



An Chomhairle Náisiúnta Eacnamaíoch agus Shóisialta
National Economic & Social Council

Transport-Orientated Development: Assessing Opportunity for Ireland

Background Case Studies

Research Series

Paper No. 14

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National Economic and Social Council

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Dr Cathal FitzGerald, Noel Cahill
and Edna Jordan

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Abbreviations

| | | |
|--|---|--|
| BRT Bus Rapid Transit | NDP National Development Plan | SDCC South Dublin County Council |
| CASP Cork Area Strategic Plan | NPF National Planning Framework | SCOT Schéma de Cohérence Territoriale |
| CEPR Contrats de Plan État- Région | NTA National Transport Agency | SDZ Special Development Zone |
| CIL Community Infrastructure Levy | PDU Plans de Déplacements Urbains | SNIT National Transport Infrastructure Strategy for France |
| KE LEG Kommunalentwicklung LEG | PLU Plan Local d'Urbanisme | TAM Transports de l'Agglomération de Montpellier |
| LIHAF Local Infrastructure and Housing Activation Fund | POS Plan d'Occupation des Sols | TOD Transport-orientated development |
| LUTS Land Use and Transportation Study | QBC Quality Bus Corridor | VT Versement Transport |
| NAMA National Assets Management Agency | RBTA Ricardo Bofill Taller de Arquitectura | ZAC Zone d'Aménagement Concerté |

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Chapter 1

Introduction

This background paper provides an analysis of international and national evidence on the role of transport in widening the potential of active land management through unlocking land for housing, sustainable urban development, and regeneration. The key points were summarised in the main document *Transport-Orientated Development: Assessing Opportunity for Ireland* (NESC, 2019). This background paper provides instructive cases of transport-orientated development (TOD), in some shape or form, examined here to reveal generalisable lessons for any such strategy in Ireland. The fictional TOD garden city known as Uxcester is also examined as an example of a model for the development of these types of cities involving investment in transport. It was proposed in an essay that won first prize in the 2014 Wolfson Economics Prize competition. The experience of regional planning in Cork including plans to develop a rail corridor is also examined. The paper concludes with the report of a field-study visit to Nantes in France.

In assessing the cases to unearth lessons for Ireland, one analytical framework was loosely applied. Under that framework, each TOD example was examined, giving particular attention to five topics and their importance to each development:

- i. the role of transport (existing and new);
- ii. the funding mechanism, including the use of value capture;
- iii. the initial ownership of the land and how land came into development;
- iv. the scale of housing planned; and
- v. the institutional framework for the development model, including the presence of key actors or interventions.

Chapter 2

Freiburg

Freiburg¹ is a German university city with a population of 230,000, located beside the Black Forest. It is described by Hall as an ‘exceptionally attractive’ city, even by the high standards of other German cities, with beautiful pedestrianised city-centre streets set between restored medieval buildings. The city centre is surrounded by 19th and 20th century suburbs. Freiburg is a very environmentally friendly city. It became the first German city to have a ‘green’ mayor, in 2002.

The strategic plan for the city aims to keep the city compact, ‘a city of short distances’, by developing brownfield rather than greenfield land. The city contains 600 hectares of parkland and 160 playgrounds. As well as the city centre being pedestrianised, there is a strong emphasis on walking, cycling and public transport. Other features that illustrate the high standard of environmental sustainability in Freiburg are: 15 district-heating systems that produce half the city’s energy requirements; extensive use of solar PV; and a high level of energy efficiency in its buildings.

In recent years, two brownfield sites became available on the urban periphery. One of these was an old sewage works (Rieselfeld) and the other was an old French army barracks (Vauban). Both have been developed as new urban districts, with a strong emphasis on sustainability. They constitute outstanding examples of successful new transport-orientated developments. These developments began in the 1990s and are now complete. The population of Rieselfeld is around 10,500 in 4,500 homes while there are around 5,500 people living in Vauban in 2,470 homes.

2.1 Role of Transport

Rieselfeld and Vauban were both designed with the aim of minimising car dependence, especially in the case of Vauban. Both are described by Broaddus (2010) as ‘transit-oriented’ developments, with a transit corridor as the main street in each case. Before the first housing was occupied, Rieselfeld was connected to the tram while in Vauban the tram replaced buses after a few years. The tram extensions were new but the presence of the existing system made this a relatively easy task. In both cases, there are three tram stops along a central corridor approximately 1km long, and it is a 15-minute trip to the centre of Freiburg. Both districts enjoy frequent bus and tram services. Almost every residence is within half a kilometre of a tram stop, while the streets are designed to facilitate an easy walk to a transit stop.

¹ This section draws on Hall (2014).

In addition, both Rieselfeld and Vauban are bicycle-oriented: there are excellent bicycle networks, with high-quality on-street bike lanes, off-street pathways, marked street crossings and ample bike parking. Both districts are also pedestrian-friendly (*ibid.*).

Effective traffic calming measures are features of these areas. Both Vauban and Rieselfeld are designed to prevent through traffic, and the ability of children to move around safely is a top concern. The child-friendly design has been a major attraction for families (*ibid.*). In the case of Vauban, the speed limit is 5km/hour on the residential streets.

In both districts, car parking is mainly in underground garages. Vauban has a more restrictive approach to car parking than Rieselfeld. Forum Vauban (a citizens' organisation) proposed that Vauban be developed as an entirely car-free area. This was not accepted by the city authorities, but the compromise reached is that parking is mainly provided in two garages on the edge of Vauban. Around 70 per cent of households in Vauban did not own a car as of 2009 (Coates, 2013).

2.2 Development Process

Rieselfeld was developed on land available from an old sewage works. The Vauban land was a former military base. The local authority acquired this land from the federal government at a reasonable price, equivalent to 20 per cent of the ultimate value of the land. The federal government had wanted to sell the land to large developers. However, the city wished to pursue an alternative strategy involving a socially and environmentally progressive development that would include sale of plots to cooperatives, individuals and groups of self-builders. The city indicated that it would not give planning permission to a developer, and the federal government had no choice but to sell the land to the city (Hamiduddin & Daesking, 2014).

Design competitions for master plans were held for both areas. Both projects had budgets separate from the Freiburg city budget. Money was borrowed to invest in infrastructure. Limited state subsidies helped with some costs such as schools and fire stations. The borrowed money was repaid from the proceeds of selling building plots.

A notable feature of the housing development is that the land was sold in small lots. Typically, the land for a development block is not sold to a single investor but parcelled out to five to ten investors.

In the case of Vauban, the city had to resolve a dispute with environmental activists. In the course of doing so, it came up with a model whereby each piece of the development (a superblock of buildings plus semi-public space) would be undertaken by a local building group (Baugruppe) working with their own architect.

The future residents were involved in the design through extensive use of co-ops, which not only commissioned groups of houses but also designed and managed the common spaces. This method was also extended to Rieselfeld.

Land was not generally sold to the highest bidder:

... rather than allocating land based on maximizing the sale price, the city evaluated the ability of the various Baugruppen to successfully meet the lofty sustainability goals of the district. The question now became: 'How can the sale of this land best suit the goals of the project and the needs of its future residents?' rather than, 'How can the city make the most money from land sales?' (Coates, 2013: 44).

At the same time, the price for land aimed to cover the costs the city had incurred. A major advantage of Baugruppen is that it enabled people to develop housing at considerably less cost than buying commercially developed housing, with estimated savings of 25 per cent (Hall, 2014).

Hall comments:

This mode of development depends vitally on one precondition: the city acquires the land and builds the necessary infrastructure before development takes place, using investment funds through a trust. The city's investment is then recovered by selling off sites to builders and individuals. This has worked triumphantly, because good location and brilliant design have generated huge demand, effectively allowing the process to self-fund itself. And, by engaging the future residents in the design process from the start, many of the development risks are simply removed, generating strong built-in neighbourliness and accumulated social capital as soon as the first residents move in (*ibid*: 258).

In the case of Rieselfeld, the original plan was that half of the housing was to be social housing. However, government cuts led to this being reduced to one-quarter.

Vauban and Rieselfeld are developed at medium gross densities of around 60 dwellings per hectare. These densities were chosen to be sufficiently high to pay for quality infrastructure but at the same time to be suited to families; the housing is built to a height that makes it possible for families to call their children regardless of the floor on which the family lives. The maximum height is 12.5 metres, which is four or five storeys, with the top storey used for storage.

In both cases, the vision was to produce very low-energy developments. Some of the housing is built to the Passive House standard and sometimes Passive plus (i.e. the building is a net generator of energy). There is widespread use of solar energy and both areas have district heating systems. Both suburbs include schools, kindergartens and small shops.

2.3 Institutional Arrangements

The city council of Freiburg was central to the process. It either owned or acquired the land, raised finance, planned the area and invested in infrastructure. Two project groups were established in the city administration to implement the Rieselfeld and Vauban projects. The project groups worked with a municipal development company, Kommunalentwicklung LEG (KE LEG) (Rieselfeld Project Group, 2010). A City Council Vauban Committee was established for the exchange of information and discussion on Vauban's development. There was intensive consultation and citizen participation in the development process. Activists who were seeking the development of Vauban established Forum Vauban in 1994. In 1995 this organisation was recognised by the city as the official partner for citizen participation. Forum Vauban brought together citizens, architects, engineers, financial experts, experienced managers of co-building projects and other partners (Sperling, 2006).

2.4 Discussion

The two recent developments of Vauban and Rieselfeld illustrate the possibility of achieving successful transport-orientated development (TOD) at medium density that is attractive to families and sustainable. According to Hall, the outcome in both Vauban and Rieselfeld is a development of 'quite extraordinary quality' (2014: 261), characterised by a universal devotion to good architecture:

The overall lesson is that new city quarters can be developed that are as attractive and valuable as historic ones, provided there is sufficient long term investment up front in the public realm and infrastructure (*ibid.*: 262).

The success of Freiburg reflects strong leadership by the city, in conjunction with deep citizen engagement:

A key to the project's success was the establishment of forums and structures which allow citizens to become involved in the decision making process at the earliest stage. It has ensured that people understand the implications and the benefits of environmental issues and can make informed choices, learn from mistakes and become owners of the concept and the ongoing management issues (PRP *et al.*, 2008: 28).

The disposal of land in small lots encouraged the participation of co-operative groups and supported affordability. Some of the land was sold to investors. Finally, Freiburg also shows that, where a public body owns land and is willing to invest, the cost of investment in infrastructure can be substantially recovered from the increase in land values (i.e. land value capture).

Chapter 3

Dublin (Adamstown)

Adamstown in west Co Dublin was Ireland's first new planned town since Shannon in Co. Clare was established in 1982. The concept emerged in 1998 in a local area plan. The 214-hectare/500-acre greenfield site is on previously agricultural land, 16km from Dublin city centre, outside Lucan, and is situated between the M4/N4 east-west road and the main Dublin-Kildare railway line. The development was expected to have a population of up to 30,000 in 10,000 new homes when fully developed.

The plans for Adamstown also envisaged the delivery of 'four schools, four public parks and a downtown shopping district with a cinema, public library and community centre... supported by a new suburban rail station, 20km of main roads, pedestrian and bicycle facilities, and two high-service bus corridors' (Gray *et al.*, 2011: 2).

Part IX of the Planning and Development Act 2000 introduced Strategic Development Zones (SDZs) to facilitate specified development of economic or social importance to the State (SDCC, 2003). Designation as an SDZ means that development in the area requires planning permission from the designated development agency—South Dublin County Council (SDCC) in the case of Adamstown—and no party can appeal to An Bord Pleanála against its decision. This conveys strong benefits on developers within the SDZ:

Under Irish planning law, an individual or company has the right to appeal a detailed planning decision made on behalf of another applicant. This has led to abuse by companies with rival interests to slow the progress of a potential competitor, or by individuals seeking to slow change to their locality. So the key concession in the use of the SDZ was to immunise land held within the lands designated as Adamstown from third-party appeal. Once the masterplan was approved in September 2003, the developers have known they were no longer vulnerable to objections (PRP *et al.*, 2008: 7).

Further, 'local authorities are given the right of compulsory purchase within the boundaries of the SDZ' (Lawton, 2018: 146). The Government designated 224 hectares of land at Adamstown to the south-west of Lucan as a site for an SDZ residential development in July 2001. Substantial lands owned by SDCC adjacent to the Adamstown site were not included in the SDZ.

A draft planning scheme was prepared and submitted to SDCC in December 2002, and was finalised in September 2003. Most of the plan, whilst considered sound, did not get implemented, largely due to the economic downturn from 2008. The entire plan was revised in 2014. At that point, Adamstown had delivered approximately 1,450 homes and significant supporting infrastructure/services, a railway station, two primary schools, a post-primary school, crèche, a park, local retail services,

water and sewerage infrastructure, and internal strategic roads and upgrades to the adjoining road network (SDCC, 2017).

3.1 Housing Plan for Adamstown

Adamstown was subdivided into 11 development areas for planning purposes. Five were earmarked for low-density housing, three for medium density, and three for high density. Taken together, the entire Adamstown development was to deliver up to 9,950 dwellings in medium density overall, with a maximum height of 12 storeys (SDCC, 2003: 8 & 13; PRP *et al.*, 2008), specifically:

- low-density (35-54 dwellings per hectare): Adamstown Castle with up to 600 dwellings, Somerton 550 dwellings, Airlie Stud/Paddocks 700 dwellings, Tobermaclugg Village up to 1,050 dwellings, and Tubber Lane 850 dwellings;
- medium-density (50-78 dwellings per hectare): Tandy's Lane Village with up to 1,025 dwellings, St. Helen's up to 1,100 dwellings, and Aderrig up to 1,400 dwellings; and
- high-density (75-90 dwellings per hectare): Adamstown Square with up to 1,100 dwellings, Adamstown Boulevard up to 1,025 dwellings, and Adamstown Station up to 550 dwellings.

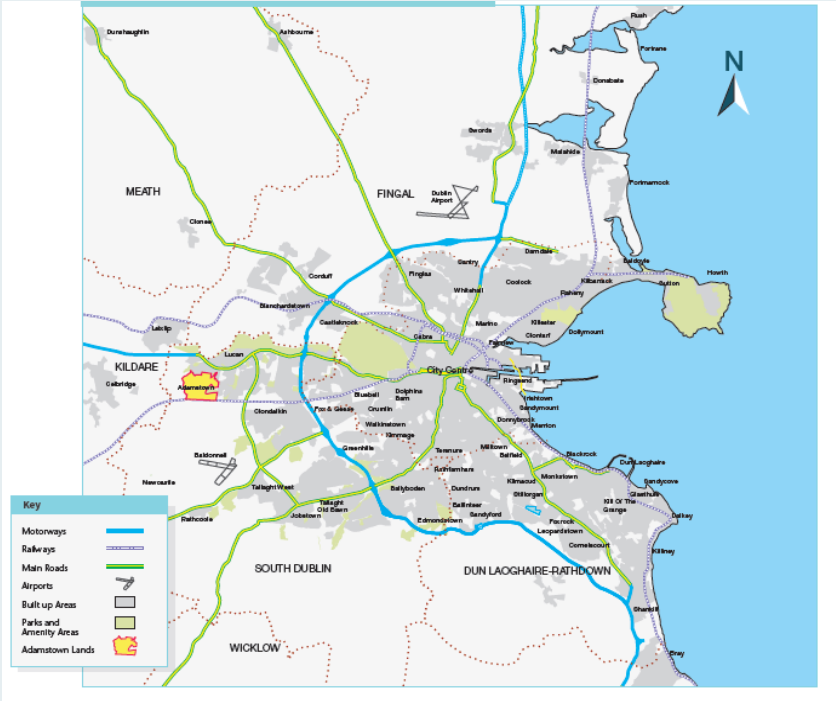
The Adamstown plan required that 15 per cent of all new housing units constructed were to be either social or affordable housing units. Thus, it was envisaged at the outset that 1,500 new social and affordable housing units would be delivered over 10-15 years.

3.2 The Development Model

The Adamstown site was privately owned by three developers: Castlethorn Construction (125 hectares), Maplewood Homes (52 hectares), and Tierra Construction (20 hectares) (Lawton, 2018: 146, approximate figures).

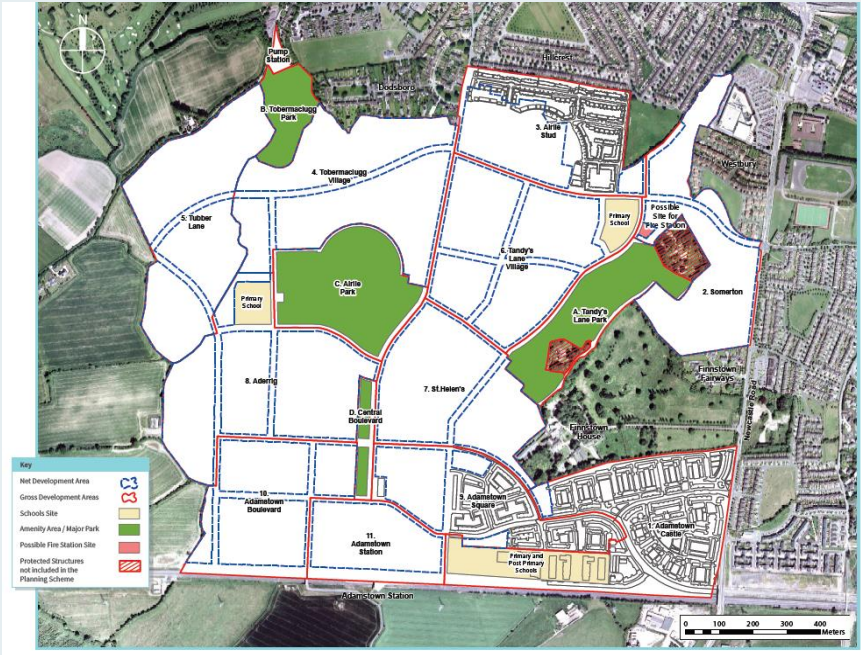
The plan for Adamstown included very specific infrastructure requirements, which had to be met before each phase of housing was progressed. For example, as part of Phase 1B (where 501–1,000 dwellings were to be constructed), one side of the Adamstown Link Road had to be delivered for use as a two-way single-carriageway road. As part of Phase 2 (1,001–1,800 dwellings), Adamstown Railway Station and a surface park-and-ride carpark had to be built. The first school was to be built before more than 1,800 housing units were constructed. And, as part of Phase 3 (1,801–2,600 dwellings), a leisure centre, swimming pool and all-weather pitch were required, as was the first phase of the Adamstown District Centre.

Figure 3.1: Adamstown SDZ—Regional Context



Source: SDCC, 2014.

Figure 3.2: Adamstown SDZ—Local Context



Source: SDCC, 2014.

The goal was a sustainable urban extension more than a new town *per se* (e.g. it was not expected that there would be large-scale employment in Adamstown itself). As Lawton puts it, ‘... in official planning circles, the ideal of Adamstown revolved predominantly around the desire to get away from the dominance of car-oriented transit’ (*ibid.*: 146). Thus transportation was a central consideration from the beginning. It has been noted that the planning of Adamstown referenced ‘international examples of urban extensions and New Towns. The concept of a high-density development based around a railway connection was taken from the writings of Robert Cervero, Professor of City and Regional Planning at the University of California, Berkley, who was also asked to advise on the project’ (PRP *et al.*, 2008: 11).

3.3 Role of Transport

The entire development focused on the location of the proposed rail station (e.g. the highest-density housing was to be located nearest the station site, and three boulevards were to lead to the station from lower-density homes, further away). Adamstown was planned to ensure there were alternatives to private car use, via the new rail station, additional rail capacity, dedicated bus routes, and a continuous network of walking and cycling links (SDCC, 2005).

The centrality of sustainable transport modes in the Adamstown plan and the emphasis on infrastructure suggests it as an example of transport-orientated development (TOD) in practice, in Ireland. A transport strategy for the greater Dublin area, published by the Dublin Transportation Office in September 2000, had set out the overall planning framework for the development of the transport system in the greater Dublin area, including the Adamstown SDZ lands.

The railway line into Heuston Station in Dublin runs along the entire southern boundary of the Adamstown site. According to SDCC’s plan, the first phase of the Adamstown development included the provision of a new railway station on the existing two-track railway line. This would provide peak-hour capacity for 600 people, with up to three trains in each direction to and from Adamstown station. The second phase of the plan included the doubling of the railway line to allow suburban services to operate on separate tracks from intercity services. This would allow for one peak-hour suburban train every 10 minutes in each direction. It would further increase peak-hour suburban capacity on the line to a total of 8,000 people in each direction, and was intended to be completed by 2008. The third phase of rail development involved electrification of the line and a new interconnector tunnel running underground via Christchurch (DART Underground), to bring peak-hour capacity up to 20,000 in each direction.

The railway station plan included in the Adamstown Planning Scheme was to support the new population (30,000) expected at Adamstown. The station would include ticketing and waiting facilities, along with a small retail kiosk. The station would have four platforms and a train ‘turnback’ facility. The transportation interchange would include a park and ride facility for 300 cars, 100 bicycle parking spaces, and bus and taxi pick-up and drop-off areas (SDCC, 2005).

The Adamstown plan also included major road improvements. An outer ring-road around the site was scheduled for completion in 2004. The road would have a dual-carriageway in each direction and a central median, and accommodate a dedicated Quality Bus Corridor (QBC). Several other road improvements were planned as part of the development, including for the M4 (between the M50 and the Leixlip interchange). That said, Adamstown was designed to accommodate but not be dominated by the car (SDCC, 2003).

Along with rail connectivity, walking and cycling routes were a central part of the transport plan for Adamstown. As a guiding principle, the planning scheme was based on 5- and 10-minute walking distances (400m/800m) between local centres and public transport.

Bicycle parking was provided for under the plan, with secure bicycle parking, comprising covered or semi-covered space with locking bars, to be provided throughout Adamstown.

The planning scheme also provided detailed plans for retail and other infrastructure such as water, sewerage, education centres, and community amenities (e.g. a civic theatre and an enterprise centre). Overall, sustainability was at the heart of the Adamstown concept. For example, early in its construction SDCC and Castlethorn Construction submitted a bid to Sustainable Energy Ireland for funding for a feasibility study into alternative energy sources for the area (SDCC, 2005).

3.4 The Adamstown Plan in Practice

The overall plan for Adamstown was finalised in 2003. By the end of 2004, the first planning application within the SDZ area had been submitted and approved. Castlethorn Construction had started on site to begin delivery of 407 residential units together with part of the access road to the rail station in the Adamstown Castle area. The development approved under this permission included 77 social and affordable housing units. In February 2005, the foundation stone was laid and an opening ceremony held to commemorate the beginning of the development.

The first residents arrived in Adamstown in 2006 as an initial 300 residential units were completed, three years after the planning scheme was agreed and two years on from the start of construction on site. Of the delivered units, 137 were social or affordable homes, representing 14 per cent of the total.

Dublin Bus began operating an express service (25X) from Adamstown to UCD Belfield, via the city centre. The outer ring road linking the N4 and N7 also opened that year.

The new railway station opened in April 2007 and a park and ride facility provided 300 car parking spaces (fee of €4 per day). A new bus service to the city centre (151) came into operation, and the first primary school opened in September 2007. At the close of 2007, some 475 residential units were occupied in Adamstown, and construction got underway on the first retail units. A total of 238 social or affordable units were delivered by the end of 2007, representing 11 per cent of all units (2,165), versus the goal of 15 per cent.

In 2008, the pace of residential development slowed due to the economic downturn, although the development of the SDZ, particularly in the northern and southern areas, continued. By the end of the year some 860 homes were occupied (400 of these homes were occupied during 2008).

Around 460 social or affordable units (13 per cent of the total) were identified. A new primary-school building was completed in the Adamstown Castle area, and work commenced on a secondary-school building. The new sewerage pumping station and electricity transformer station to the west of the SDZ were also completed.

In 2009, around 170 new units were occupied (down from 400 in the previous year) bringing the total number of homes occupied to 1,100. The proportion of social or affordable units was static, at 13 per cent of the total. Twenty families moved into new homes under the Rental Accommodation Scheme. The homes had originally been acquired by SDCC for sale as affordable homes but were eventually let on a short-term lease (five years) for social housing purposes, managed by a housing association (Helm). Adamstown Community College (a secondary school) and a convenience store also opened. The secondary school had capacity for up to 1,000 students, and in 2009 accommodated 80 first-year students from the Adamstown, Lucan, and Clondalkin areas. Perhaps unsurprisingly, there were no planning applications for housing or commercial developments in 2009.

Between July 2009 and June 2010, only 13 units were started, and just 72 new homes were occupied in Adamstown during 2010. The annual report for the year did not provide an update on social or affordable housing provision. By the end of the year, 1,170 residential units had been completed. One planning application was submitted for 177 residential units. Two temporary playing pitches were completed, pending the completion of the public parks.

No new residential builds commenced in 2011 and the focus was on finishing existing development phases. This meant that just 42 new homes were completed and occupied during the year. Around 1,200 homes were occupied in Adamstown at this point, out of the 10,150 residential units permissible in the SDZ (12 per cent). Again, the annual report (for 2011) did not include an update on the extent of social or affordable housing. In November 2011, the Government deferred the planned DART Underground project, which was an important element of the overall transport-orientated development of Adamstown.

In 2012, 34 new homes were completed and occupied, while no new residential phases were commenced. The railway station, which opened in 2007, continued to provide an important service to Adamstown, with service levels improving over time (22 inbound and 20 outbound services stopping at Adamstown on weekdays).

The downturn in activity at Adamstown actually saw the proportion of social or affordable housing rise: 'in the wake of the economic crash, a significant number of vacant dwellings were taken up via the launch of the Social Housing Leasing Initiative. This has meant that vacant properties were occupied by Housing Associations, such as Tuath and Cluid' (Lawton, 2018: 149).

In 2014, SDCC amended the original 2003 plan, shifting away from higher-density development. Interestingly, the current residents appear to be in favour of

continued higher-density housing development as a means to ensure that all of the amenities and services to make Adamstown a full success are delivered. The new plan reduced densities by 15 per cent (SDCC had sought a 20 per cent reduction) and pushed out the phasing of certain elements such as the swimming pool—the effect of this was to allow more houses than apartments be built and to reduce the overall number of homes from 10,000 to about 8,000' (Kelly, 2017a).

Development has increased at the SDZ since 2016, and a number of planning applications have been submitted, including for a community centre with sports hall, for the construction of 267 units at Tobermaclugg, and for 246 dwellings at Somerton.

In March 2017, the Department of Housing, Planning and Local Government approved €20m from the Local Infrastructure Housing Activation Fund (LIHAF) for the Celbridge Link Road, Tandy's Lane Park, and Airlie Park. It has been reported that, within one week of the announcement by government in October 2017 of a tax-rebate incentive for first-time buyers, nearly 50 homes were purchased in the Alderlie development at Adamstown, and 76 were sold in total at Alderlie between October and December 2017 (Finn, 2017). In 2018, a new community centre was officially opened alongside a newly opened all-weather pitch. There are 1,800 students in Adamstown's three schools (Adamstown Community College, St. John the Evangelist National School, and Adamstown Castle Educate Together).

3.5 Institutional Arrangements

South Dublin County Council (SDCC) was the specified development agency for the Adamstown SDZ site, being the relevant planning authority for the area. In 2003, SDCC established the Adamstown Steering Group to monitor implementation. The group was made up of local elected representatives, SDCC staff, and representatives of relevant state agencies/government departments (Irish Rail, Department of the Environment, Heritage, and Local Government, Department of Education and Science, Dublin Bus, Dublin Transportation Office, and the South West Area Health Board).

A three-member Adamstown Project Team was set up to monitor implementation of and compliance with the plan on a day-to-day basis (SDCC, 2005). As one review put it, 'although Adamstown's development is private sector led, the local authority has played a significant role in nurturing its development, moulding and influencing its masterplan and detailed design' (PRP *et al.*, 2008: 6).

The specified development agency, SDCC, did not support Adamstown directly with investment. The resources and wherewithal necessary to do so were not available at local authority level. The investment to deliver key residential, commercial and infrastructural development at Adamstown was provided primarily by three private developers/landowners (Castlethorn Construction, Maplewood Homes, and Tierra Ltd) working as a consortium known as Chartridge Developments Ltd (SDCC, 2008: 15).

One study states that ‘unlike many of the social housing estates of the past, Adamstown takes a market approach to providing subsidised housing. Developers must set aside fifteen percent of units constructed as affordable for-sale properties or as social rental housing available through the local authority or a housing association’ (Gray *et al.*, 2011: 3). Another analysis of the SDZ noted that the private-developer consortium ‘paid for nearly all the infrastructure, notably the €6.2m railway station’ (PRP *et al.*, 2008: 7). There was substantial Exchequer investment in the Kildare Route Project, which upgraded the rail infrastructure serving Adamstown, thereby increasing potential service frequency and capacity, and there has been Exchequer investment in the Phoenix Park Tunnel, which improved further the rail infrastructure serving residents of Adamstown. Further, there is continued and recurring Exchequer subvention to both rail and bus services serving Adamstown. The Exchequer investment in the Kildare Route Project was supported by a supplementary development contribution scheme under the Planning and Development Acts. However, the private consortium paid for all of the housing and the rail station, and it was continued house-price growth that became the driver of delivery. Equity-release from rising land value in the Celtic Tiger era funded the Adamstown development. Thus, the financing model for this TOD was a form of market-dependent value capture.

The private developers received concessions for this, on top of the benefits of developing within an SDZ (see above). For example, all developers in the relevant area (except Chartridge) contributed to the upgrade of the railway line serving Adamstown to four tracks (*ibid.*).

Lawton’s analysis stated that, despite Adamstown’s designation as an SDZ, the reality was that development ‘took place in a highly competitive environment between property developers operating across the metropolitan region. In the case of Adamstown, it was the notion of continued growth that was set to become a driver of the delivery of infrastructure and services’ (Lawton, 2018: 148). In describing how the private nature of the development was leveraged to deliver Adamstown, one actor involved said: ‘... the mechanism for the release of it was that land and property were beginning to go up, and up, and up, famously dangerously as we now know, but at the time, we owned no land up there but the model for how we were leveraging the facilities and the things as they came along was the release of equity through increasing land values’ (architect, local government, involved in Adamstown; *ibid.*).

Adamstown is described as a market-dependent structure; i.e. if the level of sales is good, the developer is able to finance the infrastructure (PRP *et al.*, 2008). Although, in the absence of associated infrastructure specified in the plan, SDCC had the power to stop new homes built by developers being occupied (by withholding sign-off), there was no need to exercise it.

The developers in Adamstown delivered infrastructure and amenities ahead of schedule: ‘This has been put down to a mix of knowing that they would have to pay for it later anyway—at possibly increased prices—balanced against the benefit of having the amenity in place early to support or raise the value of sales and the rate of sale’ (*ibid.*: 8).

A ‘land value capture’ model may have seen a public body own or acquire the land and either undertake development or partner with the private sector to do so, and revenue from the development contribute to the funding of transport infrastructure (NESC, 2018: 33). For example, the new railway station raises land values (as well as density), which can be captured to fund its delivery. In Adamstown, the developers funded infrastructure and service provision from bubble-era market-driven increases in the value of the land, and paid development levies to the local authority, all while making a profit. When the property market collapsed and the value of the land at Adamstown with it, funding for development and infrastructure dried up. A 2008 review summed this up as follows: ‘Upfront investment in civil engineering must be a burden on balance sheets, and there must be doubts as to whether the same arrangements would be so easy to emulate in the current climate of reduced expectations’ (PRP *et al.*, 2008: 7).

As mentioned above, SDCC did not include the substantial adjacent land it owned in the SDZ. It believed that this was not necessary as it controlled the land and oversaw the planning process, and had ideas for developing affordable housing on the site. It is possible that failure to include its land in the SDZ contributed to a lack of influence on the Adamstown site.

According to Lawton,

... in 2015, the loan portfolio of one of the development companies, Maplewood Homes, was sold to another Irish-based developer, Cairn Homes. While this illustrates the continued role of local actors within the development sector, Cairn has the backing of an international equity firm, Lone Star. Thus, as with the wider repackaging of urban space in Dublin in recent years, via, for example, the ‘bad bank’ NAMA (National Asset Management Agency), Adamstown is now subject to an increasingly internationalised funding model (Lawton, 2018: 149).

As of 2016, lands on the SDZ were owned by five entities: Castlethorn, Lone Star, Cairn, Tierra, and Crowley (Castlethorn, 2016). Recent investment has come from a number of entities including Adamstown Infrastructure Designated Activity Company, Cairn Homes, Hugh McGreevy and Sons, Somerton Residential, Castlethorn Construction, Cairn Homes, and SDCC (Various media reports, 2018).

3.6 Discussion

Adamstown won a number of awards for planning over its time, but was severely affected by the economic downturn. It is unsurprising that the pace of development stalled in Adamstown in a context where there were over 2,800 unfinished housing estates in Ireland and 230,000 vacant residential units in 2011 (Lawton, 2018). The aspiration had been for around 10,000 homes and a population of some 30,000 in Adamstown. Today, Adamstown has a population of less than 4,000 and fewer than 1,500 of its 1,700 homes and apartments are occupied.

The Adamstown project suggests that greater involvement by the State could be beneficial. Adamstown is described as continuing to ‘demonstrate the frailties of market-led approaches to urban development’ (*ibid.*: 141). Certainly, the State (via

SDCC) did not support Adamstown directly with investment, nor include its own adjacent lands in the SDZ.

The institutional arrangements meant that the rate, scale and nature of the development of the site depended entirely on the private actors, and their own performance in the property market. SDZs were designed to facilitate development of economic or social importance to the State, but the State was not active in delivering on this in the case of Adamstown and could be accused of not ‘walking the talk’.

Whether a transport-orientated development or otherwise, the institutional framework of ownership and responsibility for delivery can be a telling factor: ‘While situated and represented as an “alternative” to predominant forms of suburban development, [Adamstown] was still to be delivered by means of private developers on rezoned agricultural land at the edge of the city’ (*ibid.*: 147). Examination of the Adamstown experience shows that, given the financial crisis, ‘the emphasis on market-rate housing delivery seems somewhat misplaced... Policy models that leverage the private sector to provide infrastructure, amenities and subsidised housing must keep in mind that downturns and busts are an intrinsic part of the real estate market’ (Gray *et al.*, 2011: 12). Recent efforts to reinvigorate the Adamstown project suggest a continuation of a similar approach. SDCC has sought funding of €80m to invest in the SDZs at Adamstown and nearby Clonburris to spur private-led development, which is still regarded as essential for the success of the development (Lawton, 2018).

The Adamstown project and subsequent events also suggest that single ownership of the land is important. As one former local authority planner has stated, ‘SDZs work best where you don’t have fragmentation of land ownership, where there is engagement with and buy-in by land owners. Otherwise they will not be developed’ (Kelly, 2017b).

Following the crash, many landowners/developers went into receivership, and the National Assets Management Agency took control of developments. This has been described as being ‘a crucial factor in the success of the SDZ. With NAMA in there you were effectively dealing with a single entity’ (*ibid.*).

Next, in terms of institutions, and on a related point, it is noteworthy that Adamstown as a TOD project did not benefit from the existence of a combined transport/land development body. In their list of critical success conditions for TOD, Thomas and Bertolini (2017) identify the presence of a land-use/transport planning body as an important determinant of success. Citing Cervero (who is seen to have influenced the Adamstown concept specifically), they highlight the contribution of efficient institutions and governance as well as co-ordination of transport to effective transportation land-use planning. In assessing the transferability of success factors, Dutch land-use and transportation planners pointed to developing a ‘regional land use-transportation body (even an informal one)’, to maximise efficiency (*ibid.*: 151).

Looking ahead, it would be preferable to have an effective institutional connection between the transport planning body, public transport operators (e.g. suburban rail operator) and the land agency. As with many developments, a chicken-and-egg scenario emerged at Adamstown regarding the sequencing of transport

infrastructure and population of scale *in situ* to make investment viable in the near-term. Although sustainable transport and alternatives to car-use were at the heart of the Adamstown plan, the development (along with the nearby Clonburriss SDZ) meant that local road connections would inevitably become congested at an early stage of development. One senior local authority planner is quoted as saying: ‘The challenge of the SDZ is to ensure that infrastructure comes along with the housing, be that schools, be that public transport. If the cost of providing that infrastructure is seen as too punitive in terms of the market that is developing, it can slow down all development’ (Kelly, 2017a). A 2008 survey of Adamstown residents found that the majority of respondents (57 per cent) used a car as the primary mode of transport, 26 per cent used buses, 17 per cent relied on trains, while 8 per cent walked or cycled (Gray *et al.*, 2011). Higher-frequency trains with shorter journey times to the city centre were needed. The proposed DART Underground would also be transformational in terms of Adamstown’s connectivity to the wider rail network. Future investment policy, in the context of a new land agency, should investigate how to break the chicken-and-egg scenario.

Finally, the Adamstown development reiterates the point that SDZs in themselves are not a panacea, nor always the preferred option for developers. For example, when SDCC wanted to lower densities at Adamstown in response to the property market collapse (see above) they had to engage with An Bord Pleanála to seek permission, a process that took over eighteen months to conclude. In contrast, when lower densities were sought at two other large developments in Dublin (Clongriffin with 12,000 homes planned, and Pelletstown with 4,000), the local authority could simply amend the schemes, as they came under the normal planning procedures of the local area plan.

Local area plans are like smaller versions of a city or county development plan. They also set out heights, scales and types of development for an area, but, unlike the SDZ, applications go through the normal planning procedures. The difference between the schemes was illustrated when the viability of apartment construction appeared not to recover post-crash. To address this issue in Adamstown the council had to return to Bord Pleanála to seek lower densities, a process that took more than a year and a half.

[One property developer has stated]: ‘SDZs have a value, but it is possible to develop a properly planned town without them... [we] honoured our commitment to put in the infrastructure in advance of the homes. Thought has gone into how people live, work and play. It’s achieved through having a good relationship between the developer, the architects and the council’ (Kelly, 2017b).

Chapter 4

Stockholm (Hammarby)

Taking advantage of the fact that its urban growth began relatively late, Stockholm² planned its development almost from the start. The city began to buy land all around from early in the 20th century to ensure well-planned development. Stockholm has much experience in effectively integrating the expansion of its public transport system with housing and other forms of development. It built its metro system (the Tunnelbana) in the 1950s and 1960s. The building of the metro was designed to serve the new satellite towns proposed in a 1952 plan for the Stockholm area. This system, 108 kilometres in length, radiates from an interchange centre located in the heart of the city centre. The new satellite towns were located at approximately one-kilometre intervals. Densities are highest around the stations and it's here that the shops are located; densities decline with distance from the stations. Each town is surrounded by a green belt.

The housing in the new satellite towns was built on land owned by Stockholm city. Approximately one-third consisted of public housing built by municipal housing companies, another third was built by co-operatives or other non-profit organisations while less than one-third was built by private builders.

The metropolitan region today has extended beyond the area served by the metro system. The wider metropolitan area is served by a new approach pioneered by Stockholm and Copenhagen during the 1990s: the Regional Metro system, which links long-distance suburban train lines. The regional development plan was deliberately structured around the existence of high-speed links.

Hammarby Sjöstad was an industrial area and part of the port of Stockholm. There was a plan to redevelop the area as an Olympic Village for the 2004 Olympic Games. The bid was unsuccessful but this initiative created momentum for the redevelopment of this area. Hammarby is an example of successful transport-orientated development (TOD). The area concerned is large, at 160 hectares, and eventually will include 10,800 apartments. A central objective was to demonstrate a high level of environmental sustainability.

Hammarby Sjöstad is located on a lake; the name translates into English as 'Hammarby Waterfront Town'. Its development takes advantage of the natural features of the site. The lake is the central focus and its most attractive public space. There are boardwalks, quays and linear parks by the waterfront, while a network of parks, green spaces and walkways runs through the district.

While not formally part of the inner city, it has been deliberately developed as an urban rather than suburban area. The streets have the same width as Stockholm's

² This section is based in part on Hall (2014).

inner city, the density is relatively high at 100 residential units per hectare, and there are commercial spaces on the ground floor of buildings. The buildings are four to five storeys along the waterfront and six to seven storeys in the main streets.

4.1 Role of Transport

In 2002 a new orbital tramline in the Stockholm area was completed that connects some Stockholm suburbs, and links to the underground and commuter rail systems. This tramline runs through the main axis of Hammarby Sjöstad. There are four tram stops in the heart of Hammarby and the tram brings people to the metro system within five minutes. According to Hall (2014), the tram service has been central to the entire development. A central tramline is a feature shared with the two Freiburg extensions discussed earlier. Hammarby, however, is a considerably bigger area than either Rieselfeld (70 hectares) or Vauban (41 hectares). There are also three new bus routes, a night bus, and a ferry link across the lake; the area is bicycle-friendly and residents have access to a carpool. The transport infrastructure was based on the theory of transport-orientated development, 'an urban design theory which focuses on sustainable urban living as based on a medium density living being connected to public transport systems' (Gaffney *et al.*, 2007: 21).

Over half of journeys (52 per cent) are by public transport and 27 per cent are by foot or bicycle, with only 21 per cent by car; 6 per cent of households are members of the carpool (Faller *et al.*, 2010). The initial plan that was that there would only be 0.3 car spaces per dwelling. However, pressure from residents and developers led to this being increased to 0.75, the average for Stockholm.

4.2 The Development Process

4.2.1 Institutional Arrangements: Project Team

Stockholm City Council played a central role in the redevelopment of Hammarby Sjöstad. The vision was largely that of Jan Inghe, one of the city planners (PRP *et al.*, 2008).

The city established a project team to implement this project in 1997. This was initially outside the main city administration but was subsequently brought back in. The team is led by a project manager and environmental officer, while team members include representatives from planning, real estate, traffic, water and sewage, waste, and energy. The project team has wide-ranging responsibilities, including the finance, design and development of the area. In addition, it is responsible for soil decontamination and the construction of bridges, utility services, streets and parks within the area. The Hammarby project was large and complex so would not have happened without co-ordination across and between agencies at all levels of government, or without public/private co-operation (Gaffney *et al.*, 2007).

4.2.2 Land

The city had already acquired most of the land. It acquired the land in private ownership at above market prices in order to expedite the process. Compulsory purchase was used in a limited number of cases. However, the planners benefited from the fact that the buildings were not very valuable and contamination led to low land values (Faller *et al.*, 2010).

The city's ownership of the land enabled Stockholm City Planning Department to coordinate transportation, land use and development for Hammarby Sjöstad in a very efficient manner (Gaffney *et al.*, 2007).

4.2.3 Financing

A number of different mechanisms were used to finance Hammarby. The city government prepared the land for development, constructed the streets and parks, and put in some of the infrastructure. Decontamination of land was a major challenge and the city made a large upfront investment in this. It covered these costs by selling land to developers. The county government was responsible for building the metro, and this was financed by tax and fare revenue. The installation of electricity, water and district heating infrastructure was financed by the fees paid by developers.

Some of the major infrastructure, such as the ring road, was funded by central government. Hammarby's environmental model (described below) benefited from funding from a national government programme, the Local Investment Programme. This provided subsidies to promote the sustainable dimensions of future developments. According to PRP *et al.* (2008), long and difficult negotiations took place between different local authorities and central government over funding of the infrastructure. An overview of the role of different parties in the development process for Hammarby is shown in Table 4.1 (Hammarby Sjöstad, undated-b).

4.2.4 Master Planning

The development of the areas is based on a series of master plans. First, a strategic master plan was prepared under the leadership of the Stockholm City Planning Department. The area was divided into 12 sub-districts. Then three or four architects or planners in the private sector were asked to prepare proposals for each sub-district. The city selected the best features from each proposal to prepare and agree a more detailed masterplan for the sub-district. Comprehensive design codes were prepared for each sub-district, covering such matters as the design and layout of each block and building types. Finally, a consortium of developers and architects was invited to take forward the development of each plot or individual building in the sub-district. Many developers are invited so as to achieve diversity (Gaffney *et al.*, 2007).

Public participation was invited in the planning process. However, few people participated as it was a brownfield site and they did not have a direct personal interest at the time (Faller *et al.*, 2010). This contrasts with the Freiburg extensions where future residents were actively involved in shaping the development.

Table 4.1: Responsibilities and Financing for Implementation of Hammarby

| Stage | Role | Party | Responsibility | Financing |
|-------|--|---|---|---|
| 1 | Land ownership and master planning | City government | The municipality is in charge of (1) Creating detailed plans; (2) Building permits, and (3) Property registration. | Through plan agreements and fees paid by the construction companies |
| | | City government | The municipality is in charge of (1) Preparing the ground for construction and sanitation or remediation of soil; (2) Building and maintaining streets and parks, (3) Building waste and sewage systems; (4) Selling the land to property owners for development; (5) Coordinating the construction and building of the area. | Expansion of the area is financed via land sale to public or private developers. The management of streets and parks are tax-financed. |
| 2 | Financing and managing infrastructure | Stockholm Landsting (county of Stockholm) | The county of Stockholm was in charge of the development of the tram line that runs through Hammarby Sjöstad. It is still responsible for managing it. | The expansion of the tram line was financed through tax and ticket revenues. |
| | | Government infrastructure companies | Manage and operate water and sewage, district heating, electricity, gas, telecommunications, fibre net, and garbage. | The expansion of technical infrastructure is financed through facility fees paid by the developers. Operation and maintenance costs are financed through running charges paid by the property owners. |
| 3 | Building, developing, and managing residential and commercial properties | Developers | Building and developing residential and commercial properties | Building costs are paid for by the developers themselves. |
| | | Property owners | Manage their own facilities. Some owners joined together in a group to manage the vacuum waste system. | The residents pay a monthly fee to the property owner (rent for the apartment) that in turn finances some of the expenses of the property. |

Source: <http://www.hammarbysjostad.eu/>

4.2.5 Housing Delivery

Most of the housing has been developed by commercial developers who bought plots from the city council; some land was leased. According to Gaffney *et al.* (2007), there are political differences (as in other places) on how public land should be used in Stockholm. The political left seeks to retain ownership of municipal land (and provide the land on a leasehold basis) while the political right promotes the sale of land to commercial developers.

4.3 Hammarby Model

A central goal of this project has been to achieve a very high standard of environmental sustainability. In addition to the sustainable transport arrangements, a new 'Hammarby model' has been piloted. This involves a holistic approach to managing energy, water and waste. For example, burnable waste is used to generate district heating and electricity, and biofuel is extracted out of food waste and combusted for public transportation. The target for this project was to be 'twice as good' in terms of environmental impact compared to a typical inner-city development in the early 1990s. And, for example, new apartments should use half the volume of water of standard apartments. The model was jointly developed by the utility companies and Stockholm's Waste Management Bureau.

This environmental model added further to the complexity of the decision-making and had major implications for the infrastructure required. In relation to the first phase of the development, Svane comments that the environmental model meant that 'new routines had to be found and new knowledge gained and disseminated, to counteract everyday muddling through' (Svane, 2005: 79). The environmental officer was a critical person in the project team.

Some aspects of the environmental model are as follows:

- Residents place domestic waste in four tubes located outside their building, from where it is automatically carried by vacuum suction to a central collection point; this has reduced waste collection traffic by 90 per cent (Hammarby Sjöstad, undated-a).
- Combustible waste is converted into district heat and electricity.
- Heat from treated wastewater is used for district heating and cooling.
- A pilot wastewater plant has been built to evaluate new sewage treatment techniques.
- Biogas is extracted from sewage sludge and the residual biosolids are used for fertiliser; buses and taxis run on biogas.
- Fast, attractive public transport was provided from day one including buses, metro and a free ferry service (PRP *et al.*, 2008).

With regard to energy efficiency, the goal was to achieve energy consumption in buildings of 60kWh/m²/year. This is one environmental goal that was not achieved despite strong political support and subsidies. The developers argued that the goal was not feasible. According to Mahzouni (2015), Stockholm city was strongly committed to this goal but the other actors were not: developers, the utility company and residents. Developers preferred to use proven technologies for which they believed residents were willing to pay. The energy utility company did not want to use solar thermal heaters as they would compete with district heating; and some residents refused to increase their energy efficiency at the expense of comfort in their home. 'The target was not achieved because it was not in line with the visions, expectations and interests of the actors' (*ibid.*: 298).

While this goal was not achieved, the outcome was average consumption of 118 kWh/m², better than the 150 kWh/m² that was the benchmark for construction at the time (Hammarby Sjöstad, undated-a).

4.4 Discussion

The quality of the whole development is described as 'extraordinary' by Hall (2014). Residents report that they are very satisfied with living in Hammarby Sjöstad. The buildings are of high quality; the water and natural parks allow the inhabitants to live close to nature while at the same time enjoying good access to transport, education, health and retail services (Faller *et al.*, 2010).

The investment in a new metro line through the centre of Hammarby was critical to the redevelopment of Hammarby. This provides a fast connection to Stockholm's underground and suburban rail system. The vast majority of trips by Hammarby residents are made by public transport, walking or cycling. The vision of the innovative 'Hammarby model' of the holistic management of energy, waste and water was not fully realised in practise, and not all of the environmental targets were achieved (Faller *et al.*, 2010). However, a high environmental standard has been achieved ('as good as it gets', according to Hall, 2014: 228) and Hammarby has attracted widespread international attention for its environmental achievements.

Prior to the redevelopment, the land in the area was contaminated and of poor quality. The city council took the initiative to transform the area in co-operation with other levels of government and other stakeholders. By owning and buying land prior to the redevelopment, the city council was able to recover costs such as the upfront investment in decontaminating the land. There was additional funding of investment by central and county government.

Regarding the potential replicability of the model, an issue raised by Hall (2014) is the density of the development. The residential density is similar to other inner suburbs in Stockholm. However, it is relatively high compared to suburbs in many other countries, especially in what Hall refers to as the 'Anglo-American-Australian lower density suburban tradition' (*ibid.*: 228). With low suburban densities, an orbital tram line like that used for Hammarby would be unlikely to be viable.

The area is homogenous in terms of age groups, with most residents comprising families with children. This was unexpected; it had been thought that the area would appeal to older people down-sizing and people without children. Hall considers that the child density is uncomfortably high for such an urban environment.

A concern of several commentators regarding Hammarby is affordability. Property in Hammarby is expensive to buy and to rent, and management charges are also high. As with the development of new towns surrounding Stockholm in the 1960s, Hammarby was developed on public land. Unlike the new towns of the 1960s in which the larger share of housing was provided by public housing companies and other non-profit developers, the Hammarby model is based on selling the land to commercial developers to produce apartments for sale and rent. In theory, people with lower incomes could avail of the housing using housing benefit payments, but according to Hall this has not been the case in practice.

Chapter 5

Montpellier

During the late 1970s, the French Government identified Montpellier as a national ‘urban laboratory’ where many large-scale ‘pilot’ initiatives were tested for potential adaptation by other French cities (the Academy of Urbanism, 2017). These initiatives resulted in the redevelopment of substantial military landholdings, the reintroduction of trams and pedestrianisation of the city centre (one of the first European cities to do both) in the 1980s (*ibid.*).

Montpellier has had one of the largest population growths among French cities during the last 50 years or so. The city is the second largest in the Occitanie region in southern France and is located approximately 12km from the Mediterranean coast. It is the third largest coastal city after Marseille and Nice. Situated in a fertile plain, it has developed around its old historic location, contained within its former city walls.

Following the creation of administrative regions in France in 1956, Montpellier was promoted as the capital of Languedoc-Roussillon. This was followed during the 1960s by demographic, economic and spatial growth, characterised by public and private investments, new roads and new periphery districts. Between 1962 and 1982, the population of Montpellier rose from 120,000 to 200,000. These years also saw greater economic development with the arrival of companies such as IBM, the development of tourism along the coast, investment in transport, a new motorway and the establishment of a new airport. With this development came increased demand for housing in the peri-urban area (small villages surrounding Montpellier with high dependence on car use). In 2014, the urban population of Montpellier was estimated to be in the region of 589,610, with 275,318 in the city. Almost a third of the population was made up of students from three universities and three higher-education institutions.

5.1 Regional Development Arrangements

Since the 1960s, France has been devolving powers to cities and their regions. In 1982, Montpellier formed a joint authority, initially limited to 14 communes, and was mainly focused on the development of city-regional transport infrastructure. These regional governance arrangements continued to be developed and strengthened during the 1990s, with financial incentives to encourage municipalities to establish city-region governments.

The Montpellier Agglomération—a partnership of 31 communes led by the city’s mayor—was formed in 2001. The Agglomération facilitates strategic planning, provides a forum for collaboration and a means of delivering the infrastructure required for new development. It has implemented a long-term plan for the city-region’s housing requirements through a national scheme that incentivises

collaborative working among neighbouring authorities. Prior to this there was little co-operation and co-ordination among Montpellier’s local councils.

During the early 2000s, the Agglomération developed a 15-year comprehensive spatial development plan and delivery framework for both local communities and the city region. This plan, known as SCOT³ (Schéma de Cohérence Territoriale), includes housing and infrastructure, and defines different urban densities with special regard to increased urban densification around new tram stops. One of the main objectives of the Montpellier Agglomération SCOT is to stop urban sprawl, combine population growth and activities recognised as a source of wealth, while protecting the quality of life. This includes urban renewal, urban intensification, protection of urban space and the management of peri-urban fringes. Planning regulations on density of housing according to the level of public transport are considered to be highly important. Three minimum levels of housing density for new urban extensions are defined in the SCOT—50 housing units/hectares, 30 housing units/hectares, and 20 housing units/hectares—in the context of the local environment and the accessibility of good public transport. The better the accessibility to public transport, the higher the housing intensity allowed (Tosics, 2011).

5.2 Transport-Orientated Development in France

Tramways have made a remarkable comeback in France since the 1980s. The decentralised administration and policy-making systems, SCOT (Schéma de Cohérence Territoriale) and PLU (Plan Local d’Urbanisme), have allowed local urban authorities to make their own choices to develop public transport networks in the context of ever-increasing use of cars. The development of tramway systems in France has been influenced by concerns about reliance on fossil fuels and about sustainable development. However, unlike in other countries, the development of tramways in France is not only seen as a technical solution for traffic congestion, but also as a symbol of a cultural mutation in urban development planning (Boquet, 2017).

Coupled with a national political push for a more inclusive city in social terms, tramways are the backbone of contemporary urban policies in a French version of transport-orientated development (TOD), especially in mid-sized cities (*ibid.*).

³ In 2000, France implemented an urban solidarity and renewal law that established new rules for urbanism with the local urbanism plan, PLU (Plan Local d’Urbanisme). This law also imposed spatial planning at the inter-communal level with a scheme for territorial coherence, SCOT (Schéma de Cohérence Territoriale). This required both communal and inter-communal planning policies to be formulated in project reports that include maps showing the different status of land included in the project. SCOT and PLU were required to demonstrate collaborative and participative processes, included in local planning arrangements (Buyck *et al.*, 2008).

5.3 Co-ordination of Transport and Land-Use Planning

In 1977 Montpellier initiated a cohesive spatial plan that not only identified areas for development, but also areas not to be developed—i.e. to be reserved as green spaces for sport and leisure, as well as agricultural land. The river Lez was identified as a spine for development, and areas for development were separated into quarters. The plan for these quarters included mixed-use and tenure arrangements for developments, ample green space to create more balanced communities, and up to 25 per cent of new housing reserved for social housing.

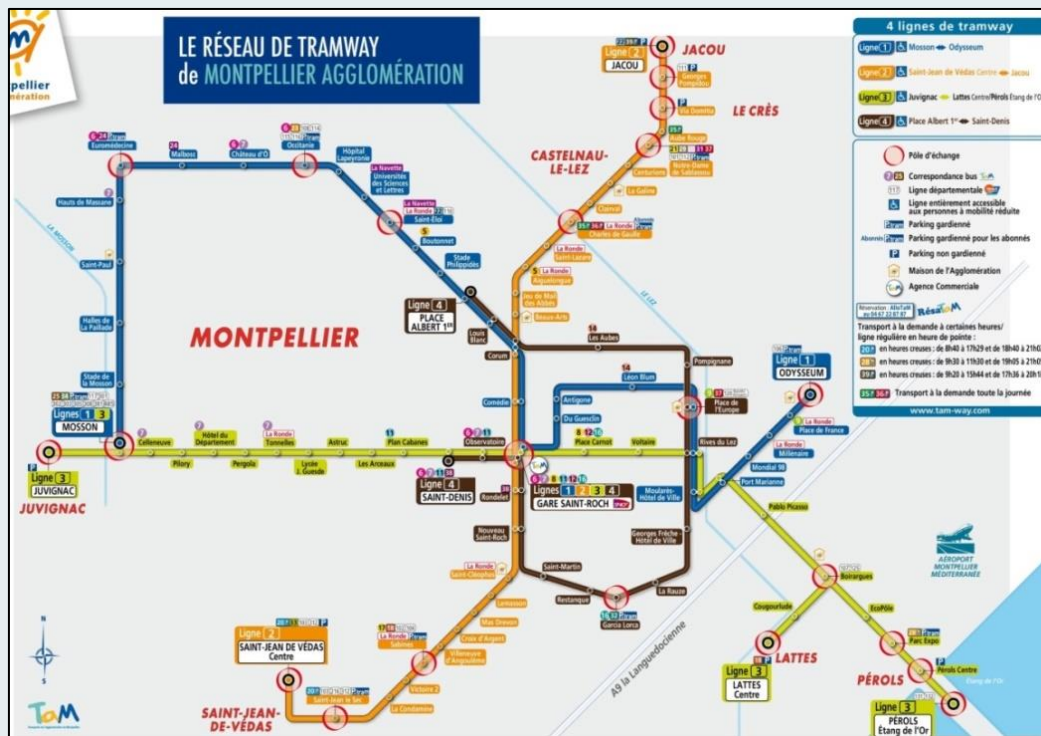
The Antigone area to the east of the city's historical centre was designated a new urban centre of Montpellier in 1979. It provides an example of a large-scale pilot initiative developed in accordance with the city's designation as an 'urban laboratory'. This was followed, in 1995, by a five-year project designed to provide a long-term solution to the growing transport problems in Montpellier. At the time public transport represented 17 per cent of all journeys. The new system was designed to attract car drivers and help Montpellier meet new EU guidelines on air quality. The existing bus lanes were not considered suitable as they were open to abuse by car drivers and the bus routes were already close to capacity. It was decided that a system with its own dedicated alignment was necessary and a new high-capacity tram system, which had already proved successful in other European cities, was purchased.

In 2009, 30 per cent of subsidies granted by the French government to local communities was allocated to rail development projects designed as part of regeneration initiatives in social housing areas alongside tramway services; for example, the Montpellier tramway line number one which serves the Antigone District described, and La Paillade, an area characterised by high-rise social housing with a population of 25,000 and high levels of unemployment and other socio/economic problems.

The Montpellier tramway (Tramway de Montpellier) is a four-line tramway system owned by the Montpellier Méditerranée Métropole and operated by the Transports de l'Agglomération de Montpellier (TAM) authority, a subsidiary of Transdev and recognised as one of the leading world light railway operators. The first line opened in July 2000, the second in December 2006, and lines three and four in April 2012, along with an extension of line one and a diversion of line two. The western section of line four opened in July 2016, completing a loop around the city.

The development of line one provides a good example of a TOD approach. Line one is a winding route from the Odysseum (in the east, claimed to be the first urban shopping and leisure centre in southern Europe) to Mosson, a residential area in the west, with a high proportion of social housing including the districts of Antigone and La Paillade referred to earlier. The line has 27 stations along a 15.7km route designed to serve all the major centres, such as the main hospital, university, exhibition centre, town centre and railway station. A total of 75,000 people live within a five-minute walk to a tramstop. The service runs from 5am to 1am. The average number of passengers per day is 130,000, far exceeding initial projections of 75,000. The line was completed on a budget of €348.8m. There are plans to extend the line to connect with high-speed trains on the Contournement Nîmes—Montpellier route.

Figure 5.1: Tramway de Montpellier



The tramway line is seen as the final part of the urban regeneration plan for Montpellier, which also included the upgrading of the university, hospital and railway station (the Academy of Urbanism, 2017). Montpellier is among a number of cities, such as Caen, Clermont-Ferrand, Dijon, Grenoble, Orleans and Rouen, ranging in population size from 200,000 to 500,000, that have invested strongly in the development of their tramway systems (Nantes is discussed later).

The characteristics of these tramway developments include:

- They are built on a specific right-of-way route, often taking over car-lanes as opposed to sharing the space with other vehicles.
- They are longer than they were in previously developed networks.
- They usually cross the entire urban area.
- They serve major traffic-generating places in the city; e.g. train stations, universities, stadiums, convention centres, hospitals, public housing projects, entertainment venues, shopping centres and office parks.
- To increase passenger numbers, they often follow windy, complicated routes characterised by sharp turns, which leads to a slower overall speed (Academy of Urbanism, 2017).

The Montpellier tramway network, along with those of Grenoble and Lyon, is highly elaborate, comprising a combination of multiple intersections and shared segments. In 2008, data from the CERTU research centre showed that the Montpellier tram network had become dominant in terms of the number of public transport trips; i.e. it had a much larger share of passengers than the length of its network implied: 75 per cent of trips versus 30 per cent of public transport network length (Boquet, 2017).

Box 5.1: The Antigone Development Project

Antigone became the new urban centre of Montpellier, between the Polygone and the Lez. The site included a former military installation, factories, Villodève Park, properties of the Don Bosco Cultural Centre and the Lycée d'Enseignement Technique Marguerite Audoux.

Spreading over 36 hectares, Antigone district is one of the single largest developments completed by RBTA (Ricardo Bofill Taller de Arquitectura) in France. It dates back to 1979, when Montpellier's newly elected municipal council adopted an urban development scheme and decided to create a new district near the city centre. The purpose of this plan was to develop a new district along a central axis that would provide for the city's balanced eastwards expansion and link the historical centre to the river Lez.

The geometry of the master plan creates a succession of spaces along the central axis, as well as the district's urban fabric, which is developed along each side. It's less centralised and built on four levels—the same scale as a small Mediterranean town. Thus, Antigone is characterised by four basic morphological elements: the axis between the office area and the Nouveau Monde, a continuation of the Polygone, the grid-format residential area, and Villodève Park.

The development project includes: La Place du Nombre d'Or (288 apartments and shops), Les Echelles de la Ville (retail and office spaces), Les Rives du Lez (landscaped design of the Lez riverbed), the headquarters of the Languedoc-Roussillon regional government, Le Port Juvénal (350 apartments), the Hotel Mercure (a four-star hotel), Le Parnasse (100 apartments), Le Capitole (apartments and shops), La Tour Europe (offices), Les Guinguettes (two restaurants), and Montpellier's Olympic swimming pool.



Above is an image of Le Port Juvénal at the end of the axis from Les Echelles through Antigone. The port has a maritime theme embracing the river and providing a cascading esplanade with platforms, stairs and terraces down to the water level. The colonnade contains 350 dwellings. The park slopes gently down the riverbank, which is lined with promenades and restaurants.

Half the housing in Antigone is subsidised and half is on the private market, but both share similar design: a row of doubly oriented residences of varying depths (between 9m and 12m) and heights (between four and seven storeys). The cost of the project is estimated to be in the region of €30m (Bofill, 1999).

5.4 Institutional Arrangements

5.4.1 Governance Powers

Urban development in Montpellier has benefited from the devolution of centralised powers from cities and their regions, and the establishment of *agglomérations* that were tasked with planning and co-ordinating urban development and regeneration in collaboration with local authorities and private landowners and other stakeholders. The Montpellier Agglomération SCOT2002, which (among other things) regulates the density of housing, with particular emphasis on increasing urban densification near stops (as part of a priority for urban renewal in a strip of 300m either side of the tramlines) is regarded by commentators as being one of the most important planning tools in the approach to urban development and regeneration in Montpellier. Land is acquired by the Agglomération, often with what has been described as more generous compensation than in the UK, for example, and less weight is given to objections. The city area is regarded as an economic entity, with regions having an important role in providing infrastructure. Private developers play a role but do not lead the process (Hall, 2014). The SCOT is a complex planning tool, and development plans are required to be compatible with the PLU and other planning tools such as the PDU (Urban Transportation Plan).

5.4.2 Taxation as a Source of Funding for Infrastructure

Montpellier Agglomération has benefited from having tax-sharing arrangements among its 31 municipalities. It has also benefited from national tax arrangements that require employers to contribute to public transport operation costs via a special tax (*versement transport*), in order to contribute to public transit as an indirect benefit for the accessibility of workplaces.

In Montpellier, a green tax paid by people building or buying new houses is used to preserve green or blue areas (Nilsson *et al.*, 2013).

5.4.3 Public-Private Partnership Arrangements

Montpellier also uses public-private partnership (PPP) arrangements to both finance and develop urban projects. The Antigone district project is one of many urban projects developed by the Montpellier regional development company SERM-SA3M Group.

SERM is a semi-public company whose shareholding is mixed, public and private, while SA3M is a local public company whose shareholding is public. The general interest is their purpose, and the spirit of enterprise their *modus operandi*. Their objective is to realise projects of public interest with the flexibility and responsiveness of private tools (Le Groupe SERM/SA3M, undated).

SERM comprises 71 per cent of public establishments (local authorities) and 29 per cent of private institutions, while SA3M comprises 100 per cent local authorities. The 19 municipalities in the metropolitan area are shareholders. The SERM agency has been patiently assembling land over the past 30 years, has enabled the delivery

of essential infrastructure, and has competitively harnessed private developers to create new/renovated neighbourhoods. On an annual basis, the group is involved in:

- the building of 1,500—2,000 housing units across the Montpellier and surrounding areas of the Agglomération;
- putting 20,000 to 25,000m² of land on the market for construction;
- selling 6 to 8 hectares of business land per year;
- investing more than €20m in economic development; and
- running district heating systems—more than 1.5m m².

These activities have resulted in more than €100m turnover, while €250m is generated by the construction of buildings (Le Groupe SERM/SA3M, undated).

5.5 Discussion

The Antigone project provides an example that is highly aligned with TOD objectives, whereby regeneration and development plans combine transport and housing that results in increased population density in close proximity to frequent high-quality transport services.

An important TOD element that has contributed to the success of the Antigone project and the city itself is the ‘tailored institutional’ arrangement characterised by the Montpellier Agglomération and the alignment of other public development policies across the system; for example, health, enterprise and education.

Also critical to the successful development and regeneration of Montpellier is the Agglomération’s use of a single development agency, which has been responsible for assembling land which in turn has enabled delivery of essential infrastructure and the ability to competitively harness private developers to create new/renovated neighbourhoods.

While there is much commentary about the successful urban and economic development of Montpellier and the role of the Agglomération, there have been challenges and difficulties. An obvious challenge is that the Agglomération controls only 31 of the 93 communes that make up the whole area. There have also been challenges within the Agglomération; many of its stakeholders, who have different interests, are ambivalent or have different points of view on public policy objectives for the region (e.g. young and older farmers). Another challenge is that the costs and benefits of the Agglomération’s policies may not always be equally shared by all stakeholders (e.g. farmers and developers).

Chapter 6

The Hague (Ypenburg)

6.1 The Hague (Ypenburg)

Ypenburg is a large urban development on the outskirts of The Hague in the Netherlands. It is situated to the southeast of the city on approximately 600 hectares. The area was the location of Ypenburg military airfield, which was built in 1936 and closed in 1992. Construction of the new Ypenburg residential area began on the site five years later. The objective was to build 12,000 homes on 340 hectares of the site. The plan also included two secondary schools, ten primary schools, a shopping centre, childcare services and business parks. All construction was to be completed by 2010.

Ypenburg is described as being a ‘a good example of a VINEX project’ (Hall, 2014: 164). VINEX is the national spatial planning strategy pursued in the Netherlands since December 1993. It had been devised over the preceding eight years in response to rising population numbers and to guide the construction of new housing districts close to urban centres. Central to the approach was the notion of intensifying growth in the central-western Randstad area (comprising the four largest cities of Amsterdam, Rotterdam, The Hague, and Utrecht), in order to conserve the Groene Hart area (the Green Heart includes smaller cities, lower populations, and more rural settings).

VINEX differed from previous national plans in that an ‘everyday living environment’ was added as a key theme (Galle & Modderman, 1997: 9). The quality of the living environment was to be enhanced under VINEX by, *inter alia*, ensuring that new developments protected open areas and limited the need to use car transport. The plan was to concentrate new urban development near medium-to-large cities, keep travel distances short between homes, work-places, and retail outlets, and maximise choices of public transport, cycling and walking.

6.2 Role of Transport

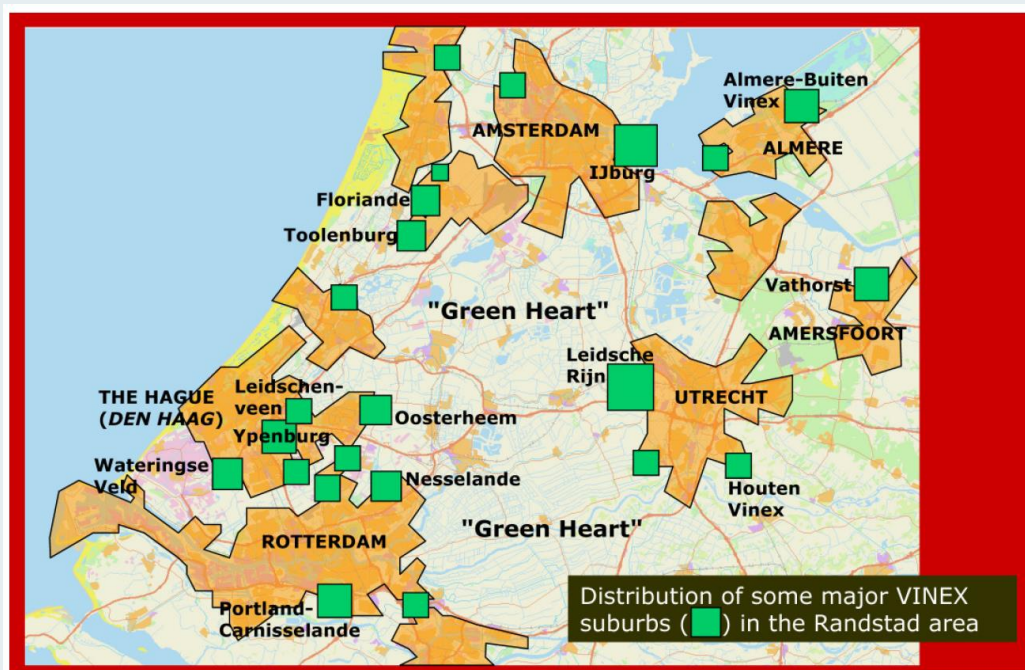
Since Ypenburg is an example of a VINEX development, the background to that national plan is important in understanding the role of transport in Ypenburg. Post-war spatial planning emphasised the development of the motorway network, while investment in rail declined. According to Mensink and van der Hoeven (2017), there was a shift in Dutch policy from ‘clustered dispersal’ to ‘compact urbanisation’ in the 1980s. This was a response to the decline of urban centres facilitated by an explosion in car ownership and usage. A draft Fourth Report on Spatial Planning was prepared, but because environmental concerns dominated the general election campaign in 1989, it was amended by the new government to install measures to

control the growth of car mobility and to tackle environmental issues on an area-by-area basis (*ibid.*: 134). That amended plan was the Fourth Report Extra or VINEX.

VINEX is an effort in 'managing urban growth by urban containment' (Korthals Altes, 2008: 225). The VINEX concept was to provide urban developments such that 'urban regions would function as compact daily urban systems. Concentration policies were there to maintain support for urban services, to limit mobility growth, to allocate housing, employment, and facilities in order to optimise accessibility by bicycle and public transport, and to contain the further urbanisation of rural areas' (*ibid.*: 102). The VINEX concept of the compact city 'meant that public transport had to be put back on the political agenda' (Mensink & van der Hoeven, 2017: 134).

Over 70 per cent of total public funding under the VINEX programme was allocated to infrastructure and public transport (€3.15bn out of €4.4bn), including 19 new railway stations, new tram and light-rail connections, the RandstadRail link between The Hague and Rotterdam, and the high-speed rail link between Schiphol Airport in Amsterdam and the French and Belgian rail networks. In parallel, strict regulations limited the availability of car parking spaces in new VINEX developments.

Figure 6.1: VINEX and Ypenburg



Source: Urbed, 2012.

The masterplan for Ypenburg, finalised in 1994, integrated some existing characteristics of the site. For example, a new central boulevard was constructed along the former runway, while waterways and lakes were developed from existing dykes (Cousins, 2009).

The Ypenburg development site was close to the busy Gouda–Den Haag rail link. Two tramlines were constructed to intersect at Ypenburg Centrum, a new central plaza to provide one central hub for trams and buses, and a 25-minute cycle from The Hague’s city centre.

Ypenburg’s own railway station (Den Haag Ypenburg) was opened in December 2005. The park and ride at Ypenburg rail station has 225 parking spaces, stands for 320 bicycles (40 covered bicycle containers), and spaces for eight mopeds. The park and ride facility is intended for use by commuters to The Hague, Zoetermeer and Utrecht. The site was ‘bordered on two sides by busy motorways [and was] protected from the noise by earth bunding’ (Hall, 2014: 165).

6.3 The Development Model

The Ypenburg site—as a former military airfield—was wholly owned by the state, and the government sought to exploit this by carefully shaping development there. Given the scale of the development across three municipalities (Rijswijk, Pijnacker and Nootdorp), a traditional public contract was considered unsuitable. Instead, the development was led by a consortium called Ypenburg Partnership (1993–2010), which combined municipalities and private actors using a concession model. In this way, ‘the local authority took the lead in the development process’ (Hall, 2014: 164). Adjacent grassland areas were purchased by the partnership and added to the overall site.

A Europe-wide competition was held to plan for the provision of up to 15,000 dwellings over 10 years, and ‘seventy-five groups of developers, urban planners, architects, and landscape designers competed’ (Cousins, 2009: 51). The Ypenburg plan placed an emphasis on quality over cost, and the selection process reflected this (Hall, 2014).

It was understood at the outset that the Ypenburg district would eventually become part of The Hague region, helping to ensure that no one of the three municipalities involved would dominate the process.

Ypenburg was part of the overall VINEX model under which the Dutch government set aside €4.4bn for housing, public transport infrastructure and soil clean-up, though this did not cover the full cost. In return, the regions had to develop housing and public transport infrastructure in accordance with the government’s compact urbanisation plan. Taking VINEX in its entirety: ‘following extensive negotiations, contracts between central government, seven urban regions, and eleven provinces were drawn up on the containment and development of urbanisation between 1995 and 2005. In accordance with these contracts, 456,959 dwelling units were to be built in the twenty-six urban regions between 1995 and 2005’ (Korthals Altes, 2006: 102). Of these, around 60 per cent (285,000 dwellings) were to be built around cities in suburbs.

As for the Ypenburg development itself, ‘as with other Dutch schemes, the high quality of the transport infrastructure... was made possible because the public sector ploughed back the uplift in land values as a result of the housing

development’ (Hall, 2014: 166). The final plan for Ypenburg provided for 12,000+ houses by 2010, and at least 30 per cent of the housing was to be affordable.

According to Cousins, ‘Ypenburg sought to learn from the mistakes of the previous VINEX schemes and as a result the design implemented a higher density with more urban character than previously found within the VINEX housing developments’ (Cousins, 2009: 51).

VINEX promoted compact urbanisation (>30 dwellings per hectare) as a means of conserving natural spaces, and linking housing, jobs and services via well-connected public transport. This would keep car ownership and usage to a minimum. Thus, Ypenburg was divided into five districts (‘fields’) of around 2,000 dwellings each, to house 30,000 people. Each district provided different average house sizes and densities: houses of 140m²–180m²; apartments of 110m² on average; 14–48 units per hectare (Cousins, 2009: 65). Overall density at Ypenburg is 37 dwellings per hectare. The different fields are further subdivided into sub-plans (‘deelplans’), each consisting of between 500 and 800 dwellings.

6.4 Institutional Arrangements

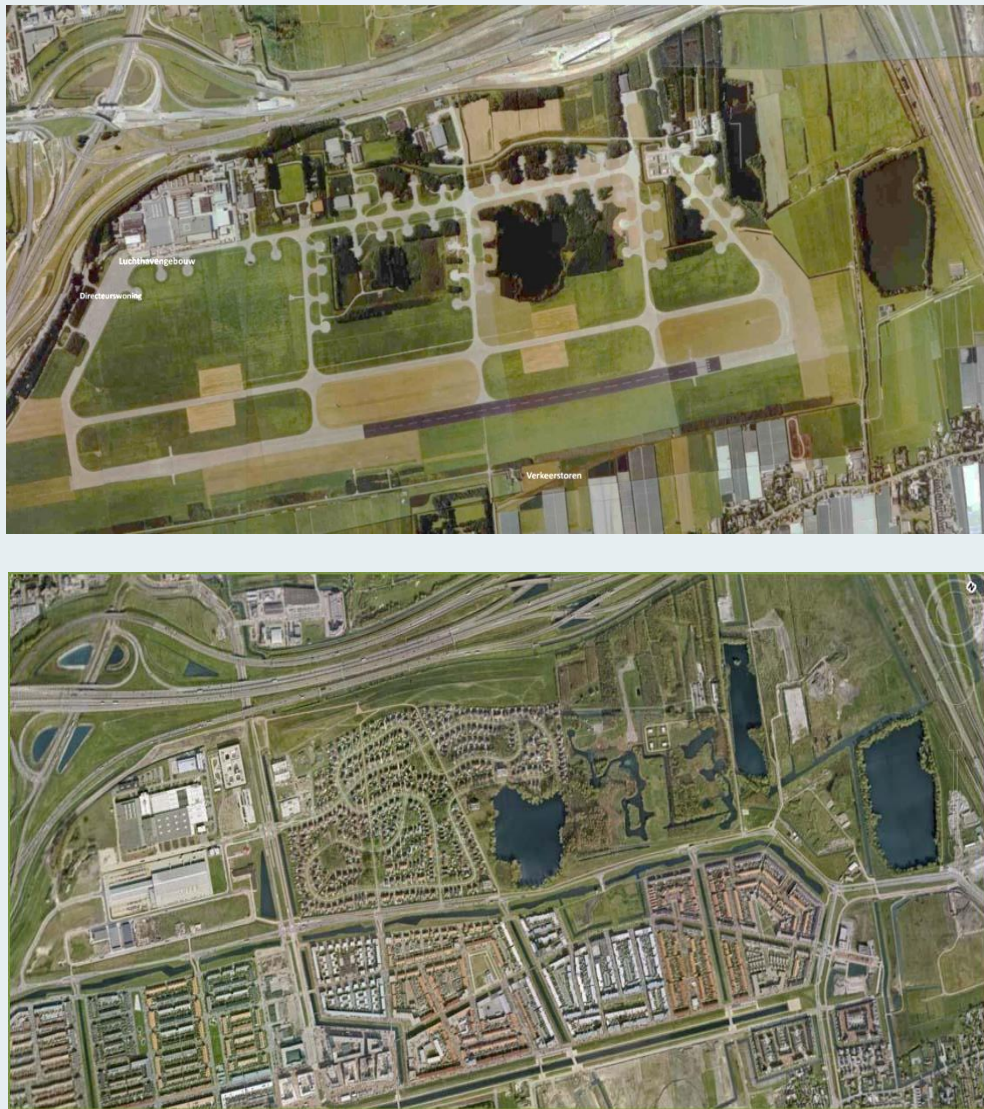
The institutional and policy framework for VINEX/Ypenburg was as follows:

... central government sets out guidelines in national policy documents, the provinces draw up regional plans (streekplannen), and the municipalities develop structure plans (structuurplannen) and local land use plans (bestemmingsplannen). The local land use plans are legally binding upon the citizens and determine the permitted land uses. The planning system consists of a set of rules to guide the work of the various organizations involved. But it says little about the content or level of detail each plan should have. Consensus on these matters has to be obtained during the preparation of policy. Views concerning the rules of the game, the players involved and the content of plans vary with time (Galle & Modderman, 1997: 10).

Korthals Altes (2006) describes this approach as being ‘based on a number of daring assumptions’:

- Regional and local government structures were willing to cooperate with national government in achieving growth-management objectives.
- There was no fundamental change necessary in the way housing development took place (i.e. market-oriented housing programmes).
- There was sufficient market demand for the types of dwellings in the locations identified.

Figure 6.2: Ypenburg Before and After Development



Source: Google Images.

It has been noted that Dutch municipalities are legally entitled to be autonomous and that there is a 'history of conflict' between different levels of government. The approach was also considered daring because it banked on the 'building of a large percentage of housing in or near to cities, in relatively high densities, and the development of a larger percentage of more expensive housing' (Korthals Altes, 2006: 102–3).

Figure 6.3: Ypenburg Site Map



6.5 Discussion

By 2010, around 10,000 of the 12,000 dwellings planned had been delivered. The estimated population of Ypenburg today is 27,000. On completion, the Ypenburg development was described as having ‘a good mix of tenure. Thirty per cent of the housing is affordable, forty-five per cent has been allocated as medium-priced housing, while twenty-five per cent is luxury housing’ (Cousins, 2009: 65). According to one local internet site, the average value of a single-family dwelling in Ypenburg in 2015 was €282,500, and of apartments €168,000, while rents varied between €650 and €1,500. The number of cars (by area) in Ypenburg is a small fraction of the national average.⁴

The reviewed literature does not present many criticisms of the plan and its implementation in Ypenburg specifically, but comment on the national VINEX approach has not been universally positive. By 2012, the VINEX strategy had resulted in 90 new suburbs, 50 of which are in the Randstad area. Over its time (1996–2005), around 750,000 homes were built, 60 per cent of which can be

⁴ Data retrieved from <https://allecijfers.nl/wijk/ypenburg-den-haag/#vergelijkende-kenmerken>, 10 May 2019.

classified as VINEX houses (Urbed, 2012). Thus, the objectives of urban containment and around 450,000 dwellings were delivered. That said, it has been noted that progress on the concentrated development objective was ‘lumpy’ over the period of the strategy, and presented some cause for concern: ‘policy results were not achieved overnight, with 1995, 1996, and 1997 showing no concentration, followed by a sharp rise in housing growth in concentration of areas in 1998. However, the concentration was achieved mostly by containing housing growth in other areas. As a result, the basis for the achievements of Dutch concentration policies is in fact the stagnation of housing growth outside the concentration areas’ (Korthals Altes, 2006: 104–5).

VINEX has also been described as being ‘a selective policy document’ which, *inter alia*, reflects ‘the tendency for government to make way for private initiatives’ (Galle and Modderman, 1997: 10). In addition, the use of 10-year agreements has been criticised for ‘not fitting in well’ with the flexibility of political agendas or with market developments in terms of the costs and benefits of development (Korthals Altes, 2006: 111).

The contracts for the 1995-2005 period did not cater for changes in demand. Moreover, because locations and housing size were specified, neither did they have the flexibility to meet known demands by preparing excess plan capacity when housing production at one location stagnated... The problem is that the Dutch national government cannot simply withdraw from urbanisation policies for a decade by doing no more than checking whether performance targets are being met (*ibid.*: 110).

Finally, in terms of VINEX as a whole, it has been described as being a success in terms of conformance but perhaps less so in terms of performance; i.e. VINEX is a success if judged as spatial development that was delivered according to plan, as opposed to providing better decision-making processes and delivering what is needed over its timeframe (*ibid.*). The extent to which the above criticisms are true (or a problem) in the development of Ypenburg is not obvious from the literature reviewed to date.

Turning to Ypenburg specifically, Heurkens’ analysis of one *deelplan* suggests that the relevant public actor should provide funding or financial incentives for the private sector to stimulate development. It should be clear to all parties from the outset whether control of the development is maintained by the public actor via the strict contractual conditions, or whether the private actor is free to act, given their taking on of the bulk of the risks and costs. Careful scrutiny at an early stage should definitively ascertain that the developer can secure sufficient funds, and has the necessary expertise for the development process. It is not sufficient that roles ‘exist on paper’. Definition in the contracts must be clear (e.g. ‘unforeseen circumstances’; permissible unilateral amendment to designs). Internal co-ordination by the public actor must be ensured and sustained, while use of the development plan by the public actor as a decision-making instrument rather than as an instrument of control is preferable. Hall notes that, while Ypenburg has been a success (as measured by people moving within rather than out of the development), the plan for older people to move into centrally located apartments near a shopping centre has not worked out as planned (Hall, 2014).

Ypenburg as an example of transport-orientated development (TOD) illustrates the value of proximity to existing, well-used rail links, as well as the impact of constructing dedicated rail/tram infrastructure and bus connections in a central location in the development (i.e. one central hub for trams and buses). Appropriate cycling distances to/from larger urban areas (e.g. 25 minutes) are also valuable. Public transport infrastructure should include the provision of park and ride as well as parking spaces, and secure/covered stands for bicycles and mopeds. Ypenburg also demonstrates how noise from proximate, busy motorways can be mitigated by earth bunding.

Although the targets for housing completions and population took slightly longer than expected to reach, this particular TOD has delivered, on the face of it, a desirable mix of tenure, 30 per cent of affordable housing, and almost 50 per cent medium-priced housing. In terms of mobility and sustainability, Ypenburg has been a success insofar as the level of car use is a fraction of the national average.

Box 6.1: The Ypenburg Development Model in Practice—Deelplan 20

As mentioned above, the Ypenburg development site is divided into five fields, which are further subdivided into ‘deelplans’, each comprising 500 to 800 houses. Deelplan 20 was reviewed by Heurkens (2012) and that work is summarised here.

Deelplan 20 covers five hectares of Ypenburg’s 600-hectare site (340 hectares allocated to housing development), and was to include the provision of some affordable homes. In 2006, the lead actor—Den Haag local authority—held a public tender competition among six preselected developers. The tender included predefined qualitative conditions, and was won by the private development firm ING Real Estate. As of 2012, the development had not commenced. The responsibilities and tasks of the respective public and private actors form part of the contract (Realisation Agreement). For the local authority, these include setting out the broad plan and the spatial conditions of the development, outlining the quality conditions of the public spaces and visual quality, adopting the land-use plan, and organising the sale of the land to the private sector. For the developer, the tasks include setting out the detailed plan and the spatial elements of the development, preparing a visual quality plan, presenting a communications plan, devising the land-use plan, executing land acquisition, and delivering the development, including the public spaces, all on time and as per the agreement. For example, the developer had to include the provision of a public swimming pool in the spatial plan. ING had to secure the finance for the development in the difficult economic circumstances of 2007. The local authority provided no funding or financial incentives for the developer/private sector to stimulate development within the plan area.

In this setup, the bulk of the risks and costs lie with the private actor. ING bears the costs of delivering the plan, the real-estate profits/losses, risks and costs arising from changes made to the plan by the local authority. The developer faces a financial penalty for each home delivered after the scheduled time. Den Haag municipality bore just one cost: the procedural cost of adopting the land-use plan, but benefited from the free purchase of the public spaces which it manages following development. It is also responsible for ensuring that the development runs smoothly from a bureaucratic perspective.

Crucially, there is a section in the contract which states that the local authority has the right to disapprove the designs of the private actor 'for reasons not incorporated within the agreement'. The local authority became intensely involved in the design processes of the development, and this has been described as one of the major drawbacks of the approach. Issues of roles and responsibilities continued to present a problem despite the conditions set out in the contract, and long after the contract was awarded. This particular *deelplan* in Ypenburg illustrates one perceived issue with the arrangements: the public/public body believes that control of the development is maintained via the strict conditions in the contract, whereas the private actor believes that it has freedom to act in return for taking on the bulk of the risks and costs associated with the development. *Deelplan 20* was also hampered by the developer not securing sufficient funds, and its expertise in *real estate* not equipping it adequately for the *development* process.

Overall, neither the public or private actors involved in this particular Ypenburg development were satisfied with the arrangements. While roles 'exist on paper', they are not performed in a transparent manner. The private actor unilaterally amended its designs due to unforeseen circumstances (including the market downturn), leading to mistrust, poor communication, and the emergence of an adversarial atmosphere. Heurkens' analysis presents a number of recommendations such as: clarity of definition in the contracts around 'unforeseen circumstances' and when unilateral amendments to designs can be made; internal co-ordination by the public actor so that it does not feel it needs to manage multiple sections within the municipality; the use of the development plan by the public actor as a *judgment tool* rather than as a *control tool*; and deeper, sustained involvement and investment by the public actor in the overall development. Adequate private capital and developer expertise are also deemed by Heurkens to be a necessary precondition.

Chapter 7

Uxcester

This case study is different from the others as Uxcester is a fictional city, an amalgam of mid-sized British cities with populations in the region of 200,000. A model for the development of these types of cities, involving investment in transport, was proposed in an essay that won first prize in the 2014 Wolfson Economics Prize competition. It had invited entries to make proposals for the creation of new garden cities that would be visionary, economically viable and popular. While fictional, this approach is of interest in that it is well-thought out and applies a new model of development in the UK context that has similarities to the Irish situation. Forty cities or towns in England that are comparable to Uxcester have been identified by the authors. These include York, Oxford and Exeter.

The proposed model draws on the experience of best practice in a number of European countries, and proponents say Freiburg is as good a model as any for Uxcester. It is also informed by the experience of the original garden cities and new towns in Britain, as well the estates that developed much of London. The authors, David Rudlin and Nicholas Falk, note that practitioners in the UK have been seeking for many years to apply the lessons of best practice from European examples, but with only partial success. They argue that this was because these efforts neglected the economic and regulatory issues that make good development hard to achieve in the UK. These relate to workings of the housebuilding industry, the economics of housing production, the problems of the land market, and the functioning of the planning system. However, practitioners have focused on design rather than these fundamental issues so that, in seeking to apply the lessons, 'they have been doing so with one hand tied behind their back because the economics are stacked against them' (Rudlin & Falk, 2014: 5).

The central problem identified by the authors in the UK development model is that most of the money and talent is focused on unlocking land through a contested planning system. They propose reforms for their version of garden-city building, which they consider has the potential for wider application. The key to the proposed reforms is 'to redirect the large sums of money that are invested in the purchase of housing land in the UK into the provision of infrastructure and the development of quality homes' (*ibid.*:2).

The proposed garden cities are based on extending existing cities rather than developing entirely new cities, for two reasons. First, the cost of a new city would be too high. Their approach is to use the difference between existing and developed land values to cover the cost of required infrastructure. This difference in land value can fund investments such as schools, local health facilities and some transport infrastructure, but not, they contend, all of the infrastructure and facilities a city needs, such as a university, general hospital and an art gallery. Second, taking advantage of the assets of an existing city allows for the more natural development of real places.

The authors propose a model that would accommodate the doubling of the population of Uxchester over 30 to 35 years. Three new urban extensions with a population of 50,000 each would be built and these, together with in-fill development in Uxchester, would enable the population to roughly double. While the new urban extensions represent greenfield development, Rudlin and Falk strongly support brownfield development and endorse the UK government's target on this. However they point out that there is a need to have a plan for the greenfield share of new development, and view their model of extending the city along transport links from the heart of town as a synthesis of urban and suburban development.

The proposed urban extensions would involve taking some land from the greenbelt. However, it is proposed that for every hectare used for development, another hectare would be allocated for accessible public space. This could include forests, sports facilities, parks and market gardens, and could benefit the whole city.

7.1 Role of Transport

Investment in quality in public transport plays a central role in the planned expansion of Uxchester. The new neighbourhoods are designed to be served efficiently by a tram (or bus rapid transport—BRT), with the tram stopping in the centre of each neighbourhood. They would be located within 10kms of the city centre, a 20-minute tram-ride away. The housing would be within 10 minutes' walk of a tram stop. The higher-density housing would be within five minutes' walk of a stop. At the same time, housing would be no more than 10 minutes' walk from green space. The neighbourhoods would include walking and cycling routes.

7.2 The Development Process

7.2.1 Acquisition of Land

Each of the three urban extensions would require 2,000 hectares (total of 6,000 hectares), with half of this used for open space. Legislation would be passed that would allow the garden city to acquire land at its existing use value plus compensation. The Garden City Land Company would be the vehicle used to acquire the land (see below). Hope value would also be paid. However, the plan is to use land from the green belt that would have little prospect of being developed in the absence of the garden-city development and hence would have minimal hope value. The basis for valuing the land would be frozen from the initiation of the process. It is assumed that 80 per cent of the land needed is agricultural land and this is acquired at a cost of £40,000 per hectare. This consists of £15,000 for agricultural land, plus an additional payment for farm buildings, plus 20 per cent compensation. The balance of land is assumed to be used for housing or commercial purposes or to have some hope value, so has a higher assumed cost of £800,000 per hectare. The average land acquisition cost is budgeted at £200,000 per hectare.

The initial land needed would be acquired outright, using compulsory purchase powers if necessary (which would be provided for in legislation). However, the development would take place over an extended period and a range of option mechanisms would be used to secure most of the land over time. These mechanisms would reduce the initial capital required for land acquisition. These are follows:

- **Loan stock:** Land would be transferred to the Garden City Land Company at its existing value (as set out above), with a final settlement date of five to ten years. The owner would receive interest during this period while continuing to use the land.
- **Equity deferral:** The Garden City Land Company has an option to purchase the land in the future at its existing value and in the meantime the owner receives an annual payment; this would be slightly higher than above in recognition of the date of acquisition not being fixed.
- **Equity investment/joint venture:** The landowners would have the option of investing their land in the Garden City Land Company as equity. In this case they would not receive payment upfront and would also have to contribute to the infrastructure investment in proportion to the size of their land holding. The landowners would get the full value of land when it is eventually sold for development. This is different from the joint ventures arrangements sometimes used in Ireland, insofar as these usually concern housing development while this is a joint venture for land development and infrastructure investment. If this mechanism could be used, it would substantially reduce the capital required by the Garden City Land Company but, in the interests of prudence, the authors did not include this in their calculations.

7.2.2 Investment in Infrastructure and Financing

The total cost of acquiring the land for the three urban extensions would be £1.46bn (60,000 hectares at £100,000 per hectare). In addition, the Garden City would invest in infrastructure, at a total estimated cost of £4.9bn. This would provide the infrastructure for 69,500 homes. This includes the cost of land preparation, major and minor roads, the tram, primary and secondary education buildings, and healthcare facilities. There are also additional costs of affordable housing subsidies and finance costs, bringing the total to £5.989bn. The income of the garden city would come from selling housing plots and also from receipts from commercial development and half of the Community Infrastructure Levy (CIL) that applies in the UK. This gives total receipts of £6.3bn, generating a small surplus. The projected revenue is based on selling plots for market housing at costs ranging from £45,000 to £65,000; land for social housing would be provided at zero cost (in place of the standard Section 106 agreements used in the UK) and in addition there would be a capital subsidy of £30,000 per unit of social housing. These land costs do not represent cheap land, but they cover a wide range of infrastructure costs as well as the cost of the social housing subsidy. In normal developments, high land prices are paid but infrastructure costs are not adequately covered. This may mean that development cannot happen or results in excessive pressure on existing infrastructure.

Table 7.1: Costs of Land Acquisition and Infrastructure and Revenue from Land Sales and Other Sources for Uxchester

| | Hectares | Rate | Total |
|-------------------------------------|--------------|-----------------|----------------|
| Total land acquired | 6,000 | £200,000 | £1,160m |
| ... allocated as open space | 3,000 | | |
| ... allocated as development land | 3,000 | | |
| Infrastructure costs | | | £4,115m |
| Affordable Housing Budget | | | £423m |
| Financing costs | | | £293m |
| Total cost | | | £5,989m |
| Foundation receipts | | | |
| Housing plot sales | 2,300 | £2.34m | £5,421m |
| Commercial development | 260 | £1.5m | £390m |
| Retail development | 40 | £1.0m | £40m |
| Community Infrastructure Levy share | | 50% | £423m |
| Total receipts | | | £6,273m |
| Balance | | | £284m |

Source: Rudlin & Falk, 2014. Figures rounded.

7.2.3 Legislation and Institutional Arrangements

The timing of investment is a challenging issue for this type of large-scale investment. The authors developed projections of how the cashflow would be managed over a 15-year period for one of the urban extensions. They assume that 30 per cent of the land is purchased outright (on a phased basis) while another 30 per cent is loan stock and 30 per cent deferred equity. Infrastructure investment is phased over the 15-year period while sales of housing plots start in year two. There is an initial equity investment of £50m, which could be from local councils or a patient investor. This earns a real return of 3.5 per cent annually. The rest of the finance is borrowed, with the benefit of a government guarantee to keep down the cost. The debt level peaks at £150m in year six (for one urban extension). Allowing for work to be under way at the same time on the other extensions would bring the total peak debt in any year to £350m.

The authors propose legislative changes to make possible their vision of new developments along garden-city lines as they do not believe it would be possible to reach voluntary agreements with landowners to enable development on the scale proposed.

Obviously, a single garden city such as Uxchester could not solve the UK's housing crisis, so they argue that their proposed approach should be the model for the expansion of all towns and cities.

The first step is a new Garden City Act. The legislation would do the following:

- establish the process for designating new garden cities;
- put a responsibility on local authorities to have long-term housing plans;
- give statutory powers to Garden City Foundations, who would promote each garden city; and
- set out the democratic basis for Garden City Foundations, including the legal and ownership structure, democratic representation and step-in powers in case of governance failures.

The authors envisage that local consortia, led by a local authority, would bring forward proposals to be designated as garden cities. For this to happen there would need to be benefits arising from being designated in this way. The benefits would be the power to acquire land, to act across administrative boundaries, to assume planning powers, and to raise development finance supported by a government guarantee. Cities that met specified criteria such as the strength of its vision, a commitment to house-building and having local buy-in would be granted this status.

The key organisation to bring forward development would be the Garden City Foundation (GCF). This would be a not-for-profit, statutory organisation. It would comprise an alliance between the city and neighbouring local authorities, and the board would also include representation of local civic organisations, business and investors, with an independent chair. This organisation would have strong powers: to acquire land (using compulsory purchase where necessary), to raise finance and to invest in infrastructure, and would also have planning powers.

The authors also suggest a separate company, the Garden City Land Company, which would hold the land. The GCF would own a controlling share of the land company while institutional and smaller investors would be invited to buy shares in the land company. The Garden City Executive would undertake the day-to-day management of the garden city, with an executive board appointed by the GCF.

The GCF would commission a masterplan. This would identify the infrastructure requirements and set the quality standards for development throughout the garden city.

Table 7.2: Cost of Providing Infrastructure for One Urban Extension of Uxchester

| Item | Unit | Quantity | Rate | Total |
|-------------------------------------|---------|----------|---------|----------------|
| EDUCATION | | | | |
| Primary | No. | 12 | £10m | £120m |
| Secondary | No. | 4 | £25m | £100m |
| Other | Various | | | £35m |
| Subtotal | | | | £255m |
| TRANSPORT | | | | |
| Minor roads | Km | 12 | £7.5m | £90m |
| Major roads | Km | 4 | £22.5m | £90m |
| Tram to city centre | Km | 6 | £20m | £120m |
| Tram within n'hood | Km | 6 | £10m | £60m |
| Other public transport | Various | | | £50m |
| Subtotal | | | | £410m |
| HEALTH | | | | |
| Primary | No. | 5 | £8m | £40m |
| Hospices/nursing homes | No. | 2 | £10m | £20m |
| Subtotal | | | | £60M |
| OTHER | | | | |
| Land preparation | HA | 2000 | £50,000 | £101m |
| Distinctive quality | Various | | | £100m |
| Open scape/landscape/ recreation | HA | 1,000 | £250m | £251m |
| Admin and marketing | | | | £45m |
| Contingency | | | | £100m |
| TOTAL | | | | £1,372m |

Source: Rudlin & Falk, 2014. Figures rounded.

7.2.4 Housing Delivery

In regard to housing output, the intention is to achieve an annual output in excess of 2,000 units. The garden city would make serviced plots available for house-building. To achieve a high level of quality housing output, it is proposed to use a variety of delivery models. It is envisaged that there would be a role for large-scale volume builders, but the authors emphasise the importance of diversity of producers to achieve the targets sought. Land sales would be structured to allow scope for small builders as well as large volume builders. In addition, land would be allocated for custom-build (customers buy a plot and chose from a list of home manufacturers to provide their home) and self-build (customers buy a plot, commission an architect, build themselves or employ a contractor). A fifth of the housing would be social housing.

It is proposed that most of the housing would be built at suburban densities of 30-45 units per hectare. Some homes (20 per cent) would be at lower densities; these would be detached homes on the periphery of the neighbourhoods, while 10 per cent would have much higher densities of 65 units per hectare in central areas consisting of terraces and apartments. These densities could be considered low in view of the scale of infrastructure investment; they are designed to counter potential criticism of building at high density in what is currently a rural setting. This choice increases the average infrastructure cost and hence the cost of plots.

House-building would be guided by a master plan for each neighbourhood. Each plot would have a 'passport' setting out what development is permitted. Those buying plots (individuals or developers) would have a clear idea as to what is permitted before buying.

The authors envisage that planning permission would probably be provided for both the master plan and plot passports; plot buyers would then have 'deemed consent' for development within these parameters.

The Garden City Land Company would retain the freehold of all plots, which would provide the company with a degree of control over the future use of property. Property owners would pay modest ground rents (£200 per year is suggested) to cover the maintenance and upkeep of the local public realm.

7.2.5 Sustainability

New garden cities should be sustainable in all respects, including transport. The authors propose that garden cities plan to be carbon-neutral from the start. Two approaches to sustainability are outlined. One is neighbourhood-based and would include district heating, combined heat and power, and food-growing and car-sharing. The other focuses on individual houses with elements such as super-insulation, passive design and roof-mounted solar energy. Both elements are needed but in some respects there are trade-offs. In particular, if energy demand for each house can be reduced to extremely low levels (or houses become net generators of energy), then district heating would not be required (or viable). The authors outline a number of sustainability standards regarding energy, waste, water and green infrastructure that would be included in a Garden City Sustainability Charter and enshrined in ground leases. Examples include the level of greenhouse-

gas emissions per dwelling, the certification of materials, and provision of composting facilities.

7.2.6 Popularity

There is often opposition to new development. Rudlin and Falk (2014) sought to develop a model with the potential to command popular support. If the proposed approach to development were adopted, it would mean that, rather than new housing development taking place at the edge of every new suburb and village in the district, it would be concentrated in a few large-scale developments. The authors argue that this would gain the support of people in those places spared from development.

They propose a social contract with the people of Uxcester and the surrounding area, with the following elements:

- First, the location would be chosen to minimise environmental impact.
- Second, there would be a gain of accessible open space that would be available for existing and new residents; for every hectare of land used for development, a hectare would be allocated for open space.
- Third, fair compensation would be paid to those directly affected.
- Fourth, given that the impact on traffic congestion is a frequent cause for concern with new development, major infrastructure investment is an intrinsic part of the proposed approach. Both existing and new residents would benefit from this, especially from the new city-wide tram network. There would also be new sustainability infrastructure (e.g. car-sharing and food-growing).
- Fifth, rather than creating a new town centre, upgrading of the existing city centre is proposed.
- Sixth, the community would be given a financial stake in the body that develops the garden city.

The authors advise that the designation of being a garden city should not be imposed from national level but would be the outcome of a process whereby local consortia would make bids for garden-city status, as described above.

7.3 Discussion

The vision outlined by Rudlin and Falk is attractive: new planned urban settlements of walkable neighbourhoods served by public transport and provided without public subsidy. The approach they propose is of particular interest as a means of organising development in a situation where there are multiple landowners, including private landowners. Critical to the realisation of this vision is the creation of an entity with the ability to acquire land, raise low-cost finance and invest in infrastructure. The land is acquired at existing use value plus compensation and hope value, where it exists, with the capacity to use compulsory purchase powers if necessary. The land price is still sufficiently low to make the development economically viable, based on the assumption that, on account of the greenbelt policies, there is a considerable volume of land close to cities or towns that would not have any reasonable expectation of development in the absence of the garden-city model and hence would have minimal hope value. The basis of valuing land is frozen from the start of the process. Over time, all of the land is acquired by the Garden City Land Company but the authors suggest useful mechanisms to economise on capital: use of loan stock, options, and the landowners becoming equity partners. The authors say that their model is similar to one used in Germany; this appears to be a reference to the mechanism of an urban development measure (see NESc, 2018).

Their model illustrates the potential of arrangements that can both boost development capacity and capture value for investment in an ambitious programme of infrastructure investment. A central component of this is the investment in transport that opens up new land for development.

By generating a large, sustained increase in housing supply, one-fifth of which is social housing, this model would improve affordability. In addition, some of the housing would be self-build, which would further assist affordability. However, this programme puts more emphasis on creating a high-quality environment than on affordability improvements. The infrastructure costs are recovered in the sale of land for market housing.

Chapter 8

Cork

There is a long history in Cork of strategic planning at a sub-regional level that has sought to achieve an integrated approach to land-use planning and transport. In 2016, NESC commissioned a research paper on Cork's approach to strategic planning from the UCC Centre for Planning Education and Research as part of work on infrastructure planning in Ireland (O'Sullivan & Brady, 2017). This case study considers Cork's strategic planning approach and the achievement of and potential for transport-orientated development (TOD) in the Cork area. It draws extensively on the NESC commissioned research paper.

8.1 Regional Land Use and Transport Planning

In 1976, a Land Use and Transportation Study (LUTS) was commissioned by the South West Regional Development Organisation on behalf of Cork County Council, Cork Corporation, the Department of Local Government and other public bodies. Key ideas set out in the LUTS study included revitalising the city centre, maintaining a compact city and satellite towns, achieving modal shift and choice in transport, and providing an enhanced public transport service. A formal review of the strategy in 1992 concluded that it remained robust, and that mixed results were mainly due to poor macro-economic conditions and a constrained funding regime. Manseragh (2005) pointed out that the LUTS settlement strategy required revision of the zoning regime, and this proved more challenging than envisaged.

A new plan, the *Cork Area Strategic Plan 2001–2020* (CASP) was published by Cork County Council and Cork City Council in 2001. This strategy included regeneration of the city and docklands areas, creation of an integrated transport system, and the creation and maintenance of a high-quality environment, broadly defined to include the natural, social and cultural environment. The study identified 'metropolitan Cork', incorporating the city and the closest settlements, as a single area in terms of economic, social and cultural facilities that would be highly interconnected. Outside this area, growth would be concentrated in towns and villages.

8.2 Role of Transport and the Rail Corridor

A major part of the CASP strategy was the development of a rail corridor in the metropolitan Cork area. The idea was to provide a high-frequency rail service and to use this as a means of shaping development along the corridor. At the same time, the study pointed out that the viability of a high-frequency rail service was critically dependent on appropriate residential development along the corridor.

The CASP envisaged the rail corridor as a means of rebalancing growth from the southern and western edges of the city to the north and eastern part of the metropolitan area. The proposed corridor was to go from Blarney through the city centre and docklands to Midleton and Cobh. The strategy involved reopening the rail-line to Midleton and building several new stations. At present, the train runs continuously from Mallow to Cork; the planned rail corridor would create new stations, including at Blarney. New commuter railcars would be provided along with three new park-and-ride facilities. The CASP identified the scope for a new rail station to be the basis for a major new development in the vicinity of Monard/Rathpeacon, subject to further assessment. Subsequent plans for a new town at Monard are set out below.

Figure 8.1: Cork Rail Corridor



Source: O'Sullivan & Brady, 2017.

Government commitment to reopen the train line to Midleton was secured in 2004 and the new service commenced in 2009, with new stations at Midleton and Carrigtwohill. However, other aspects of the rail corridor have not been implemented; the other new stations have not been provided, nor have the park-and-ride facilities at train stations.⁵ The frequency of the Cork commuter service has not increased to the extent envisaged in the CASP strategy; the current frequency is every hour and half-hourly at peak times.

Following government commitment to invest in the Cork rail service, the county and city development plans and the local area plans for the areas concerned were revised to increase the share of new housing investment located in the hinterlands of rail stations on the network. In the county, three new special local area plans (Blarney-Kilbarry, Carrigtwohill and Midleton) were prepared in 2005, and the post-rail zoning was changed to include an additional 23,310 housing units in the period to 2020. In the city, local area plans for the North Docks and North Blackpool areas incorporated a rail-orientated development approach and were targeted towards supporting rail services and rail-based development. Successive City Development Plans supported the provision of a new train station in the North Blackpool area, but this has not yet happened. All of the local authorities along the route (including town councils) agreed on the introduction of a special development levy on new developments along the rail corridor, with the intention that these contributions would cover around 50 per cent of the cost of the rail project.

The 2009 County Development Plan welcomed the imminent reopening of the rail line to Midleton and reaffirmed commitment to rail-based development. The local area plans for Midleton and Carrigtwohill had left it to the multiple landowners of key sites close to rail facilities to prepare detailed master plans necessary to provide infrastructure on these sites. The 2009 County Development Plan indicated that, in light of the lack of progress made and the critical importance of these sites to the suburban rail project, the council would take steps to ensure masterplans were put in place. Subsequently the council produced framework master plans for these sites in 2015.

The 2014 County Development Plan indicated some movement away from promoting higher density along the rail corridor. It considered that, despite the investment that had been made in rail, the current service was not sufficiently frequent for the locations along the rail corridor to meet the requirements for locations 'generally suitable for higher density' (Cork County Council, 2014: 45), and that the best locations for high densities were in the city. There was also concern that the application of higher-density policies was restricting the range of housing types available and encouraging many households to locate in rural areas to secure their desired housing type. The plan proposed facilitating a range of housing types in the towns along public transport corridors. The plan proposed high densities (defined as 35 dwellings per hectare, a downward revision from 50 dwellings per hectare in the previous plan) in the locations within the towns that are close to

⁵ A new park-and-ride facility has been provided in the south city area (Black Ash), with a connecting bus service around the city centre.

future high-quality transport corridors, including those with frequent bus services, with lower densities at other locations within these towns.

Population trends along the eastern part of the Cork rail corridor are examined in the O’Sullivan and Brady (2017) study. Population increased along the corridor, but not to the extent envisaged by the CASP plan. Over the period 2006 to 2016, population along the East Cork rail corridor grew by 27.8 per cent, including an increase of 41.0 per cent in the Carrigtwohill and Midleton hinterlands. These increases were higher than those experienced in Cork city (5.2 per cent) and elsewhere in the CASP region (19.0 per cent). However, O’Sullivan and Brady found that lack of progress on key sites near the rail stations meant that much of this growth occurred in locations unlikely to support the rail service. Analysis of the 2011 Census and the preliminary 2016 results revealed that the strongest growth was in the more rural areas along the rail corridor. This period is dominated by the economic collapse during which very little housing was developer-built.

Some recent initiatives indicate a renewed focus on the promotion of development along the rail corridor. The council has recently announced plans to initiate the infrastructure investment at a key site in Midleton (Water Rock), following on from the framework master plan published earlier. In addition, the council’s plan for a new town at Monard, beside a planned new railway station, was approved by An Bord Pleanála (ABP) in 2016. Both of these initiatives are now outlined.

8.3 New Development: Water Rock, Midleton

Water Rock, a large development site close to the town centre of Midleton, is one of nine ‘urban expansion areas’ that have been prioritised for development by the council within the Cork metropolitan area. Taken together, these sites have the potential to deliver 11,000 housing units. The council has established a specialist housing delivery and infrastructure team to expedite this work. In view of the multiple land ownership in the urban expansion areas, the council intends to proceed with start-up infrastructure investment to unlock development potential. This is focused on internal infrastructure (and limited site-specific external infrastructure) that would normally be undertaken by the developer, with the cost recovered through agreements with developers (under Section 47 of the Planning and Development Act) or special developer contributions (Cork County Council, 2017).⁶

The council has secured €5.5m from the Local Infrastructure and Housing Activation Fund (LIHAF) to undertake the strategic infrastructure needed for the first phase of the development. It is envisaged that later phases will be funded predominantly through developer contributions. Water infrastructure will be funded separately through Irish Water, while other funding is to be investigated for the railway station.

⁶ The arrangements described here refer to eight of the nine urban expansion areas.

Water Rock is a mixed-use development that will include housing, schools, business use, parks and a railway station. The total site has an area of 160 hectares, of which 80 will be used for housing, giving a density for this part of the site of 28 units per hectare. The plan is to have a mix of dwelling types, from two-bedroom to four and five-bedroom units.

The site is close to a railway station, and it is intended to create a second railway station in order to maximise the area within one kilometre of a station. The high-density housing will be located closest to the railway stops; approximately 13 hectares of the site will be used for high-density housing. The framework master plan specifies that detailed design will be required to provide for safe pedestrian and cyclist areas of high quality. Within the site, road space will be shared with motorists and cyclists where the speed limit is below 30km/hour. Car parking requirements are the normal standards for County Cork.

The plan for Water Rock has the classic elements of a transport-orientated development: a mixed-use area close to public transport, facilitating walking and cycling, and high-density housing close to public transport. However, the overall density (28 units per hectare) is low for a rail-orientated development.

8.4 New Town: Monard

A significant element of the planned development of the rail corridor is the development of a new town at Monard. A substantial settlement at Monard was identified as a flagship project in the 2001 CASP. An area of 390 hectares (greenfield land) was designated as a Strategic Development Zone (SDZ) for the new town in 2010; this plan for the SDZ was approved by An Bord Pleanála in 2016. It is intended that the new town will have from 4,750 to 5,850 dwellings and an eventual population in the region of 11,000 people. This represents a substantial new settlement, larger for example than the new urban districts developed in Freiburg of Rieselfeld (4,500 dwellings) and Vauban (2,470 dwellings). The land area used for both Rieselfeld (70 hectares) and Vauban (41 hectares) is much smaller than Monard.

A new railway station is central to the vision of this new town. The development of Monard is to contribute the increase in the population and employment along the rail corridor that is required to make a frequent commuter rail service viable. It is intended that bus services would also be provided as the development progresses. The layout of Monard is based more on the network than the cul-de-sac principle, and provision for walking and cycling features prominently. The plan takes advantage of the fact that this is a new area, so it is possible to design pedestrian and cycle routes that are optimal in terms of directness, while long sections go through open space in order to enhance their amenity value. Open spaces are designed to be overlooked by houses.

Monard is to be a mixed-use area, predominantly residential. Three new village centres and a town centre are planned. The non-residential development will consist mostly of local services, but there is also provision for 10,000 square metres of offices that would be part of the office space of the Cork area. The housing is to comprise a mix of houses and apartments, with the largest share consisting of terraced housing. The net residential density is to range from 27.7 to 34.0 units per hectare depending on the final housing mix. Densities will be higher (50 to 55 units per hectare) in most of the area within 0.5 kilometres of the railway station. Social housing will be provided in line with the normal Part V requirement while (perhaps surprisingly) there is a ceiling set of 20 per cent on the total share of social and affordable housing.

The area has 23 landowners, and this is the first time that an SDZ has been established in an area with such fragmented land ownership. This poses a challenge to achieving the ambitious plan. Cork County Council considered that acquisition of the land and provision of infrastructure by a local authority or public body was inadvisable because of the lack of funding available for this purpose, while agreement among the landowners was also deemed unlikely. The proposed way of addressing the provision of infrastructure is primarily through the 'use of incentives and controls which make it in the interests of developers and landowners to act in a way which in the aggregate results in provision of the necessary infrastructure and facilities' (Cork County Council, 2018: 186), in conjunction with limited land acquisition.

It is proposed that the initial development work be undertaken by the county council. This will involve some land acquisition and creation of the first part of the SDZ infrastructure networks. The estimated cost to public bodies of the infrastructure for Monard is put at €30m, excluding water, the railway station and an external ring road that is forecast to be needed when the development is well advanced.

This cost is to be recovered through development contributions. Such contributions for Monard will be higher than for other areas. The SDZ plan explains that:

Monard is more dependent on provision of new infrastructure than most land at the edge of existing built up areas, and in the absence of such infrastructure is not developable, and has agricultural value only. It is not unreasonable that this reality be reflected in the average contributions sought (Cork County Council, 2018: 168).

To minimise potential disincentive effects, it is intended that contributions will start at a level close to the current level of contributions elsewhere in the CASP area, and then increase. Private-sector developers are expected to extend the initial infrastructure put in place by the council.

The timescale for the development of this new town is a quarter of a century, possibly longer. Monard incorporates key elements of TOD.

8.5 Docklands Redevelopment

The planned growth along the rail corridor includes regeneration of Cork city centre and docklands. Much of the employment and population growth for the city area envisaged in the CASP was to be in the docklands. Employment growth here would also increase the attractiveness of residential development elsewhere along the rail corridor. Cork's main railway station (Kent Station) is located on the north-city docks but this station has traditionally not been well connected to the city centre. Redevelopment of the station was recently completed. Improvements include a new underground pedestrian link to the quays and a new public transport hub from which three bus services will operate.

Local area plans for the north and south docks were produced in 2005 and 2008 respectively, but progress has been slow. One obstacle is the fact that the city docks are still in active use as a port, and relocation of this activity is a major project; this work is now under way. Other obstacles have been the lack of funding for the infrastructure required and the economic recession. One major difference between the Cork docklands project and the regeneration of the Dublin docklands is that there was no comparable institution in Cork to the Dublin Docklands Development Authority, which owned substantial land, had the capacity to raise finance and had planning powers. A few development projects are now under way in the Cork docklands, including one on a CIE-owned site close to Kent Station. CIE has given a 300-year lease to the private developers of this site in exchange for 10 per cent of the market rent on completion of this mixed-used development. New local area plans are now being prepared.

8.6 New Transport Strategy

A new transport strategy for Cork Metropolitan Area is being finalised by the local authorities, in partnership with the National Transport Authority (NTA). This will include proposals for a revised bus system for Cork and enhancements to the commuter rail service, including additional stations and rail fleet. In addition, the strategy will appraise the potential of a bus rapid transit or light-rail corridor to serve increased population growth, as envisaged by the National Planning Framework (NPF) (Government of Ireland, 2018).

8.7 Conclusion

From their examination of the experience of almost 40 years since Cork adopted the LUTS strategy, O'Sullivan and Brady conclude that Cork has performed reasonably well in terms of spatial planning and that 'there has been a surprising level of consistency in the way key ideas and principles have endured' (2017: 151). They point to the strong focus on the idea of the metropolitan area, while the greenbelt remains largely intact. Travel is still dominated by the private car but the capacity remains to support greater choice in transport. They find that the LUTS and CASP experience was quite a positive one in terms of promoting development at suitable locations and restraining it elsewhere. The LUTS and CASP encouraged a shift in

thinking towards higher densities and mixed use development along suburban rail. The lack of progress on this in recent years is attributed by O’Sullivan and Brady to a combination of the recession, the banking crisis and the austerity policy (which constrained government investment in rail and other transport initiatives).

Both LUTS and CASP promoted balanced population, including prioritising locations that can be served by public transport. According to O’Sullivan and Brady, the planning authorities have, by and large, remained consistent in releasing housing land at suitable locations when required. However, they express concern that there has been a noticeable shift away from this consistency following the update of CASP in 2008. The CASP update facilitated substantial increases in the allocation of planned housing development away from the rail corridor. Some of the locations now being promoted by the council in response to the pressing need to increase housing output are not priority locations as identified in the CASP. They point out that the availability of large volumes of greenfield development sites in locations that were almost solely car-dependent is a disincentive for development along the rail corridor. These locations also have the disadvantage of higher development contributions and challenging local infrastructure issues. Fragmented land ownership at key development sites was another obstacle to TOD at key sites on the rail-line.

The strategic planning approach adopted in the Cork area is supportive of transport-orientated development. The CASP strategy for the period 2001 to 2020 set out a plan for an integrated transport system, including rail, quality bus corridors, bus rapid transit, circling the city with park-and-ride facilities, improvements for cycling and walking, and integrated ticketing and provision of information.

There remains huge potential for TOD in the Cork area. Under the NPF, the preparation of a metropolitan area plan will now be on a statutory basis. There is substantial zoned land suitable for TOD along the rail corridor, while the commitment in the National Development Plan (NDP) to the BusConnects project should open up further possibilities.

Chapter 9

Field Study—Nantes

To supplement the literature review and case-study analysis, a research visit was made to Nantes, France. A central purpose was to understand the extent to which the four factors revealed in the case studies (vision, decision, institution and funding) help to explain their positive experience of transport-orientated development (TOD). The wider Nantes Métropole area (comprising 24 communes, one of which is Nantes central) has the following qualities (equivalent data for Dublin county/four constituent local authorities is in brackets):

- surface: 524km² (922km²);
- 630,400 inhabitants (1,347,359),
 - 47 per cent in Nantes central (41 per cent in Dublin city);
- 359,000 jobs (542,145),
 - 53 per cent in Nantes central (47 per cent in Dublin city); and
- 56,000 students (126,817).

Nantes has 2.3 million daily passenger movements within the metropolitan perimeter (inwards, outwards, inside) and an extensive public transport network, which is regularly held up as an international example of good planning and operation:

- 3 tramway lines;
- 1 busway BRT line;
- 7 'chronobus' lines;
- 46 standard bus lines;
- 1 shuttle airport–city centre;
- 1 on-request transport service and for people with reduced mobility (Proxitan);
- 1 boat service (navibus) (across Erdre and Loire rivers);
- 1 night service (tramway–busway–chronobus–bus), and
- Luciole bus (night, Saturday to Sunday + Thursday route).

9.1 Vision

The emergence of a vision for TOD in Nantes can be traced back to the 1970s, and the planning of a new tramway system (Vigarié, 1983). Nantes previously had a tram operation, with the first line constructed in the 1870s and over 100km of track operating in the area in the 1920s. However, by the 1960s the service had been discontinued as car-orientated planning dominated.

By the mid-1970s many cities in France, and indeed around the world, were suffering the negative impacts of low-density urban sprawl and traffic congestion. In 1975, the French government invited the mayors in a number of cities to examine the potential of (re)establishing tram systems at the heart of their public transport networks. Nantes, along with Lyon, Strasbourg, Grenoble and five other cities, responded positively.

9.2 Decision

From the outset, the decision to build the tram was viewed as an instrument to control urbanisation (*ibid.*). Public transport planning and delivery was used to steer urban growth in locations decided on by the local authority (mayor and municipality). The institution of a mayor with strong executive powers was important. The responsibility for preparing a local plan lies with the local authority under the direction of the mayor. Up to the year 2000, the local plans were called *Plan d'Occupation des Sols* (POS), but have been replaced by the *Plan Local d'Urbanisme* (PLU). In addition to these local planning layers, there is a national legal requirement for each metropolitan area to produce a *Plan de Déplacements Urbains*, its sustainable urban mobility plan. Another influential document is *Le Schéma National d'Infrastructures de Transport*, the National Transport Infrastructure Strategy for France (SNIT), which defines the policies, objectives and major investments in transport over 30 years. The current SNIT pursues a greener, more collective and multi-modal infrastructure in favour of rail and river transport, to the detriment of road and air (see Section 9.4 below).

A number of studies of the potential for a new tramline were undertaken in Nantes, with an emphasis on how it could positively affect urban development. The analysis included an examination of an 800m-wide corridor along the potential route that could serve 70,000 urban residents. Then the planning area was broadened out under the POS for Nantes. This approach is most developed in the *Contrats d'Axe* (Corridor Contract) strategy used in BRT systems such as in Paris. TOD has at its heart the interaction between land-use and transport planning. To more closely align these activities, cities in France began using corridor contracts (also known as axis contracts) in the early 2000s. First employed in Grenoble and Toulouse, corridor contracts are formal reciprocal agreements between two types of actors: (a) a transport planning and delivery institution that 'commits itself to the commissioning of a line of new transport, extension, or revitalisation of an existing line', and (b) adjacent land-owners and service providers who are 'committed to densifying urbanisation along the corridor and to provide access to the stations' (Bentayou *et al.*, 2015).

Table 9.1: General Scheme of French Planning Hierarchy

| Document | Level | Comment |
|---|---------------|--|
| <i>Code de l'Urbanisme</i> | National | Sits at the top of the planning hierarchy. Development and 'lower-level' plans must comply with the code, without exception. |
| <i>Schéma de Cohérence Territoriale (SCOT)</i> | Regional | Prepared by a committee of local authorities in consultation with local stakeholders. Identifies areas for residential, commercial, recreational and tourist development, and open spaces for a 10-year period. |
| <i>Plan Local d'Urbanisme (PLU)</i> (formerly <i>Plans d'Occupations des Sols, POS</i>) | Local | Sets out the zoning of land and detailed plan defining permitted development within an area, including the density, and ZACs—see below. Density is outlined using the Coefficient d'Occupation du Sol (COS). The higher the COS, the higher the density. For example, a 1,000m ² parcel of land with a COS of 0.25 is allowed 250m ² of net habitable space (1,000 x 0.25). |
| <i>Contrats d'Axe</i> (corridor contracts) | Local | Formal reciprocal agreements between transport body and adjacent land-owners/service providers. |
| <i>Zone d'Aménagement Concertée (ZAC)</i> | Site-specific | Outlined in the PLU, a ZAC is a special Urban Development Zone, for which more specific land uses and desirable development are set out. |

Table 9.2: Plans de Déplacements Urbains

| | | |
|--|-------------------|--|
| <i>Plans de Déplacements Urbains (PDU)</i> | Metropolitan area | <p>Provides a comprehensive and coherent approach to organising the different services of mobility at the scale of the metropolis, with the following goals:</p> <ul style="list-style-type: none"> ○ Reduce individual car usage ○ Develop public transport ○ Develop cleaner mobility (bicycle, walking...) ○ Optimise goods delivery ○ Optimise car parking ○ Encourage employers to promote cleaner mobility ○ Help impaired people gain access to public transport |
|--|-------------------|--|

Nantes had a tradition of holding on to public land that was close to transport nodes where development or extension was likely. The tramway plan made maximum use of the river quays, newer roads, and pre-existing railway to minimise expropriation/compulsory purchase. Private landowners were incentivised to reach agreement with local authorities, as any expropriation/compulsory purchase arrangement would see land tied up in a lengthy process.

In Nantes, the POS, combined with use of *Zones d'Aménagement Concerté* or urban development zones (rather than corridor contracts), was the main instrument for delivering TOD. The POS detailed the nature and density of residential development close to the new public transport system.

The areas closest to tram stops were placed in three categories: one area reserved for highest-density housing (COS = 0.80) at a distance not exceeding 600 meters from the tram stop; the next area less proximate to the transport node with a COS of 0.50; and a third area, which was relatively undeveloped but earmarked for longer-term planning and development to the east of the route, the current residential occupancy depending on the progress of transport patterns in Nantes.

In addition, a ZAC was applied to a 900-hectare area to 'avoid land speculation'; this ZAC area was 'inseparable from the commissioning of the tramway', meaning public transport would ensure 'the cohesion of the urban elements', control transport flows, and 'accelerate housing construction' (Vigarié, 1983: 47). Another ZAC of 52 hectares provided for the rapid construction of 1,730 dwellings linked to the development of the tram.

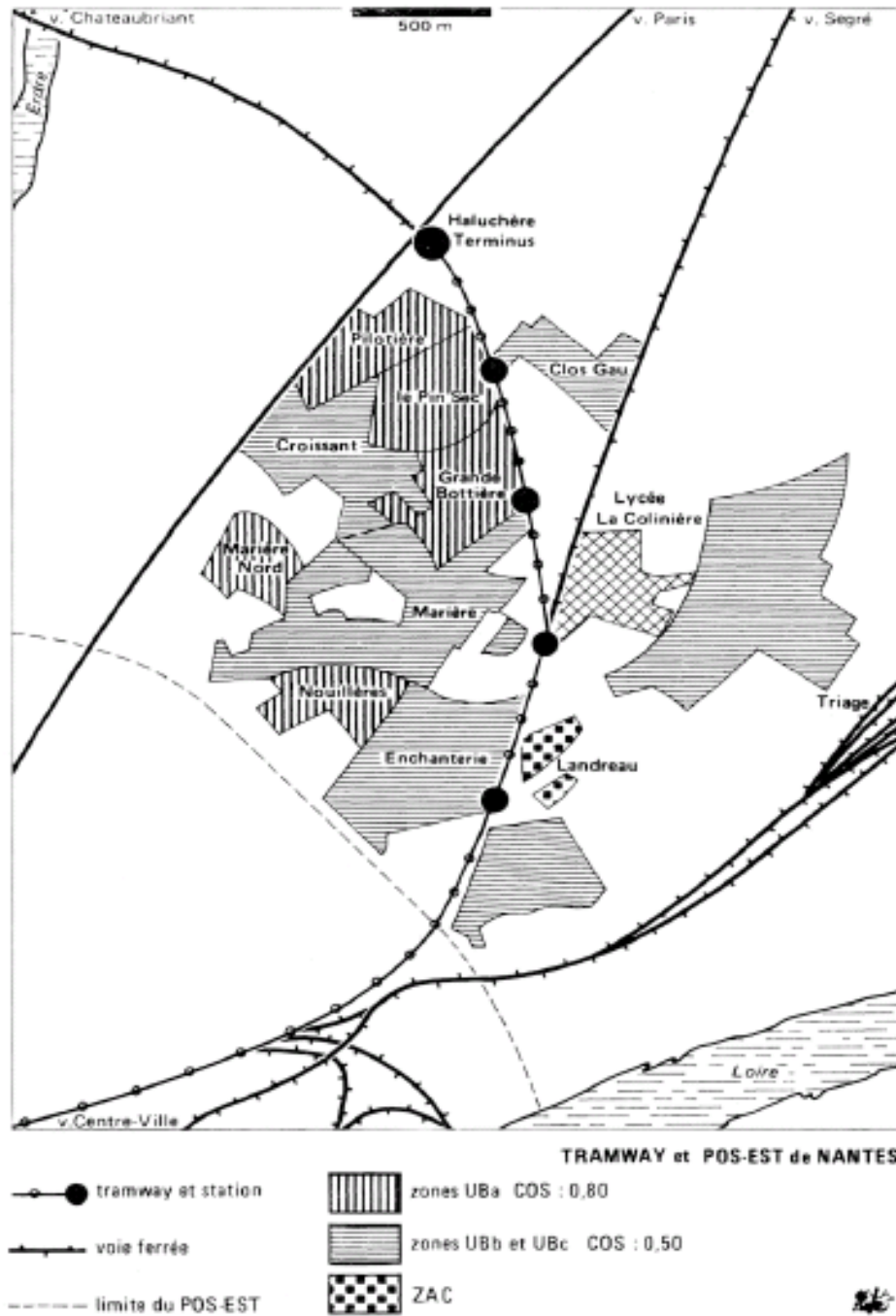
The new system would reconfigure urban development in the proximity of the tram line as well as the entire public transport network. It was estimated that 75 per cent of existing bus services would no longer have to traverse the city centre, a shift facilitated in part by the introduction of transport hubs and a single-ticket system provided tickets were valid on all public transport modes.

The new service was to have frequency as a central feature to make timetables obsolete. Trams would arrive at stops every four minutes during peak hours and every 15 minutes off-peak, with trams getting priority at traffic lights or junctions.

The tram ('Tramway') was opened in 1985, the first of three lines that now travel 43km in total. It has been supplemented by a BRT line ('Busway'), which runs for 7km. The tram system has frequency during rush hours of three to five minutes, and four to six minutes off peak. The number of vehicles is 79, running at an average speed of 20km/hr, serving 82 stops. The BRT is similar to the tram system in that it is high-frequency, provides a regular service, has priority at crossroads, and runs on a fully dedicated lane.

The tram and BRT are further supplemented by another bus system ('Chronobus') linked to the tram system and BRT at hubs, with a single ticket valid on all three systems. There are nine hubs which are multimodal connection poles organised to allow passengers easily switch from one transport mode to another: Tramway, bus (Busway and Chronobus), car and heavy rail.

Figure 9.1: Example of TOD Plan in Nantes



Source: Vigarié, 1983.

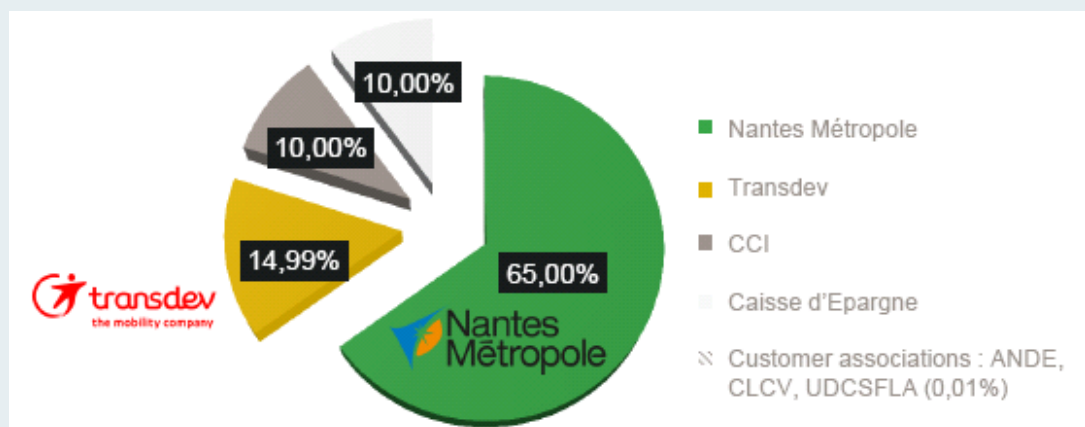
9.3 Institutions

The transport-orientated concept applied in Nantes since the 1980s has been—and has had to be—sustained over the decades since. In the 2000s, the local authority Nantes Métropole adopted a vision to develop via ‘controlled urbanisation’, to organise itself as ‘the city of short distances’ and to see urbanisation increase by 10 per cent while the population increased by 15 per cent, with continuing transport-orientated development. This includes adopting the concepts of ‘never alone in my car’, and ‘all players work for sustainable mobility’.

As outlined above, the institution of a mayor with the executive powers to install the vision of TOD via the POS was an important feature in Nantes. However, perhaps the key institutional development was the establishment of Semitan in 1979 as the tram system was being designed and delivered.

Semitan is a ‘mixed economy’ (public-private) institution led by Nantes Métropole (65 per cent ownership), with a private transport company, Transdev, as the main private shareholder (14.99 per cent). The remaining shares are owned by banking group *Caisse d’Epargne* (10 per cent), the Nantes Chamber of Commerce CCI (10 per cent), and customer associations (0.01 per cent). Semitan has been central to how TOD has been applied in Nantes. Since 1979, it has won the formal tender process to operate the public transport network, including the public service element. The contract is extensive and runs for seven years.

Figure 9.2: Ownership of the Public-Private Semitan Institution



Source: Semitan.

The current contract runs from 2019 to 2025. Under the contract, Semitan has three missions:

- operate the public transport network (operation, information, maintenance, commercialisation, safety and innovation);
- project-manage, on behalf of Nantes Métropole, the research and development of the transport network, expansion projects, and construction of transport infrastructure; and
- co-ordinate mobility within the Nantes area.

As Semitan is led by the local authority, and operates and manages the public transport system, this one institution links urban and transport development. The mayor and the local authority are in a position to ensure that urban development is transport-orientated via the *Plan Local d'Urbanisme* (PLU, formerly POS) and the *Plans de Déplacements Urbains* (PDU) it adopts and enforces, and via Semitan's operations. There is a direct institutional link between urban development and transport planning and investment, via Nantes Métropole's leadership over the PLU and PDU, and Semitan's operations.

It is in the context of these local authority-led urban development and sustainability plans that Semitan manages public transport and mobility in Nantes. Semitan has to adopt an asset life-cycle approach to optimise costs, and provide in-depth analysis of the future operation and maintenance of the public transport network. It must adhere to the local urban development and sustainability plans, and reflect them, from the project research and design stage, right through to project delivery.

Investment in public transport (funded by leveraging the *Versement Transport* tax and fare revenue—see below), must also comply with these plans. At present Semitan is managing transport projects to the value of €600m, including Tramway line construction or extension, the procurement of 61 longer trams, 100 new buses over the next seven years (including new e-Busways; see below), the construction of two public transport depots, a new tram operating management system, park-and-ride construction, and other infrastructure and building renewal.

One example of this link between local authority-led urban development and sustainability plans, and public transport investment and planning in Nantes, is the e-Busways project. This project will see the move from diesel- or gas-powered buses on the BRT, to the procurement of new 24m electric vehicles. In 2015, the mayor stated that she expected Nantes to show as much ambition as possible in terms of commitments on actions to fight climate change. The mayor sought to accelerate the move from commitments to concrete actions. As the mayor and Nantes Métropole lead the development of the PDU sustainability plan, it could reflect this ambition. The launch of the revision process of the PDU was held in October 2014 and was followed by the completion of a large-scale travel survey, the development of a draft PDU, workshops and meetings with the citizens association and actors, and finalisation and communication last year. The agreed PDU defines the principles of organising travel in Nantes, sets the objectives, strategy and prospects for development of services travel for the next 15 years. It also provides for the 2018–2027 action programme for all modes of travel, and especially actions to develop walking, cycling and public transport.

In parallel, as the mayor and Nantes Métropole lead the Semitan institution responsible for public transport planning, investment and operation, the strategic direction evident in the PDU could be applied in investment decisions. After a carefully designed tender process, Semitan procured 22 electric buses with guaranteed battery life of seven years, all to be delivered by September 2019.

Finally, in terms of institutions, the third Semitan mission above represents an interesting function: to bring consistency between mobility operators, public and private. At present Nantes' TOD approach is built around many modes of transit including trams (Tramway run by Semitan), bus (Busway and Chronobus run by Semitan), self-service bike (Bicloo run by JC Decaux), car-sharing (Marguerite run by Europcar), and various individual or collective bike parks.

Semitan, led by a public body (Nantes Métropole) but including private-sector involvement (Transdev), has been charged with co-ordinating all of these mobility modes in the Nantes area. This entails facilitating the customer's journey across all modes, by creating a unique and ubiquitous mobility card/subscriptions, standardisation of practices, and sharing information and tools. This is an ambitious project but one that is seen as maintaining the transport-orientated approach to urban development. TOD in Nantes is evolving from car versus public transport, to car versus a wider set of mobility options such as walking, trams, bus, cycling (including self-service bike) and car-sharing.

9.4 Funding

At the highest level, the aforementioned SNIT outlines the national transport infrastructure investment priorities. Flowing from this are the *Contrats de Plan État-Région* (CEPR), which set out the priority contracts for public investments the government seeks to establish over the following six years.

The CEPR contains the priorities on which the state, the regions and sub-regional communities agree, with 35 per cent of funding provided by the state and the balance provided by local authorities. The current CEPR runs from 2015–2020 and lists contracts with a value in excess of €30bn, to be invested in regional economies.

A key feature of TOD in Nantes (and France generally) is the existence of a hypothecated local tax to fund transport development and operation: the *Versement Transport* (VT). First introduced in the Paris region in 1971, the tax was gradually applied to all French municipalities: where population exceeded 300,000 in 1973, more than 100,000 in 1974, 30,000+ in 1982, and 10,000+ in 1999.

The VT is payable by all public and private employers and is used to finance the budget of the local authorities responsible for organising transport and mobility in the municipality. The rate of tax is applied to the payroll of all firms with 11 or more employees, and is decided by municipalities within the rate limits set by law. The current maximum rate is two per cent.

Today the VT (two per cent) raises approximately €163m annually in the Nantes region, which—along with the €75m raised through fares—funds the operation, renewal and development of the public transport system. In addition, employers in

Nantes must pay 50 per cent of the cost of their employees' public transport ticket subscription where the employee chooses to subscribe.

The VT has played an important funding role in Nantes for decades. The cost of the initial tramway system described above was almost 500m francs in 1982 (€75m using 1999 fixed parity of €1 = 6.5 francs). That included 214m francs for infrastructure and 94 million for rolling stock. The total cost included power supply equipment, conversion of roads/public places, and operating fees. While the French state contributed 50 per cent of the finance, the balance came from loans amortised via the VT introduced in Nantes in 1974.

9.5 Discussion

The purpose of this exploration of Nantes was to better understand the extent to which vision, decision, institution and funding assist in explaining the positive experience of TOD there. From this analysis, a few points appear clear and important. First, the *vision* to pursue TOD emerged from the approach adopted to design and construct the tram line in the 1980s. The vision to employ the tram to steer urban growth was crucial.

Second, regarding a *decision* to undertake TOD, the vision manifests itself in Nantes' *Plan d'Occupation des Sols* (POS), based on an analysis of the corridor along the potential route, and which broadened out the planning area for the tram. The POS, combined with use of *Zones d'Aménagement Concertée* (ZACs), was the main mechanism for delivering TOD, as they detailed the nature and density of residential development close to the transport system. Those areas closest to tram stops were placed into different categories, with highest-density housing situated within 600 meters of a tram stop. The decision taken in the preparation of the *Plans de Déplacements Urbains* (PDU) also carries the original vision through into project planning and delivery.

Third, in respect of the *institution* to deliver sustained TOD, the presence of a mayor with executive powers was an important feature in Nantes. However, perhaps the key institutional development was the establishment of a public-private institution led by Nantes Métropole in 1979. This institution, led by the local authority, operates and manages the public transport system, thus linking urban and transport development and investment.

Fourth and lastly, the *funding* of TOD in Nantes depended to a large extent on the existence of a hypothecated local tax: the *Versement Transport* (VT). The public transport financing system based on this specific local tax, combined with fare revenue, provides sufficient resources to finance transport investment and operation, reducing the need to borrow.

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