4,000 (current) 40,000 (Targeted)	11,019 (2020)	c. 5,000
<b>Population Density</b> (persons per kilometre squared)	>10,000 (Projected)	c. 11,000	9,180 (2020)	c. 12,500
<b>Number of Dwellings</b>	11,500 (Projected)	-	8,368	c. 2,000
<b>Proportion that is Social Housing</b>	>60% (Vienna)	25% (Targeted)	35% (target)	c. 10%
<b>Sustainable Transport Aims</b>	Target modal split: - 40% cycling and walking - 40% public transport - just 20% car traffic is the envisaged modal split	- 75% of trips in to be made on foot, by bicycle or by public transport; - Half of commutes to work or school are by bicycle; and - An increase of public transport use by 20%.	Target mode split by 2035 of: - 57.3% auto - 18.9% transit - 2.3% bike, and - 21.5% walking All new developments must be within a 500-m radius of a mass transit station	Achieved 200 cars per 1,000 residents (versus 382 per 1,000 in wider Freiberg)



## Public Transport and Infrastructural Developments

Strong public transport networks are synonymous with compact growth and in each of the four case studies they were central to the developments' success. It was particularly evident that having public transport links in place at an early stage of development contributed to the initial momentum behind each project. In the case of Aspern Seestadt, the underground connection with Vienna city was in place before the first residents had arrived. This encouraged people to move into the development at an early stage and was evidence that they would not need to rely on cars for transport in the area.

In general, having well developed infrastructure in place was shown to make these areas desirable for both residents and commercial entities. Well-connected developments with an abundance of facilities and public amenities lead to strong demand for buildings and reduce the need for policymakers to put in place specific policies to incentivise private developers to develop on these brownfield sites. The importance of coordinated investment in supporting infrastructure was evident in each of the cities considered.

In an Irish context, focusing high-density development in areas well served by public transport and other public infrastructure should be a key focus when targeting compact urban growth on a significant scale. Continued investment in public transport capacity will also be required to ensure that the promotion of lower car dependency in compact urban areas remains viable. Additionally, while lower parking requirements can promote development viability, this also relies on sufficient investment in public transport and active travel.

## Co-ordination Through Development Company

Co-ordination of development is a particular challenge to brownfield developments on the scale of those analysed in this report. Central to the success of these projects has been the workings of a single entity which has a mandate for co-ordinating all planning, consultation and construction activity. In the case of Vienna, Wien 3420 AG was established with the sole purpose of managing the Aspern Seestadt development. In Copenhagen, the Copenhagen City and Port Corporation manages the development of a number of developments in the city including Nordhavn. The Portland Development Company was vital in the development of the Pearl District. The focused mandates of these development companies allow them to dedicate their operations to making these projects successful and provides single points of contact for other stakeholders from the public and private sectors to engage with the developments.

The establishment of development companies represents a means of devolving power and responsibility to agents with a sole focus on the delivery of their specific objectives with regards to compact development in particular areas. In an Irish context, this approach has been taken previously with the establishment of the Dublin Docklands Development Authority. The Land Development Agency, via the establishment of the Cork Docklands Delivery Office, is playing a similar role in the proposed project to redevelop the docklands in Cork City. The international experience suggests that establishing entities with a focus on delivering specific compact urban growth projects can be an important element of ensuring that the developments are appropriately coordinated and managed in line with their overall objectives.

## Infrastructure Financing

Public investment in the case studies considered here was typically financed in a manner which, to a significant degree, allowed the public sector to cover a large portion of the investment costs. This was done via Tax Incremental Financing of public infrastructure in Portland, and the financing of infrastructure costs via lands sales in Copenhagen, Vienna, and Freiburg.

These case studies demonstrate the potential for the significant public investments required to facilitate compact urban growth initiatives to be at least partially financed via land value capture mechanisms. Aspern Seestadt, Nordhavn and the Pearl District financed the majority of the costs of enabling infrastructure for the wider development via land sales (Aspern Seestadt, Nordhavn) and land value capture mechanisms (the Pearl District). Although it should be noted that investments in metro and tram infrastructure were not financed by the development companies in Aspern Seestadt or the Pearl District, in Nordhavn the development company is required to fund the extension of the metro via the sale of land in the development.

Financing significant public investments in this manner may merit consideration in an Irish context and has been part of the policy mix in Ireland under Section 48<sup>72</sup> and Section 49<sup>73</sup> development levies under the Planning and Development Act, 2000. The National Economic and Social Council has also considered how international approaches to financing public transport development through land value capture may have lessons for Ireland.<sup>74</sup> This report highlighted the need for strong institutions to implement mechanisms of land value capture, organisational capacity with the expertise to implement effective land value capture mechanisms and supportive land-use policies that facilitate land value capture and sustainable urban development. The report also highlighted the importance of social and political support for this form of funding to be successful. However, it is important to be mindful of the existing viability challenges in Ireland in development of high-density apartments when considering the potential role of such financing measures in enabling compact growth in an Irish context. An additional cost in the form of land value capture mechanisms would likely enhance these viability challenges.

The viability concerns of financing public investment in this manner are becoming evident in Copenhagen in particular where stakeholders indicated that the additional costs of building in Nordhavn due to the requirement for the development to finance the costs of infrastructure, particularly the Metroline extension, make the development of affordable housing in the Nordhavn area an increasing challenge.

---

<sup>72</sup> Section 48 refers to the provision under which a planning authority can require a developer of a new commercial or residential development to make a development contribution in respect of public infrastructure and facilities benefiting development in the area. For further detail see: <https://www.irishstatutebook.ie/eli/2000/act/30/section/48/enacted/en/html>

<sup>73</sup> Section 49 refers to the provision under which a planning authority can require a developer of a new commercial or residential development to make a development contribution in respect of a particular public infrastructure service or project that the development is deemed to benefit from. For further detail see: <https://www.irishstatutebook.ie/eli/2000/act/30/section/49/enacted/en/html>

<sup>74</sup> National Economic and Social Council, 2018, "*Land Value Capture and Urban Public Transport*". Available at: <https://www.nesc.ie/publications/nesc-secretariat-paper-13-2018-land-value-capture-and-urban-public-transport/>

## Legislative and other Constraints on Greenfield Development

Legislative constraints on green field development are a common theme across the case studies considered here. The presence of greenbelts around the cities considered largely mandates compact urban growth to facilitate the continued growth of these cities. The greenbelts around these cities have typically been in place for a significant period with the explicit objectives of minimising urban sprawl and maintaining agricultural and wilderness areas. The presence of these greenbelts has, for the most part, led to the embedding of the principles of compact urban growth in urban planning and development practices in the cities considered here. When asked about the potential for alternative greenfield development, stakeholders met as part of this study typically responded that this was not a viable option for their cities. As such, while these cities are cognisant of the benefits of compact urban growth, they are typically not considered relative to an alternative under which the cities grow via continued sprawl.

The deeply embedded focus on compact urban growth in the wider urban planning frameworks used in the case study cities has doubtlessly played a role in facilitating the planning and development of successful high-density urban developments in these cities. The socialisation and acceptance of the merits of compact urban growth and the environmental, social and public service delivery costs of sprawl in the political and wider urban planning environment, as detailed in Section 2.2, would help to drive policy in Ireland in a manner that facilitates similar levels of investment in compact urban growth.

A useful step forward in this regard would include the establishment of a definition of what constitutes compact urban growth in an Irish context. At present, development within existing CSO settlement boundaries can constitute compact urban growth in planning terms in Ireland. However, these CSO definitions were not developed with a spatial planning purpose in mind. They take no account of density of development or service provision. As such, a better articulated definition of compact urban growth which steers planners and wider policymakers towards more appropriate sites is more likely to facilitate successful developments akin to those outlined in the case studies in this report.

## Car Parking Minimums

For the most part, direct incentives to developers were not provided for the developments considered here, although Portland did provide some specific tax incentives for developers. Stakeholders consulted largely noted that the rezoning of the land and provision of supporting infrastructure offered enough of a market incentive for private developers to supply both the housing and commercial space in these developments on a market basis. However, stakeholders did note that the reduction in the car parking requirements in these developments did act as an incentive and viability aid to developers by decreasing the costs per unit and increasing the number of units permissible on a given plot. While reducing car parking requirements was also aligned with wider objectives of walkability and reducing car dependency in these areas, it also acted as a development incentive in many cases.

Given the viability challenges faced for many high-density developments in Ireland, a reduction in car parking requirements potentially merits consideration in any future plans for large compact growth projects. However, it should be noted that dramatic reductions in car parking requirements does need to be accompanied by investments in other areas to promote liveability in these developments including service provision, local amenities, retail

and, most importantly, public transport provision. In the absence of the delivery of these wider elements of a compact development, reducing car parking spaces may serve only to make the development less attractive to potential residents.

## **Subsidised Retail**

An important element of the development of a number of the examples of compact growth considered here was the establishment of a vibrant street life and achievement of human scale development more generally. With regards to retail, this typically manifested in an exclusion of large shopping centre style developments in these areas in favour of street level retail. In Copenhagen, this presented a challenge of ensuring the viability of this street level retail. To overcome the challenge, the development company agreed to subsidise the retailers in these areas for the initial years of their operation to allow for the fact that the population of the development was only likely to reach a point of sustainability for the retailers a number of years into the future. Without a subvention, the retailers may not operate in the area with negative implications for street life, reducing car dependency and the overall attractiveness and liveability of the area.

The case study development in Vienna also involved the investment by the development company into the provision of retail space in the new development. The development company took an activist role in ensuring that appropriate retail services were provided in partnership with a corporate retail partner, who in turn managed the letting of property. Should large scale compact urban growth initiatives be undertaken in an Irish context, consideration could be given to a time limited subvention to retailers operating in the early stages of the development to ensure their presence to support the longer-term objectives of the development.

## **Design and Implementation**

### **Public Consultation**

A common obstacle faced in the development of large-scale residential projects is objections from members of the public in the local area. This is particularly true of brownfield sites which are in the midst of pre-existing development. At the outset of each of the four analysed developments, before the masterplan had been adopted, locals were given the opportunity to have their views heard and their inputs included in the planning process. In Vauban, a new organisation formed by members of the public was given an official part in the planning process and their influence resulted in the city authorities adopting more ambitious goals for compact development than they had originally set out. In Aspern Seestadt, three members of the public were made part of the planning team at the outset of the project to represent the interests of the local neighbourhoods throughout the planning process. Consultation that gives locals real input into the planning process/masterplan can help alleviate disconnect and disagreement between the local community and planners.

### **Small Plots and Human Scale Development**

Development companies/authorities in each of the case studies had a preference for tendering plots of land in small parcels. This resulted in a more diverse and mixed-use types of development. It was highlighted that the Copenhagen City and Port Corporation, who are in charge of the Nordhavn development, had taken the opposite approach on a previous development whereby large plots of land were tendered for development by a single developer. This was generally seen as a mistake and led to homogeneity of design in that

particular development. The small plots of land tendered in the Vauban development facilitated the Baugruppen approach to construction. It is important to note that while the development companies/authorities encouraged diversity in development across building plots they still had oversight on the development of each plot and could ensure the desired degree of cohesion between buildings.

### **Development around focal point/amenity**

The case study developments outlined in this report share a common design feature of focusing the wider development around a focal point/public amenity. The lake shore in Vienna, the waterfront in Copenhagen and the riverside in Portland all serve as public amenities to service the wider development and provide a piece of public infrastructure at the heart of the development. The focus of the development around the university in Freiberg serves a similar role. The presence of these 'anchors' for these developments provide a sense of identity, enhance placemaking and improve the overall attractiveness and liveability of these developments. Ensuring that designs include central attraction/public amenity as a backbone of the development should be an important focus in any significant development in compact urban growth in Ireland.

### **Long term planning and coordination**

Each of the case studies considered here were developed in line with a long-term development plan and with coordination between stakeholders to ensure that each development was supported by the requisite transport, education, social and other infrastructure. The success of compact urban growth initiatives at scale in an Irish context will also require clear planning and coordination in these areas.

### **Social and Affordable Housing**

The smart urban design of the four developments analysed, including the range of public amenities, green spaces and accessibility they offer, make them very desirable locations for residents. This creates high demand for residential property in these areas and raises the prospect of them becoming exclusive developments in which only those on high incomes can afford to live. In order that the developments maintain affordability, different methods have been employed across each of the case studies. In Aspern Seestadt a set amount of accommodation is mandated to be set aside for social housing. Portland set targets for 30% of all housing to be affordable in the Pearl District. Ensuring an appropriate mix of private and social and affordable housing is an integral part of the planning of developments in the case study cities and should be a key element of a development with similar compact growth objectives in an Irish context.

### **Staged/Phased Development**

Each development analysed in this report was purposefully designed to be completed in a number of distinct stages. Each of these stages focused on a particular area of the development that was brought to completion before the next stage began. This allowed for particular areas of the developments to be completed as their own self-contained developments and facilitated residents moving into the developments at a relatively early stage of the project. While each stage had to eventually work together as part of the complete project, separately they embodied the principles of the overall development including their mixed use and short-distance design principles, allowing the first residents to benefit from the compact growth design.



Table 7.2 summarises some of the main characteristics in each of the developments. This table demonstrates a number of commonalities across the examples of successful compact urban growth considered in this report.

<b>Table 7.2: Development Characteristics</b>				
	<b>Vienna – Aspern Seestadt</b>	<b>Copenhagen – Nordhavn</b>	<b>Portland – Pearl District</b>	<b>Freiburg – Vauban</b>
<b>Significant public investment in transport/ enabling infrastructure</b>	Metro, public amenities, land remediation	Metro, public amenities, land remediation	Streetcar, public amenities, land remediation	Trams, public amenities, land remediation
<b>Development Company Established</b>	Wien 3420 AG	City & Port	Portland Development Corporation	Not a separate development company but Project Group Vauban established by the city authority
<b>Financing Public Investment via Land Value Sharing</b>	Yes	Yes	Yes	Yes
<b>Presence of Greenbelt limiting greenfield development</b>	Yes	Yes	Yes	Yes
<b>Central public amenity at core of development</b>	Man made lake	Harbour front	River front	Green public spaces
<b>Development plan explicitly cites compact growth benefits</b>	Yes	Yes	Yes	Yes
<b>Explicit subsidies to improve viability</b>	No	No	Some specific tax incentives and financing supports	Land sold to Baugruppen for below market prices

## 8. Conclusions

This research has examined four examples of successful compact residential urban developments. The purpose of this research has been to examine the features of compact residential developments and what makes them viable. As part of this research, the development process in each case study was examined, from the initial inception stage to the latest developments. This included identifying how policy was designed to facilitate their development and the extent to which the benefits of compact growth relative to urban sprawl were considered by these cities when choosing to promote and undertake large scale investments in compact urban growth.

With regard to the role that the wider economic and social benefits of compact growth versus urban sprawl have played in the success of compact growth in the case study cities, for the most part, the benefits of compact growth are largely treated as self-evident in these cities. The presence of legislative barriers to greenfield development and a history of relatively high-density development means that compact growth and its associated benefits are core elements of the development plans for the individual developments considered here, as well as the urban growth strategies of these cities more widely. While the cities included in this research do appraise the developments for their success with regard to key objectives of compact growth in terms of environmental impact, reduced car usage etc., there is typically no attempt made at quantifying these benefits relative to a greenfield alternative. The merits of these objectives are typically seen as self-evident.

While this conclusion limits the ability of these case studies to inform policymakers in Ireland with regard to quantifiable benefits of compact growth versus urban sprawl, there are nevertheless a number of lessons that can potentially be taken from the examples of successful development projects internationally and the policies that supported them that can be used by policymakers to inform future work in Ireland.

The key conclusions from this research, abstracting from the specifics of any one case study development, are outlined in the table overleaf.

## Conclusions

1. The examples of successful compact urban growth outlined in this report have been undertaken in a context in which greenfield development of a similar scale was not considered a viable alternative. The culture and legislative environment in these cities ensure that compact growth is the only viable means of accommodating ongoing growth. Typically, these cities have imposed greenbelts which make growth via development on greenfield sites challenging. The benefits of compact growth have been embedded in the planning and urban design systems in these cities.
2. The case studies in this report have all been undertaken with an explicit focus on ensuring that the benefits of compact growth in the form of reducing commuting times, improved liveability, reduced car dependency, and wider environmental benefits are realised via the design, location, and density requirements of the developments.
3. Significant public investment in transport and other enabling infrastructure is typically required to facilitate large scale compact urban growth developments and ensure that the objectives of these developments with regard to reduced car journeys and sustainable development are to be achieved.
4. Successful compact urban growth internationally ensures that districts contain a mix of residential and commercial developments, as well as an appropriate mix of private and social/affordable housing. It is also typically the case that development of both is staged to ensure an element of 'organic' growth in both areas rather than development of one aspect in its entirety followed by the other. Ensuring that designs also include street level retail services has also been seen as important to improving overall liveability of meeting wider objectives in terms of reduced car dependency.
5. New large-scale compact urban growth developments benefit from the establishment of a development company with the remit and resources to overcome coordination and financing challenges to completing large scale new developments.
6. In each case study a high level of public involvement throughout the planning phase of each development was highlighted by stakeholders as an important element contributing to its success. Public consultations gave future residents input into the planning and design of the districts, making them more suitable for the needs of residents and fostering good relations with existing residents in the areas.
7. Public investment via development companies financed via a form of land value sharing has allowed the developments considered in this research to finance infrastructure development, pooling of land, land remediation, and other site preparation costs.
8. Successful compact urban growth developments typically centre around a significant public amenity such as, in examples studied here, the lakeshore, the riverside, or the harbour. The presence of a central public amenity provides a sense of identity and improves the placemaking and liveability of the developments.
9. Viability challenges have not typically been encountered in the case study cities. Generally, the provision of supporting infrastructure and rezoning of the lands have provided a sufficient incentive for private developers to provide residential and commercial development. Mandating lower parking spaces per unit was cited by stakeholders as a policy that both aligned with wider sustainable development goals while also improving development viability.

## Appendix 1

As discussed in Section 2, compact growth is a stated development objective of the National Development Plan and National Planning Framework and is a key aspect of future spatial planning in Ireland. In line with this objective, progress is being made in integrating and promoting compact growth into the planning and development processes in Ireland.

A number of the common features of successful compact development highlighted in this study are being reflected in Irish policy. Recent developments in this regard are outlined below.

### Policy Development in Compact Growth in Ireland

1. The value of 'greenbelts' in Ireland is acknowledged in the NPF and a number of Regional Economic and Spatial Strategies make reference to establishing their presence around the State's major cities. However, it may be the case that it is less embedded as a concept and culture relative to the countries of the case studies.
2. The need for improved residential densities has been embedded in the Irish planning system for a number of decades. For example, under Section 28 of the Planning guidelines specific reference is made to the focus on settlements that support compact growth.
3. Part of the intention of aligning the NDP and NPF under Project Ireland 2040 was to work towards a capital investment strategy that would help achieve spatial planning goals such as compact growth.
4. The Design Manual for Urban Roads and Streets published by the Department of Transport, Tourism and Sport recognises the value of mixed used development and sets out guidelines for how it can be implemented. Part V of the Planning and Development Acts 2000 to 2021 is partially aimed at ensuring that there is mix of social housing within private developments, aligned with best practice observed in the case studies in this report.
5. A number of development companies have previously been established and tasked with the development of large-scale urban sites in Ireland. This includes the Dublin Docklands Development Authority and the Land Development Agency, via the establishment of the Cork Docklands Delivery Office.
6. Guidance on large-scale residential development procedures, including public consultation, have been published by The Office of the Planning Regulator and the Department of Housing, Local Government and Heritage.
7. A land value sharing bill is currently being considered by the Irish government which could potentially facilitate approaches to infrastructure financing for compact development observed in a number of the case studies considered in this report.
8. The concept of place-making and 'places for people' in the Irish National Policy on Architecture recognises the need to develop public spaces as features of development.
9. The Office of the Planning Regulator have undertaken analysis which quantifies the cost difference of brownfield and greenfield development. In the case where private developers face significant cost advantages of greenfield development, policy makers may need to consider policy interventions to encourage brownfield development. Research of this nature is informative to the wider policy context in which supporting compact growth is prioritised.