NSB CoRe

The impact of the E75 railway line modernisation on the development of the Warsaw Metropolitan Area

Case study

The impact of the E75 railway line modernisation on the development of the Warsaw Metropolitan Area

Project
North Sea Baltic Corridor of Regions (NSB CoRe)

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1. INTRODUCTION

1.1. *Rail Baltica*

This study has been carried out as part of the international project North Sea Baltic Connector of Regions (NSB CoRe) financed by the Baltic Sea Region Interreg Programme. The project involves the KI corridor of Trans-European Transport Network (TEN-T) North Sea – Baltic Sea. The key element of the corridor is Rail Baltica, which links the Baltic countries with other EU countries (Figure 1).

The Baltic countries have developed a project called Rail Baltica, which aims at building and modernising standard rail lines gauge (with the track gauge of 1435 mm) between Berlin, Warsaw, Kaunas (with a Kaunas–Vilnius track section), Riga, and Tallinn in order to create a new alternative traffic route in the north–south direction on the east coast of the Baltic Sea. The project has been undertaken due to the use of various gauge rail lines in the EU. The standard gauge is used in most countries of the European Union, including Poland. On the other hand, the ex-Soviet States (including Estonia, Latvia, or Lithuania) use the gauge of 1520 mm, while it is 1524 mm in Finland.

In accordance with the guidelines, which have been adopted in EU regulations, concerning the infrastructure of the TEN-T core network, this railway investment is planned to be completed by 2030. Once completed, the maximum speed of passenger and freight trains will be 160 km/h and 120 km/h respectively. Rail Baltica will provide fast transport of people and goods between the aforementioned metropolises and enable to connect freight and passenger transport with other elements of European transport network. According to Catherine Trautmann, the European Coordinator, ”*The Rail Baltic line should be seen as a skeleton for further connections*”[1]. In addition, the investment will also contribute to the economic growth of regions located along the railway line through, for example, development of logistics, entrepreneurship, labour market, and tourism.

In Poland, Rail Baltica includes two international railway lines: E20 (Kunowice–Poznań–Warsaw) and E75 (Warsaw–Białystok–Ełk–Olecko–Suwałki–Trakiszki), which practically run through the Mazowieckie Voivodship. PKP PLK S.A. is the owner of these railway lines and is responsible for their modernisation.

[1] C. Trautmann, 2016, *North Sea Baltic, Second Work Plan of the European Coordinator*.

Figure 1. Route of the North Sea – Baltic Sea corridor in Europe

Source: Study of the MBPR on the basis of http://ec.europa.eu

1.2. Aim of the analysis

The outcome of the NSB CoRe project will include the possibilities of increasing the availability of the eastern Baltic Sea region through developing solutions aimed at eliminating bottlenecks in border areas, synchronisation of long-distance transport with local transport systems. The effects of completed actions and project results will be presented in the *NSB CoRe Growth Strategy*.

As part of work package no. 4, concerning the issues of spatial planning, a joint transnational spatial vision on regional development, logistics, and mobility of the North Sea – Baltic Sea corridor will be developed. The vision will include recommendations for institutions responsible for spatial planning and development of railway transport. One of the tasks, necessary for preparing this vision, is to elaborate four case studies on a regional scale by project partners.

This study is a case study (hereinafter referred to as the *Case study*), the objective of which, according to initial assumptions[2], was to evaluate the impact of the modernisation of the E75 railway line on the development of the Warsaw Metropolitan Area[3] (hereinafter referred to as the *WMA*) in terms of: railway transport functioning, evaluation of the adopted improvement by passengers, changes in the settlement area, and, especially, investigation of the urban sprawl. The implementation of the railway investment was planned for 2012–2016; however, the completion date was extended to mid-2017. Due to an infrastructural character of the investment, the trends in areas are possible to be identified after at least several years following the investment completion. Consequently, **the *Study* involved an initial evaluation of the effects of the Rail Baltica investment on the WMA**. The research carried out as part of the *Study* may be repeated in the future and perhaps expanded. In addition, the impact of

[2] Assumptions of the project application form of 10 May 2016.

[3] Area designated in the *Spatial Development Plan for the Mazowieckie Voivodship*, adopted by Resolution no. 180/14 of the Sejmik of the Mazowieckie Voivodeship of 7 July 2014 (Official Journal of the Mazowieckie Voivodship of 2014, item 6868).

the modernised E75 railway line on the WMA over the years may also be specified. Nevertheless, the results of this *Study* will be used to produce the joint transnational spatial vision of the KI corridor and they will be used to update strategic and planning documents of the Mazowieckie Voivodship.

1.3. Scope of analysis

The main issue of the case study is the E75 railway line section running through the WMA. The section starts at the Warszawa Rembertów station, reaches the Zielonka station via railway line no. 449, and then passes the Wołomin and Tłuszcz stations via railway line no. 6 to finally end at the Mokra Wieś railway stop (Tłuszcz commune). The E75 railway line section runs through six WMA communes (Rembertów – district of the Capital City of Warsaw, Zielonka, Kobyłka, Wołomin, Klembów and Tłuszcz communes). However, the impact of this railway investment may be more far-reaching.

As a result, to evaluate the impact of the E75 railway line modernisation on the WMA, a case study area was delimited within the WMA. This area includes communes located within a 3-km radius of Rail Baltica as well as communes through which national road no. 8 (express road S8) runs. The case study area thus includes the Rembertów district of the Capital City of Warsaw, communes belonging to Wołomin County and Zabrodzie commune belonging to Wyszków County (Figure 2**).** The case study area is 841 km^2, which is 11% of the WMA.

The timeframe for the case study is the period during which the E75 railway line was modernised, i.e. between 2012–2016, starting from signing an agreement with the contractor of the investment. Although the completion date of the investment was extended to mid-2017, analyses of the case study were based on the 2016 data because newer spatial and statistical data were unavailable[4].

The information contained in the *Case study* refers to characteristics of the case study area, which involve the settlement network, socio-economic and transport conditions compared to the potential of the Warsaw Metropolitan Area. Given that the subject of the case study is the E75 railway line modernisation, conditions and development prospects of railway infrastructure included in national and regional documents were analysed in detail and individual stages of the investment were described.

The main part of the *Case study* includes analyses carried out in three dimensions: spatio-functional, socio-economic, and transport. Spatial analyses demonstrate land-use changes during the Rail Baltica modernisation, the character of settlement processes before and during the investment implementation – with emphasis put on the urban sprawl – and planned actions of local governments in reference to the management of the spatio-functional structure. The socio-economic dimension of analyses focuses on describing demographic and economic processes as well as on changes in property prices. For the transport analysis, the quality of services provided by railway companies operating on the E75 railway line was evaluated and passengers' opinions on railway transport operation and integrating Rail Baltica with alternative transport were collected.

The conclusions and recommendations referring to formal and legal, organisational, and investment actions are postulated.

The case study contains figures in the text and a 1:50 000 map showing the conditions of the spatial development of the case study area.

[4] For the purpose of this case study, data were collected until mid-Q1 2017.

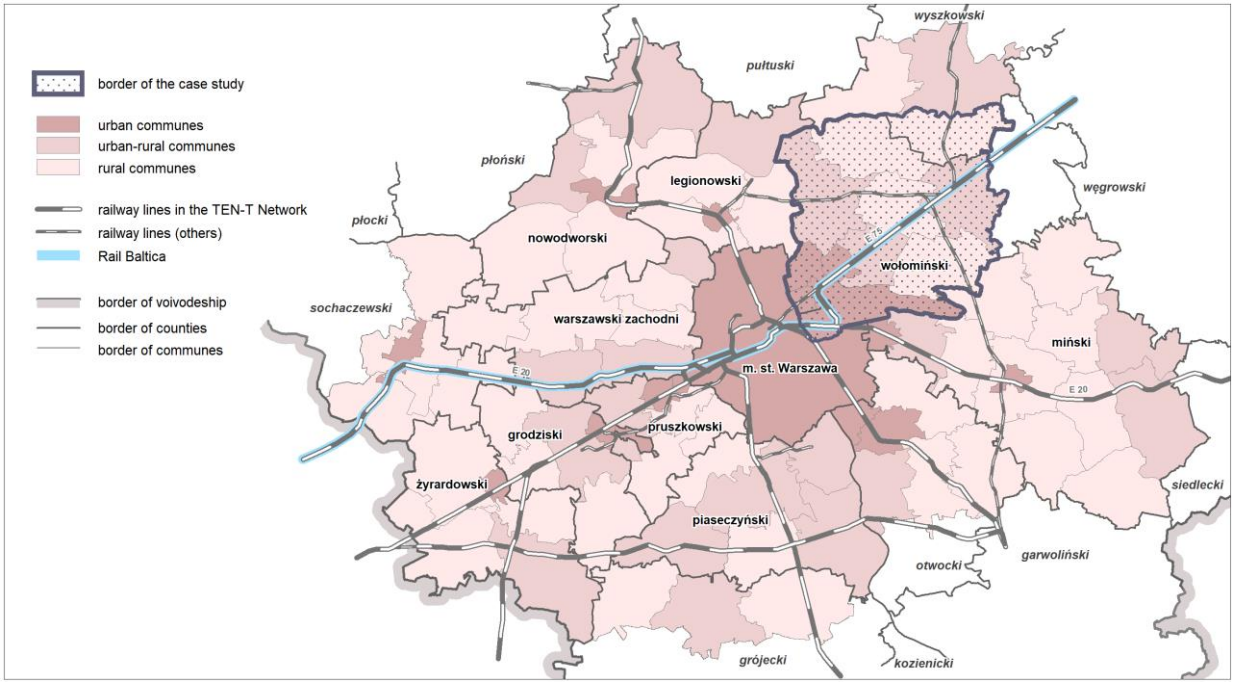


Figure 2. Case study area compared to the administrative division of the WMA

Source: Study of the MBPR on the basis of BDL, PZPWM, www.mapa.plk-sa.pl

1.4. Study methods used in the analysis

The subject of the *Case study* was to identify the effect of the E75 railway line modernisation on the Warsaw Metropolitan Area. Therefore, the case study was based on statistical and spatial data in three dimensions: spatio-functional, socio-economic, and transport. The source of data included registers and databases kept by the Centre of Geodetic and Cartographic Documentation, Voivodship Military Headquarters, Central Registration and Information on Business, Statistics Poland, railway companies, and territorial self-government units. The most important source of qualitative data included the results of a survey of local governments concerning the spatial policy of communes. In addition, passengers' opinions of the quality of transport on the E75 railway line were analysed. This analysis was also based on a survey, the results of which are an integral part of the transport analysis.

Methods for data generalisation and presentation were selected according to the nature and character of the analysed issues.

The spatio-functional and socio-economic dimensions were mainly based on spatial data of a quantitative character. Therefore, the aforementioned dimensions had the same analysis criteria, i.e. the case study area was divided into territorial units and distance zones from the E75 railway line were determined.

The case study area included communes located within the Warsaw Metropolitan Area within a 3-km radius of the E75 railway line[5] and communes belonging to Wołomin County through which alternative national road no.8 (express road S8) runs. Both connections (the E75 railway line and national road no. 8)[6] form the KI corridor of TEN-T. Communes through

[5] The commune was included in the case study area if at least a part of a commune was located within a 3-km radius of the E75 railway line (Rail Baltica).

[6] National road no. 8 within the case study area is a section of the Via Baltica – European route E67, which is the most important road connection between the Baltic countries (Poland, Lithuania, Latvia, Estonia, Finland).

which European route E67 runs were included in the spatial scope because – as well as the E75 railway line – this route is an important factor of spatial and socio-economic development. The case study area, determined in this way, enables to identify the scope of impact of railway line excluding areas affected by the road. On the basis of the aforementioned criteria, a total of 11 communes and the Rembertów district of the capital city of Warsaw were included in the case study area.

Due to a significant number of factors shaping the development of the WMA, not only infrastructural ones, the identification of the impact of one railway investment within such an extensive area at the level of communes was very difficult. Given the above, selected analyses were carried out in the smallest territorial units[7] – districts in rural communes and towns, whose size is similar to districts in rural municipalities). The case study area includes 158 territorial units – 151 districts in rural municipalities and 7 towns (including the Rembertów district of the Capital City of Warsaw), in which the observation of spatial and socio-economic processes in detail was possible.

What is more, the case study area was divided into zones for the purposes of analyses. These zones were determined by their distance from the E75 railway line: zone 1 (0–3 km), zone 2 (3–6 km), zone 3 (6–9 km), zone 4 (over 9 km). Some territorial units are included in two or more zones. A higher (over 50%) share of built-up land and urban land determined the zone to which a territorial unit belonged. The 3-km width of zones was determined in due to the size of the territorial units, the majority of which fitted into these auxiliary boundaries (Figure 3).

The starting point for analyses according to territorial units was based on analyses demonstrating a general situation at the level of communes.

Existing transport links were analysed by comparative method. The settlement and transport networks near Warsaw were analysed on the basis of Google Maps and Openstreetmap.

Having distinguished categories in a hierarchy of settlement centres, theoretical courses of transport corridors from Warsaw in particular directions were determined. They were ordered and named after directions of the world. At first, the courses were identified by determining linear connections between Warsaw and the main settlement centres in individual directions, and then the courses of these connections were modified according to the location of the smaller settlement centres along the way. The allowable deviation of the corridor course was dependent on the category of a settlement centre.

Next, the theoretical layout was verified by existing infrastructure. As a result, two maps of fanning-out railway and road corridors were created.

Each of the corridors was then described in the context of current and planned inclusion of transport infrastructure elements. On the basis of the data obtained from railway and road companies respectively, technical parameters of railway lines and average daily traffic were given.

The system of the Warsaw node on a subregional scale was described in detail. The description included crosswise and bypass railway and road connections, including airports. The case study included a detailed description of the transport system near the Rail Baltica in the Warsaw Metropolitan Area.

[7] The smallest territorial units are included in the documents of the Centre of Geodetic and Cartographic Documentation (CODGiK).

Appendix 6 contains the analysis of the most important strategic and planning documents at the national and regional level, including sectoral documents. In addition, the *Warsaw's Development Strategy* – the only local document – was analysed due to the significance of the Warsaw node in the Poland's transport system. In the aforementioned documents, we attempted to find information in the diagnostic part (condition of infrastructure) and in the directional part (modernisation plans). This information concerned the development of railway infrastructure in the KI transport corridor (railway line no.6/E75), with particular attention paid to its course through the Mazowieckie Voivodship, including the WMA.

Appendix 7 is the analysis of the stages of the E75 railway line modernisation in the case study area. The analysis was determined on the basis of written sources – information provided by the railway company, the investment contractor, and of Internet sources – primarily sectoral forums. The description of modernisation stages focused on the most important administrative actions and construction works associated with the infrastructure of the railway line.

The case study contains figures in the text and a 1:50 000 map presenting the condition of spatial development of the case study area during the E75 railway line modernisation.

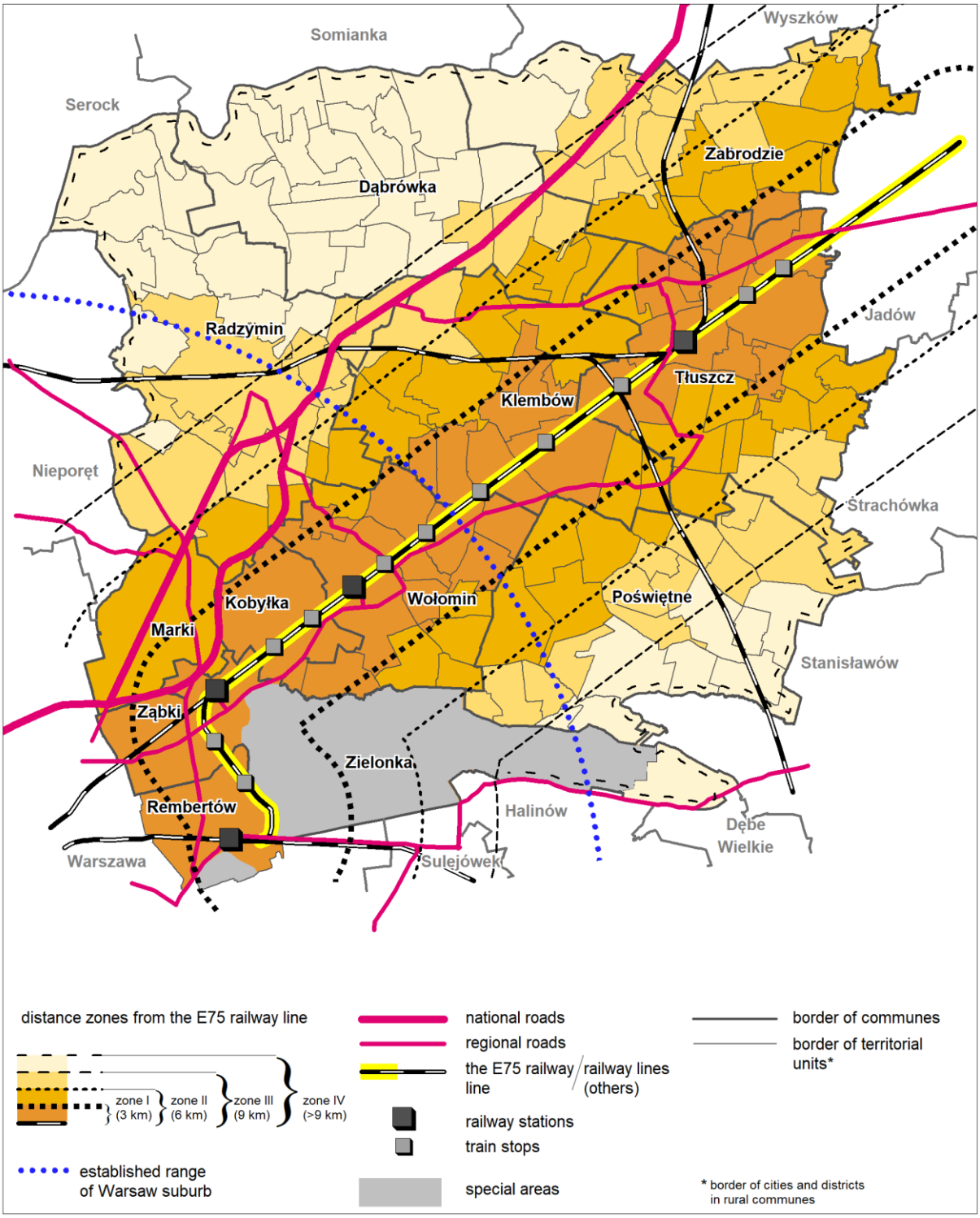


Figure 3. Zones of distance from the E75 railway line

Source: Study of the MBPR

2. SELECTED CONDITIONS OF THE DEVELOPMENT OF THE WARSAW METROPOLITAN AREA

2.1. Socio-economic potential

There has been a steady population growth in the WMA, which is characterised by the highest demographic potential on a regional scale (Chapter 2.1). Between 2012–2015, there was a 2% and 4% increase in the population of the WMA and the case study area respectively. Population changes in the WMA, which result from the positive birth rate (1.3‰ per 1000 inhabitants) and migration processes (the net migration rate – 5.8 per 1000 inhabitants), are a consequence of suburbanisation to a large extent. Despite the growing population, the demographic structure of the WMA is not in favour of the economy, which is expressed by a high demographic dependency ratio (113 non-working-age persons per 100 working-age persons). For the case study area, this ratio is 74 persons – acc. to the BDL[8], as of 31 December 2015.

In spite of unfavourable demographic phenomena related to population ageing, the Warsaw Metropolitan Area is characterised by a high availability of workforce – both high- and low-skilled. The WMA attracts the most creative persons due to a wide gamut of possibilities for professional and personal development and due to the services that it provides. This area has a high – 30.5% – share of population having completed tertiary education, which is higher than the voivodship average by 7 pp. In the case study area, the population having completed tertiary education is 28% of the total population – acc. to the 2011 National Census.

Warsaw is the largest labour market in Poland and in the WMA. Over 1 million people work in this city – approx. 73% and 56% of all people employed in the WMA and the Mazowieckie Voivodship respectively. Over 40,000 people work in the analysed case study area, which is 3.5% of the people employed in the WMA – acc. to the BDL, as of 31 December 2015. A significant proportion of the people employed in the WMA commute to Warsaw. A high – over 20% – share of the people commuting to the capital among all the people employed was recorded in most WMA communes (except for the southern part). This share is over 50% in the majority of the analysed case study area – acc. to the 2011 National Census (Figure 4).

The employment structure in the Warsaw Metropolitan Area, which is characterised by a predominance of people employed in the service sector, reflects a high level of socio-economic development. In 2015, 77% of the people employed in the WMA were employed in the service sector. This rate was 72% for the case study area.

The favourable position of the labour market is reflected by a low unemployment rate. The unemployment rate in the WMA is 6.7% (lower than the voivodship average by 3.6 pp) and it is 9.6% in the case study area – acc. to the BDL, as of 31 December 2015.

Gross domestic product (GDP) is the most synthetic indicator of economic potential. 3 subregions of the Mazowieckie Voivodship (NTS-3 – the Capital City of Warsaw, Warsaw East, Warsaw West), which form the Warsaw Metropolitan Area, generate the GDP of PLN 90,600 per capita on average, which is 26% higher than the voivodship average – acc. to the BDL, as of 31 December 2014[9]. This high value of the indicator results from the economic

[8] Local Data Bank (https://bdl.stat.gov.pl/)

[9] Due to no statistical data concerning GDP per capital at a lower level than NTS-3 (also after 2014), it is impossible to present this rate for the Warsaw Metropolitan Area.dużymi literami, tak jak jest w całej publikacji

structure of the area, i.e. predominance of market services associated with the fact that Warsaw is the capital city. The driving force behind development is the capital city, which generates the GDP of PLN 130,900 per capita (which is almost two times as high as the average in the region and four times as high as the average in Poland). Disparities in the economic level of the WMA (determined at the NTS-3 level) are clearly noticeable between the East and West parts. GDP per capita in the Warsaw East subregion, which is where the case study area is located (except for the Rembertów district), is 33% lower than the Warsaw West subregion (PLN 56,800 per capita).

The number of business entities is the measure of the high economic activity of the WMA. There are over 596,000 business entities registered in the National Official Register (i.e. 78% of all entities in the region) in the WMA, while there are over 32,000 business entities in the case study area – acc. to the BDL, as of 31 December 2015.

When it comes to the business profile, the majority of business entities are commercial, transport, construction, and financial companies. There are companies with a considerable competitive potential in Warsaw and its surroundings. In particular, the capital city specialises in media design (e.g. the ICT, creative, promotional sectors), while suburban communes specialise in wholesale trade and technical services. The communes located in the western part of the WMA have a high logistics and warehouse potential. The eastern part of the WMA, including the case study area, is associated with the construction industry and the production of textiles and foodstuffs[10]. International transport is highly competitive on European markets of the WMA. In 2013, the Warsaw Metropolitan Area was the leader in Europe in terms of the size of logistics centres and the number of leasing companies. Companies operating in road transport generated approx. 10% of GDP in the country and were among the few in the service sector that produced a surplus in international trade[11].

Entities with foreign capital – constitute a high proportion of the registered business entities in the WMA. Over 50% of the largest foreign investors located within Poland's metropolitan areas have their registered office in the Warsaw Metropolitan Area (1,039 registered foreign companies, i.e. 75% of foreign companies in the Mazowieckie Voivodship) – acc. to the PAIiIZ (Polish Information and Foreign Investment Agency[12]), as of 31 December 2015. The highest concentration of such companies is in Warsaw – 917 companies. A significant proportion of foreign investors (over 20) have its registered office in western communes of the WMA (Warsaw West County and Pruszków County). The main fields of specialisation of foreign investors include business services, ICT, commerce, and construction. There are 51 companies with foreign participation registered in the H section (transport and storage) of the 2007. Polish Classification of Business Activity (PKD 2007). Entrepreneurs mainly from European countries – Great Britain, France, Germany, Italy, and the United States of America – invest on the Polish market. Only 16% of foreign investors in the WMA come from the Baltic states through which Rail Baltica runs.

Many business entities in the WMA representing specific economic specialisations cooperate and compete with each other in business clusters. Among 13 business clusters operating in the Mazowieckie Voivodship, 12 business clusters with their registered office in Warsaw were located in the Warsaw Metropolitan Area in 2015. These are business clusters

[10] W. Dziemianowicz, M. Mackiewicz, K. Szmigiel-Rawska., 2014, *Diagnoza obszaru metropolitalnego Warszawy, Raport syntetyczny*, Geoprofit, Ekorys, Warsaw.

[11] *Transport pod lupą, Raport 2013*, 2014, Europejski Fundusz Leasingowy, Warsaw.

[12] In 2017 the Agency change the name to Polish Investment and Trade Agency (PAIH).

having a high capacity for raising competitiveness and they are primarily associated with energy, medical, creative, or ICT industries, e.g. the Mazovia Cluster ICT[13].

High density of specialised services in the Warsaw Metropolitan Area creates favourable conditions for economic activity. Among the registered business entities in the WMA, over 83% operate in the service sector (in addition, over 70% of entities operating in the service sector carry out their business in Warsaw and 5% of them carry out their business in the case study area) – acc. to the BDL, as of 31 December 2015. Over 50% of entities operating in the service sector in the WMA and 4% of such entities in the case study area are among the J-R service sectors, including specialised services (acc. to the 2007 Polish Classification of Business Activity – PKD 2007). Most companies in this group are listed in the M section (professional, scientific, and technical activity requiring specialised knowledge). The services provided as part of the aforementioned section are focused in Warsaw and constitute over 23% of all business entities registered in the J-R service sections (belonging to the so-called specialised services) in the Mazowieckie Voivodship.

The Warsaw Metropolitan Area has well-developed economic infrastructure, which is its unarguable asset. Investments within the Warsaw Metropolitan Area may be located in attractive areas, which are specially prepared on preferential terms and offered by Special Economic Zones (SEZ): the Łódź Special Economic Zone, Tarnobrzeg Special Economic Zone, and Warmia and Mazury Special Economic Zone. Favourable conditions for enterprise development (i.e. concessions and local tax exemptions), which result from the location in the SEZ, involve areas located in the range of Warsaw, western communes (Grodzisk Mazowiecki, Pruszków, Sochaczew, Żyrardów), northern communes (Wyszków, Pomiechówek, Zakroczym), and the Mińsk Mazowiecki rural commune. There are no SEZ in the case study area.

Well-developed intellectual and technological facilities act as a magnet for investors and entrepreneurs. In 2013, there were 201 research and development units in the WMA (i.e. approx. 95% of all R&D units in the voivodship)[14]. Warsaw displays the greatest innovation capacity, which is the seat of 92% of renowned higher education institutions and research and development centres in the Warsaw Metropolitan Area. The case study area features three research institutions: in the Rembertów district, in Zielonka and Kobyłka[15].

With the Warsaw Metropolitan Area, Warsaw is characterised by high human resources and is the most attractive and competitive investment location in the region and Poland. Apart from socio-economic qualities, the central location in the settlement network and transport system of Poland affects the attractiveness of the area to a great extent.

The research conducted by the PAIiZ on investment attractiveness of Poland's regions demonstrated that most communes belonging to the Warsaw Metropolitan Area are ranked highest (A) on a 6-point scale (A-F) in terms of their potential investment attractiveness for the national economy. Appropriate ranks are given on the basis of regional location-specific advantages (determined based on indicators with many elements[16]), which affect, in

[13] G. Buczyńska., D. Frączek, P. Kryjom, *Raport z inwentaryzacji klastrów w Polsce 2015*, 2016, Polish Agency for Enterprise Development, Warsaw.

[14] R&D units: research institutes, Polish Academy of Sciences institutes, organisational units of higher education institutions, centres of excellence, accredited research laboratories, business incubators, academic business incubators, technology transfer centres.

[15] A. Gryzik, A. Miller, A. Knapińska, *Analiza działalności B+R w regionie Mazowsza*, 2013, PSDB, Warsaw.

[16] Indicators concerning labour resources, having technical and social infrastructure, administrative microclimate; market indicators, e.g. the net migration rate, the number of employed people per 100 working-age persons, the percentage of people with access to sanitation or water supply, usable floor area of apartments per

particular, investment outlays, business activity expenses, the value of production and its taxation[17].

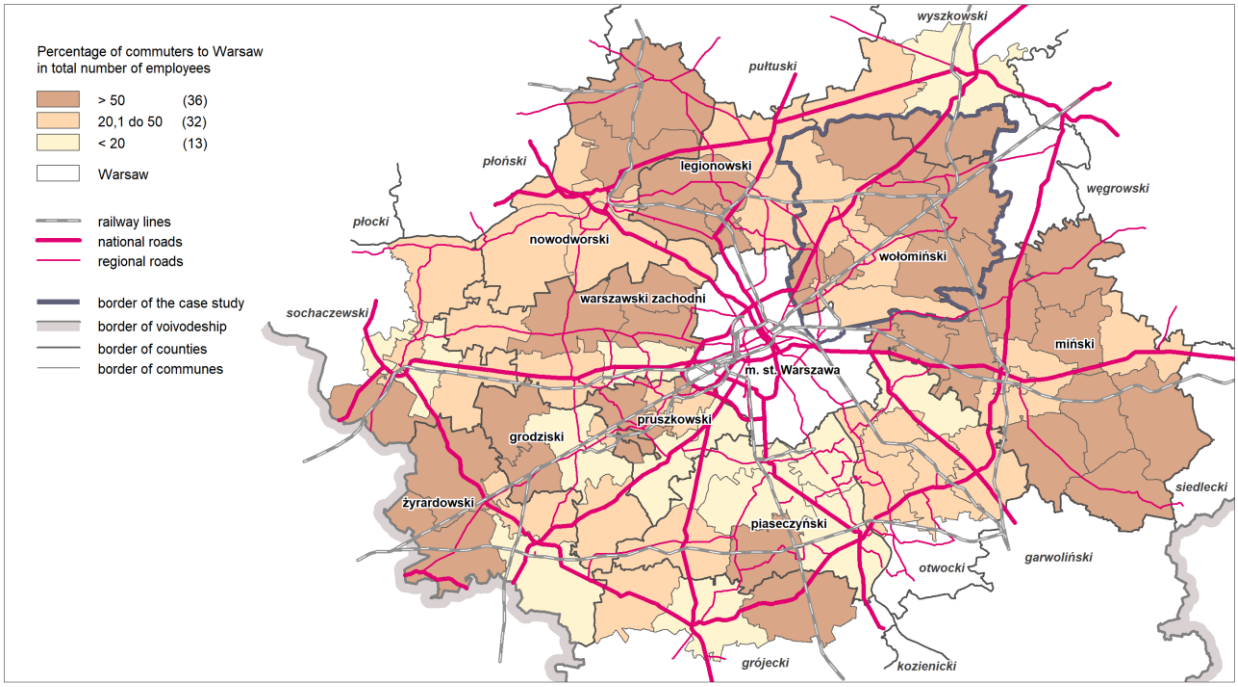


Figure 4. Commuters to Warsaw compared to total working population in 2011

Source: Study of the MBPR on the basis of NSP, BDL, PZPWM

2.2. Settlement network

2.2.1. Historical conditions of the development of the settlement network

Road routes in the 16th century had an impact on shaping the arrangement of the settlement network in the case study area[18]. The most important routes, including the Great Lithuanian Route – one of the main roads of the Kingdom of Poland – led to the Grand Duchy of Lithuania. Road routes were the basis for spatial development, as a result of which the first settlements in the case study area were created (Figure 5). Spanning through centuries, the development of settlements along road routes was associated with the function of roads, i.e. they were places of increased trade and social activities. Road routes stimulated the economic development of settlements, which caused population growth and spatial changes. This model of settlement development survived until the second half of the 19th century, i.e. when the first railway lines started to be constructed. Opening railway lines was an important factor that shifted the centre of spatial development in the case study area. Trains became the dominant means of transport and replaced road transport, which was less effective, for almost 100 years. As an alternative to road routes, trains provided a fast and efficient way of transport goods, raw materials and people quickly and efficiently. The construction of the one of the main railway lines in the Kingdom of Poland in 1862, i.e. the *Saint Petersburg – Warsaw Railway* (which connected the administrative centre of the Kingdom of Poland with the capital city of

capita, commune income per 1 inhabitant, area covered by a local spatial management plan in relation to the commune area etc.

[17] H. Godlewska-Majewska, A. Komar, D. Turek et al., *Atrakcyjność Inwestycyjna Regionów 2016*, 2016, Polish Information and Foreign Investment Agency, Warsaw.

[18] The oldest acquired data on the historical arrangement of settlement and road networks (before the railway line was opened) come from a publication by the Institute of History of the Polish Academy of Sciences *Atlas historyczny Polski, Mazowsze w drugiej połowie XVI w*.

the Russian Empire at that time) led to the increase in the attractiveness of areas located along the railway line as a place to live and carry out investment projects near Warsaw. Consequently, the number of people in those areas increased rapidly[19]. The aforementioned population growth led to granting town charters to several settlements located along the railway line (now the E75 railway line). To this day, these locations are towns and maintain their development potential.

Over the several decades during which railway transport was dominant, the core of the current settlement arrangement developed, while the growing importance of road transport since the 1950s has not had a dramatic impact on the centre of this settlement arrangement. Shaped in the past centuries, the courses of major roads are similar to the current transport routes of regional and national significance. Together with railway lines, they constitute the main elements of the transport network in the case study area.

[19] Wołomin – the most populated town in the case study area – had 91 inhabitants in 1823, while in 1919 (57 years after the railway line had been built) this number was approx. 13,000 acc. to *Rocznik Mazowiecki, Wołomin na tle innych nowych miast podstołecznych w latach 1896–1919.*

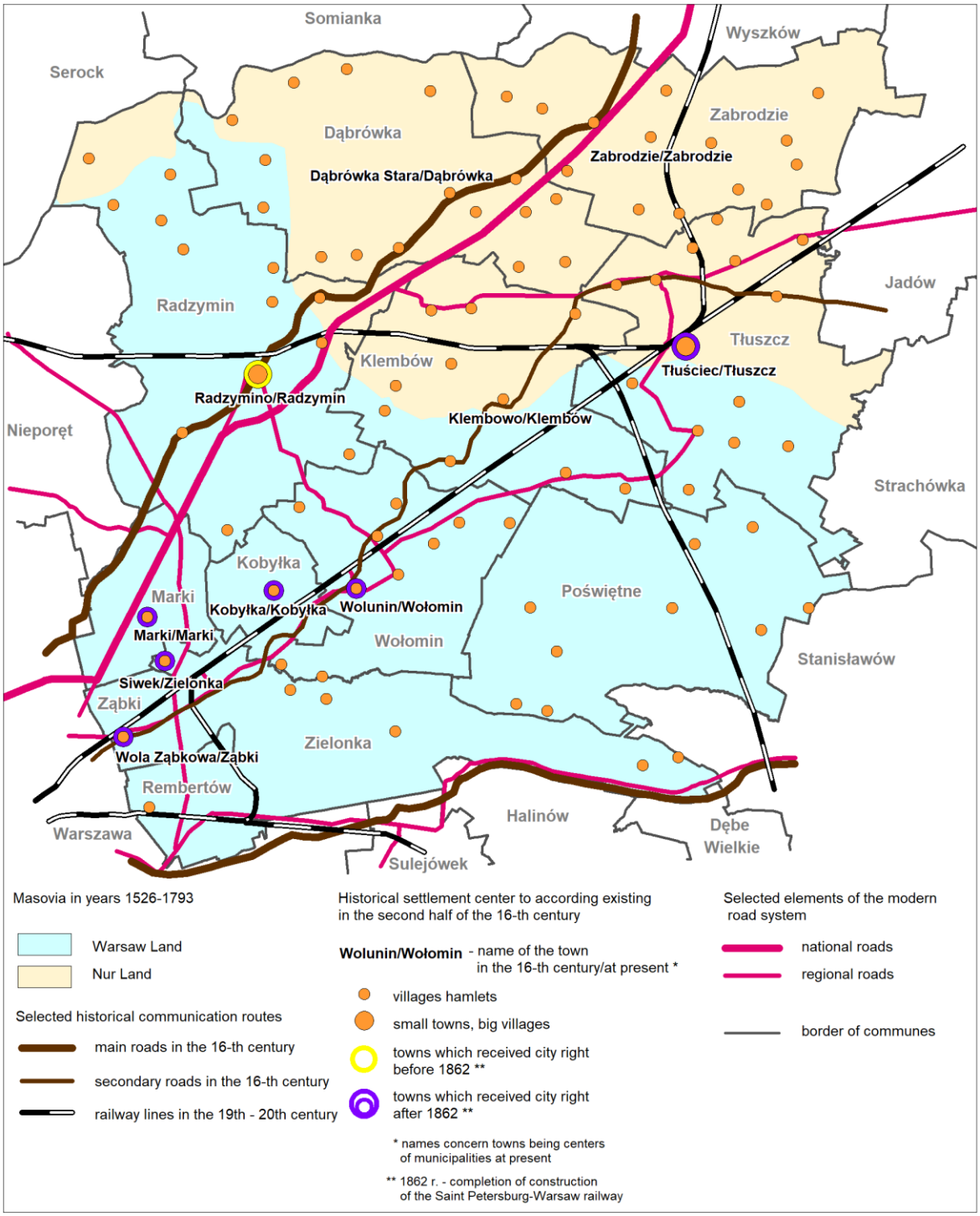


Figure 5. Historical settlement network

Source: The historical atlas of Poland, Masovia in the second half of the 16-th century

2.2.2. Basic components of the settlement network

The settlement network of the WMA is formed by 39 urban centres and 1,806 villages, the total population of which is 3,203,800 people (60% of the total voivodship population) – acc. to the BDL, as of 31 December 2015. The urban population represents 80% of the total Warsaw Metropolitan Area population. The largest city is Warsaw with the population of 1,744,300 (54% of the WMA population). Only 2 towns – Legionowo and Pruszków – are among the centres with a population of over 50,000, while there are only 14 towns with a

population of 20,000–50,000 (Figure 6). The majority of urban centres are small towns below 20,000 inhabitants – there are 22 centres of this type (including 7 towns with a maximum population of 5,000). In 2015, the WMA urbanisation rate was 79.4%, which was higher than the average in the voivodship by 15 pp. This high urbanisation rate indicates a well-developed urban settlement network whose changing and propagation processes concern the existing town and are not associated with the creation of new urban centres.

There are 160 settlement centres with a total population of 254,400 (8% of the total WMA population) in the case study area[20]. The urban settlement network is formed by 8 towns, in which 72% of the population of the case study area live. Towns with a population of over 20,000 dominate the urban centres – there are 5 of them (including the Rembertów district of the capital city of Warsaw). In 2015, the urbanisation rate of the analysed area was lower by 6.6 pp compared to the urbanisation rate of the WMA.

The hierarchy of urban centres and their relationships within the WMA settlement arrangement is also determined by their rank (related to the position of the centre in the administrative structure of the voivodship and its range of influence) and the dominant function of towns[21].

Warsaw stands out among the urban centres. It is a city of European significance, which is not only the capital city of Poland, but also the capital of the Mazowieckie Voivodship and the core of the Warsaw Metropolitan Area. Warsaw serves as a supra-regional centre for the management of the socio-economic development of the country. The capital city is a place where a great many specialised services are located. In the WMA, centres of county significance (NTS-4 seats except for Warsaw and Ożarów Mazowiecki), the number of which is 12, play an important role in the public section, mainly at a local level, while there are only a few that fulfil supra-local functions, stimulate the development of services and production. The remaining 26 towns, which are the seats of urban communes or urban-rural ones (NTS-5), perform functions of local (commune) significance.

Defined on the basis of the structure of the employed by economic sectors in 2015, functions of towns indicate a service-oriented (over 70% of the total employed population work in services) and a service- and industrial-oriented (similar share of the people employed in the following sectors: market services and non-market services, industry, and construction) nature of the majority of the WMA towns. There is one centre of county significance and multifunctional nature in the case study area. The remaining town are centres of local significance that perform diverse functions.

The settlement network of the Warsaw Metropolitan Area is characterised by the dominance of the capital over other poorly developed towns; at the same time, urbanisation is increasing, especially in rural areas around Warsaw. In this system, the hierarchical structure of urban centres is poorly developed, while suburbanisation around Warsaw has a small impact on increasing the significance of urban centres. This monocentric metropolitan area formed by Warsaw, towns, and villages around it, including towns immediately adjacent to it (Ząbki, Marki, Łomianki, Ożarów Mazowiecki, Piaseczno, Piastów, Raszyn, Józefów, Konstancin-Jeziorna), determines how the ”suburbs” of the capital city look. Other towns located near Warsaw are mainly situated in the so-called development ranges, which formed along the main road and railway routes/lines starting in Warsaw. There are 7 development

[20] The Rembertów district of the Capital City of Warsaw was included among the settlement centres (towns) located within the case study area.

[21] The adopted hierarchy of towns complies with the rank of urban centres set forth in applicable higher-ranking documents: *National Spatial Development Concept 2030, Spatial Development Plan for the Mazowieckie Voivodship.*

ranges in the WMA: Legionowo, Sochaczew, Żyrandów, Góra Kalwaria, Otwock, Mińsk Mazowiecki, and Wołomin. The case study area is located within the Wołomin development range, which is situated in the KI transport corridor – North Sea – Baltic Sea and along which all towns of the analysed area are located.

The main factor that influences changes in the settlement network of the WMA is the distance from Warsaw and most important transport routes. In recent years, the Warsaw Metropolitan Area has seen the development of urban settlement in the outer districts of Warsaw (e.g. Rembertów, Białołęka, Wesoła, Ursus), suburban communes, which serve as satellite areas of the capital city, as well as in areas located along the main transport routes.

The results of these changes include functional transformations of the centre of Warsaw into administrative, trade and service districts and progressing suburbanisation. Preferences, inhabitants' income, activity and investment opportunities affect relocations of businesses, especially residential and service and production ones, outside the centre of Warsaw. Suburbanisation processes within a 30–40 km radius of the capital city (in which the case study area is located) lead to the expansion of urban areas into the adjacent agricultural areas as well as into forests. The size of built-up and urban areas increases, while the intensity of land use varies. As a result, boundaries between villages and towns start to diminish. The development of urban influences in rural areas is associated with, for example, the influx of new inhabitants, which results in the development of residential housing, appearance of companies providing services, and changes in land use. Urban sprawl of this type is characterised by significant dispersion, which creates a landscape mosaic of alternating urban areas, agricultural areas, and forests.

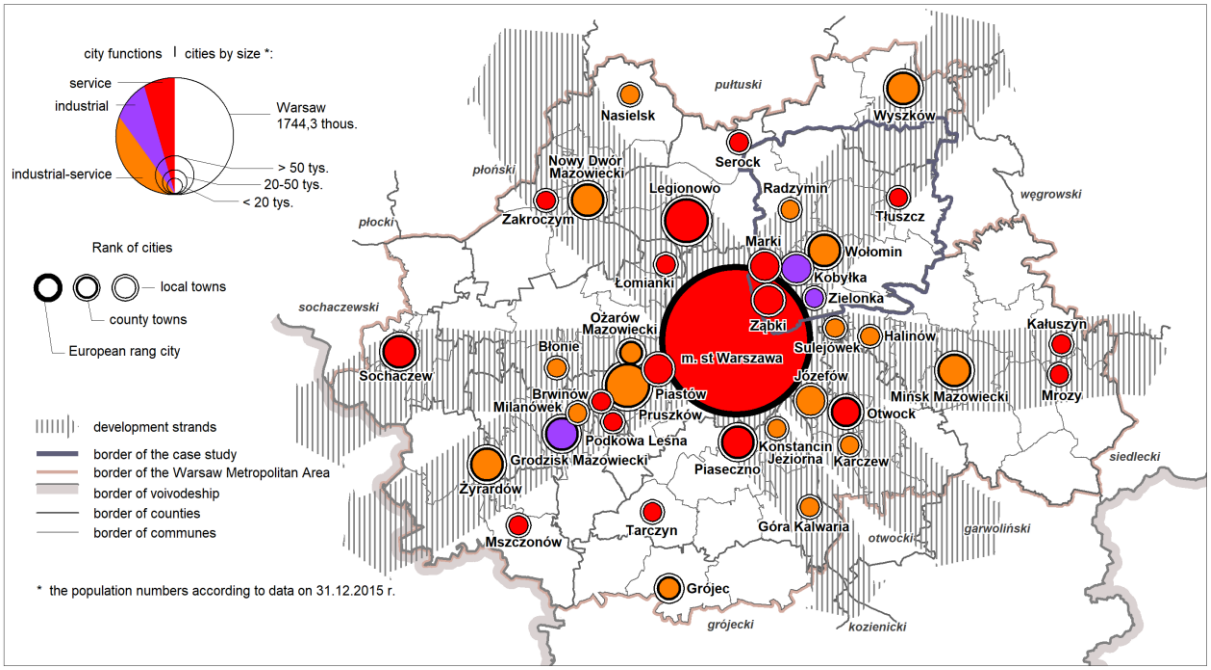


Figure 6. Settlement network of the WMA

Source: Study of the MBPR on the basis of BDL, PZPWM, KPZK 2030

2.3. Transport systems

2.3.1. Main transport corridors

The settlement network within a pre-arranged 400-km radius was considered, while potential main transport corridors were distinguished. Adjacent metropolitan areas were

searched within an approximate 400-km radius, while lower-rank centres – within an approximate 200-km radius and subregional centres – within an approximate 100-km radius. The division of centres refers to the *National Spatial Development Concept* in Poland, while it is conventional abroad. Border centres considered in this way are Košice (Slovakia) and Vilnius (Lithuania), Częstochowa, Kutno and Puławy respectively. Only those lower-rank centres that are not ”covered” by higher-rank centres located nearby were considered.

The following – adjacent in relation to Warsaw – centres belonging to particular categories were distinguished. They are listed starting from northern ones and clockwise:

- metropolitan areas: Kaunas, Vilnius (Lithuania), Lublin, Lviv (Ukraine), Košice (Slovakia), Kraków, Katowice and its urban area, Ostrava (Czechia) Łódź, Wrocław, Poznań, Bydgoszcz and Toruń, Gdańsk and its urban area, Kaliningrad (Russia);
- voivodship/regional centres: Białystok, Brest (Belarus), Radom, Kielce, Częstochowa, Włocławek, Płock, Olsztyn;
- subregional centres: Ostrołęka, Siedlce, Puławy, Tomaszów Mazowiecki, Skierniewice, Kutno, Ciechanów.

Theoretical corridors run as linearly as possible from Warsaw in the direction of the distinguished particular metropolitan areas or lower-rank centres – the latter concerns corners where there are no larger centres. These are the centres that shape the network. There are smaller centres along the way; they modify the network. The rank of the centre that modifies the network shapes the allowable deviation from the linear course. The number of corridors – their angular density – results from the distribution of centres that shape the network (Table 1, 2, 3).

The corridors are listed in the order described above. They are initially named after cardinal directions and their accuracy is one sixteenth of the full angle:

Table 1. Theoretical transport corridors that start in Warsaw

Corridor name	Starting location	Direction	Via
NNE	Warsaw	Kaunas	Ostrołęka—Łomża
NE	Warsaw	Vilnius	Białystok—Grodno
E	Warsaw	Brest	Siedlce
SE	Warsaw	Lviv	Puławy—Lublin
SSE	Radom	Rzeszów	
S	Warsaw	Kraków	Radom—Kielce
SW	Warsaw	Ostrava	Tomaszów—Piotrków—Częstochowa—Katowice
WSW	Warsaw	Wrocław	Łódź
WNW	Warsaw	Poznań / Bydgoszcz	Płock—Włocławek
NNW	Warsaw	Gdańsk / Kaliningrad	Ciechanów

Source: Study of the MBPR on the basis of PZPWM

Another step involves the verification of theoretical corridor courses with the use of existing infrastructure Numbers and courses of railway/road lines/routes were provided.

Table 2. Railway corridors that start in Warsaw

Corridor name	Railway line number	Starting location	Direction	Via
NNE	29	Tłuszcz	Ostrołęka	
NE	6	Warsaw	Kaunas / Grodno	Tłuszcz—Białystok
E	2	Warsaw	Brest	Siedlce
SE	7	Warsaw	Lublin	Puławy
SSE	25	Skarżysko-Kamienna	Rzeszów	
S	8	Warsaw	Kraków	Radom—Skarżysko-Kamienna—Kielce
SW	4	Grodzisk Mazowiecki	Katowice	
WSW	1	Warsaw	Łódź	Grodzisk Mazowiecki—Skierniewice
W	2	Warsaw	Poznań	Kutno
WNW	(postulated corridor)	Warsaw	Bydgoszcz	Płock—Włocławek
NNW	9	Warsaw	Gdańsk / Olsztyn	Ciechanów—Działdowo

Source: Study of the MBPR on the basis of PZPWM

You should note that compared to the initial theoretical arrangements, there is the W corridor that connects Warsaw and Poznań without passing through Łódź or Płock. This is a route whose existence is conditioned by nature and runs along the Warsaw–Berlin ice-marginal valley. In this way, a higher (angular) density of corridors running in southern and western directions is achieved, which reflects the diversity of population density and settlement network density in south-western Warsaw and north-eastern Warsaw respectively.

Table 3. Road corridors that start in Warsaw

Corridor name	National road number	Starting location	Direction	Via
NNE	S61	Ostrów Mazowiecka	Kaunas	Łomża
NE	S8	Warsaw	Grodno	Ostrów Mazowiecka—Białystok
E	A2	Warsaw	Brest	Siedlce
SE	S17	Warsaw	Lviv	Lublin
SSE	9	Radom	Rzeszów	
S	S7	Warsaw	Kraków	Radom—Kielce
SW	S8	Warsaw	Katowice	Tomaszów—Częstochowa
WSW	S8	Łódź	Wrocław	
W	A2	Warsaw	Poznań	Łódź
WNW	S10 (new course planned)	Nowy Dwór Mazowiecki	Bydgoszcz	Płock—Toruń
N	S7	Warsaw	Gdańsk / Olsztyn	Nowy Dwór Mazowiecki

Source: Study of the MBPR on the basis of PZPWM

Average daily traffic in the area of the WMA in 2015 is shown in Figure 7. There is clearly more traffic in directions located in the south-western half, in directions towards the middle of

Poland, and in directions towards the European Union. As many as three adjacent radii close to each other (S, SW, WSW) have traffic of over 30,000. The north-eastern half features the Via Baltica direction.

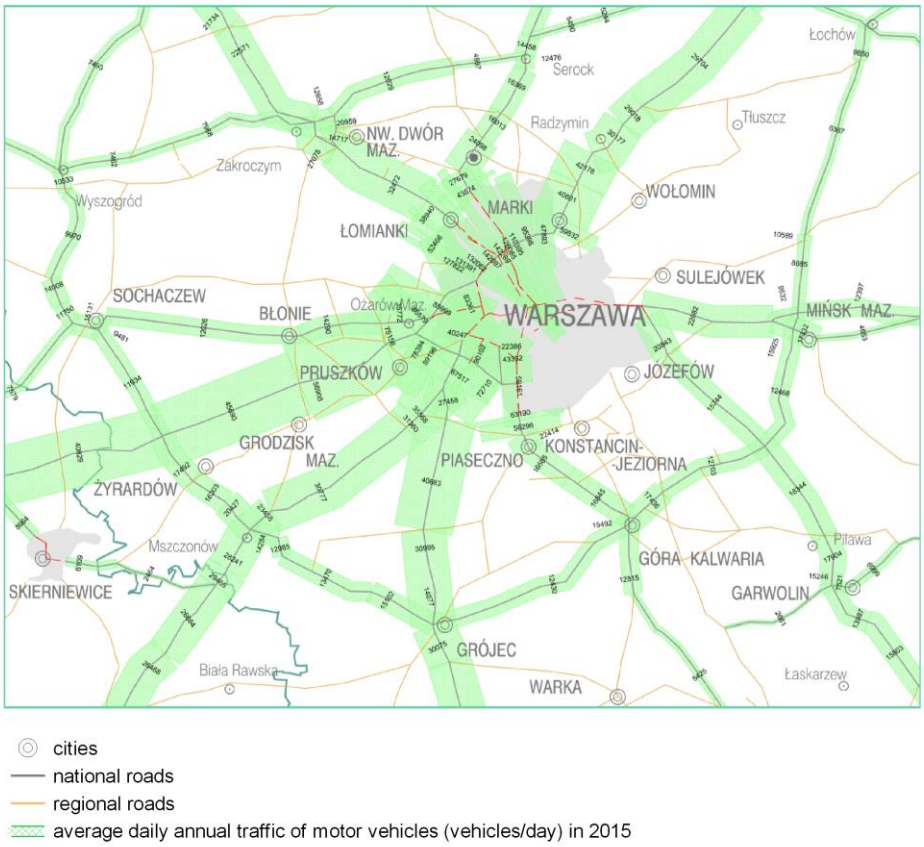


Figure 7. Average daily vehicle traffic on national roads near Warsaw in 2015
Source: GDDKIA

2.3.2. Layout of communications routes in the Warsaw node

Layout of the railway node

The cross-city railway line that connects the Warszawa Zachodnia and Warszawa Wschodnia railway stations is essential in passenger traffic. It links railway lines from all corridors on both sides together to form one group. They include the following directions from the west: Radom, Katowice, Łódź, Poznań; and from the east: Ciechanów, Ostrołęka, Białystok, Siedlce, Lublin. The cross-city railway line has four tracks – long-distance traffic and agglomeration traffic are separated. The line runs through a tunnel in downtown Warsaw. It is also there that the Warszawa Centralna railway station is located. In addition, the Białystok line has a separate entrance into the city from the Warszawa Wileńska terminus.

There are Warszawa Zachodnia and Warszawa Wschodnia railway stations at both ends of the cross-city railway line. They are terminus stations for trains that end in Warsaw – after passing from the cross-city railway line. There are also technical and freight stations near these stations. There is the Warszawa Grochów station near the Warszawa Wschodnia railway station – at the exit of railway line no. 7 (towards Lublin). It is used by regional public transport operator Koleje Mazowieckie and long-distance carrier PKP Intercity. There is the Warszawa Główna Towarowa station near the Warszawa Zachodnia station – at the exit of railway line no. 2 (towards Poznań). The Warszawa Praga railway station is a freight marshalling yard – on railway line no. 9 (towards Ciechanów).

Bypass line no. 20 surrounds downtown Warsaw from the north. It connects the areas of the Warszawa Główna Towarowa and Warszawa Praga railway stations. The track system makes it possible to operate connections to the Warszawa Wschodnia station, while it does not provide entrance to the Warszawa Zachodnia station without changing the direction (this system fault is planned to be fixed). This railway line makes it possible for trains that link connections concentrated in the western entrance to the cross-city railway line (e.g. Radom–Warsaw–Bydgoszcz) to pass through Warsaw without changing the direction of the train and via circular routes in relation to the cross-city railway line.

Railway line no. 20 is of national importance. It has two tracks (except for two several-hundred-metre long sections) and is electrified. It features the following railway stations: Warszawa Główna Towarowa, Warszawa Czyste (technical station) and Warszawa Gdańska (passenger station). The Warszawa Czyste station is located in the immediate vicinity of the Warszawa Zachodnia station, but they are not connected by a track. The allowable train speed does not exceed 80 km/h. Allowable axle loads are 221 kN and 206–221 kN for locomotives and carriages respectively. Railway line no. 20 has a varied course: it changes its direction from the latitudinal to the longitudinal one in the north-western area from downtown Warsaw. It is there that another bypass railway line – railway line no. 509 – branches off railway line no. 20. It initially runs in the western direction and changes to the southern direction to reach the Warszawa Główna Towarowa station.

In addition, there is a system of further bypass lines around Warsaw. They have the shape of an open quadrilateral – two lines run in the latitudinal direction, while one runs in the longitudinal direction. The southern and eastern bypass lines lie 30 km outside Warsaw, while the northern bypass line lies 20 km outside Warsaw.

The northern bypass line connects Legionowo in the N corridor (towards Ciechanów) and Tłuszcz in the NE corridor (towards Białystok). Railway line no. 10 is a primary-importance line of national significance and its length is 38 km. It has one track and is electrified along the entire length. It features the following railway stations: Legionowo, Legionowo Piaski, Wieliszew, Radzymin, Emilianów, and Tłuszcz. The allowable train speed on most of the line is 100–120 km/h, while the axle load is 216–221 kN.

The eastern bypass line connects Tłuszcz in the NE corridor and Pilawa in the SE corridor (towards Lublin); the E corridor (towards Siedlce) crosses Mińsk Mazowiecki in the node. Railway line no. 13 is a primary-importance line of national significance and its length is 56 km. It has one track and is electrified. It features the following railway stations: Pustelnik, Grzebowilk, Sufczyn, and Pilawa. Allowable train speeds are as follows: to the north of Mińsk Mazowiecki – 60 km/h, to the south of Mińsk Mazowiecki – 100 km. The axle load is 221 kN along the entire line length.

The southern bypass line connects Skierniewice in the WSW corridor (towards Łódź) and Pilawa in the SE corridor. It crosses the SW corridor (towards Katowice) near Mszczonów, and the S corridor (towards Radom) in the Czachówek node. Constituting a southern bypass line, railway line no. 12 continues in the eastern direction to Łuków in the E corridor beyond Siedlce. It is a primary-importance line of national significance. The line has two tracks and is electrified, the exception being a one-track bridge over the Vistula river and a section between Puszcza Mariańska and Mszczonów, along which one track is not used. The entire line is covered by the AGTC agreement as a CE-20 international combined transport line. It is also included in the TEN-T network in the North Sea – Baltic Sea core network corridor.

The length of the section between Skierniewice and Pilawa is 99 km. It features the following railway stations: Skierniewice, Puszcza Mariańska, Mszczonów, Tarczyn, Góra Kalwaria, Osieck, Pilawa. The allowable train speed along almost the entire line length is

below 100 km/h. Axle loads are 221 kN and 216 kN for locomotives and carriages respectively.

Layout of the road node

The layout of ring roads in Warsaw is to provide a complete circuit closure with the use of express roads. The ring road is to run in varied distances from the Warsaw city centre – from the distance of 5 km in the north-western part to the distance of 18 km in the south-eastern part. The Warsaw ring roads may be divided into four parts depending on the main course direction and the adopted nomenclature.

The north-western section – the longest one – runs from the Konotopa interchange, where the A2 motorway starts, towards Łódź to the Marki interchange. Its extension to the Drewnica interchange is planned. This interchange is also planned for an express road S8 exit. This section of the ring road maintains the SW-NE direction, and is part of Wrocław–Warsaw–Białystok express road S8. In the planned NS interchange, an exit for a new course of express road S7 towards Gdańsk is planned. Average daily traffic of the north ring road was from 48,000 vehicles near access to national road S8 ahead of Marki to 142,000 vehicles along the section to the north of the Warsaw city centre, ahead of national road S7.

The north-eastern section of the ring road – S17 – and in the NW-SE direction is planned. The plan is to build a road from the Drewnica interchange to the Lubelska interchange, where the maintenance of the course in the same direction will be provided in the form of express road S17 to Lublin. Only the last section – from the intersection with national road 2 at the Zakręt interchange – has been built.

Southern sections of the Warsaw express ring road are marked as express road S2 belonging to the A2 motorway. Currently, there is a south-western section that maintains the NW-SE direction – starting at the Konotopa interchange near the motorway and ending beyond the Puławska interchange at an intersection with the road having the same name as the interchange, which runs to Piaseczno. This ring road section in the Opacz interchange crosses express road S8 towards Wrocław (and Katowice); express road S8 towards Radom and Kraków branches off this road at the Warszawa Janki interchange. In addition, ring road S2 crosses new express road S79, which leaves Warsaw near the Chopin Warsaw Airport, at the Warszawa Południe interchange. Express road S79 is planned towards Piaseczno. Daily traffic at this section was from 78,000 near the Konotopa interchange to 90,000 between express roads S8 and S79.

The planned south-eastern section is to connect the Puławska interchange with the Lubelska interchange and is to have a WSW-ENE direction. It will cross express road S17 at the Lubelska interchange, and its extension will connect to the A2 motorway towards Siedlce and Brest located in Belarus.

Airports

The WMA is operated by two airports. The Chopin Warsaw Airport (Okęcie) is currently the main airport in the country. In 2015, 11 million passengers passed through the airport, which constituted 36% of air traffic in Poland. It offers several dozens of regular flights to airports in all major European countries. In addition, several non-European destinations are located in North America as well as the Middle and Far East in Asia.

The airport is located on the outskirts of Warsaw, 7 km southwest to the city centre. The airport is supported by the railway line extending from railway line no. 8 (towards Radom) from the passenger terminus. As far as the road system is concerned, it is possible to get to the

airport from Warsaw using regional road no. 634 (ul. Żwirki i Wigury) running from Śródmieście. There is ring road S2 on the outside of the airport, from which express road S79 runs in the direction of the city and the airport.

The second airport – Warsaw Modlin – offers regular short- and medium-distance flights to several dozens of cities in western and southern Europe. These are low-cost connections. The airport is located in Modlin, which is currently a housing estate of Nowy Dwór Mazowiecki, situated 34 km north-west of the Warsaw city centre. Railway line no. 9 in the direction of Ciechanów runs through Modlin. The Modlin railway station is located 3 km from the airport. It is planned to build a rail link for passenger traffic. As far as the road network is concerned, it is possible to get to Modlin from Warsaw by taking national road no. 7 (the part of which is express road S7) and national road no. 62 on the final section to the airport.

Special consideration of the case study area

The main area of the case study is railway line no. 6 on the section running through the following communes: Zielonka, Wołomin, Klembów and Tłuszcz. The line runs SW-NE. In total, the case study area includes 12 passenger railway stations or stops, such as Kobyłka Ossów and Kobyłka between Zielonka and Wołomin stations; Zagościniec, Dobczyn, Klembów and Jasienica Mazowiecka between the Wołomin and Tłuszcz stations; Chrzęsne and Mokra Wieś after the Tłuszcz Station.

Railway line no. 21 is a straight continuation of railway line no. 6 in the direction of Warszawa Śródmieście. It includes the following railway stops: Ząbki and Warszawa Zacisze Wilno. After it crosses railway line no. 9 (towards Ciechanów) the line ends at the Warszawa Wileńska terminus, which is located just a few hundred metres from the Warszawa Wschodnia railway station.

Railway line no. 2 runs latitudinally in the south-western region of this area through Rembertów, peripheral district of Warsaw, from Warszawa Wschodnia station at the end of the cross-city railway line in the direction of Siedlce. After the Warszawa Rembertów station, rail link no. 449 branches off this line in the north-west direction. It includes the following railway stops: Mokry Ług and Zielona Bankowa. The line meets line no. 6 ahead of the Zielonka station.

Tłuszcz is the largest railway node in the case study area. Lines in five directions branch off this node. Two of them include railway line no. 6, which crosses the node in a straight line from SW to NE. Railway line no. 29 running north to Wyszków and Ostrołęka branches off the node. In the case study area, there are also Jarzębia Łąka and Grzegorzowo railway stops and the Mostówka railway station.

Bypass lines no. 10 and 13 meet in the Tłuszcz node. The track system enables the entrance to the Tłuszcz station or interconnection with the omission. Railway line no. 10 goes west from Tłuszcz in the direction of Radzymin and Legionowo. The case study area includes the Emilianów and Radzymin stations. Line 13 leads south-east in the direction of Mińsk Mazowiecki. There are no stations within the case study area.

The main route passing through the case study area is Warsaw–Białystok national road no. 8. It crosses the area in the direction of SW-NE, parallel to railway line no. 6. The distance between the railway line and the road varies from 2 km in the region of Ząbki to 10 km ahead of the exit in the opposite direction. More than two-thirds of the road is classified as express road S8, starting from the Radzymin ring road. In 2015, the average traffic at the Radzymin–Wyszków section was 29–30,000 vehicles per day (Figure 8).

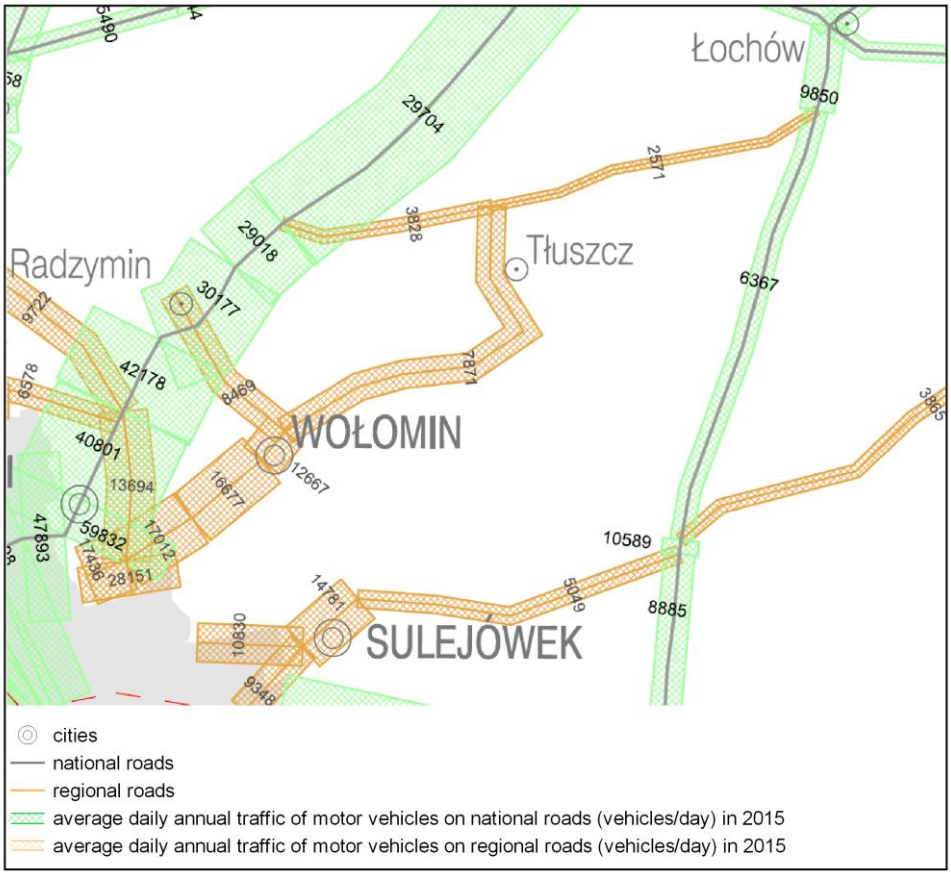


Figure 8. Average daily vehicle traffic on national and regional roads in 2015
Source: GDDKIA

Several regional roads, which can be divided into radial and bypass ones from the perspective of Warsaw, cross this area. Warsaw–Węgrów road no. 637 runs parallel to the southern part of the area. It starts in Rembertów along railway line no. 2 (towards Siedlce) and extends beyond the case study area. In Sulejówek, it turns north and in Okuniew, at first, it runs parallel to the case study area and then along its edge. The average traffic on the road was: 11,000 vehicles per day at the section exiting Rembertów and 5,000 vehicles per day after Okuniew.

Warsaw – Tłuszcz regional road no. 634 runs parallel to railway line no. 6, i.e. in the SW-NE direction. The road goes from Warsaw and at the section starting in Ząbki and going through Zielonka and Wołomin it runs at a distance of no more than about 1 km south of the line. The distance between the road and railway line no. 6 gradually increases and at an intersection with railway line no. 13 it is 4 km. Then it turns north, and it connects with regional road no. 636 past Tłuszcz. The average traffic on road no. 634 ranges from 17,000 vehicles per day ahead of Wołomin to 8,000 vehicles per day after Wołomin.

Road no. 636, which runs parallel, connects the S8 road to the north of Radzymin and Tłuszcz and Łochów. In the case study area, this road refers to railway line no. 10, which runs at a distance of 1–2.5 km to the north of it. The average traffic on this stretch of the road is 3,000 vehicles per day.

3. DEVELOPMENT OF THE WARSAW METROPOLITAN AREA IN THE CONTEXT OF THE MODERNISATION OF THE E75 RAILWAY LINE

3. 1. Spatio-functional dimension

3.1.1. Model of the spatio-functional structure

The model shows already well-established characteristic features of regionally important space, which are identified in the *Spatial Development Plan for the Mazowieckie Voivodship*, and also emerging local characteristics reflecting, for instance, the spatial policy of commune governments. The said model indicates elements of the spatio-functional structure that have a decisive influence on settlement processes taking place in the case study area (Figure 9). They include:

- urban centres – node areas of the settlement network of the case study area:
  - Warsaw – a European city, the national growth pole affecting the socio-economic development of the Mazowieckie Voivodship, especially the Warsaw Metropolitan Area;
  - Wołomin – a county centre strengthening the polycentric structure of the voivodship; it performs a lot of supralocal functions within the case study area;
  - Zielonka, Kobyłka, Ząbki, Marki, Radzymin, Tłuszcz – local urban centres of significant development potential;
- transport corridors – ranges of the highest socio-economic activity constituting the framework for the development of the settlement network;
  - international – KI corridor (Helsinki–Tallinn–Riga–Kaunas–Warsaw) comprising railway lines no. 449 and no. 6 (E75) and national road no. 8 (E67);
  - subregional – consisting of regional roads no. 636 (Wola Rasztowska–Zawiszyn), no. 635 (Radzymin–Wołomin), no. 634 (Warsaw–Wólka Kozłowska), no. 632 (Płońsk–Marki), no. 631 (Nowy Dwór Mazowiecki–Warsaw), no. 629 (Marki–Warsaw), no. 628 (Wołomin railway station – road no. 634), no. 625 (Zielonka railway station – road no. 634) and railway lines no. 10 (Legionowo–Tłuszcz), no. 13 (Krusze–Pilawa), no. 29 (Tłuszcz–Ostrołęka);
  - metropolitan – consisting of the so-called Warsaw Small Ring Road (determined by the intra-regional bypass route connecting towns near Warsaw), including national and regional roads; the case study area includes national road no. 8 (S8) as well as regional roads no. 631 and 635 (with some new sections);
- open areas – they perform food-providing as well as nature and recreational functions; they co-create the so-called ”green ring” around Warsaw; the most valuable natural assets are protected by law, e.g. there are restrictions in urban development, especially in the natural and cultural range associated with the valley of the Bug river.

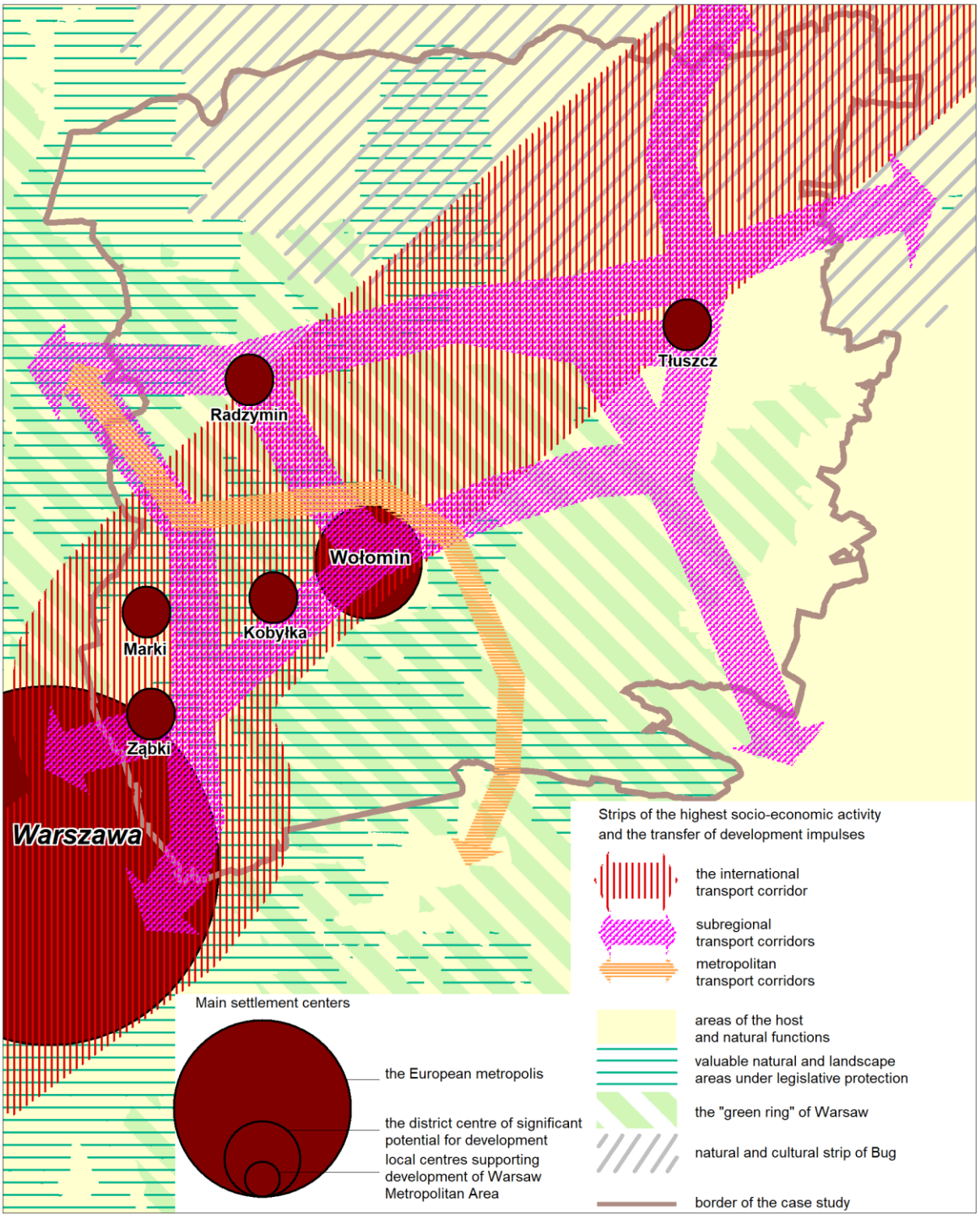


Figure 9. Model of the spatio-functional structure

Source: Study of the MBPR on the basis of PZPWM

Based on the analysis of the existing land development, the main functions of land within the case study area have been indicated and presented on Map 1.

- invested areas:
  - residential areas with the majority of multi-family buildings (multi-family buildings with related services and green spaces);

  - residential areas with the majority of single-family buildings (single-family, homestead and summer buildings with related services and green spaces);
  - service and residential areas (larger complexes of service buildings, with a predominance of public services, including multi-family and single-family residential buildings with related service facilities, community green spaces and home gardens);
  - production and technical and service areas (production buildings, warehouses, storage facilities, land-consuming service building complexes, technical infrastructure facilities as well as building-accompanying green areas);
  - special areas;
- open areas:
  - green areas (parks, squares, allotments, recreational areas, cemeteries);
  - agricultural and uncontrolled green areas;
  - forests;
  - surface waters.

Buildings in the case study area are mainly located in strips along the main transport routes departing from Warsaw. Most of the built-up and urban areas (approx. 54%) are concentrated in urban centres located next to the international transport corridor. Urban areas located next to the E75 railway line are characterised by a fairly densely built-up area due to existing spatial barriers within towns' boundaries – natural (forest complexes, river valleys) and artificial (the said railway line). Invested areas are – to a lesser extent – village buildings located mainly along local roads. In addition, there are also a lot of building enclaves, separated from spatial layouts of villages, which are disharmonious elements of the agricultural production space. The E75 railway line clearly divides the case study area into two areas that are different in terms of the intensity of urbanisation processes. Most of invested areas are centred to the north of the said railway line whereas the area situated to the south is developed in a more extensive way. The scale of development of settlement units varies due to the fact that national road no. 8 (S8) and the majority of transport routes of supra-local importance are located in the northern part. In case of the north-western part, natural and recreational values related to the valley of the Bug river and Zegrze Reservoir located nearby are additional factors determining the development of buildings.

Invested areas are dominated by residential areas with the majority of single-family buildings and associated minor service facilities as well as, to a lesser extent, single-family, homestead and summer buildings (associated with the valley of the Bug river) of villages. Large complexes of multi-family buildings are located in Rembertów (outer district of Warsaw) and in the suburbs of the capital city (Ząbki, Marki, Zielonka). In the central parts of urban areas (mostly formed along the main transport routes), there is a densely built-up area of service and residential buildings that create a mosaic of intertwining service complexes (public, religious and commercial services) with single-family and multi-family buildings (small housing estates). Large-format service buildings (transport, logistic and commercial services) co-create production and service and technical areas mostly located in the suburbs of towns and villages with ranges of socio-economic activities (Photos 1–3). Special areas are located in the southern part of the area (in the district of Rembertów and in the town of Zielonka) and they cover a total surface area of 6040.1 ha (7.2% of the analysed area). Due to their functions, they are closed areas.

Photo 1 (A-H). Invested areas by building type in urban areas

Source: NTview Tomasz Nizielski

Photo 2 (A-D). Invested areas by building type in rural areas that form a mosaic with open areas

Source: NTview Tomasz Nizielski

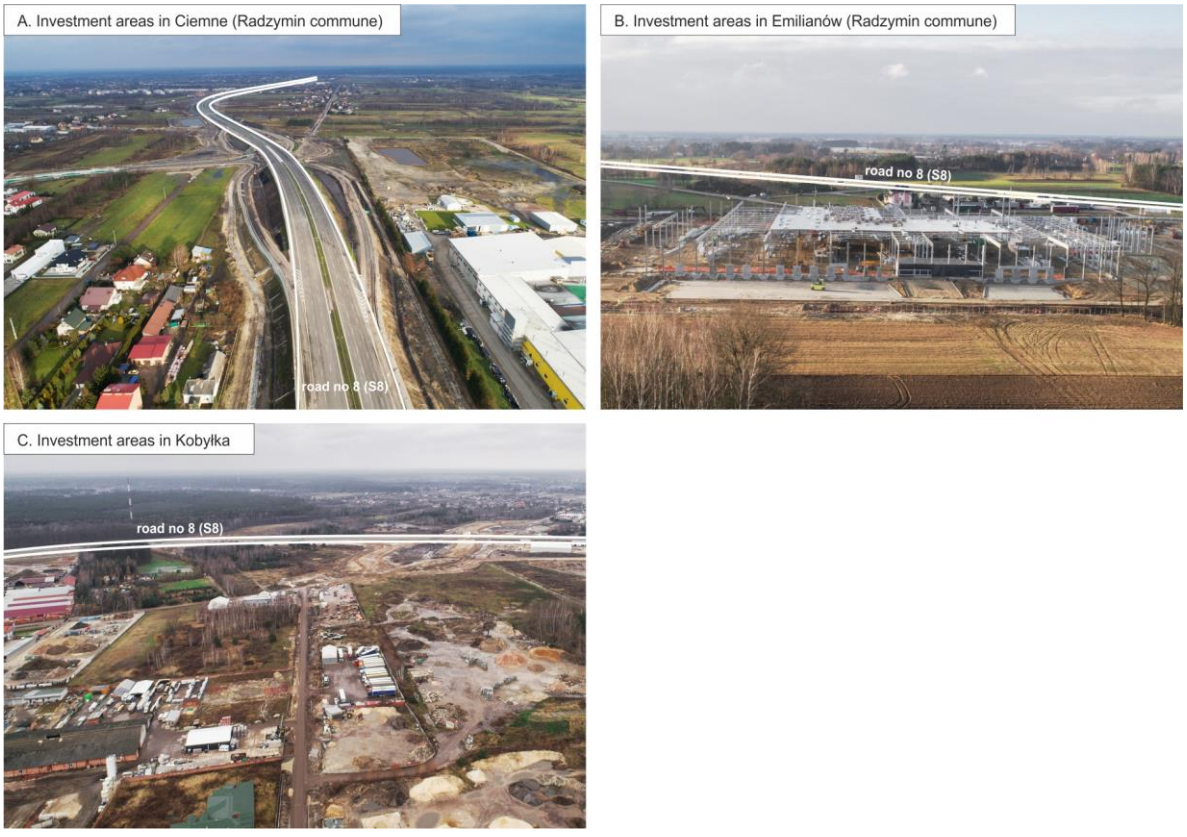


Photo 3 (A-C). Investment areas of a production and technical and service type along national road no. 8 (S8)

Source: NTview Tomasz Nizielski

Built-up and urban areas of neighbouring towns (Rembertów district–Ząbki–Marki–Zielonka–Kobyłka–Wołomin) form an integrated spatio-functional zone. Invested areas of Ząbki and Marki that are adjacent to Targówek (the district of Warsaw bordering the case study area) from the south-west connect with the buildings of the capital city as well. Moreover, spatial layouts of villages, located in the neighbourhood of Zielonka, Kobyłka, Wołomin, Tłuszcz and Radzymin are connected with the adjacent urban area in some places (Photo 4). However, most rural areas are separated from towns as a result of spatial barriers existing on the border (Photo 5). Spatio-functional links occurring between settlement centres are a consequence of increased Warsaw suburbanisation processes, which is a catalyst for development that stimulate and transform areas in its immediate surroundings.

Between urban areas there are areas of extensive development, i.e. open areas, some of which are legally protected. They perform a number of important functions (such as agricultural, environmental, recreational, climate and protective ones), without which sustainable development would not be possible. Open areas are mostly agricultural areas with band-shaped river valleys (wildlife corridors) which are, along with forest complexes, the main elements of the natural system of the case study area. The largest surface forests are located on the edge of the analysed area. The forest complex in Zielonka (170 ha) stands out in terms of size and it is the largest closed area. Open areas also include green areas, which constitute larger complexes in urban areas and rather small ones in villages, mainly including cemeteries and sports and recreation areas. Areas in the valleys of the Bug and Rządza rivers (Rządza is a tributary of the Narew river), which are mostly used for agricultural purposes, are exposed to flooding. A part of open areas within the case study area creates the so-called ”green ring” around Warsaw playing a key role in maintaining the spatio-functional continuity of valuable natural areas and in protecting the spatial structure against chaotic urbanisation.

In the years 2012–2016, there were slight changes in the use of land, which did not have a significant impact on the spatio-functional structure of the case study area. The area of built-up and urban land with a various number of buildings increased at the expense of agricultural and forest land. In 2016, built-up land constitutes 9.6% of the total area and it was higher by 0.6 pp in relation to 2012.

Towns located within the case study area have considerable reserves of building land. In the analysed period buildings spread beyond the existing spatial layouts of towns. The chaotic development process mainly occurred in rural centres. In towns, a lot of new building structures were constructed in areas that had already been urbanised; as a result, these areas became more densely built-up. Spatial barriers which prevent the chaotic expansion of buildings to neighbouring areas have an impact on the concentric development of towns.

During the modernisation of the E75 railway line urbanisation processes were more intense in the northern part of the case study area than in the southern part. Urban centres, especially those located within 25 km from Warsaw, were characterised by the greatest intensity and diversity of these processes. The above-mentioned processes were mostly associated with the suburbanisation of Warsaw, the character of which is determined by the existing spatial barriers and local government policies.

Photo 4 (A-D). Integrated row of buildings on the border between urban and urban-rural areas

Source: NTview Tomasz Nizielski

Photo 5 (A-D). Spatial barriers to building development in urban and rural areas

Source: NTview Tomasz Nizielski

3.1.2. Changes in land use between 2000–2016

To determine the trends of changes in the settlement space of the case study area, especially in the context of the impact of the railway line E75 modernisation on the spatial development of the Warsaw Metropolitan Area, the scale of urbanisation processes during the investment implementation and during a longer period prior to the investment was analysed.

There has been an intensive development of urban areas in the case study area for over 15 years (Figure 10). Urbanisation processes were chaotic in character and caused the efficiency of spatial structures and amorphous growth[22] of the suburban area of Warsaw to be reduced. Designation of building land was characterised by an individual approach to the space, i.e. changes concerned individual plots rather than high-density investment complexes. In addition, the development of urban areas did not have an established order of designating lands for non-agricultural and non-forestry purposes, i.e. the priority of changes was not determined, on the basis of designating a supplementary zone (densification of existing buildings) and development of buildings (indication of new plots for development). Liberal legislation in the field of spatial management makes it possible to implement individual investments on individual plots mostly by decisions about conditions of development and spatial management. The decisions do not have to comply with the spatial policy of a commune, which is expressed in the study of conditions and directions of the spatial management. The result is that local governments have no control over sustainable development of communes, which causes ubanisation chaos in the WMA to deepen.

[22] Amorphous growth involves a dysfunctional, uncontrollable spread of metropolitan area buildings in its surroundings.

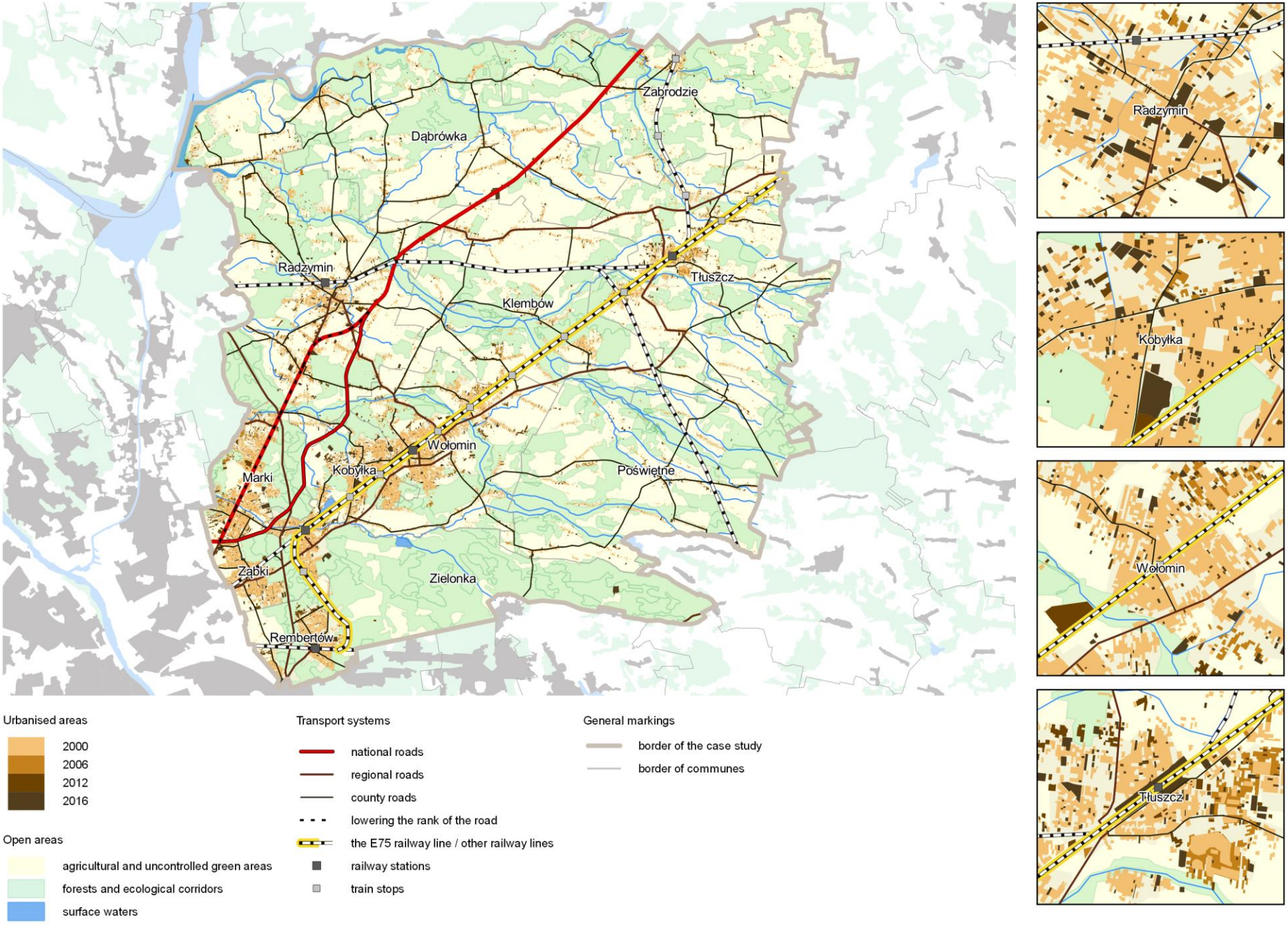


Figure 10. Changes in land use between 2000–2016
Source: Study of the MBPR on the basis of the database Corine Land Cover/Land use (CLC), granted building licenses

In 2016, the size of built-up and urban areas in the case study area was 804.9 ha and was higher by 0.2% compared to the year 2000. Urban-rural communes – Wołomin and Radzymin – feature the largest urban areas. There was an increase in urban areas in each commune within the analysed[23] periods. This increase was rather linear, i.e. there were no noticeable deviations in building development (Figure 11).

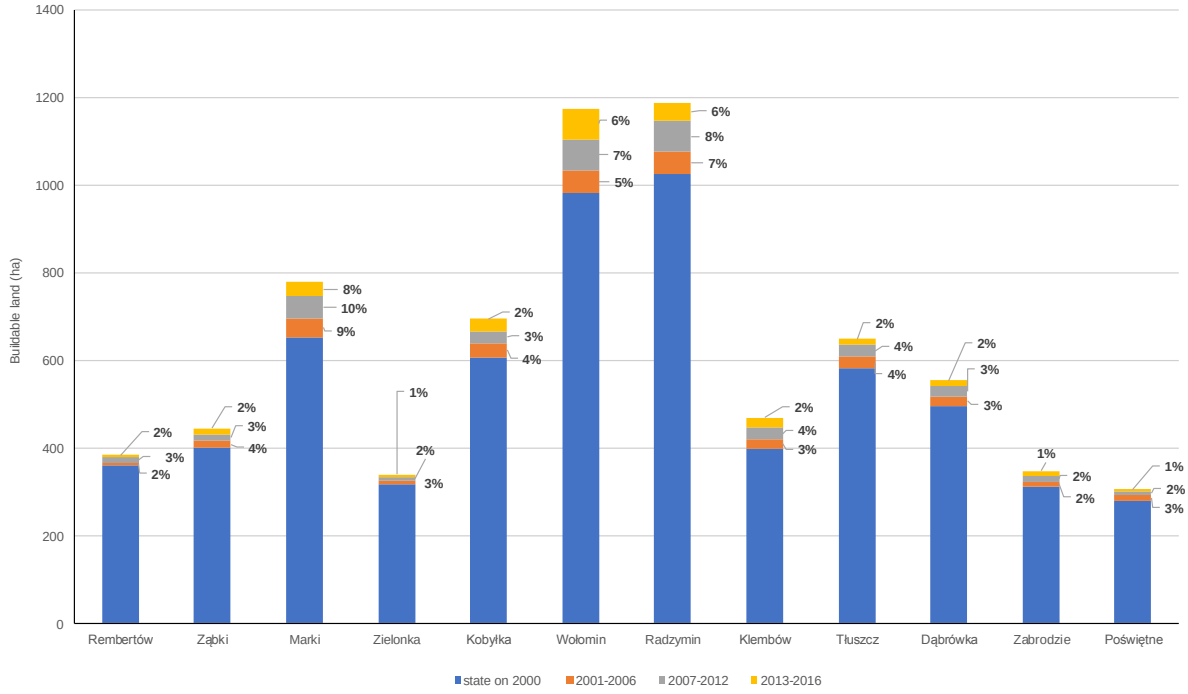


Figure 11. Buildable land in 2000 and the increase in buildable land between 2001–2006, 2007–2012, and 2013–2016 by communes

Source: Study of the MBPR on the basis of the database Corine Land Cover/Land use (CLC), granted building licenses

When it comes to the zones specified by the distance from the E75 railway line, zone 1, which features the areas located within a 3-km radius of this railway line, had the largest proportion of all urban areas in the case study area, amounting to approx. 50%. From 2000, the urban area increased proportionally to the reduction of the distance from the railway line. The increase in building land in each of the zones was steady (Figure 12). During the railway line modernisation, construction activity was slightly smaller compared to the previous years. However, it should be noted that settlement processes are analysed within the periods of various duration; therefore, the slower increase in areas of construction works within the shorter 4-year period during which the railway investment was implemented does not have to be the result of slower investment processes at that time.

[23] Selected periods: 2001–2006, 2007–2012, and 2013–2016 result from availability of data concerning land use, which was determined on the basis of Corine Land Cover-CLC, TBD, and satellite images by Google Earth.

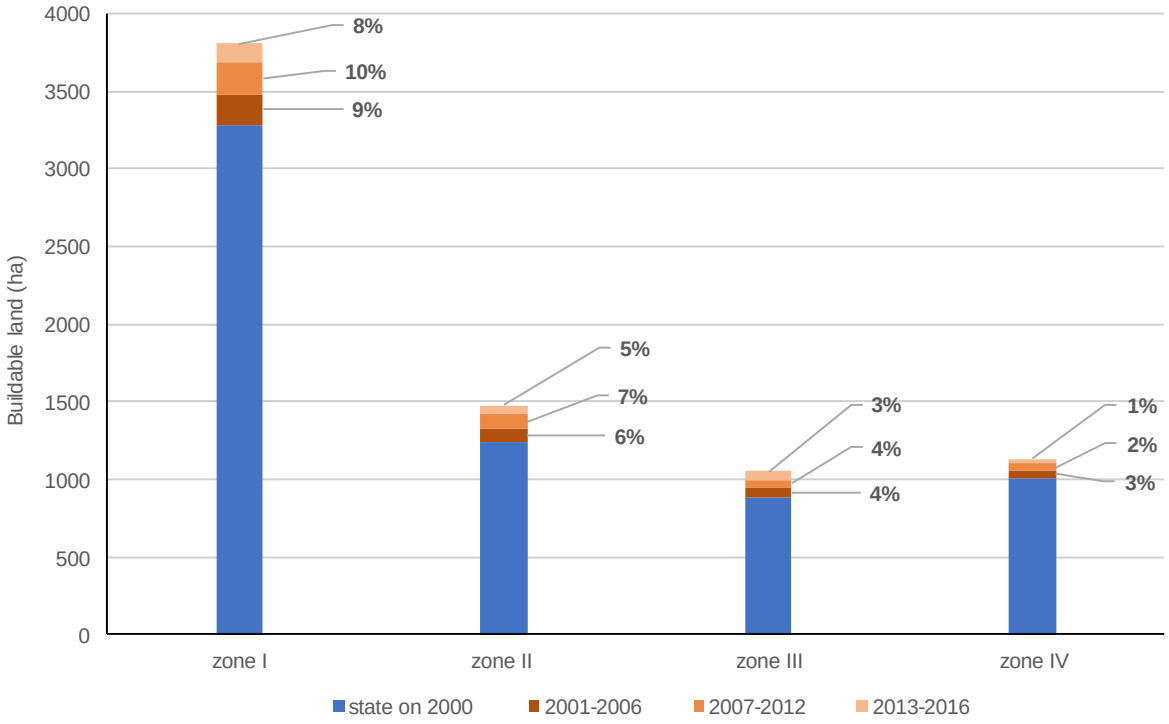


Figure 12. Buildable land in 2000 and the increase in buildable land between 2001–2006, 2007–2012, and 2013–2016 by zones of distance from the E75 railway line

Source: Study of the MBPR on the basis of the database Corine Land Cover/Land use (CLC), granted building licenses

Urbanisation pressure during the E75 railway line modernisation was analysed in detail based on building licenses. Between 2012–2016, 5,402 building licenses, 78% of which were for new building investments, were granted in the case study area. Over half (55%) of the building licenses involved towns, while most building licenses were granted in Marki (711) and Kobyłka (572) and in urban-rural communes: Radzymin and Wołomin (over 600). On the other hand, the smallest number of building licenses (below 150) were issued in rural communes: Zabrodzie and Poświętne, which are located in the eastern part of the case study area.

The number of building licenses in the zones determined by the distance from the railway line denotes increasing construction activity along with the decrease in the distance from this line. 2,736 building licenses were granted in zone 1, which is 50.6% of total building licenses issued in the case study area. The number of building licenses granted in zone 2 was 28.5% smaller than in zone 1. On the other hand, these differences were considerably smaller in the remaining zones, i.e. zone 3 and 4 featured 15.9% and 11.2% building licenses respectively.

No trends in the development of buildings were observed in separate years of the railway line modernisation. The number of building licenses granted in each of the zones decreased at least twice. However, the number of building licenses in zone 1 was on a gradual decline from 2013, which coincided with the commencement of initial engineering works associated with the implementation of the railway investment. These drops were irregular in other zones (Figure 13).

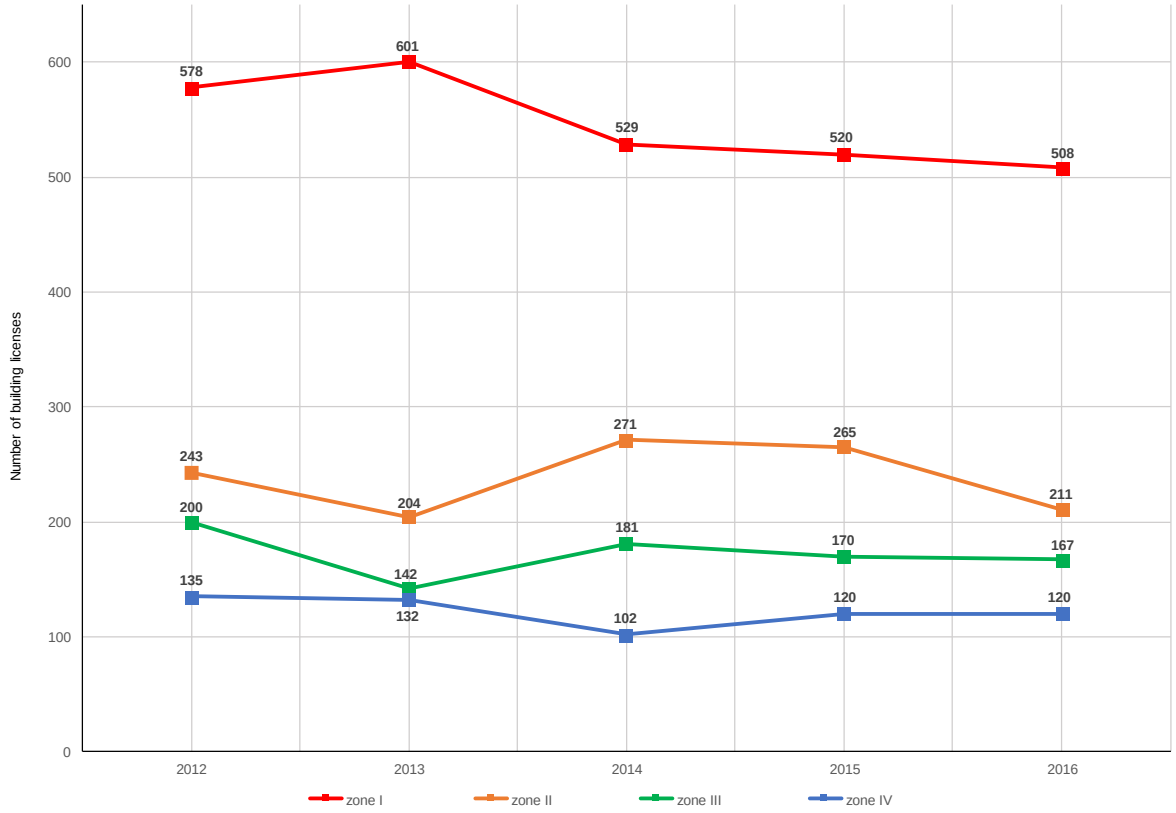


Figure 13. Number of building licenses granted between 2012–2016 by zones of distance from the E75 railway line

Source: Study of the MBPR on the basis of granted building licenses

The spatial distribution of building licenses issued demonstrated a considerable gap between the areas located north and south of the studied railway line. Small construction activity (generally up to 20 building licenses) was noticed in southern territorial units, while the intensity of construction processes was more varied in the northern part (Figure 14). The development of construction investments in the case study area was primarily affected by the availability of the most important transport routes that make is possible to reach the capital city quickly. National road no. 8 is a rival route for the E75 railway line. It passes 70% of the areas belonging to the northern part of zone 3. This road also borders the towns located in the northern part of zone 1. Considerable construction activity was also noticed along the aforementioned road route. However, the scale of urbanisation processes, especially along the section between Radzymin and the border of zone 3, was much smaller compared to the intensity of these processes in the areas closest to the E75 railway line. A relatively large number of building licenses – up to 50 – were issued in zone 4 (the north-western part of the Radzymin commune), which features areas of high landscape interest. The highest construction activity was generated by urban centres located mainly in zone 1 and within a 25-km radius of the Warsaw city centre. Being the stimulus to development, Warsaw has a decisive impact on how urbanisation processes shape in the case study area. The number of building licenses (3,425, which is 63.5% of all building licenses) issued in the suburbs of Warsaw serves as a confirmation[24].

[24] The area located within a 25-km radius of the Warsaw city centre was considered the suburbs of Warsaw.

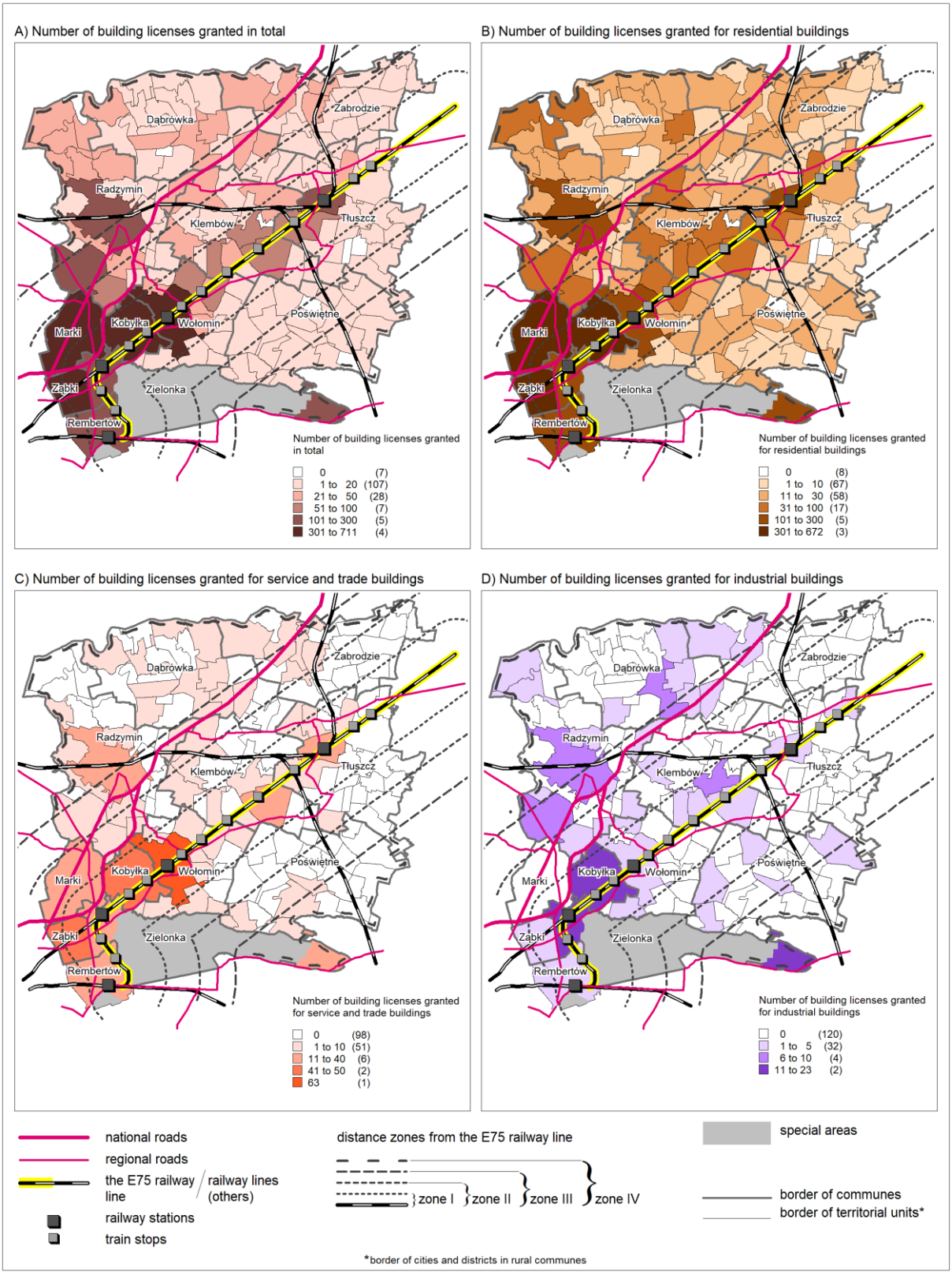


Figure 14 (A-D). Number of building licenses granted between 2012–2016

Source: Study of the MBPR on the basis of granted building licenses

The structure of the building licenses granted in the case study area was dominated by residential building licenses, which was approx. 90% of all administrative decisions, including ¾ for new housing investments. The average number of building licenses issued per 1000 inhabitants per year was 6.2 in rural communes, while it was 2.7 in urban and urban-

rural communes. These differences in the development of housing in communes of different types, which was measured in relation to population, do not result from increased construction activity in rural areas, but result from rural population being several times lower and from the character of urban area housing for which building licenses were granted, i.e. building licenses were granted for multi-family buildings in addition to single-family buildings.

There were no considerable functional differences concerning building licenses issued in particular zones. Residential building licenses were predominant in each zone (Figure 15). A high share of non-residential building licenses was recorded in zone 3 due to the course of national road no. 8 (S8) as well as in zone 1, which features a considerable share of service buildings (9%) as a result of the fact that this zone features the majority of towns in which over 70% of all building licenses for service buildings were granted in the case study area.

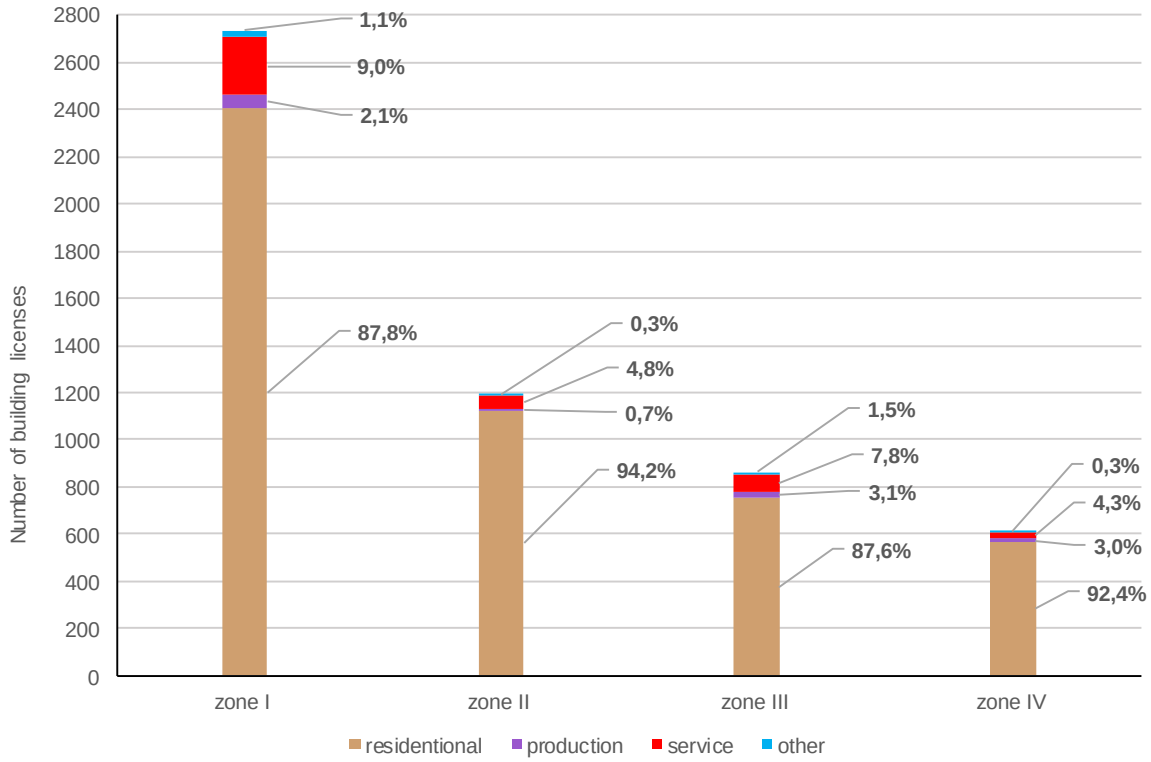


Figure 15. Number and share of building licenses granted between 2012–2016 by zones of distance from the E75 railway line compared to the total number of building licenses granted in individual zones

Source: Study of the MBPR on the basis of granted building licenses

There was no relationship between the number of building licenses granted and the distance from the E75 railway line for most types of buildings. Housing buildings were the only ones that bore this relationship. On the other hand, the share of building licenses granted for types of buildings other than residential ones did not increase along with the decrease in the distance from the railway line.

To sum up, towns, especially the ones located within a 25-km radius of Warsaw, stood out when it comes to the number of residential building licenses granted – over 300 of such building licenses were issued for them. In addition, the majority of territorial units in zone 1 and individual territorial units belonging to other zones located along national road no. 8 and in the Bug river valley feature a higher number of building licenses for housing investments – over 30 – compared to the average for the case study area. What is more, the number of building licenses for commercial and service investments and for production and technical investments indicate that the highest number of them is in towns. A clear band-shaped

arrangement of the building licenses for service buildings was formed along the railway line (zone 1) and the national road (the northern part of zone 3 in particular). In reference to production investments, continuity in the building licenses issued in particular zones is not maintained. Similar to building licenses for service buildings, the concentration of investments of secondary and tertiary economic sectors was also noticeable in the northern areas of zone 4 apart from the aforementioned zones.

3.1.3. Spatial policy of communes

The study of conditions and directions of the spatial management is a document that defines the spatial management policy of a commune, including local spatial development rules. It is a planning document, which is obligatorily drawn up within the administrative boundaries of a commune on the basis of the *Spatial Planning and Land Development Act of 27 March 2003.* Its provisions are binding when local spatial management plans are formulated.

To illustrate spatial management policies defined by local governments, a synthesis of directions of the spatial management, set out in the applicable planning documents of communes, was conducted (Figure 16). As a result of the synthesis of studies of conditions and directions of the spatial management, 4 spatio-functional zones were determined. They include areas of existing and planned land development:

- **residential and service zone** – including residential areas, service areas (small facilities and larger complexes) located in residential areas and surrounding green areas;
- **production and technical and service zone** – comprised of production and technical areas as well as service areas located within them (especially large-area ones);
- **nature and recreation zone** – formed by surface water, meadows in river valleys, forests, and large complexes of cultivated green areas;
- **food-providing zone** – including agricultural production areas.

This spatial policy of communes, presented in a generalised way, is an expression of long-term activities planned in areas by local authorities. It presents economic and spatial perspectives for commune development, for example, indicates areas to live or run business, or attractive recreational areas.

To examine the impact of the E75 railway line modernisation on actions taken by local authorities in terms of changes in land use, the studies of communes (adopted prior to and during the railway investment implementation) were analysed in detail.

The communes belonging to the case study area have applicable studies of conditions and directions of the spatial management adopted between 2003–2017 (Table 4).

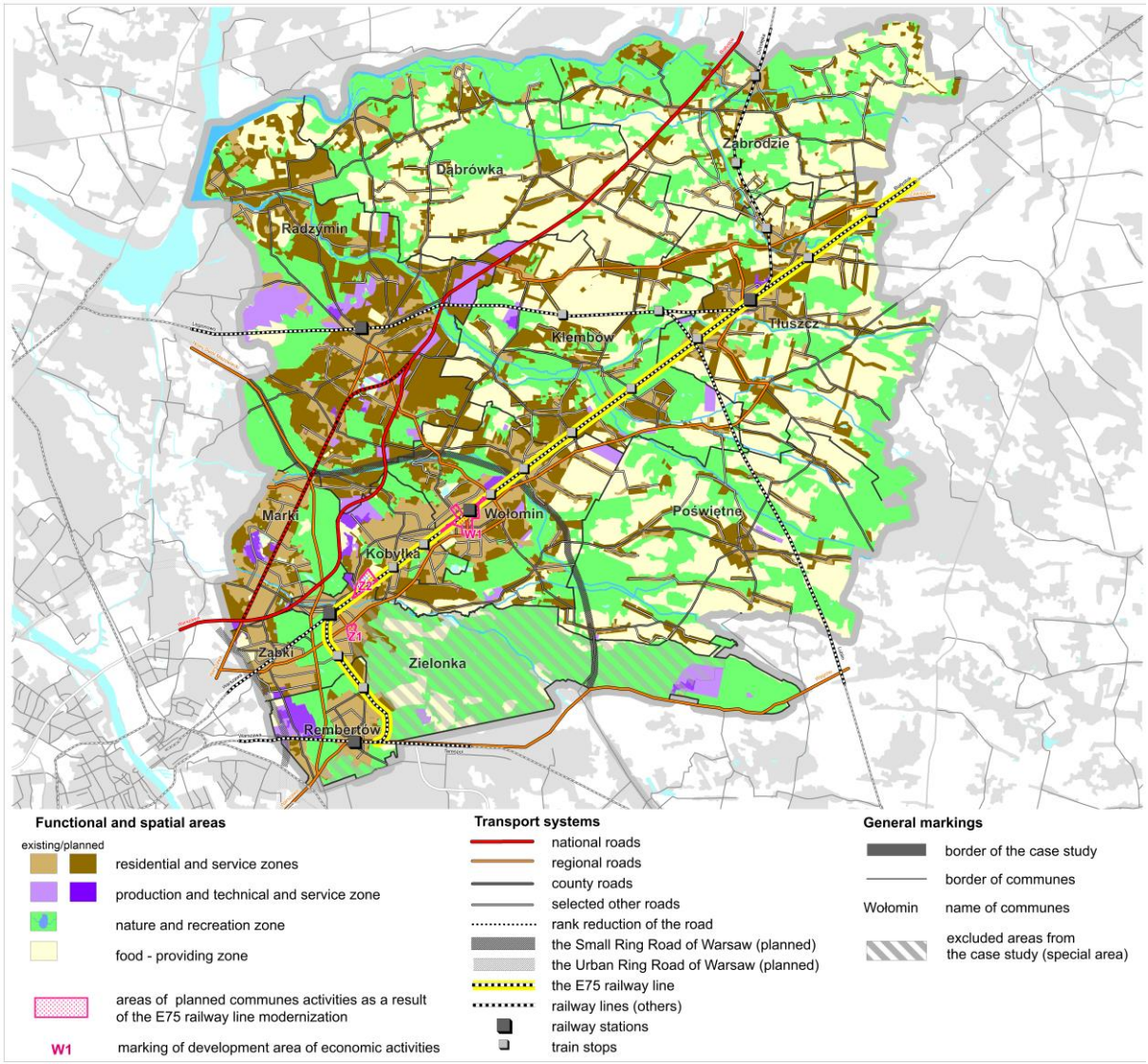


Figure 16. Spatial policy of communes

Source: Study of the MBPR on the basis of studies of the conditions and directions of the spatial management of communes

Table 4. Validity of studies of conditions and directions of the spatial management of the communes in the case study area

Commune	Date of study adoption	Date of study alteration adoption	Study alteration is being proceeded
Dąbrówka	10 July 2003	study alteration is being developed	+
Klembów	17 December 2009	27 April 2017	-
Zabrodzie	31 August 2006	19 January 2017	-
Poświętne	17 June 1997	29 June 2006	+
Radzymin	20 November 2009	20 June 2016*	+
Wołomin	29 August 2002	14 October 2011	-
Tłuszcz	03 July 2003	22 December 2005* 28 May 2008* 16 June 2015*	-

Commune	Date of study adoption	Date of study alteration adoption	Study alteration is being proceeded
Kobyłka	25 May 2010	03 February 2014*	-
Marki	24 October 2012	study alteration is being developed	+
Ząbki	15 June 1998	26 April 2011	+
Zielonka	30 December 2002	07 February 2008	-
Warsaw (Rembertów district)	10 October 2006	16 October 2014	-

* study alterations involved selected commune areas only

Source: Study of the MBPR

During the E75 railway line modernisation (between 2012–2017), 7 communes updated their studies of conditions and directions of the spatial management (including the fact that the Marki commune developed it for the first time) in the field of:

- inclusion of public investments of supra-local importance in terms of transport and energy;
- inclusion of public investments of local importance in terms of transport (construction, redevelopment, and modernisation of local roads), water and sewage systems, waste management, social infrastructure (construction of sports and recreational facilities, playgrounds);
- development of friendly public spaces and local service centres for inhabitants;
- expansion or designation of new areas for production and service buildings (Warsaw, Marki, Kobyłka, Klembów, Radzymin, Zabrodzie) or residential buildings (Warsaw, Tłuszcz, Kobyłka, Radzymin, Zabrodzie);
- transformation of existing urban areas in terms of their function and indicators concerning their development and use;
- inclusion of areas at risk of flooding based on flood hazard maps and flood risk maps;
- inclusion of arrangements from the register of objects of cultural heritage in communes;
- indication of degraded areas and areas in need of revitalisation.

The analysis in the field of the spatial policy of communes showed that 5 communes updated their planning documents but only the Dąbrówka commune adopted a resolution to proceed to alter its study entirely. In other communes, alterations have a local character and only referred to some of communes' parts. Due to the fact that updating documents is at the initial stage, it is impossible to evaluate directions and the scale of planned alterations.

The analysis of spatial policies of communes[25] reveals that the most important factors that determined decisions made by local governments to alter their studies of conditions and directions of the spatial management were: expectations of inhabitants and investors, changes in legal regulations, and the necessity to include public investments of supra-local importance. As a reason for updating planning documents, the Zielonka, Kobyłka, and Wołomin

[25] The survey was carried out among communal governments at the turn of May and June 2017, and it constitutes Appendix 1. to this case study.

communes indicated the E75 railway line modernisation. Moreover, the aforementioned communes as well as the Radzymin and Zabrodzie communes considered improving the technical parameters of national road no. 8. Inclusion of the infrastructural investments in updated studies of communes was primarily associated with the provision of spatial possibilities for their implementation.

Alterations in studies of communes generally involved designation of new building plots. As a result, there is a large reserve of greenfield planned for building (53.1%) in the case study area. This reserve in the Radzymin and Tłuszcz urban-rural communes and rural communes is higher than the aforementioned average. On the other hand, all other communes have much less greenfield planned for investments due to the urbanisation level already being over 60% (the ratio of built-up land to total planned investment space) and the existing spatial barriers within the boundaries of towns that make it impossible to develop buildings. Towns have the smallest reserves[26] for residential and service areas, especially in Rembertów (13.8%), Ząbki (4.2%), and Kobyłka (15.2%). Ząbki and Klembów have the smallest reserves for production and technical and service areas (below 20%). It is impossible to evaluate reserves by function for the Dąbrówka commune because its study does not distinguish production areas from areas having other functions (Appendix 2).

In communes' planning documents, communal governments emphasise the need to change the function of areas from residential, which are too many, to production and service.

In the zones determined by the distance from the E75 railway line, the larger distance from the railway line, the higher proportion of greenfield intended for building purposes. Characterised by the highest urbanisation level – 26.9% (the ratio of urban areas to total zone area), zone 1 features the smallest vacant investment area (45%) due to the fact that the majority of urban centres are located in it. The proportion of areas for new construction investments is above 60% in other zones.

In the updated studies of conditions and directions of the spatial management of communes and in the analyses of changes in land development conducted for updating studies, communes put emphasis on the fact that improvements to the technical parameters of the E75 railway line and national road no. 8 (S8) will have a positive impact on transport efficiency and availability.

In their planning documents, the following communes: Kobyłka, Wołomin, and Klembów, through which the E75 railway line and rival national road no. 8 (S8) run, indicated that national road no. 8 (S8) is of higher significance for their development than the E75 railway line. As a result, these communes designate investment areas near the road or in the direction where the commune connects with it.

According to the results of the survey, only 4 communes: Zielonka, Wołomin, Tłuszcz, and Radzymin see the E75 railway line modernisation as an opportunity to develop their economic activity (Table 5). The Radzymin commune indicated the highest number of actions despite of the fact that it is not directly adjacent to the E75 railway line and that it takes 10 minutes by car to reach the line.

[26] Reserve – the ratio of greenfields to total land intended for a certain type of buildings (residential and service, production and technical and service) in studies of land use conditions and directions.

Table 5. Planned actions taken by communes as a result of the E75 railway line modernisation

Type of action	Commune			
	Zielonka	Wołomin	Tłuszcz	Radzymin
Designation of new land for residential buildings				
Designation of new land for service buildings/production and technical buildings				+
Development of infrastructure in existing investment areas			+	+
Creation of investment incentives for entrepreneurs	+		+	+
Revitalisation of degraded areas	+	+		+
Construction of P+R parking lots and bus loops near railway stations and stops		+		
Development of local spatial development plans		+		

Source: Study of the MBPR on the basis of the ”Spatial policy of communes” survey

In spite of a considerable size of degradable land in the vicinity of railway transport[27], only 3 local governments see the improvement to transport availability as an opportunity for their development. Degraded areas mainly involve substandard buildings in town centres with a low land development quality and which do not meet basic aesthetic and composition requirements. Degraded areas also include larger complexes of housing estates as well as post-railway, post-industrial, and post-military areas. Being planned long-term, multidirectional corrective actions on degraded areas are generally associated with improvements to the aesthetics of public spaces, changing the use of former military and railway areas to sports and recreation; they also include the implementation of many public investments (redevelopment or construction of new road sections, modernisation of public utility facilities or their conversion for social and cultural purposes etc.). Corrective actions indicated in communal revitalisation programmes in railway areas, i.e. the construction of a passenger transfer centre in Wołomin and modernisation of parking lots next to the Tłuszcz railway station, are not among the investments planned as part of the railway line modernisation.

When asked – during the survey – about the areas in which they are going to implement the actions referred to in Table 5, only the Wołomin and Zielonka communes provided a precise indication of 3 areas for which, according to local authorities, the E75 railway line modernisation is an opportunity to develop. These areas coincide with the areas specified as degraded in revitalisation programmes. For the indicated areas located in the vicinity of or near the E75 railway line, there are markings on Map 2, which detail studies in question on a local scale (indicators concerning spatio-functional processes as well as socio-economic processes during the railway line modernisation). In addition, their investment attractiveness as potential areas of economic activity was described through the analysis of selected and most universal factors of location of various investment types (Photo 6). The verification also

[27] Degraded areas planned to be revitalised was designated in communal/local revitalisation programmes established on the basis of the *Act of 8 March 1990 on Commune Government* (Journal of Laws of 2016, item 446) or the *Act of 9 October 2015 on Revitalisation* (Journal of Laws of 2015, item 1777 as amended); these are operational documents that constitute long-term programmes to coordinate and integrate various corrective steps in degraded areas; the aforementioned programmes are implemented in the following communes of the case study area: Tłuszcz (2015–2023), Zielonka (2016–2022), Ząbki and Radzymin (2016–2023), Marki (2016–2025), and Wołomin and Kobyłka (2017–2023).

included the degree of existing investment, purpose in planning documents of communes, accessibility, and ownership of areas. The analysis of qualities of individual areas was listed in Table 6 and presented on Map 2.

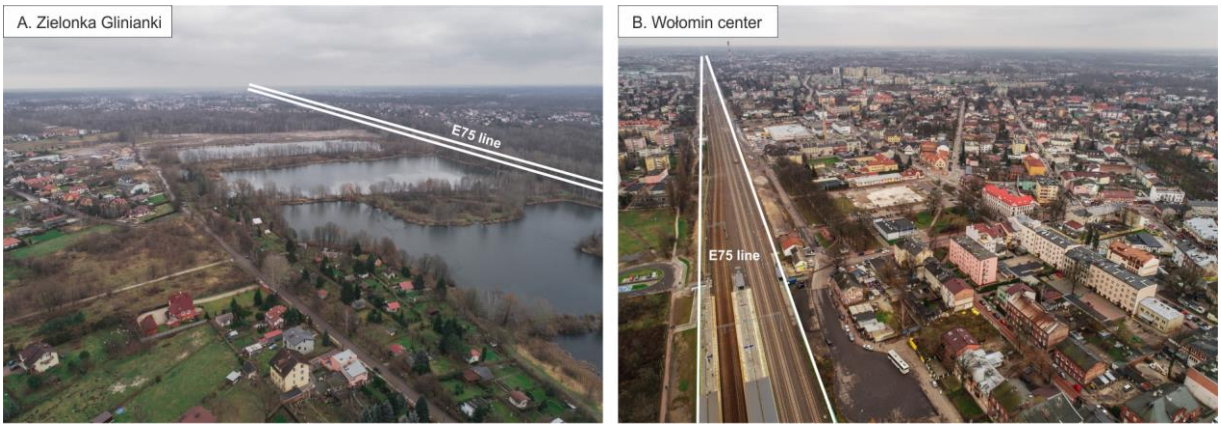


Photo 6 (A-B). Potential areas of business activity development indicated by local governments

Source: NTview Tomasz Nizielski

Table 6. Areas of economic activity development as a result of the E75 railway line modernisation

Area location	**Wołomin – town centre**	**Zielonka – Glinianki**	**Zielonka** ▪ **Poligon district** ▪ **post-miliary area**
Map no.	2 A	2 B	2 C
Image no.	6B	6A	-
Designation of the area on the *Spatial policy of communes* map	W1	Z1	Z2
Functions and purpose in the study of conditions and directions of the spatial management of the town (sukzp)	− residential and service; − single-family residential; − service (public utility facilities) − public space;	− service (sports and recreation services); − areas with the majority of surface water;	– residential (multi-family and single-family buildings with related services); – service (including social services); – forests;
Current investment (description of the existing situation)	− 90% of the area is built-up − types of buildings: ▪ service buildings (public utility facilities, commercial buildings); ▪ residential and service buildings (buildings in the Wołomin Old Town – mostly tenement buildings of a low quality with services on ground floors; multi-family buildings built in the 1960s, 1970s, 1980s, single-family buildings, single facilities or complexes of service-oriented buildings); ▪ single-family buildings with small single commercial buildings; ▪ cultivated green areas (parks, squares); ▪ uncontrolled green areas; ▪ squares;	− undeveloped area; ▪ post-industrial area, in which there were brickyards until the 1980s; − surface water (5 basins covering 90% of the area);	− 70% of the area is built-up; − types of buildings: ▪ multi-family buildings; ▪ residential and service buildings; ▪ service buildings (public utility facilities, commercial buildings); − post-military area – undeveloped
Local spatial development plan (mpzp)	− local plans for the area located in the quarter of residential and service buildings between the following streets: 6 Września,	− in place;	– in place;

Area location	Wołomin – town centre	Zielonka – Glinianki	Zielonka ▪ Poligon district ▪ post-miliary area
	Wileńska, Nowowiejska, and Żelazna; − according to the communal revitalisation programme, a local revitalisation plan is provided for the Wołomin Old Town area; − according to the sukzp, areas located north of the E75 railway line are indicated as areas in which the mpzp has to be developed, while areas located south of the line are indicated as areas in which the mpzp is planned to be developed;		
Selected socio-economic and spatio-functional indicators	− area – 110 ha (6.4%) − population – 1,331 (7.9%) <u>indicators and their share (%) in the total values for the town (between 2012–2016):</u> − the number of building licenses granted – 17 (4.8%) − the number of registered business entities of natural persons – 213 (22.2%) − the number of real estate transactions – 170 (21.8%)	– area – 48 ha (0.6%) − population – 0 (0%) <u>indicators and their share (%) in the total values for the town (between 2012–2016):</u> − the number of building licenses granted – 0 (0%) − the number of registered business entities of natural persons – 0 (0%) − the number of real estate transactions – 0 (0%)	– area – 14.4 ha (0.2%) – population – 1,300 (8.2%) <u>indicators and their share (%) in the total values for the town (between 2012–2016):</u> − the number of building licenses granted – 3 (1.2%) − the number of registered business entities of natural persons – 22 (4.2%) − the number of real estate transactions – 86 (15.4%)
Investments carried out as part of the railway line modernisation	− modernisation and construction of railway tracks at the section between the Wołomin railway station – the Wołomin Słoneczna railway stop; − construction of 2 tunnels for road transport and pedestrians; − construction of an underpass beneath a railway; − construction of 2 new platforms with shelters at the railway station; − construction of noise barriers along the railway line;	− construction of a railway track at the section between the Zielonka railway station and the Kobyłka Ossów railway stop. − construction of noise barriers along the railway line;	− the following investments were carried out at the E75 railway line section adjacent to the area: ▪ construction of a railway track at the section between the Zielonka railway station and the Kobyłka Ossów railway stop; ▪ construction of a passage for cyclists and pedestrians; ▪ construction of an underpass with access to platforms; ▪ construction of 2 new platforms

Area location	Wołomin – town centre	Zielonka – Glinianki	Zielonka ▪ Poligon district ▪ post-miliary area
	− construction of a signal box building as part of the railway station;		with shelters; ▪ construction of a signal box building as part of the railway station; ▪ construction of noise barriers along the railway line;
Accessibility	− arterial railway line no. 6 (E75); − regional roads: regional road no. 634 (ul. 1 Maja), regional road no. 638 (ul. Legionów); − county roads (ul. Lipińska, Przejazd, Wileńska, aleja Armii Krajowej, ul. Piłsudskiego); − commune roads related to regional and county roads; − it takes less than 6 minutes by car to get from the area to the Wołomin railway station/stop;	− arterial railway line no. 6 (E75); − county road (ul. Wolności) − commune roads related to a county road; − it takes less than 6 minutes by car to get from the area to the Zielonka railway station/stop;	− regional road no. 634 (ul. Prymasa Stefana Wyszyńskiego) − commune roads related to a regional road; − it takes less than 6 minutes by car to get from the area to the Zielonka railway station/stop;
Ownership of areas	−	− the town (dominant ownership) and the State Treasury	− the State Treasury (dominant ownership), natural persons and the town
Other strenghts (assets)	− location in the centre of the town; − location near the Wołomin railway station and the Wołomin Słoneczna railway stop; − location within the Special Revitalisation Area – the SSR (opportunities to obtain subsidies for construction works to carry out revitalisation projects specified in a resolution of the commune council on establishing the SRR);	− location with a 800-metre radius of the Zielonka railway station and a 500-metre radius of the Kobyłka Ossów railway stop; − revitalisation area which is the location for a great number of investment plants of the commune (for local community, space, and economy);	− revitalisation area which is the location for a great number of investment plants of the commune (for local community, space, and economy);
Weaknesses	− part of the area (60%) is within degraded areas designated in the revitalisation programme of the commune; − spatial chaos (no clear spatial composition,	− poor accessibility (no supra-local public roads of a high category) − poor technical condition of commune roads;	− being adjacent to military areas, which constitute a barrier to the development of the town and limit town development in an eastward

Area location	Wołomin – town centre	Zielonka – Glinianki	Zielonka ▪ Poligon district ▪ post-miliary area
	dissonant buildings) − poor condition of the so-called Wołomin Old Town built in the 20th c., which reflects the area identity; − shortage or poor quality of public spaces; − shortage of places for recreation and leisure; − inadequate social and technical infrastructure or its poor condition; − lack of adequate traffic organisation to make journeys safe for various traffic participants (pedestrians, cyclists, drivers); − no access to basic services or their poor quality; − low level of entrepreneurship; − poor condition of local businesses; − presence of waste posing a threat to life, health, and the environment;	− inadequate social infrastructure (recreational and sports ones); − presence of ”illegal dumping”;	direction; − high unemployment (elimination of some positions in the Military Electronic Works adjacent to the area); − unfavourable population pyramid (the majority of non-working-age population); − presence of ”illegal dumping”;
Investment plans of local authorities	− development of prestigious public spaces for representational meetings, recreation and leisure, exchange of services and information, and for urban events; − construction of new public utility facilities, e.g.: ▪ passenger transfer centre (railway and bus) with redevelopment of the road network and construction of an underground car park and small service facilities; ▪ educational and cultural facilities; − Construction of P+R parking lots and bus loops near railway stations and stops;	– development of public spaces for recreation and leisure, organisation of urban events, and for meetings; – conversion of the post-industrial area ▪ cultivation of and planting greenery, construction of walking routes, street furniture; redevelopment and construction of a new parking lot; ▪ construction of new sports and recreation facilities (e.g. outdoor gym, ornithological stations, shooting range, campfire places, fishing pegs); ▪ preparation of a reservoir for recreational purposes (cleaning the bottom, construction of a	– development of public spaces with convenient access to social services; – modernisation and construction of sports and cultural facilities;

Area location	**Wołomin – town centre**	**Zielonka – Glinianki**	**Zielonka** ▪ **Poligon district** ▪ **post-miliary area**
	− development of special transport solutions, i.e. woonerf-type streets for traffic calming and performance of various social functions;	flood protection system, bridge);	
Main sources of financing for investment plans	− EU structural funds allocated for projects implemented as part of the 2014–2020 RDOP and national operational programmes: Infrastructure and Environment and Knowledge, Education, Development; − funds from the town budget; − public–private partnership;	− EU structural funds allocated for projects implemented as part of the 2014–2020 RDOP and national operational programmes: Infrastructure and Environment and Knowledge, Education, Development; − funds from the town budget; − external partners;	− EU structural funds allocated for projects implemented as part of the 2014–2020 RDOP and national operational programmes: Infrastructure and Environment; − funds from Norway grants; − funds from the town budget;

Source: Study by the MBPR on the basis of data provided by city communes, Wołomin County Office, CEIDG data, studies of conditions and directions of the spatial management of communes, local spatial management plants, revitalisation programmes of communes

Even though the majority of communes – including those through which the E75 railway line runs – do not see the railway line modernisation as an opportunity to develop, considerable greenfield reserves may turn out to be their advantage. The implementation of the railway investment will make transport to and from Warsaw more convenient, which may contribute to, for example, higher construction activity, an influx of new inhabitants and development of companies providing services. Building plots designated in the studies of communes are still undeveloped; as a result, new investments may be located there. Once the railway line modernisation is completed, investment processes in the case study area may accelerate, while the existing greenfield reserves make it possible for these processes to take place. However, to prevent an uncontrolled spread of buildings, building space should be reasonably managed, i.e. gaps in the existing built-up areas should be filled in the first place; then buildings should be constructed in new areas with developed infrastructure, which are indicated in planning documents of communes.

Conclusions:

1. The E75 railway line divides the case study area into a more urbanised part – the northern part – and into the southern part, in which the intensity of urbanisation processes is smaller.
2. The urbanisation processes analysed in communes and selected zones prior to the E75 railway line modernisation and during it was steady; without clear fluctuations in the intensity of building development.
3. During the E75 railway line modernisation:
   - the intensity of construction processes increased along with the reduction of the distance from the railway line; however, there is no relationship between construction activity and the distance from the E75 railway line in the spatial distribution of the building licenses issued;
   - the largest and most diverse construction activity was noticed in urban centres within a 25-km radius of Warsaw and in the areas of zone 1, in which the majority of towns in the case study area are located.
4. The E75 railway line has a rival in the form of national road no. 8 (S8), along which construction activity is relatively high, especially in the Radzymin commune, where the Bug river valley and considerable building land reserves are assets.
5. Two of seven communes in the case study area that proceed to update their planning documents during the railway line investment indicated the E75 railway line modernisation – along with improvements to the technical parameters of national road no. 8 (S8) – as one of the reasons for altering their studies of conditions and directions of the spatial management.
6. Two of six communes through which the E75 railway line runs emphasised the impact of the railway investment on their future economic development.
7. The national road no. 8 (S8) in communes, through which the E75 railway line and the road no. 8 pass, plays a greater role in commune development; a great number of investment areas are developed near the road.
8. According to the information provided in planning documents of communes, excess areas designated for residential buildings should be converted into areas for production and service buildings.

3.2. Socio-economic dimension

3.2.1. Demographic processes

The historical course of settlement processes, spatial barriers, and methods for organising the spatio-functional structure determined the uneven distribution of the population in the case study area.

The construction of the Saint Petersburg – Warsaw Railway (nowadays the Warsaw – Białystok E75 railway line) in the second half of the 19th c. acted as a catalyst for accelerating settlement processes. That investment had a considerable impact on how the core of the urbanised structure of the case study area shaped up; it acted both as a stimulant to settlement development and as a spatial barrier that limited the process of suburbanisation. The construction of the railway line caused more people to live nearby as well as the development of many socio-economic functions along it, while for 150 years the areas located in its vicinity became attractive places to live and carry out a great number of investments. Settlement processes were intensified due to the fact that Warsaw is located nearby. To confirm this, the most populated settlement units – the majority of towns in the case study area – are located within a 25-km radius of the capital city and along the railway line.

The case study area is located in a region in which the population has been on a steady rise since 2000 (5.4 million – the total population at the end of 2016[28]). However, the case study area varies a lot in terms of occurring demographic processes, which are affected by the birth rate and net migration rate. Between 2000–2016, the highest positive values of the aforementioned rates were recorded in the following communes near Warsaw: Ząbki, Marki, Kobyłka, and Radzymin; on the other hand, the lowest values, including negative ones, were recorded in the following communes Zabrodzie, Poświętne, Zielonka and in the town of Wołomin (the highest negative net migration rate). During the analysed period, the population in the case study area increased by 39,100 (246,700 – the total population at the end of 2016[29]), which amounted to approx. 16% of the increase in the Mazowieckie Voivodship population. The highest population growth was recorded in urban communes near Warsaw (Ząbki and Miarki – the increase by 11,000 and 9,500 people respectively. In addition, a high increase in population (by over 4,500 people) was found in the Radzymin and Kobyłka communes. In contrast, a small increase in population (+150–180 people) was found in rural communes located peripherally in relation to Warsaw (Zabrodzie, Poświętne) and also in the Zielonka commune, which is located near Warsaw (approx. +300 people). In their case, it is impossible to distribute the population and to expand buildings due to spatial barriers in the form of forests, which belong to the military and are off-limits. During the analysed period, changes in the population of particular communes were stable, i.e. the intensity of demographic processes was rather small. During the E75 railway line modernisation, the population grew by 25% only in the Radzymin commune, which is over twice as high as in Marki and Ząbki, which demonstrated the highest population growth from 2000 onwards. During the analysed periods, the population in the majority of communes directly adjacent to the E75 railway line was on the rise; only the Wołomin and Zielonka communes experienced a steady decrease in their population from 2008 onwards (Figure 17).

[28] Based on the BDL.
[29] Based on the data provided by communes.

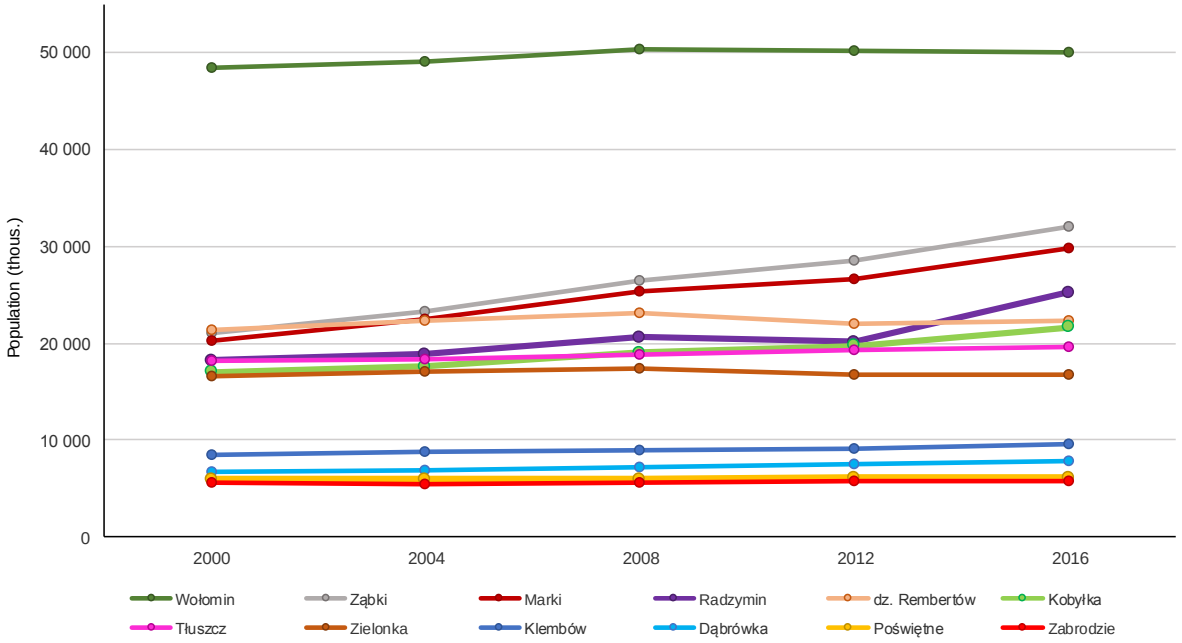


Figure 17. Population of communes between 2000–2016

Source: Study of the MBPR on the basis of BDL and data of commune offices

In 2016, urban and urban-rural communes were characterised by the highest population in the case study area (over 16,500 inhabitants). The Wołomin commune had the highest number of inhabitants, who amounted to approx. 50,000.

In the zones determined by the distance from the E75 railway line, the population increases along with the reduction of the distance from this line. In 2016, 67% of the population in the case study area lived in zone 1, which features as many as 6 urban centres (including the Rembertów district of the capital city of Warsaw). A total of 162,100 people live in these urban centres, which is 83.3% of the total population in this zone. In zones 2–4, 17, 11%, and 5% of the total population in the case study area live respectively. Due to the fact that only one urban centre is located in zone 2 (Marki) and in zone 3 (Radzymin), the share of urban population in these zones was considerably smaller compared to zone 1, the location of which is closest to the E75 railway line (Figure 18).

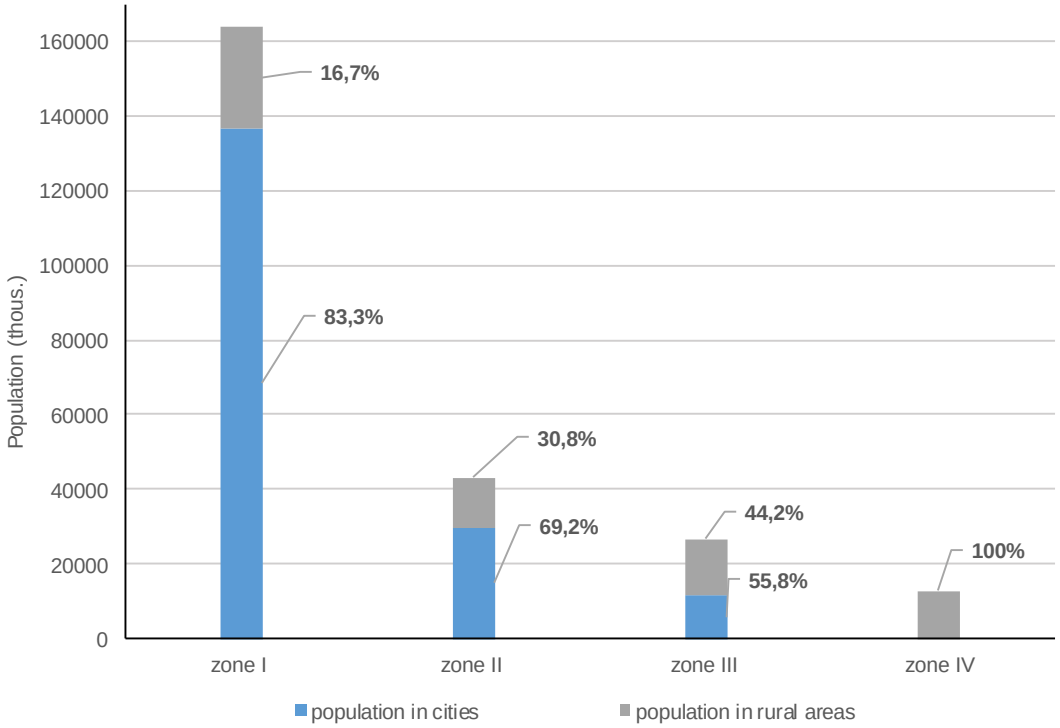


Figure 18. Population by zones in 2016

Source: Study of the MBPR on the basis of data of commune offices

The vast majority of the case study area (77% of the population) was located within a 25-km radius of the Warsaw city centre, in which almost all towns are located (except for Tłuszcz). The areas located in zone 1, which is situated in the closest vicinity of the analysed railway line, are characterised by a significant concentration of population. Apart from the aforementioned population centres, there is also a band-shaped strip of towns located along national road no. 8 (S8) (the northern part of zone 3), in which the average population (2,688) is higher than the average in the entire case study area (1,562). The least populated areas include towns located peripherally in relation to Warsaw and main transport routes/lines – i.e. the eastern part of the case study area (Figure 19).

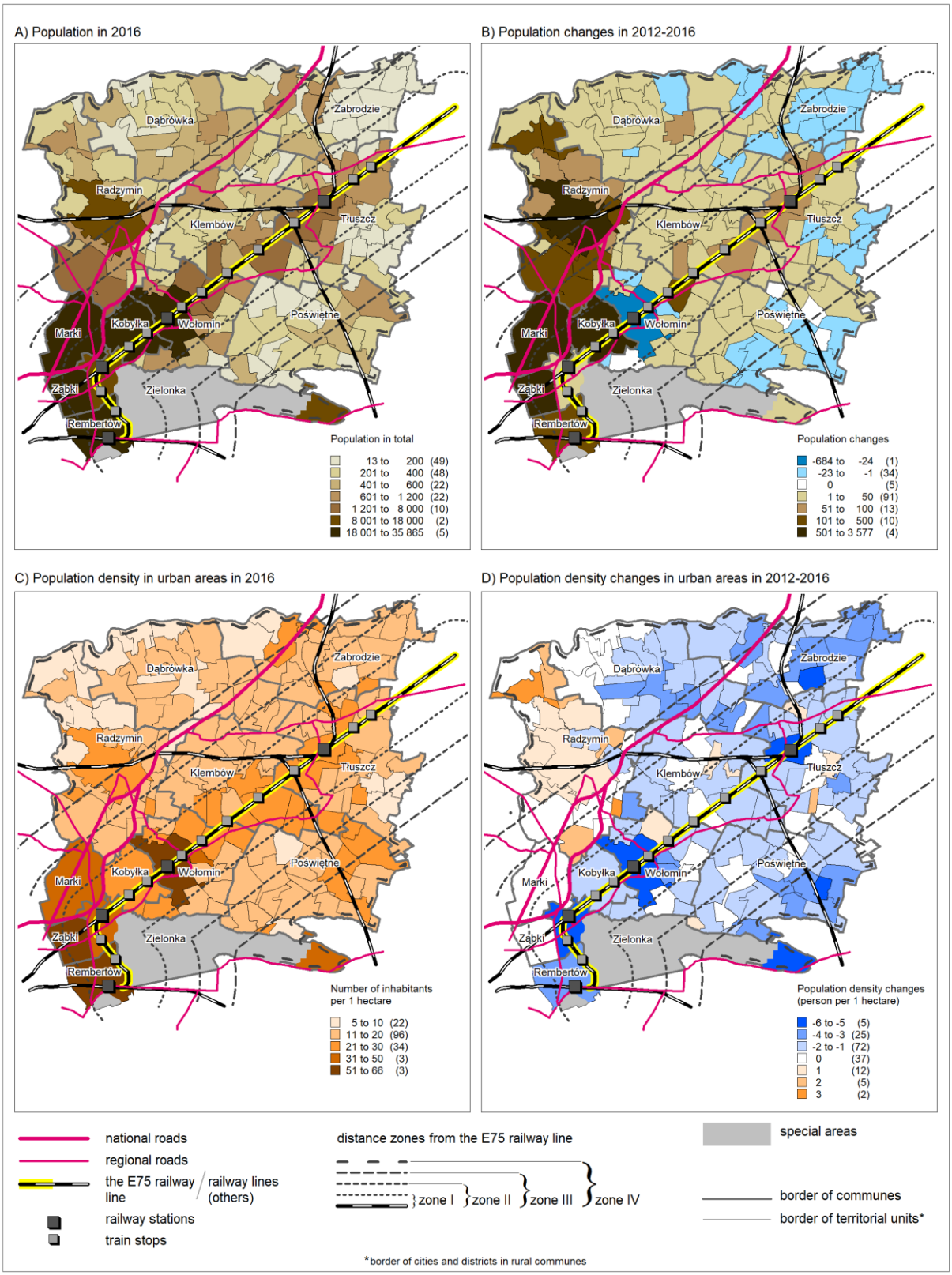


Figure 19 (A-D). Population and population density between 2012–2016

Source: Study of the MBPR on the basis of data of commune offices

During the E75 railway line modernisation, the population in the case study area went up by 14,900. A high population growth was recorded in the communes located near Warsaw: Radzymin (over 5,000), Ząbki and Marki (over 3,000), and Kobyłka (over 1,800).

A population decline was noted in the following communes only: Wołomin and Zielonka – by 217 and 2 people respectively.

Between 2012–2016, the highest population growth was recorded in zone 1 (by 6,300) among all zones determined by the distance from the E75 railway line. Population growth was smaller in the remaining zones and amounted to: in zone 2 – approx. 4,000; in zone 3 – approx. 3,800; and in zone 4 – over 1,000 (Figure 20).

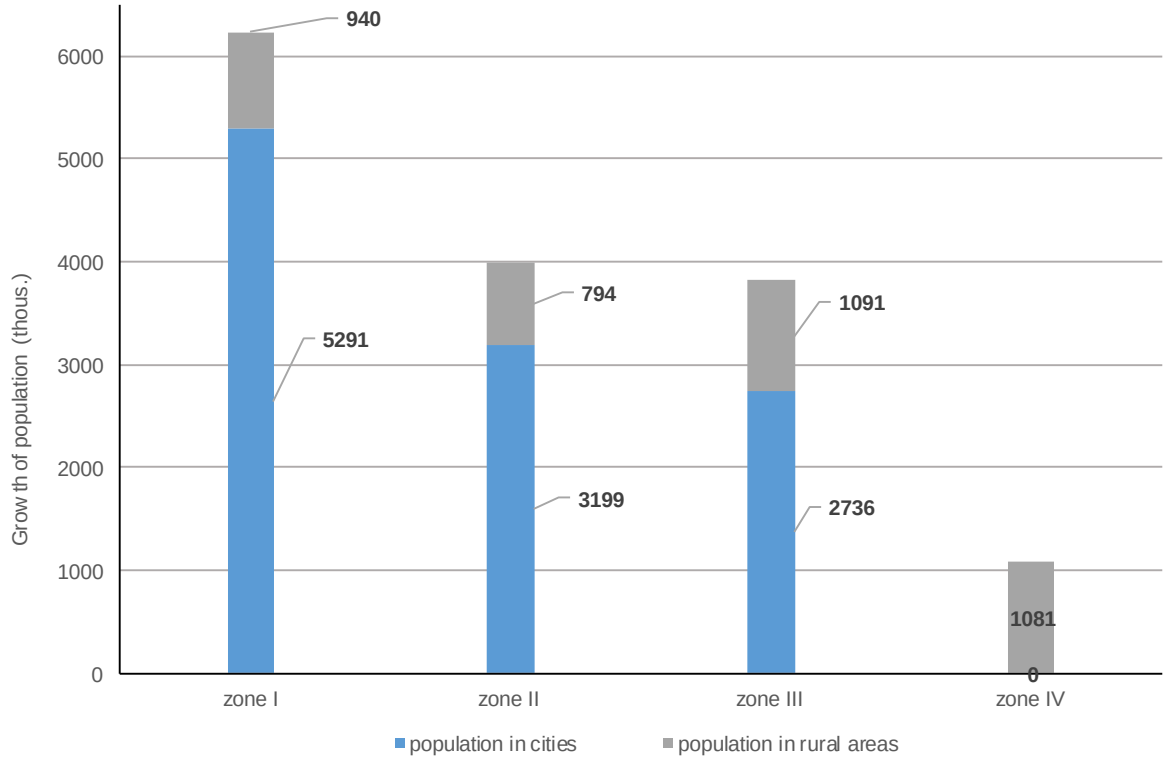


Figure 20. Changes in population by zones between 2012–2016

Source: Study of the MBPR on the basis of data of commune offices

Prior to the implementation of the railway line investment[30], the pace and nature of demographic changes, which were examined in individual zones, were similar to the changes that took place during the railway line modernisation. When comparing changes in the population during the E75 railway line modernisation with such changes during the analysed periods, there was steady population growth in zones 2–4. During the modernisation period, there was a slowdown of population growth by 23% compared to the 2006–2011 period in zone 1 (Figure 21).

[30] The analysed periods: 2002–2006 and 2007–2011 correspond to the railway line modernisation in terms of duration (2012–2016).

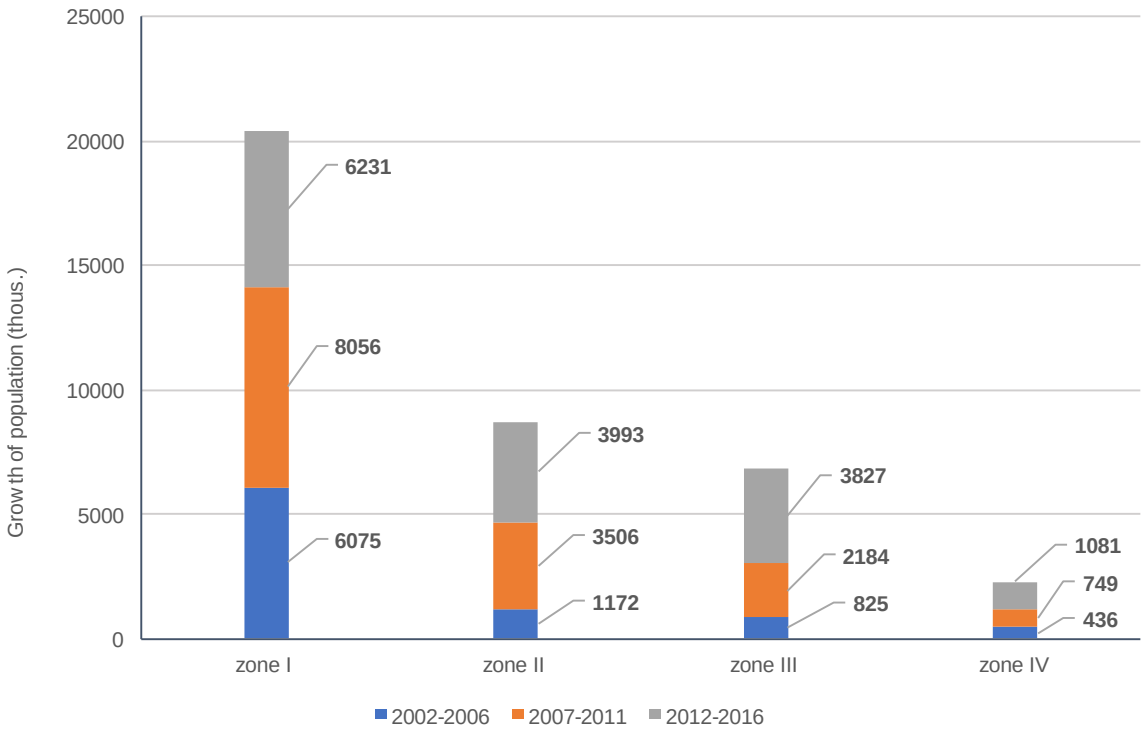


Figure 21. Changes in population between 2012–2016 compared to previous periods (2002–2006 and 2011–2016) by zones

Source: Study of the MBPR on the basis of data of commune offices

Apart from the aforementioned towns near Warsaw, which are characterised by the highest population growth, rural areas along the E75 railway line (west of Wołomin) and villages adjacent to Radzymin stood out when it comes to changes to the spatial distribution of the population during the railway line modernisation. Population growth in the above-mentioned areas is related to the suburbanisation of Warsaw. Location in relation to the capital city and main transport routes/lines, as well as closeness to recreational areas, determine the trends in population growth in the case study area. The wave of the suburbanisation of Warsaw missed Wołomin, in which there was a 2% population decline. Weakening the demographic potential of the county centre – with a simultaneous influx of inhabitants to satellite towns (Ząbki, Marki) – strengthens the monocentric structure of the case study area and the entire Warsaw Metropolitan Area. Between 2012–2016, a population decline was also recorded in the least populated eastern parts, which caused demographic polarisation in the case study area to deepen.

Changes in the population, an increase in urban areas, and the nature and intensity of residential systems had an impact on population density in the case study area.

In 2016, population density in built-up and urban areas was 30 people per hectare. The highest values of population density (30–66 people per hectare) were recorded in the communes near Warsaw (the Rembertów district of the capital city of Warsaw, Ząbki, Marki, Zielonka, Kobyłka, Wołomin), while the lowest ones (13–17 people per hectare) were found in rural communes (Poświętne, Zabrodzie, Dąbrówka).

In areas located in the zones determined by the distance from the E75 railway line, population density, analogous to population, increased along with the reduction of the distance from the line and amounted to: in zone 1 – 40 people/hectare; in zones 2 and 3 – 20 and 26 people/hectare respectively; and in zone 4 – 12 people/hectare.

When it comes to the spatial distribution, areas with considerable population density (over 20 people/hectare) – apart from the suburbs of Warsaw – were also located along the E75 railway line and in some towns belonging to the Poświętne commune (next to railway line no. 13). The lowest population density (up to 10 people/hectare) was recorded in villages, in particular those situated in the Dąbrówka commune.

Between 2012–2016, population density in the case study area went down by 1.7 people/hectare. The highest population density decline was noted in the Zielonka (-6 people/hectare) and Wołomin (-4 people/hectare) communes and in the Rembertów district of the capital city of Warsaw (-3 people/hectare), while the only one commune that recorded population density growth was Radzymin (1 person/hectare). The value of population density did not change in Ząbki and Marki.

In zones 1–4, a population density decline was recorded in three zones, which are located in the closest vicinity of the E75 railway line, i.e. in zone 1 (-3 people/hectare), in zone 2 (-1 person/hectare), and in zone 3 (-10 people/hectare). The greatest deviation of population density between individual territorial units in the zones concerned zone 1 (standard deviation – 1.44 people/hectare) and zone 2 (1.39 people/hectare) due to the fact that these zones feature a great number of different areas: urban, urban-rural, and rural. The value of population density in zone 4 did not change.

The analysis of the data on changes in the population, on the increase in building land, and on dominant single-family buildings, which were built after 2012, shows that the areas in which there was a population density decline have a higher demand for new investment areas compared to available supply; this demand is expressed by population. Population density growth in territorial units belonging to the Radzymin commune resulted from higher population growth (25%) compared to the increase in investment areas (18%). However, the pace of population density growth in this commune was relatively slow (4%), which is reflected by, for example, a high dispersion of buildings there.

Conclusions:

1. Population distribution in the case study area (including the railway line modernisation period) is considerably affected by Warsaw and location in relation to transport routes/lines (e.g. the E75 railway line), which were shaped throughout history and provide access to the capital city.
2. During the E75 railway line modernisation:
   - demographic processes (population growth in the areas with the highest population density and a population decline in the eastern – least populated – part) caused considerable socio-economic differences in the case study area;
   - due to the fact that towns (areas with the highest population) are located close to the modernised E75 railway line (zones 1–3), the intensity of the changes in the population increased along with the reduction of the distance from the railway line in question;
   - apart from the towns located within a 25-km radius of Warsaw, the most noticeable demographic changes also took place along national road no. 8, especially in the Radzymin commune, which results from the fact that suburbanisation processes shifted from the communes near Warsaw (Ząbki, Marki, Zielonka, Kobyłka, Wołomin) to more attractive areas with higher greenfield reserves as well as from the growing impact of this road on the settlement processes in the case study area.
3. Prior to the E75 railway line modernisation and during it, the demographic processes analysed in the communes belonging to the case study area were stable apart from the

Radzymin commune, in which there was considerable population growth during the railway line modernisation.

4. Based on the demographic changes examined prior to and during the implementation of the railway investment, it cannot be clearly stated whether these processes occurred as a result of the railway line modernisation as far as the zones determined by the distance from the railway line are concerned. They solely made it possible to identify the part of the area with the greatest intensity of the studied phenomena. There was no constant population growth during the three analysed periods. The highest population growth was between 2007–2011, while there was a considerable decline in population growth in each zone during the railway line investment. The highest decline was recorded in zone 1, while the smallest in zone 3, which may be associated with the shift of suburbanisation processes to the areas located in the north-eastern part of the case study area.

3.2.2. Economic situation

The number of national businesses entered into the National Official Business Register (REGON) is an important indicator of economic potential and the level of entrepreneurship. 33,100 unevenly spread business entities operated in the case study area in 2016. The highest concentration of business entities is found in the communes near Warsaw – Wołomin (6,500), Ząbki (5,400), and Marki (4,300), while the lowest economic activity is recorded in rural communes (Dąbrówka, Zabrodzie, Poświętne), in which the number of business entities is between 400–700. Over 70% of companies are focused on commercial and service activities, while half of them are associated with specialised services oncentrated in the suburbs of Warsaw. Business entities associated with industry and construction, which make up 23% of all companies in the case study area (including 7% belonging to the transport and storage section), are mainly located in peripheral areas – rural communes of the case study area. All business entities in the case study area are considered small-sized enterprises – employing fewer than 50 people.

To analyse the level of entrepreneurship in detail, business entities of natural persons (individual entities) registered in Central Registration and Information on Business (CEIDG)[31] and classified under the 2007 Polish Classification of Business Activity (the PKD 2007). These are the only available data concerning business entities aggregated at a territorial unit level.

In 2016, 16,700 business entities of natural persons operated in the case study area, 80% of which were registered in or after 2000. Between 2000–2016, the number of companies in individual communes in the case study area was on a steady rise (Figure 22). The highest number of new companies was set up in the communes near Warsaw (Ząbki, Marki, Wołomin) – 6,800 in total, while the lowest level of entrepreneurship in the analysed period was recorded in rural communes, in which a total of 1,100 companies were established.

In 2016, the vast majority of business entities of natural persons operated within a 3-km distance of the railway line (in zone 1) – 11,500 (68.7%), 10,100 of which operated in towns. In zone 2, the number of operating business entities was almost 4 times lower – 2,900 (17.6%), 2,400 of which in towns. The number of business entities went down in the remaining zones. This number was 1,700 (9.9%) and 600 (3.8%) in zone 3 and 4 respectively. The aforementioned data reveal that companies were set up near the studied railway line, while the majority of them operated in urban areas – due to better transport accessibility and a larger outlet compared to rural areas.

[31] These data do not refer to national businesses registered as commercial and private companies, foundations, and associations.

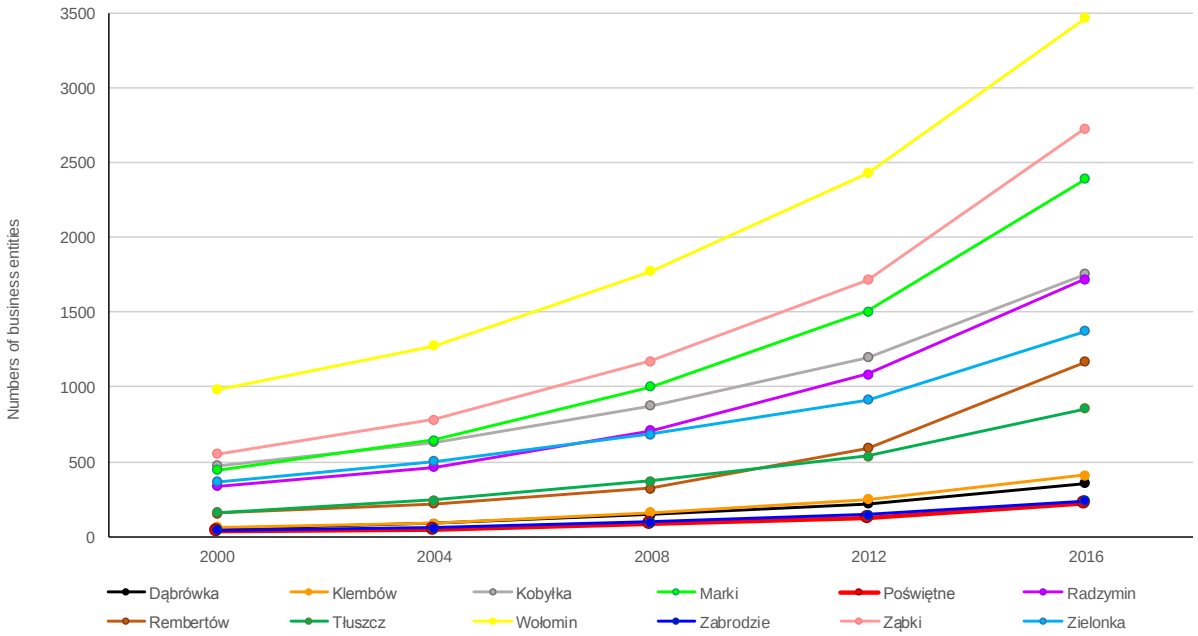


Figure 22. Number of registered business entities of natural persons between 2000–2016 by communes

Source: Study of the MBPR on the basis of data of Central Registration and Information on Business

Most business entities are located in the suburbs of Warsaw – 14,200 of all individual companies in the case study area, while the majority of them (77.8%) have their registered office in towns (Marki, Ząbki, Zielonka, Kobyłka, Wołomin, Radzymin) and in the Rembertów district of the capital city of Warsaw. Apart from the above-mentioned urban centres, the number of business entities did not exceed 500 in any territorial unit. Apart from the suburbs of Warsaw and when it comes to spatial distribution, there is a clear band-shaped strip of companies (over 20 business entities) along the E75 railway line and in single territorial units situated along the national road and north of Radzymin (Figure 23).

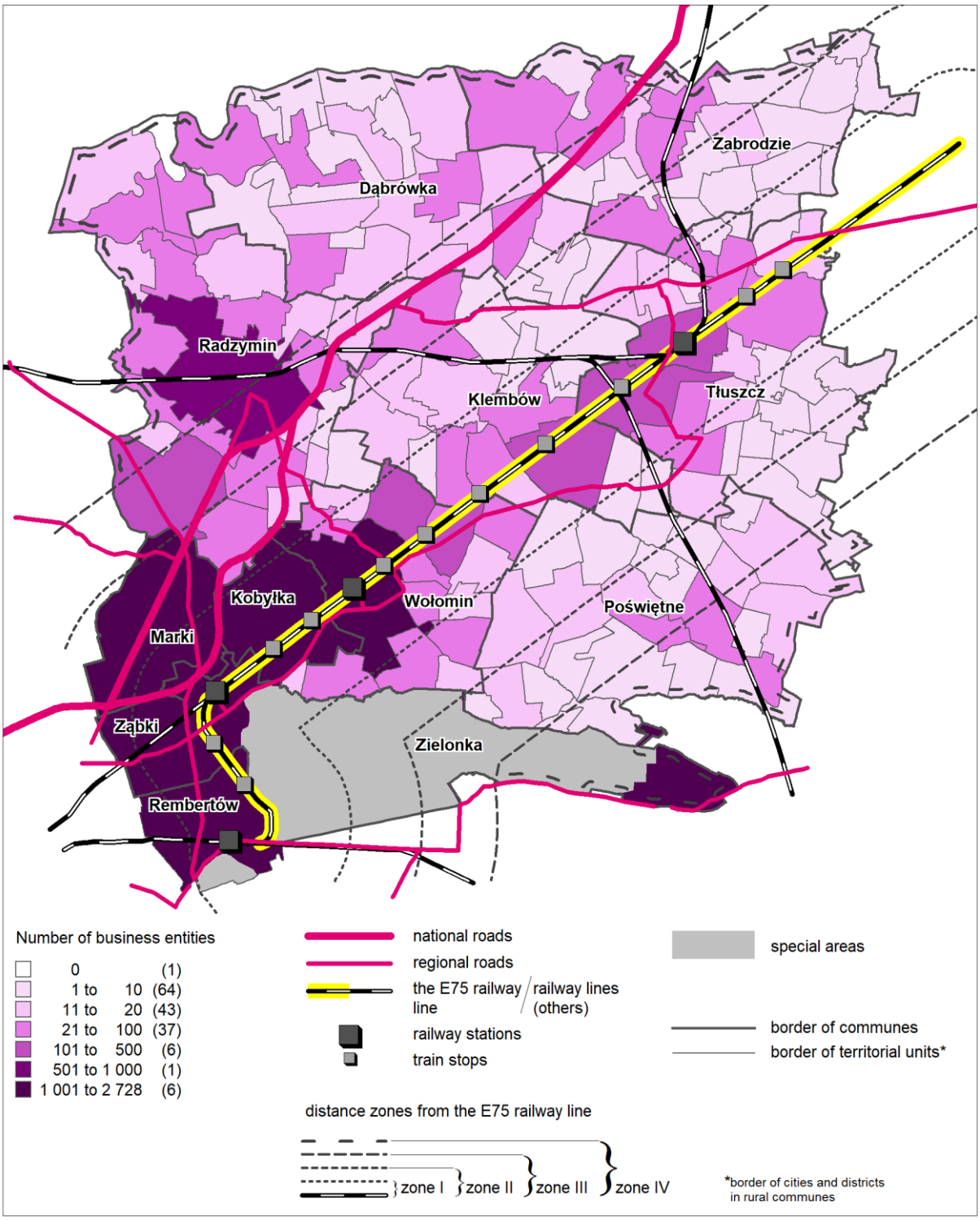


Figure 23. Number of registered business entities of natural persons in 2016

Source: Study of the MBPR on the basis of data of Central Registration and Information on Business

During the railway line modernisation, the number of business entities of natural persons went up by 6,900. The highest increase was noticed in the Wołomin and Ząbki communes (by 1,200 each) and in Marki (1,000).

Between 2012–2016, the highest number of companies were set up in zone 1 – 4,600. As the distance from the E75 railway line decreased, the number of registered companies went down sharply. The most considerable (4-fold) difference was recorded between zone 1 and 2. Compared to the years prior to the investment implementation – the period during which the

E75 railway line was modernised was characterised by the highest number of registered companies of natural persons, i.e. twice as many companies were established in each zone compared to the years prior to the modernisation. However, the analysis of the increase in the number of business entities between the three analysed period reveals that their number was on a steady rise – a twofold increase in each zone (Figure 24).

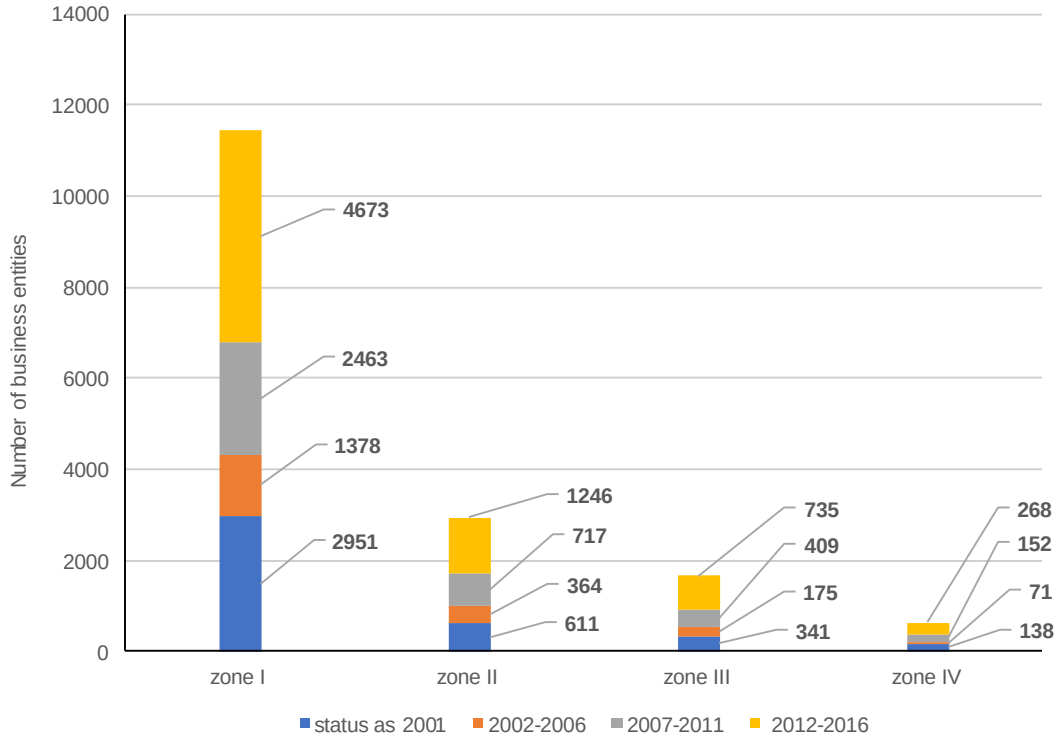


Figure 24. Number of registered business entities of natural persons in 2001 and the increase in the number of business entities between 2002–2006, 2007–2011, and 2012–2016 by zones of distance from the E75 railway line

Source: Study of the MBPR on the basis of data of Central Registration and Information on Business

During the individual analysed years, there was a systematic increase in the number of new business entities of natural persons. The vast majority of them were founded in zone 1, which is highly urbanised. In 2014, there was a slower increase in the number of business entities in zone 1 and 2. However, it is difficult to link it to the E75 railway line modernisation because even though intense construction works were carried out in 2014, they were continued in the following years, during which, in contrast, the number of companies went up considerably (Figure 25).

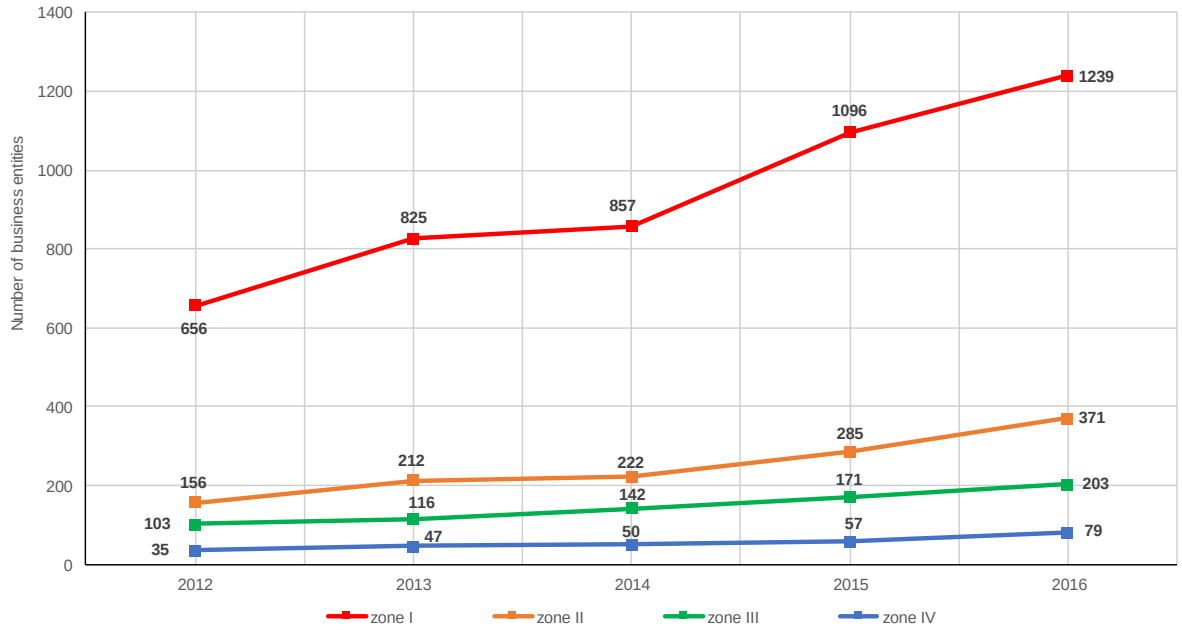


Figure 25. Number of registered business entities of natural persons between 2012–2016 by zones of distance from the E75 railway line

Source: Study of the MBPR on the basis of data of Central Registration and Information on Business

During the railway investment implementation, the highest economic activity was recorded in Ząbki and Marki (over 1,000 registered business entities of natural persons). In addition, a high level of entrepreneurship was seen in Kobyłka, Wołomin and the Rembertów district of the capital city of Warsaw (over 500 business entities). Apart from the aforementioned towns, the areas that stood out in terms of the number of new companies (over 10) are territorial units situated east of the Wołomin town, along the E75 railway line and north of Marki, along national road no. 8 (S8), as well as near railway line no. 29 (Figure 26).

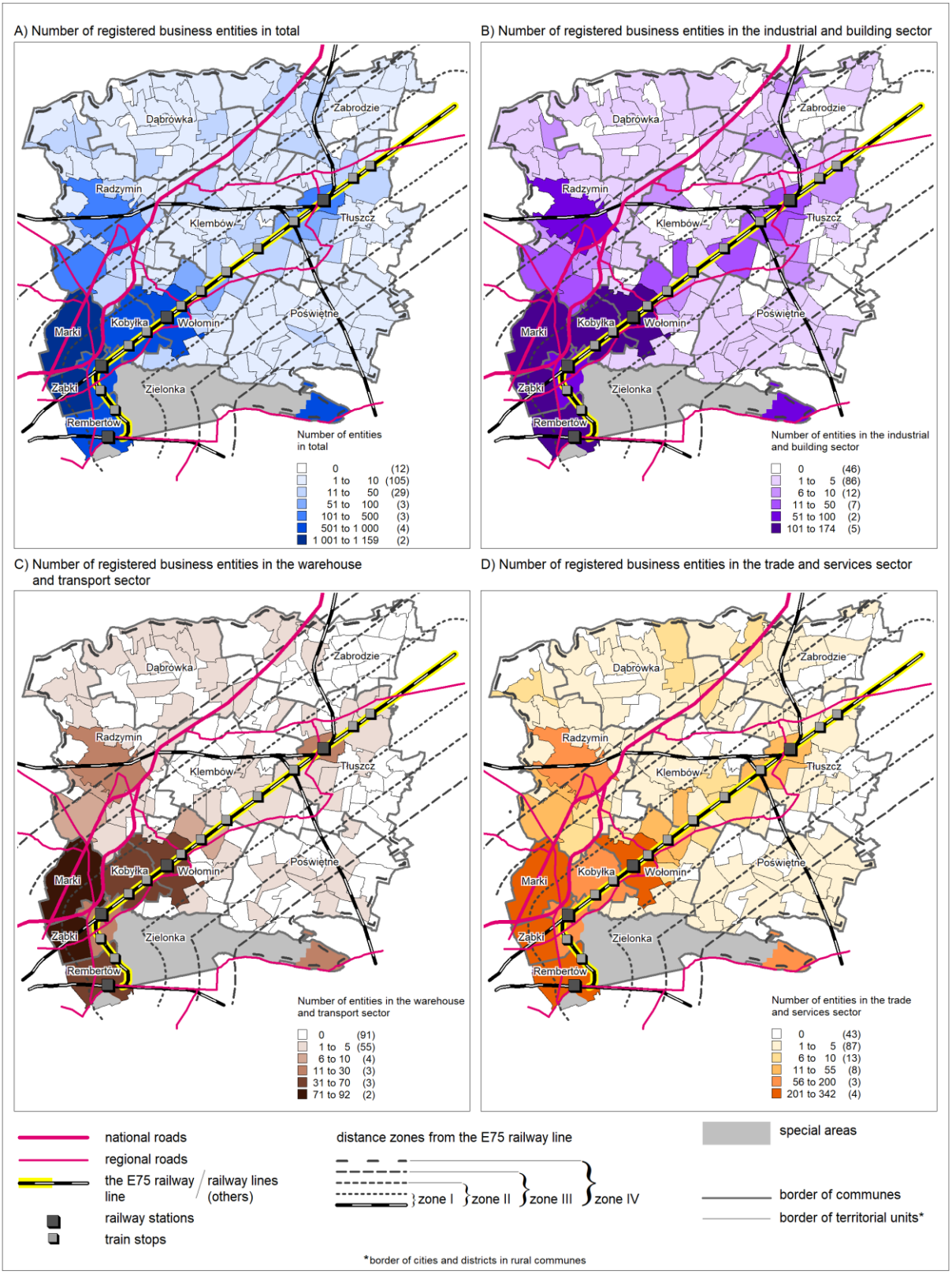


Figure 26. Number of registered business entities of natural persons between 2012–2016 by PKD sections

Source: Study of the MBPR on the basis of data of Central Registration and Information on Business

To analyse business entities of natural persons by their activity categories, the sections in the PKD 2007 were divided into thematic groups: agriculture (section A), industrial and building sector (sections B-F), warehouse and transport sector (section H), trade and services sector (sections G, I, S, T, U), and specialised services (sections J-R).

In 2016, the case study area was characterised by a high share of services companies (67.5%), which fell under the trade and services section and the specialised services section. In each commune, the share of the services sector was predominant and amounted to over 50% of business entities in operation, while this share was over 50% in Zielonka, Ząbki and the Rembertów district of the capital city of Warsaw. Specialised services were primarily located in towns located as near the capital city as possible (Ząbki, Marki, Zielonka, and Kobyłka) as well as in the Rembertów district of the capital city of Warsaw – the share of over 35% in the PKD 2007 structure. Business entities operating in industrial and building sector were prevalent in rural communes of the case study area and in the Tłuszcz commune (over 30%). Companies specialising in warehouse and transport operated in each commune, while the highest – 10% – share of such companies was recorded in the Dąbrówka and Poświętne communes (Figure 27).

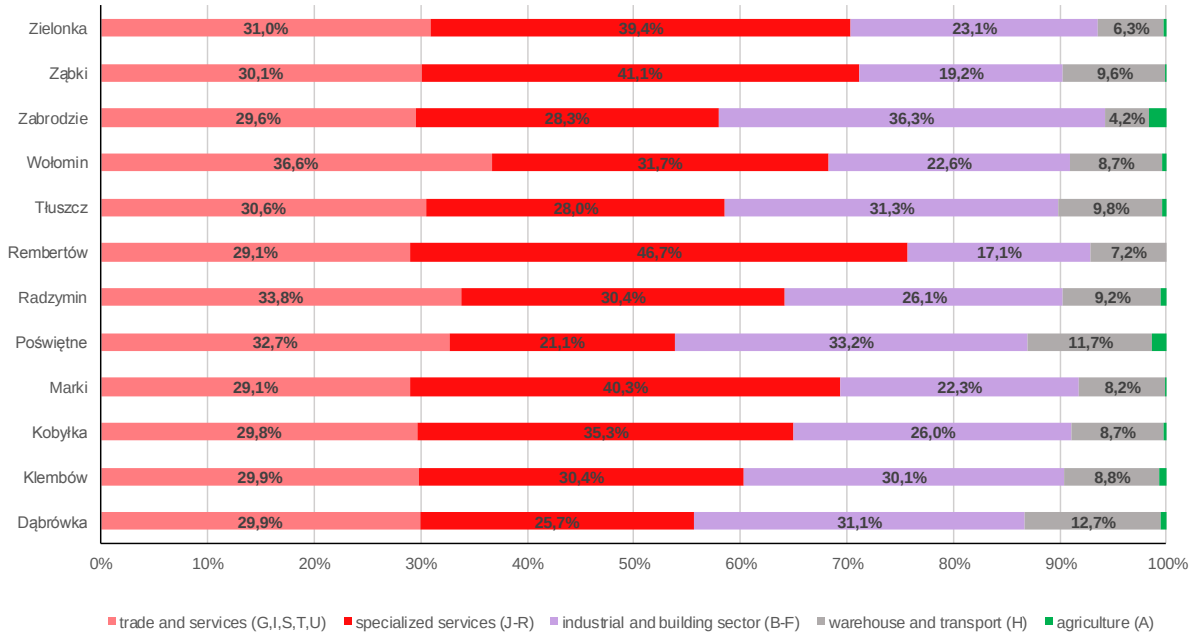


Figure 27. Share of registered business entitites of natural persons in PKD 2007 sections by communes in 2016

Source: Study of the MBPR on the basis of data of Central Registration and Information on Business

When analysing economic activity (the number of business entities of natural persons of the PKD 2007 section) in detail during the E75 railway line modernisation, which was examined by zones determined by the distance from the E75 railway line, it was decided to exclude section A (due to a low number of agricultural companies and potential marginal impact of the railway investment on the location of such companies) and sections J-R (due to no aggregate data at a lower level than communal for companies operating in specialised services).

In 2016, the highest number of business entities of the selected PKD 2007 sections was situated as near the studied railway line as possible; this number decreased along with an increase in the distance from the line. Companies operating in trade and services sector were prevalent in each zone. The largest difference in the number of registered business entities in individual zones was recorded between zone 1 and 2 (Figure 28).

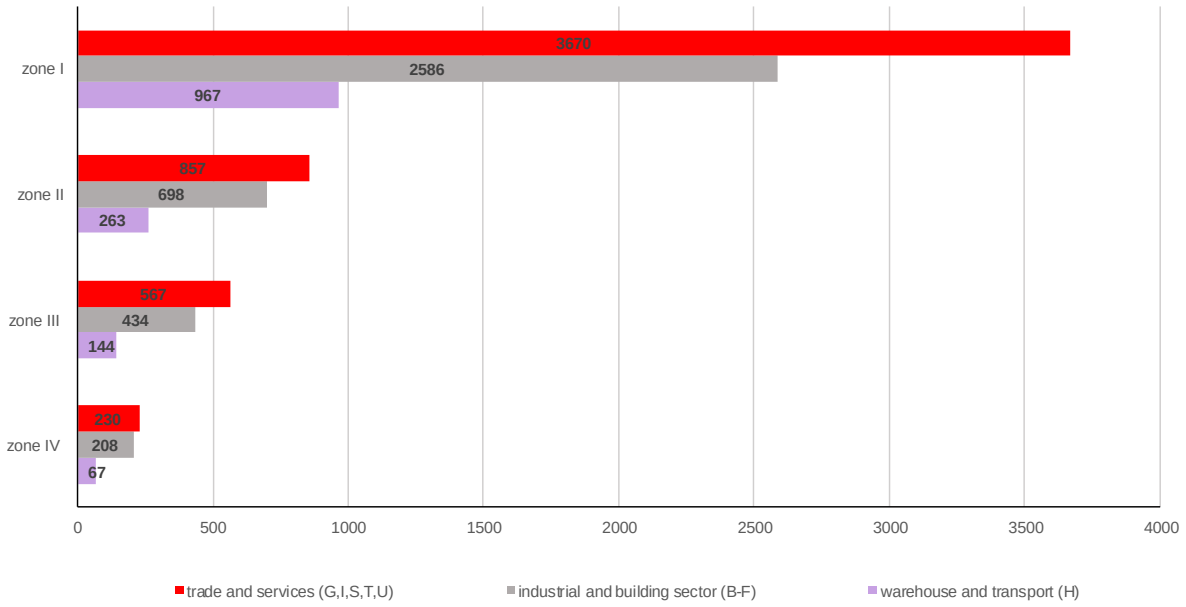


Figure 28. Number of registered business entitites of natural persons in selected PKD 2007 sections in 2016 by zones of distance from the E75 railway line

Source: Study of the MBPR on the basis of data of Central Registration and Information on Business

In the period between the E75 railway line modernisation and 2007–2011, there was a 20% increase in the number of registered service companies and a 7% increase in the number of registered warehouse and transport companies in zone 1 only compared to previous periods. In the remaining zones, the trend of this type was contrary, i.e. there was a smaller increase in the number of registered companies between 2007–2011 and the railway investment implementation period in each of the selected PKD 2007 sections compared to previous periods, i.e. 2002–2006 and 2007–2011 (Figure 29).

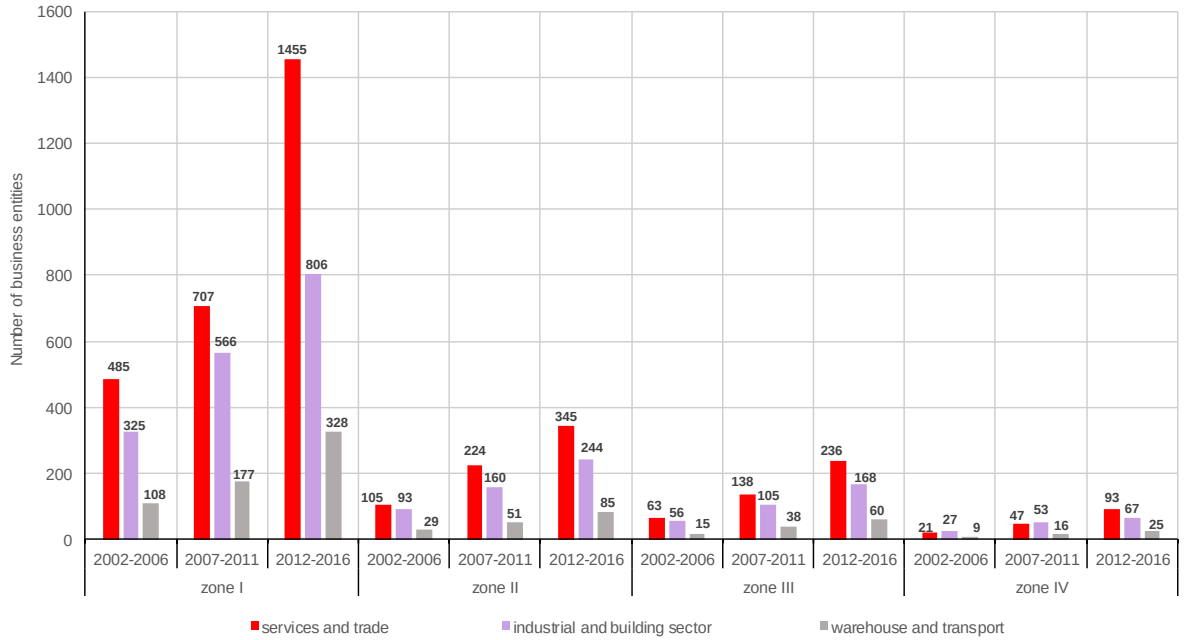


Figure 29. Number of registered business entitites of natural persons between 2002–2006, 2007–2011, and 2012–2016 by zones of distance from the E75 railway line

Source: Study of the MBPR on the basis of Central Registration and Information on Business

Between 2012–2016, 2,100 trade and service companies were founded in the case study area, which amounted to 54% of all business entities of natural persons set up in that period. They were followed by companies operating in industry and construction (1,300) and storage and transport (498). Distribution of companies in each section group was similar, i.e. the highest number of companies were established in towns near Warsaw. What is more, a considerable number of such companies were established in the town of Tłuszcz and in rural areas (territorial units) situated along the E75 railway line and in several territorial units next to national road no. 8 (S8).

Conclusions:

1. The communes near Warsaw – urban centres in particular – feature the highest concentration of business entities of natural persons.
2. Companies operating in services are prevalent in each commune of the case study area.
3. During the E75 railway line modernisation:
   - the highest economic activity was recorded in urban centres situated in the suburbs of Warsaw;
   - the number of new companies of natural persons in the selected PKD 2007 sections increased along with the reduction of the distance from the E75 railway line; companies focused on trade and services were prevalent in each zone;
   - there was a 2-fold increase in the number of business entities of natural persons in each zone in the case study area;
4. In the years prior to the modernisation of the E75 railway line and during it, the intensity of changes in the number of registered business entities of natural persons was on the rise and steady in character. The highest increase in the number of business entities between the analysed periods was in zone 1.
5. Based on the intensity of changes in the number of business entities of natural persons, it cannot be clearly stated whether the increasing economic activity results from the E75 railway line modernisation as it depends on a great number of factors. Transport accessibility and institutional facilities – including access to public services in urban centres – were among the main factors having an effect on the distribution of companies of natural persons both during the railway investment implementation and in the preceding years. The distance from large outlets and access to labour force were also of particular importance; the highest number of companies was established in towns, which have the highest population.

3.2.3. Situation on the real estate market

Apart from the qualities of the property itself (type and size of a plot, legal status, facilities, urbanised area, function and standard of a building or dwelling in case of development plots), it is **location and social, economic, and legal background** that have a considerable impact on real estate trade.

The general socio-economic condition of an area (economic activity level, situation on the labour market, volume of GDP, demographic or family situation, preferred lifestyle), legal factors – that make it possible to specify real estate trade freedom, real estate destination in light of the applicable law (local spatial development plan), form of possession as well as tax provisions and the housing policy in the country have a major effect on real estate management and trade. Location is an equally important factor – location in the settlement

network and transport system. However, real estate prices may also be influenced on purpose – without the effect of market signals.

Determined on the basis of selected economic indicators, the socio-economic tendency in the case study area between 2004–2016 indicates improvements to the general economic situation of this area. Despite the economic crisis of 2008, its symptoms were not noticeable given a decline in the unemployment rate, increase in the number of registered companies and an increase in remuneration and access to housing during the analysed period[32]. This stable socio-economic situation is reflected in the growing number of real estate transactions and marginal fluctuations in real estate prices.

In addition, real estate trade (the number and price of real estate transactions) was also affected by variable credit terms and the following government housing programmes: ”Rodzina na Swoim” (2007–2012) (”A Family in Its Own Home”) and ”Mieszkanie dla Młodych” (2014–2018) (”Apartment for the Young”), thanks to which selected population groups (e.g. young married couples, one-parent families) received apartment contributions.

With regard to location conditions, being located in the Warsaw Metropolitan Area and in the KI international transport corridor (Helsinki–Tallinn–Kaunas–Warsaw) constitutes a significant advantage. A convenient location in relation to Warsaw, which is one of the most important junction points of the settlement network along the route of the aforementioned transport corridor in Poland, ensures that it is possible for finished products or services to be transported to national outlets and those located abroad quickly and for people, e.g. employees, business partners, customers and product and service consumers to move around quickly.

Due to the implementation of construction works in the KI transport corridor between 2012–2016 (E75 railway line modernisation, construction of the Marki ring road – a section of national road no. 8 classified as an express road), accessibility to Warsaw was hindered. However, given the response of the real estate market, which is affected by long-term investment processes in advance, the above-mentioned investments, which would eventually result in the reduction of time required to reach Warsaw, may have had an impact on the real estate transaction prices in the case study area. Future outcomes, of the railway investment in particular, might have been an important factor that influenced changes in the real estate prices in the analysed period.

Between 2012–2016, 10,700 transactions (2,100 per year on average) were made on the real estate market. Purchase/sale transactions made during that period were particularly prevalent in the towns situated in the suburbs of Warsaw, where approx. 81% of all transactions were conducted. The urban communes of Marki and Ząbki saw the highest number of real estate transactions (over 1,500 transactions). Apart from the suburban area, a considerable movement on the real estate market (over 50 transactions) was recorded in territorial units along the main transport routes/lines and in the northern part of the case study area. The lowest number of real estate transactions (1–10 transactions) was noticed in the eastern part of the case study area (Figure 30).

[32] Selected economic indicators and their changes between 2004-2016: unemployment rate (2004 – 10.4%; 2016 - 5.7%); number of registered business entities in the REGON registry (2004 – 23,200; 2016 – 33,100); average gross monthly remuneration (2004 – PLN 2,208; 2016 – PLN 4,121); total number of apartments (2004 – 67,261; 2016 – 88,989).

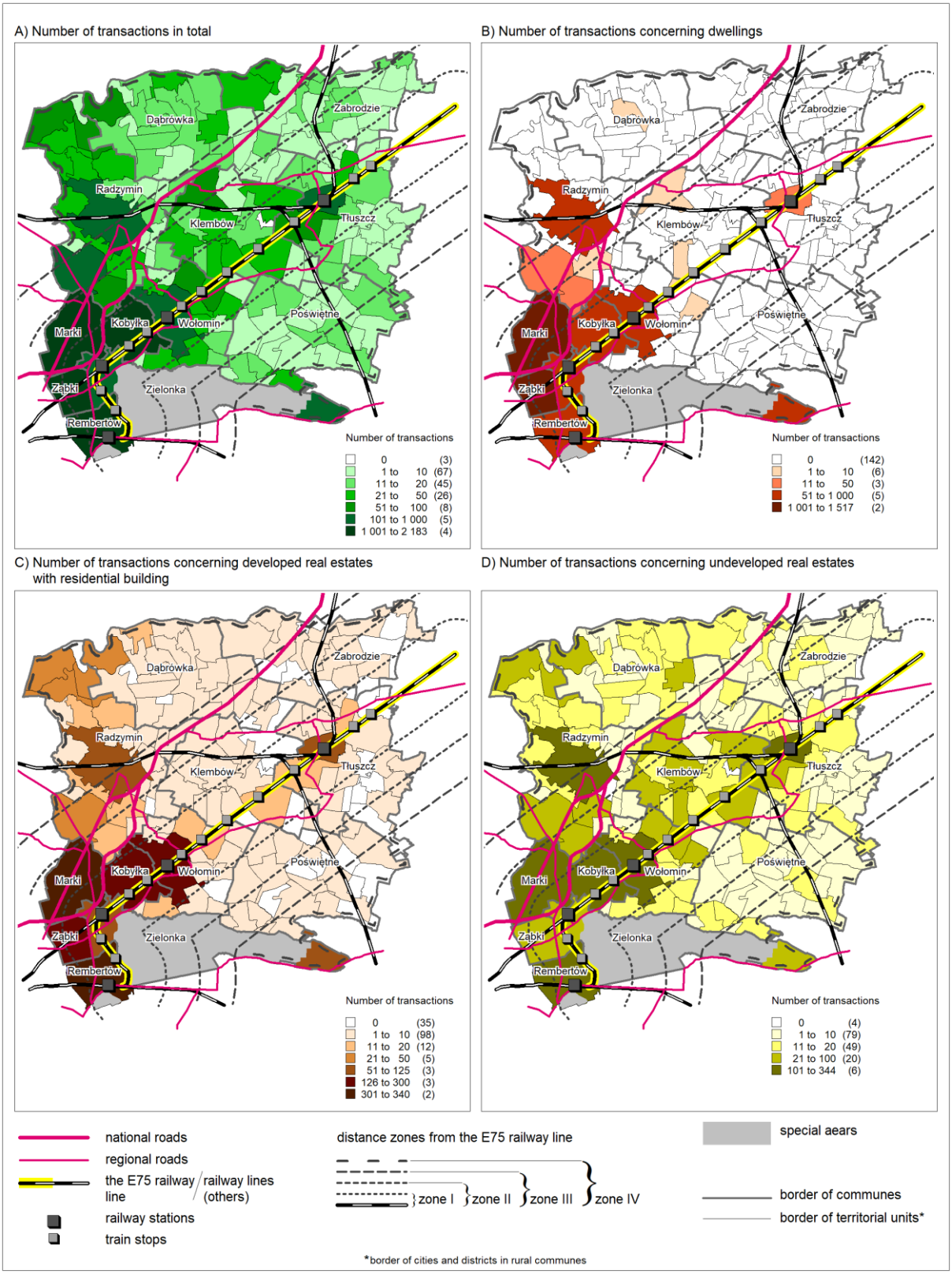


Figure 30. (A-D). Number of real estate transactions between 2012–2016

Source: Study of the MBPR on the basis of data of county offices

When it comes to real estate types: dwellings, developed real estates with residential building, and unbuilt real estates, the highest number of transactions (51%) concerned dwellings (5,500). The vast majority of these transactions took place in the Ząbki and Marki communes (1,500 transactions each), i.e. 69% and 84% of real estate transactions respectively, while the lowest number of these transactions was conducted in rural communes. Transactions concerning unbuilt real estates made up 28% of all transactions carried out in the case study area (2,900). The highest number of transactions of this type was made in urban-rural communes (1,200), while the urban communes of Zielonka and Ząbki saw the lowest number of such transactions. However, the highest share in the structure of the analysed real estate types was recorded in rural communes (70–85%) (Figure 31). The remaining 2,300 transactions involved developed real estates with residential building, and the highest number of them was found in the Rembertów district of the capital city of Warsaw and in Marki.

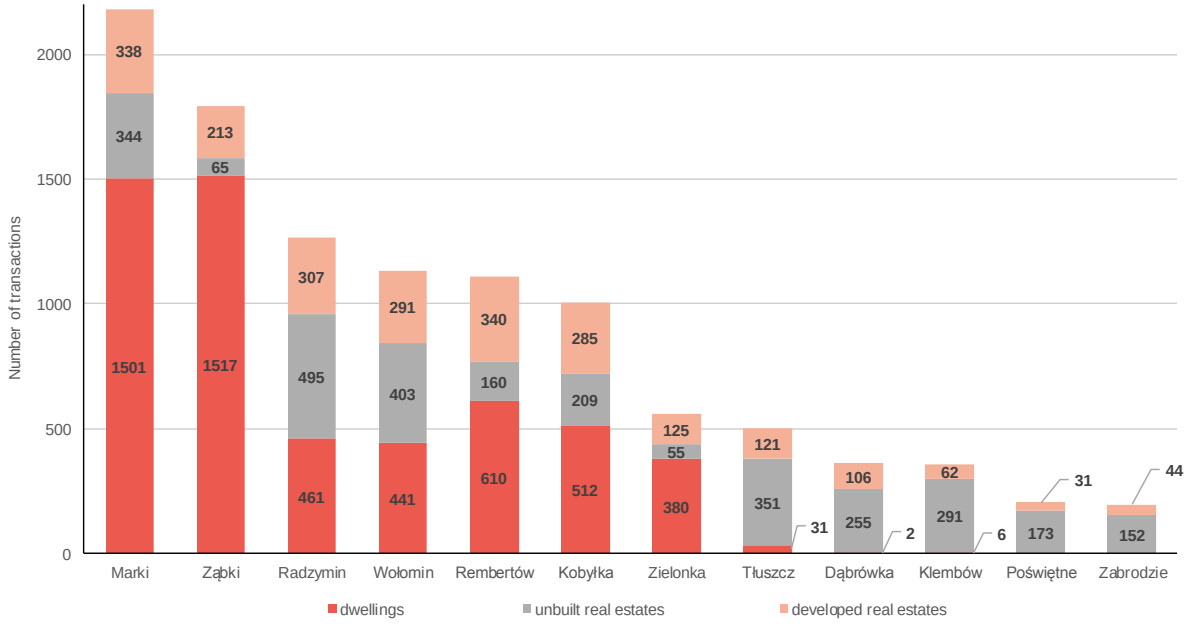


Figure 31. Number of conducted transactions by selected real estate types between 2012–2016 by communes

Source: Study of the MBPR on the basis of data of county offices

In terms of developed real estates with residential building and unbuilt real estates, the spatial distribution of transactions was similar, i.e. the highest number of transactions was made not only in the suburbs of Warsaw (as it was seen for dwellings), but also in areas located along the E75 railway line and in the northern part of the Radzymin commune.

Between 2012–2016, the average prices of selected real estate types in the case study area were as follows: PLN 4,400/m^2 for dwellings; PLN 906/m^2 for developed real estates with 1 residential building[33]; and PLN 138/m^2 for unbuilt real estates. The average prices of each real estate type were higher in the communes near Warsaw, while the lowest prices were recorded in rural areas located peripherally in relation to the main transport routes/lines in the case study area and in the areas located the furthest from Warsaw. The highest transaction prices were seen in the Rembertów district of the capital city of Warsaw, Ząbki, Marki, and Kobyłka, in which real estate prices were generally higher than the average real estate prices for the case study area. Real estate prices in the Klembów, Dąbrówka, and Poświętne

[33] When it comes to the analysis of prices, real estate types characterised by the highest number of completed transactions were considered, which made it possible to distinguish a representative sample. Transactions involving developed land with 1 residential building accounted for 12% of all transactions in the case study area during the analysed period (2012–2016).

communes were almost two times lower than the average real estate prices for the case study area (Figure 32).

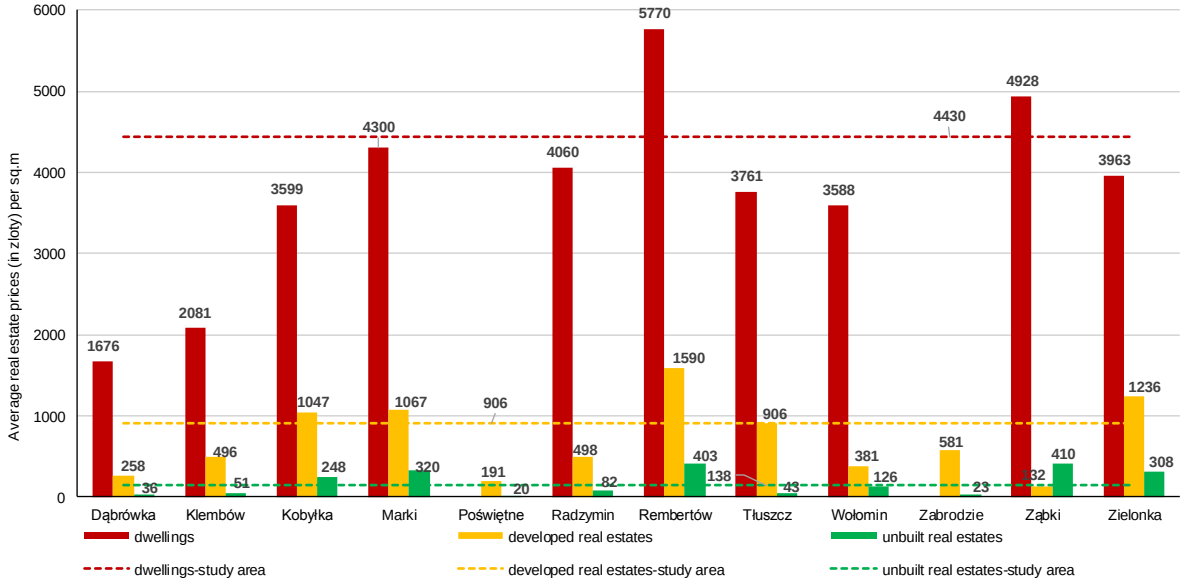


Figure 32. Average transaction prices by real estate types in the communes of the case study area between 2012–2016

Source: Study of the MBPR on the basis of data of county offices

Apart from 2014, the number of real estate transactions in the case study area went up in individual years during which the E75 railway line was modernised. The highest number of real estate transactions was recorded in 2013 and 2015 – 507 and 600 transactions respectively. To consider the reasons for these changes, the housing policy of the government at that time and the policy introduced by financial institutions should be taken into account. In 2013, there was no government programme that would provide contributions towards housing investments; yet, the number of real estate investments went up considerably compared to the preceding year. The cause of a high number of real estate transactions may have lain in beneficial credit terms (low-interest mortgages and no own contribution required). In spite of higher interest rates and the necessity to pay own contribution to a loan[34], the 2015 increase might have been caused by the ”Mieszkanie dla Młodych” programme. Indeed, the highest number of real estate transactions concerned dwellings, for which the government launched the aforementioned purchase/sale programme (Figure 33).

[34] As part of the recommendation of 18 June 2013, the Polish Financial Supervision Authority introduced recommendations concerning mainly the value of the loan-to-value (LTV) ratio, which describes the ratio of a loan to the total appraised value of real property. Therefore, thresholds determining the amount of own contribution, to 20% were indicated in 2017. Since 2014, own contribution has increased by 5% annually.

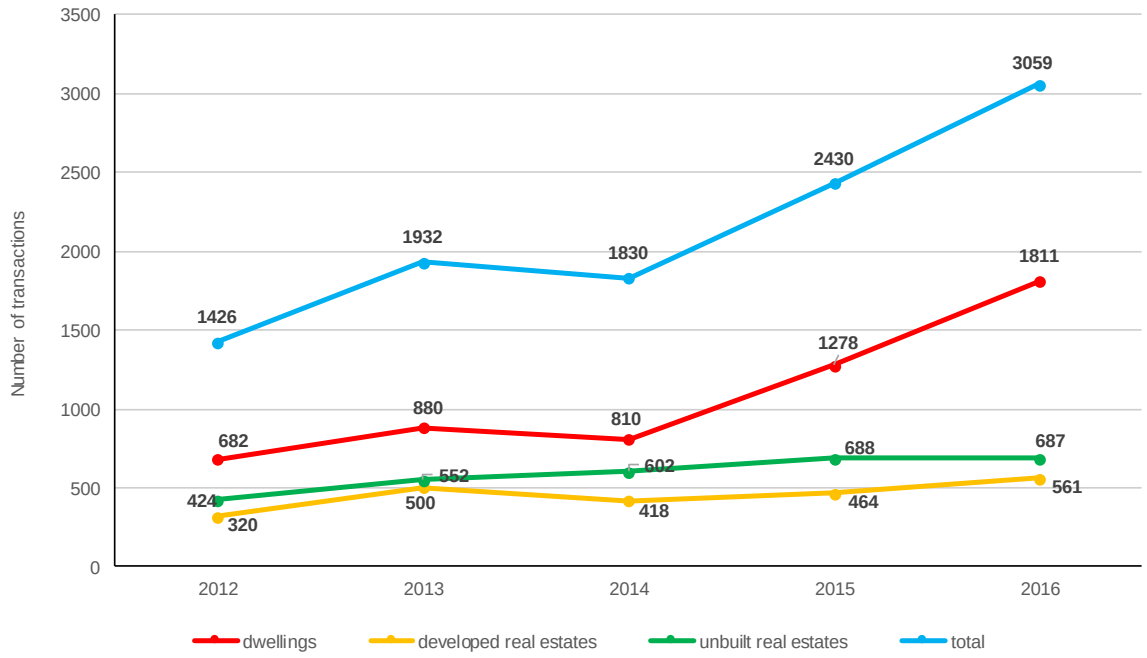


Figure 33. Total number of conducted transactions and the number of conducted transactions by real estates types between 2012–2016

Source: Study of the MBPR on the basis of data of county offices

During the railway investment implementation, there was a decline in the average prices of dwellings. When compared to the data concerning the number of sold dwellings, it is clear that the number of transactions was higher when the transaction prices were lower. The year 2013 saw the most pronounced decline in the prices of dwellings, which may have been caused by, in particular, a high supply of apartments on the real estate market, cheaper loans as well as by the fact that it was the last year during which no own contribution was required. Average prices of developed real estates with residential building were characterised by the largest variability, i.e. the average transaction went down by 22% between 2012–2015 to rise (by 14%) in 2016. On the other hand, prices of unbuilt real estates did not fluctuate considerably in individual years of the railway line modernisation (Figure 34).

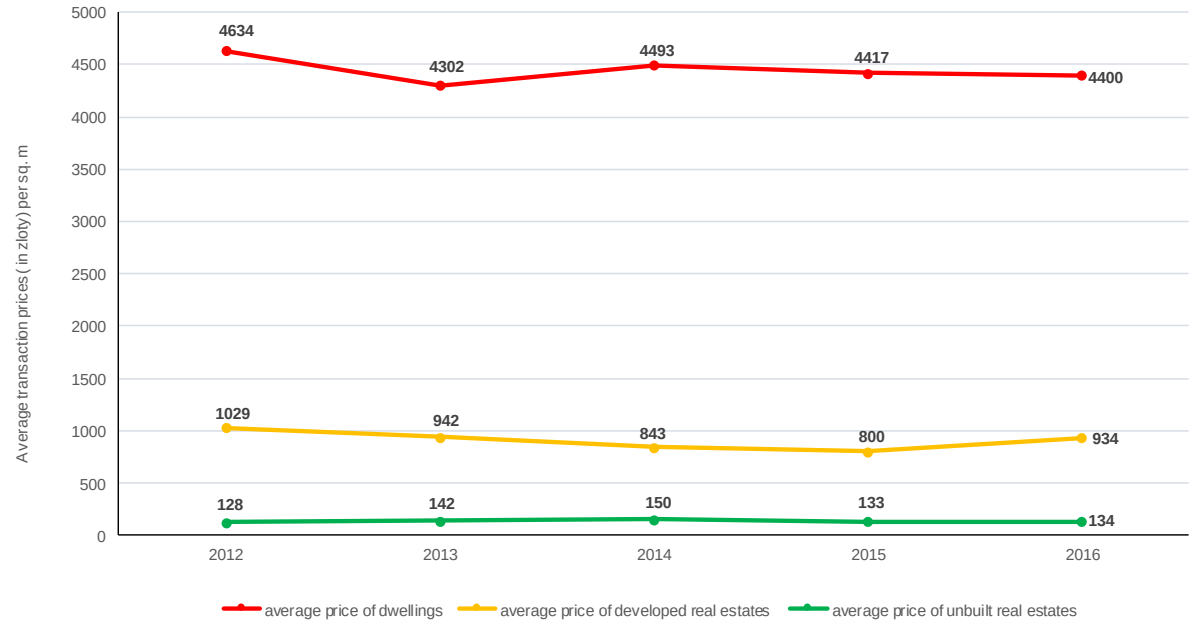


Figure 34. Average transaction price by real estate types between 2012–2016

Source: Study of the MBPR on the basis of data of county offices

During the investment implementation, the number of real estate transactions went up along with the reduction of the distance from the E75 railway line (both in general and for each analysed real estate type). Zone 1 featured the highest activity on the real estate market, i.e. 6,100 transactions, which amounted to 57% of all transactions in the case study area. The number of transactions in zones 2–4 was much lower: 2,700, 1,200, and 800 transactions respectively. The vast majority of transactions in zones 1 and 2 were carried out in towns, in which mainly dwellings were traded (Figure 35). In zones 3 and 4, the highest demand was for unbuilt real estates due to the dominant rural character of the areas located in these zones.

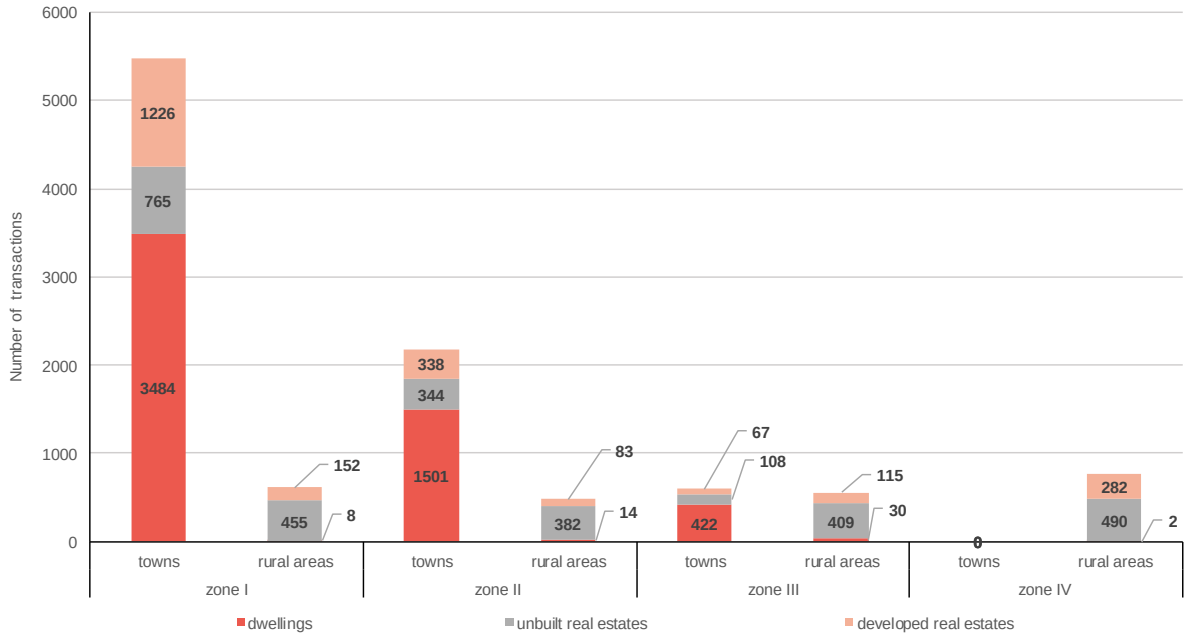


Figure 35. Number of conducted transactions by real estate types by zones of distance from the E75 railway line between 2012–2016

Source: Study of the MBPR on the basis of data of county offices

In individual years during which the railway investment was carried out, the number of real estate transactions was on the rise irrespective of the distance from the E75 railway line (Figure 36). When it comes to the division into real estate types, a noticeable increase in the demand for dwellings and developed land has been observed in zones 1 and 2 since 2014 as these zones have the largest resources concerning dwellings. This increase may be associated with the start of the ”Mieszkanie dla Młodych” programme, the results of which were visible in the following years. Transactions concerning unbuilt real estates were also prevalent in these two zones located near the railway line, but they were sinusoidal in character. A high number of transactions concerning all analysed real estate types near the E75 railway line testify to a considerable attractiveness of the transport line as a place, in the vicinity of which one can live or conduct business activities. The growing interest in the purchase of dwellings and plots recorded during the railway line modernisation may have been reflected in the fact that the railway investment had an impact on the real estate market, which is affected by investment processes of this type in advance.

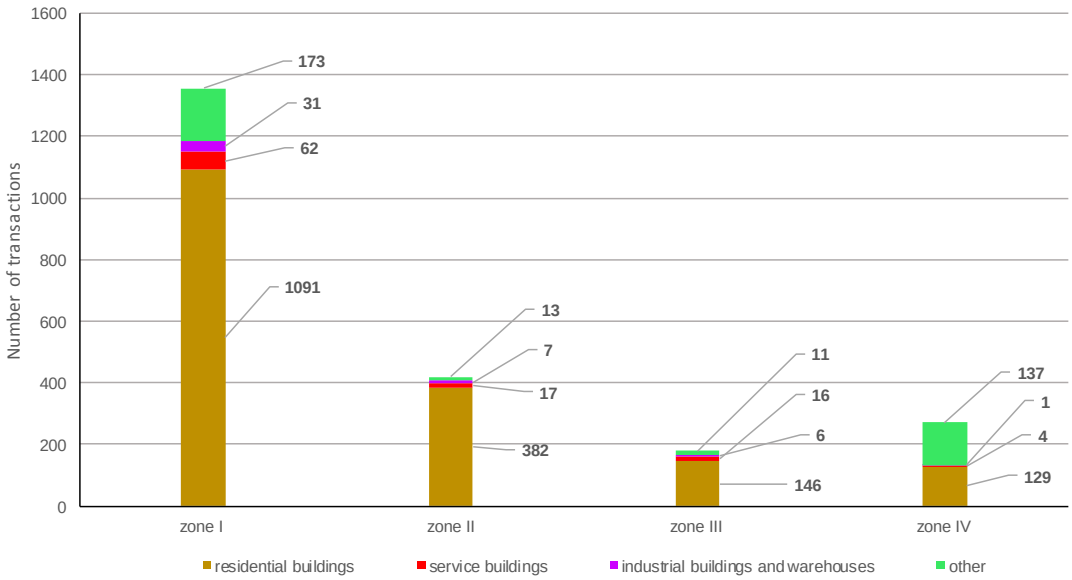


Figure 36. Structure of transactions by real estate types in zones of distance from the E75 railway line between 2012–2016

Source: Study of the MBPR on the basis of data of county offices

As far as the structure of transactions involving developed real estates with residential building was concerned, 77% of them constituted developed real estates with a residential building (or buildings). They amounted to 80–91% of all transactions involving developed real estates with residential building in zones 1–3. A slightly higher number of transactions involving developed real estates non-residential buildings were recorded in zone 4 (Figure 37)[35]. The highest number of transactions in zone 4 – 87% – concerned developed real estates with buildings serving as holiday cottages. Both a higher number of transactions in zone 4 compared to zone 3 and the prevalence of a different type of real estate may result from the tourist attractiveness of the northern part of zone 4. Holiday cottages were traded primarily in the communes of Radzymin and Dąbrówka.

[35] For the purposes of this case study, developed real estates were divided according to the dominant function of buildings, i.e. residential, commercial and service, industrial, storage, and others. Garages, utility buildings, and holiday cottages fell into the ”others” category.

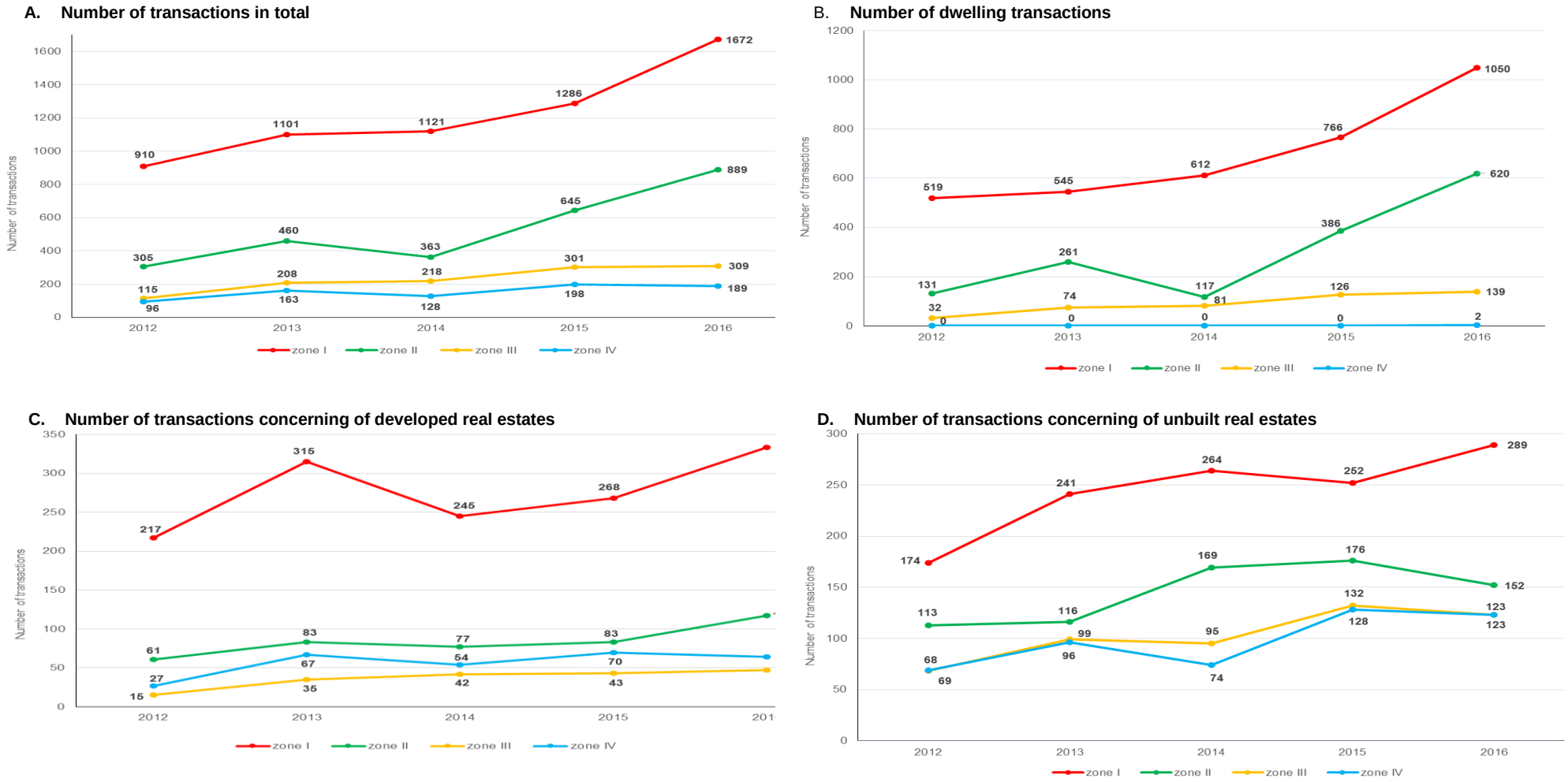


Figure 37 (A-D). Number of transactions by real estate types in zones of distance from the E75 railway line between 2012–2016

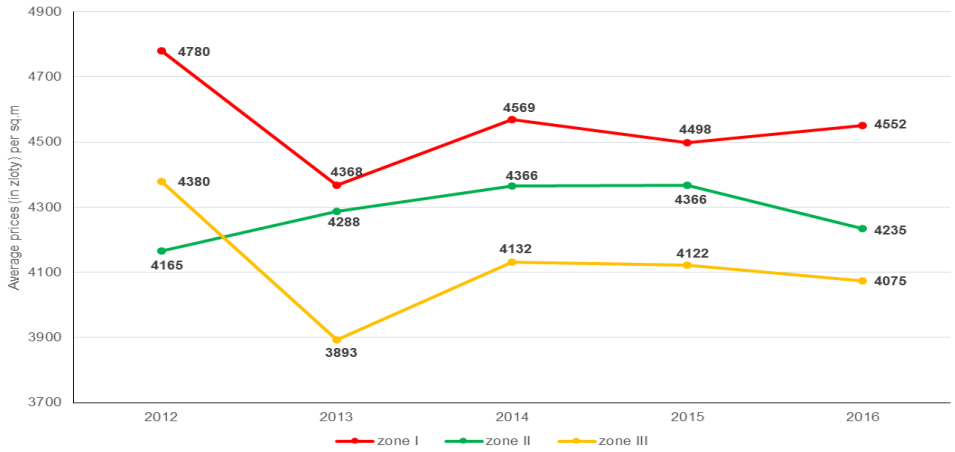
Source: Study of the MBPR on the basis of data of county offices

Zone 1 and 2 featured the highest average prices of the analysed real estate types; however, these prices did not increase evenly along with the progress on the railway line modernisation. Within 5 years of the investment implementation, the years of 2013, 2015, and 2016 were marked with slumps in the real estate prices in the zones located near the E75 railway line. These prices also fluctuated to a considerable degree in case of dwellings and developed real estates with residential building in zone 3. Average prices of real estate involving developed real estates with residential building and unbuilt real estates in zones 1 and 2 were similar and were over twice as high as real estate prices in zones 3 and 4 (Figure 38).

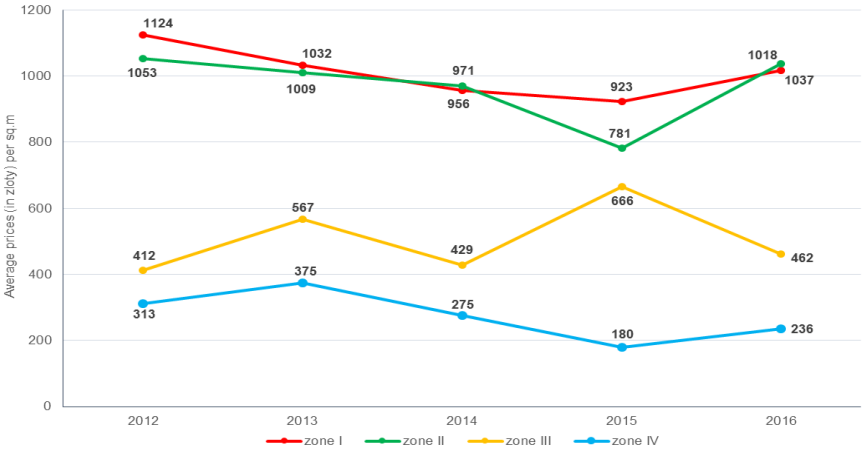
For each analysed real estate type, the highest average transaction prices were recorded in the suburbs of Warsaw. Transactions involving dwellings were mainly made in the western part of the case study area, i.e. in towns and surrounding rural areas. The highest average prices of real estate involving dwellings were found in the Rembertów district of the capital city of Warsaw (PLN 5,800/m^2) and in towns of Ząbki, Marki, and Radzymin (PLN 4,200–4,900/m^2), while the lowest prices, ranging between PLN 1,300 and 2,700/m^2, concerned rural centres[36]. 60% of transactions concerning developed real estates with one residential building were made in 4 towns (Rembertów, Ząbki, Marki, Kobyłka), in which the average building plot prices (PLN 1,000–1,500/m^2) were higher compared to the average for the case study area (PLN 906/m^2). Real estate transactions with prices exceeding PLN 300/m^2 (PLN 301–1,600/m^2) were primarily conducted along the main transport routes/lines, in particular along the entire length of the modernised E75 railway line. As for unbuilt real estates, there was a similar spatial distribution in terms of the highest prices; however, unbuilt real estate prices were several times lower (Figure 39).

[36] Average prices of real estate involving dwellings in rural centres should be considered demonstrative due to a small number of transactions in these villages (there were 1–14 transactions depending on the village).

A. The average prices of dwellings



B. The average prices of developed real estates with residential building



C. The average prices of unbuilt real estates

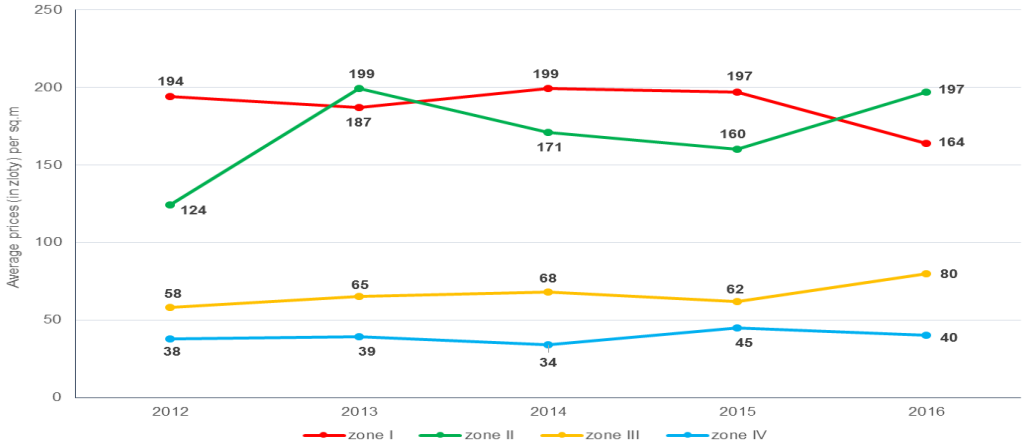


Figure 38 (A-C). The average price of transactions by real estate types in zones of distance from the E75 railway line between 2012–2016
Source: Study of the MBPR on the basis of data of county offices

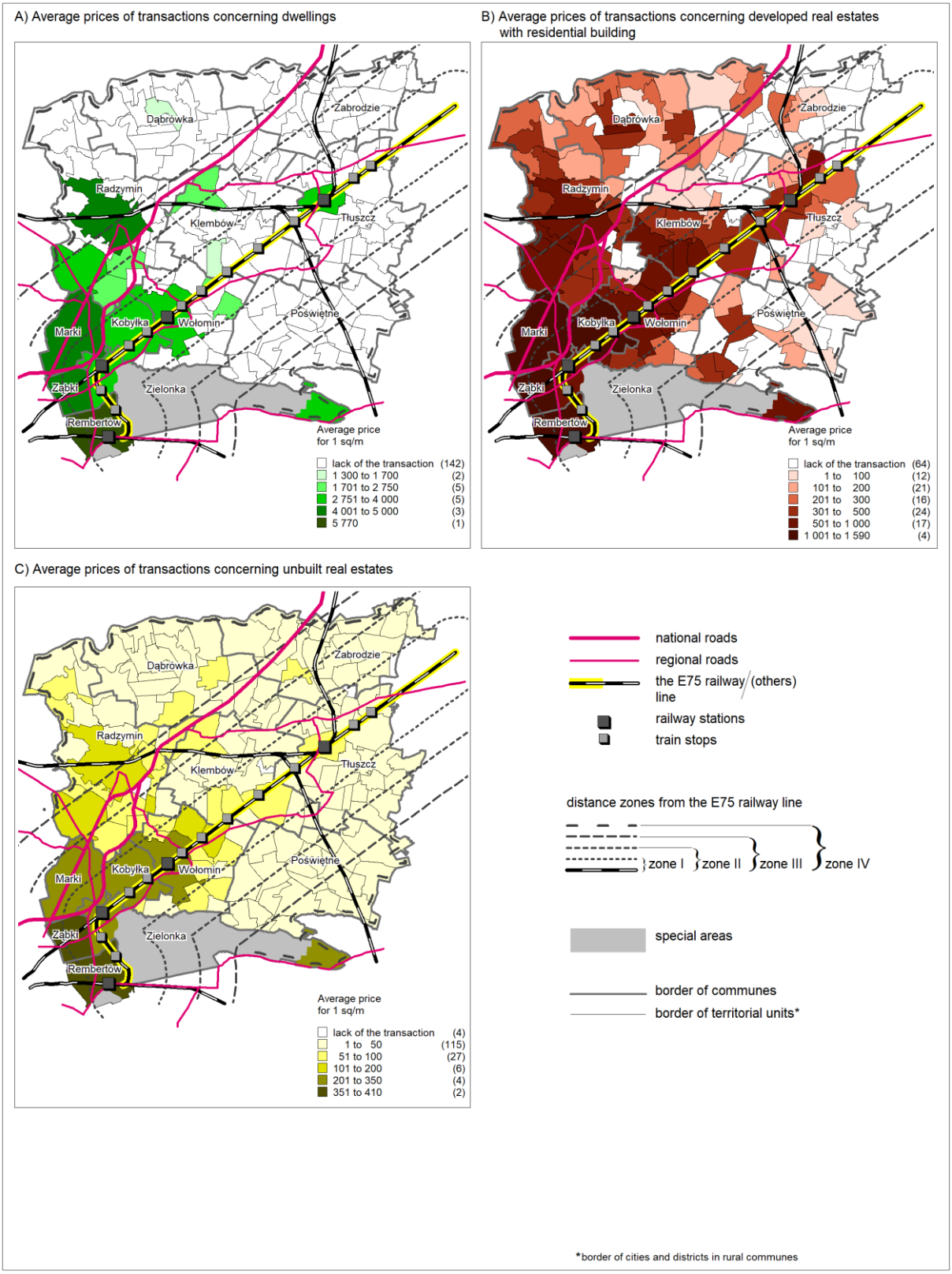


Figure 39. (A-C). Average transaction prices of selected real estate types between 2012–2016

Source: Study of the MBPR on the basis of data of county offices

Conclusions

1. During the E75 railway line modernisation:
   - there were more real estate transactions, but this increase was not steady in character, which may have been caused by, for example, changes in the housing policy of the government and credit terms of financial institutions;
   - there was no upward trend in average real estate prices – they fluctuated during the individual years of the railway line modernisation irrespective of the distance from the line;
   - the intensity of the processes occurring on the real estate market was greatly dependent on the location in relation to Warsaw and the major transport routes/lines in the case study area:
     - the highest number of real estate transactions and their highest prices were recorded in the Rembertów district of the capital city of Warsaw and in rural centres located in the suburbs of Warsaw, the majority of which belong to zone 1 or 2 (which depended on the distance from the E75 railway line);
     - considerable changes (high real estate prices and a high number of such transactions) were noticeable in the Radzymin commune (zones 3 and 4), along national road no.8 and in its northern part – in areas attractive to tourists.
     - the highest real estate prices in towns are dictated by the highest supply of dwellings, while transaction prices were several times higher compared to the remaining real estate times analysed (developed real estates with residential building and unbuilt real estates).
2. Changes in the real estate market during the analysed period were the outcome of socio-economic processes, spatial phenomena shaped throughout history (location of the main urban centres along the E75 railway line), the legal situation in real estate trade, implementation of the national housing policy, credit terms of banks, activities of the Polish Financial Supervision Authority; in addition, they might have been caused by the ongoing investment processes in the field of transport – the E75 railway line modernisation. It is impossible, however, to evaluate the impact of one single railway investment on the real estate market, the changes of which are dependent on a series of long-term actions and processes occurring in the area. Still, the growing interest in the purchase of dwellings and plots during the railway line modernisation may be reflected in the fact that the railway investment might have had an impact on the real estate market, which is affected by investment processes of this type in advance.

3.3. Transport

3.3.1. Passenger rail transport on the E75 railway line

3.3.1.1. Transport offer

The transport offer in the field of railway stations and stops in the case study area was analysed. The analysis included the offer of Koleje Mazowieckie (KM), which operates regional and agglomeration railway lines at the request of the Sejmik of the Mazowieckie Voivodeship as an organiser of public transport in the entire voivodship. It was carried out at a 1-year interval between 2011–2018 (Table 7).

Due to the course of railway line no. 6 (E75), the majority of KM trains in the case study area end their courses at the Warszawa Wileńska terminus. Access from this terminus to the

Warsaw city centre is provided by a rapid transit line. The connection with the main transport nodes – the Warszawa Centralna railway station and the Warszawa Zachodnia railway and bus station leaves a lot to be desired: extra changes are required to reach them from the aforementioned metro line. Changes are not required in case of a direct railway connection to reach the cross-city railway line; however, the number of trains that go there is much lower.

Table 7. Number of passenger connections between Warszawa Wileńska – Mokra Wieś

No.	Timetable	Number of connections
1	2010/2011	19
2	2011/2012	23
3	2012/2013	23
4	2013/2014	18
5	2014/2015	16
6	2015/2016	20
7	2016/2017	21
8	2017/2018	23

Source: Study of the MBPR on the basis of Koleje Mazowieckie timetables

Between 2011–2014, the number of connections from Tłuszcz to the Warszawa Wileńska railway station was approx. 50 per day, 20 of which reached the Mokra Wieś railway stop, which is the last stop in the case study area. In addition, there were approx. 10 extra connections from the Wołomin Słoneczna railway stop. This distinction may be conventionally applied to the division between regional and agglomeration railway operation. Due to modernisation works on railway line no. 6, the lowest service level was recorded in 2016: only approx. 25 trains from Tłuszcz and approx. 20 extra trains from Wołomin. On the other hand, the number of trains that go to Tłuszcz did not change considerably; the number still oscillated around 20. The fact of a higher number of agglomeration trains compared to regional ones, which would continue in the subsequent periods, is pointed out. That is, the number of connections from Tłuszcz has been just under 50 since 2017, so it is slightly lower than prior to 2014. On the other hand, the number of connections from Wołomin went up substantially – to almost 80, which is just under 20 more than during the aforementioned previous period. The number of connections that go beyond Tłuszcz is similar and amounts to 23 in 2018 (Figure 40).

The number of connections between railway line no. 6 and the cross-city railway line was considerably lower regardless of the period (Figure 41). Up to 2013, only trains from Wołomin reached the Warszawa Śródmieście railway stop. The number of connections from Wołomin to Warszawa Śródmieście and vice versa was 9–10 per day. Between 2014–2015, the aforementioned relations ceased to be operated entirely. Since 2016, there have been connections not only from Wołomin, but also from Tłuszcz. The number of such trips was the highest in March 2017; it included 6 trips from Tłuszcz and 3 extra trips from Wołomin. In the current period, the number of trips is between 5–6 from Tłuszcz and 1 extra from Wołomin.

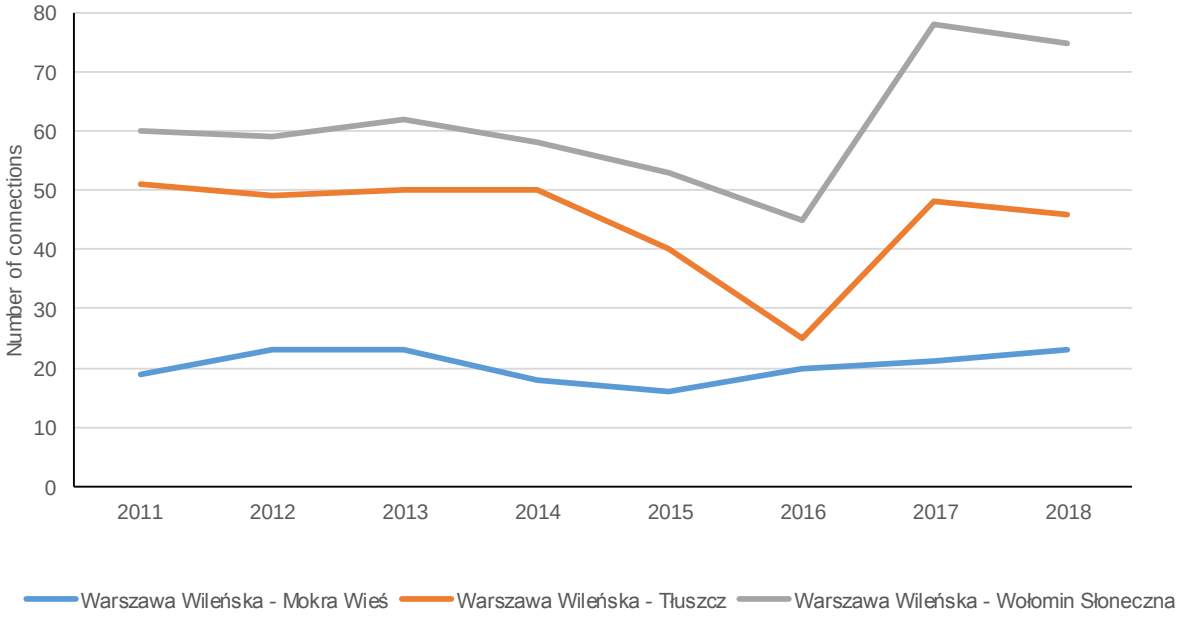


Figure 40. Number of connections between Mokra Wieś–Tłuszcz–Wołomin–Warszawa Wileńska per day

Source: Study of the MBPR on the basis of Koleje Mazowieckie timetables

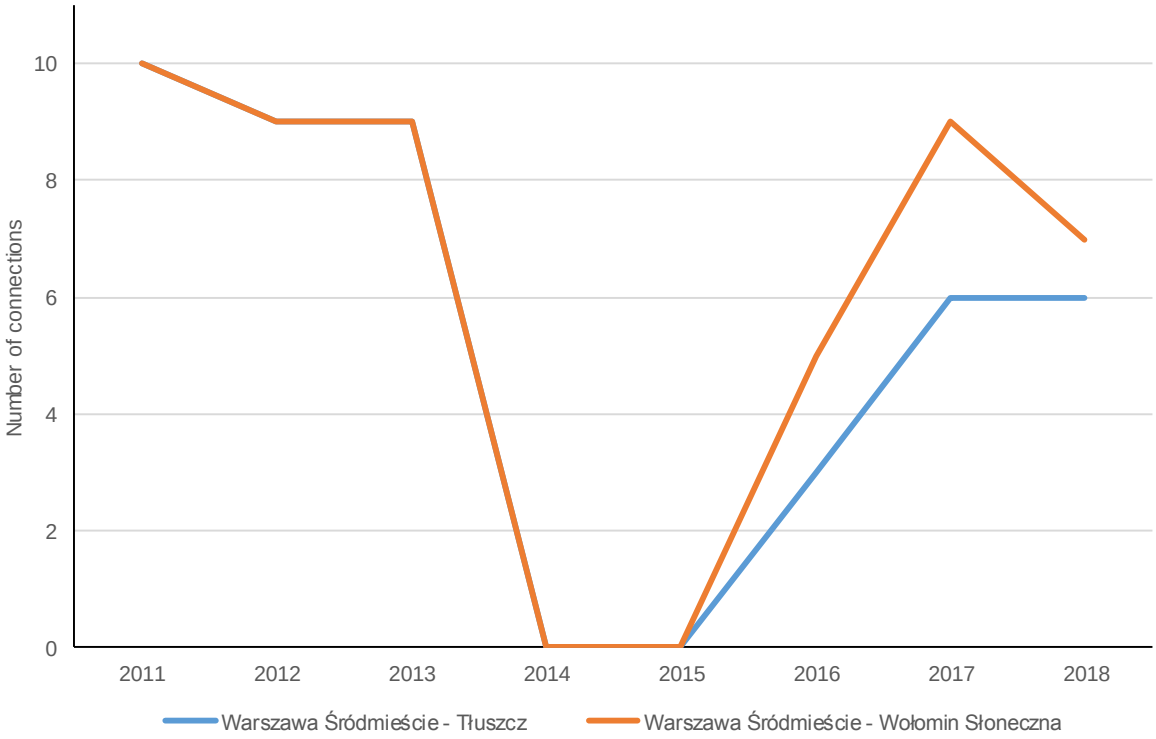


Figure 41. Number of connections between Warszawa Śródmieście – Tłuszcz/Wołomin per day

Source: Study of the MBPR on the basis of Koleje Mazowieckie timetables

Currently, the journey time of a passenger train from Tłuszcz to Warszawa Wileńska is 39 minutes and from Mokra Wieś 44 minutes according to the timetable. It takes 59 minutes for a passenger train to reach Tłuszcz from Warszawa Śródmieście. Generally, the journey time

from Tłuszcz to Warsaw does not differ now from the journey time of 40 minutes in 2011. However, there were temporary increases in the journey time during the analysed period. It was substantially longer between 2014–2015 and amounted to 53–54 minutes. A quicker way to reach Warsaw is a fast train operated by Koleje Mazowieckie but, unfortunately, it only reaches the Warszawa Wschodnia railway station. It takes 43 minutes for this train to reach Warsaw from Tłuszcz (Table 8, Figure 42).

This connection is operated from early morning to the night. The first train to Tłuszcz departs from Warszawa Wileńska at 4:50 a.m., while the last one at 12:45 p.m. The frequency of trains is not consistent. As for the relation to Tłuszcz, trains run every 20–30 minutes in general. Some trains run every 10 minutes only during morning peak hours (at approx. 7 a.m.) and afternoon peak hours (at approx. 3–4 p.m.). Similarly, there is a considerable number of cases when the frequency goes down to 35–40 minutes at off-peak times.

Along the entire length of the analysed section, i.e. beyond the Tłuszcz railway station as well, the connection operation begins with a trip from Warszawa Wileńska at 4:50 a.m. and ends with a trip at 11 p.m. The interval between train trips is irregular; the frequency is not consistent but is similar to being consistent. This frequency does not generally exceed 1 hour. The frequency goes down to approx. 30 minutes.

Table 8. Journey time of passenger trains between Warszawa Wileńska – Mokra Wieś

Stations/stops	Distance [km]	Travel time [min]							
		2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Warszawa Wileńska	0.0	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
Warszawa Zacisze Wilno	4.0	-	-	-	0:04	0:04	0:04	0:04	0:04
Ząbki	6.7	0:06	0:06	0:08	0:08	0:08	0:08	0:08	0:07
Zielonka	10.1	0:09	0:10	0:12	0:13	0:13	0:14	0:13	0:12
Kobyłka Ossów	13.1	0:14	0:14	0:16	0:17	0:17	0:18	0:16	0:15
Kobyłka	15.0	0:17	0:17	0:19	0:20	0:21	0:22	0:18	0:17
Wołomin	17.0	0:20	0:20	0:22	0:25	0:24	0:26	0:22	0:21
Wołomin Słoneczna	18.7	0:23	0:23	0:26	0:28	0:28	0:29	0:24	0:23
Zagościniec	20.7	0:26	0:26	0:29	0:31	0:31	0:32	0:27	0:26
Dobczyn	23.4	0:29	0:30	0:32	0:34	0:34	0:35	0:30	0:29
Klembów	26.7	0:33	0:33	0:36	0:38	0:38	0:38	0:34	0:32
Jasienica Mazowiecka	30.5	0:37	0:37	0:40	0:43	0:43	0:42	0:38	0:35
Tłuszcz	33.5	0:40	0:41	0:43	0:52	0:53	0:47	0:44	0:39
Chrzęsne	36.6	0:44	0:48	0:47	0:55	0:56	0:50	0:47	0:42
Mokra Wieś	38.5	0:47	0:51	0:50	0:58	0:59	0:53	0:50	0:44

Source: Study of the MBPR on the basis of Koleje Mazowieckie timetables

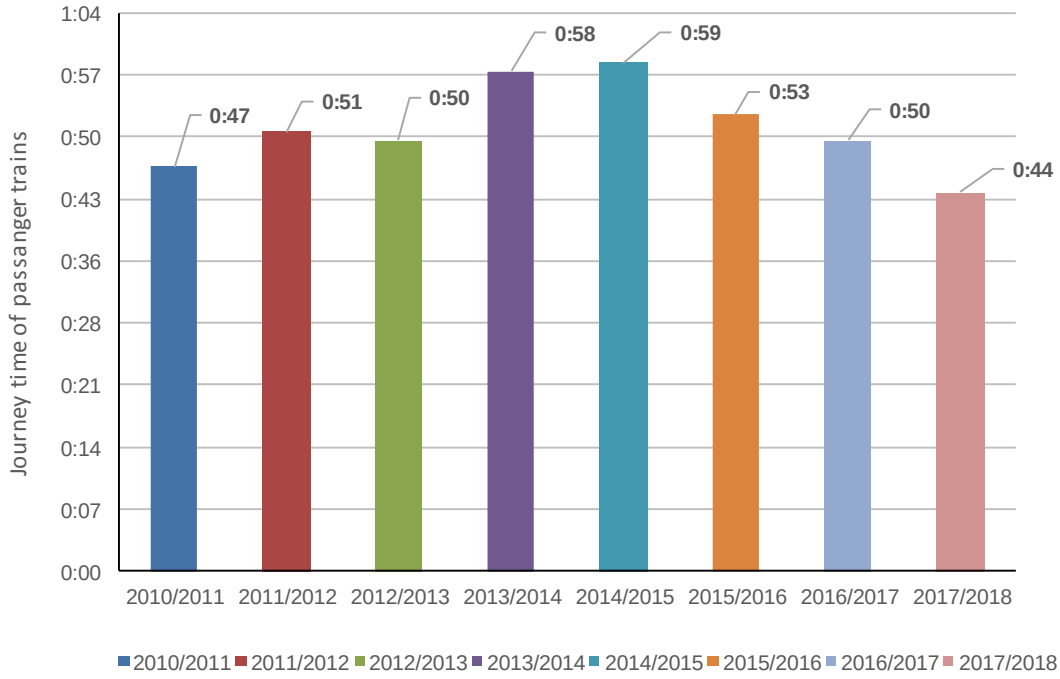


Figure 42. Journey time of passenger trains between the Warszawa Wileńska – Mokra Wieś section by timetables valid in 2010–2017

Source: Study of the MBPR on the basis of Koleje Mazowieckie timetables

During the analysed period, timetables varies both in terms of the number of connections and departure hours of individual trips (Table 9). The arrangement of routes at the analysed section is consistent – its termini include the Wołomin Słoneczna and Tłuszcz railway stations; in addition, there are trips that go beyond the case study area. From the 2013–2014 timetable onwards, passenger trains also stop at a new Warszawa Zacisze Wilno railway stop, which is located at 3.950 km of railway line no. 6. It is the first railway stop in Warsaw that was built by a private investor – it was erected next to the Wilno district, which is being built by a developer.

Table 9. Comparison of the number of connections at the Warszawa Wileńska – Mokra Wieś section by timetables between 2010–2017

Timetable	Number of connec-tions	Departures from the Warszawa Wileńska station																							
2010/2011	19	4:48	5:15	5:38	6:38	7:08	8:08	9:38	10:38	12:38	13:38	14:38	15:38	16:28	17:38	18:38	19:38	20:38	21:38	22:48				
2011/2012	23	4:45	5:10	5:30	5:45	6:45	7:50	8:45	9:45	10:45	12:45	13:45	14:45	15:30	15:50	16:30	16:45	17:30	17:45	18:45	19:45	20:45	21:45	22:45
2012/2013	23	4:40	5:15	5:35	5:50	6:40	7:50	8:40	9:40	10:40	12:40	13:40	14:40	15:15	15:40	16:05	16:40	17:15	17:40	18:40	19:40	20:40	21:45	22:45
2013/2014	18	4:36	5:43	6:43	7:43	8:45	9:45	11:45	12:45	13:45	14:45	15:25	16:45	17:45	18:45	19:45	20:45	21:45	22:45					
2014/2015	16	4:38	5:38	6:38	8:38	10:33	12:38	13:38	14:38	15:38	16:38	17:38	18:38	19:38	20:38	21:38	22:18							
2015/2016	20	4:45	5:35	6:35	6:35	8:35	10:35	12:35	13:35	14:35	15:20	15:45	16:20	16:45	17:20	17:35	18:40	19:35	20:35	21:35	22:35			
2016/2017	22	4:45	5:45	7:05	8:15	9:05	9:55	10:55	11:50	12:55	13:50	14:50	15:20	15:49	16:20	16:50	17:20	18:00	18:55	19:50	20:50	21:50	22:50	
2017/2018	23	4:50	5:55	6:45	7:45	8:50	9:15	10:15	11:55	12:50	13:56	14:35	15:25	15:55	16:23	16:45	17:15	17:45	18:45	19:50	21:00	21:45	22:50	23:00

Source: Study of the MBPR on the basis of Koleje Mazowieckie timetables

The Koleje Mazowieckie ticket offer includes one-way and monthly season tickets and considers statutory discounts applicable to pupils and students. Typical of railway companies,

fare tables that reduce the unit price of km along with the increase of the number of km travelled are used (Table 10, 11).

There are also fast connections operated by PKP Intercity from one station in the case study area; however, their impact on the transportation of daily commuters to Warsaw may be solely marginal given their significantly smaller frequency and higher ticket prices. PKP IC operates fast trains (IC, TLK) only along the Tłuszcz – Warsaw connection. These trains do not stop at other stations in the case study area. Their journey time is between 32–40 minutes. There are 12 connections per day, while departure times are within the range of 6:30 a.m. and 10:30 p.m. These trains run every 1 hour and 23 minutes on average.

Table 10. One-way ticket prices (valid from 1 January 2015)

Stop	Distance [km]	Koleje Mazowieckie sp. z o.o. – one-way ticket		
		Normal price	Discount price for pupils (37% cheaper)	Discount price for students (51% cheaper)
Warszawa Zacisze Wilno	3.95	3.7	2.33	1.81
Ząbki	6.68	5.8	3.65	2.84
Zielonka	10.10	5.8	3.65	2.84
Kobyłka Ossów	13.07	6.8	4.28	3.33
Kobyłka	14.97	6.8	4.28	3.33
Wołomin	17.04	8.1	5.1	3.97
Wołomin Słoneczna	18.68	8.1	5.1	3.97
Zagościniec	20.71	10.5	6.61	5.14
Dobczyn	23.38	10.5	6.61	5.14
Klembów	26.67	10.5	6.61	5.14
Jasienica Mazowiecka	30.47	10.5	6.61	5.14
Tłuszcz	33.54	11.8	7.43	5.78
Chrzęsne	36.65	11.8	7.43	5.78
Mokra Wieś	38.45	11.8	7.43	5.78

Source: Study of the MBPR on the basis of the Koleje Mazowieckie price list

Table 11. Prices of monthly season tickets (valid from 1 January 2015)

Stop	Distance [km]	Koleje Mazowieckie sp. z o.o. – monthly season tickets					
		Normal price		Discount price for pupils (37% cheaper)		Discount price for students (51% cheaper)	
		return ticket	one-way ticket	return ticket	one-way ticket	return ticket	one-way ticket
Warszawa Zacisze Wilno	3.95	96.00	48.00	60.48	32.64	47.04	23.52
Ząbki	6.68	128.00	64.00	80.64	43.52	62.72	31.36
Zielonka	10.10	128.00	64.00	80.64	43.52	62.72	31.36
Kobyłka Ossów	13.07	170.00	85.00	107.1	57.8	83.3	41.65
Kobyłka	14.97	170.00	85.00	107.1	57.8	83.3	41.65
Wołomin	17.04	170.00	85.00	107.1	57.8	83.3	41.65
Wołomin Słoneczna	18.68	170.00	85.00	107.1	57.8	83.3	41.65
Zagościniec	20.71	170.00	85.00	107.1	57.8	83.3	41.65
Dobczyn	23.38	220.00	110.00	138.6	74.8	107.8	53.9
Klembów	26.67	220.00	110.00	138.6	74.8	107.8	53.9
Jasienica Mazowiecka	30.47	220.00	110.00	138.6	74.8	107.8	53.9

Stop	Distance [km]	Koleje Mazowieckie sp. z o.o. – monthly season tickets					
		Normal price		Discount price for pupils (37% cheaper)		Discount price for students (51% cheaper)	
		return ticket	one-way ticket	return ticket	one-way ticket	return ticket	one-way ticket
Tłuszcz	33.54	248.00	124.00	156.24	84.32	121.52	60.76
Chrzęsne	36.65	248.00	124.00	156.24	84.32	121.52	60.76
Mokra Wieś	38.45	248.00	124.00	156.24	84.32	121.52	60.76

Source: Study of the MBPR on the basis of the Koleje Mazowieckie price list

Koleje Mazowieckie – KM sp. z o.o. uses modernised EN57-type electric multiple units: AKM and AL (Photo 7 A-D). Their length is 65 m and they weigh 125 tonnes. Their power output is 1000 kW, thanks to which they can reach maximum speed and acceleration of 120 km/h and 1 m/s^2 respectively. The AKM unit can seat 188 passengers and accommodate 468 standing passengers, while the AL unit can seat 160 passengers. Modernisation works included replacing standard doors with sliding plug doors and standard engines with asynchronous engines as well as building a toilet with a closed circuit and equipping it with facilities for the disabled and a baby changing table. The interior of the modernised trains is open along the entire length of 2nd class. There are lifts that make it easier for wheelchair users to get on and off the trains. The individual door opening system with automatic door closing makes it easier to maintain comfortable temperature inside the train. Passengers with bicycles may also use bicycle racks located at both ends of the train.

Photo 7 (A-D). Electric multiple units of Koleje Mazowieckie

Source: NTview Tomasz Nizielski

3.3.1.2. Quality of railway transport – passengers' evaluation

This section has been developed based on the ”Report on surveys of the quality of railway services and transport attractiveness involving passengers who use the E75 railway line”, which was prepared by the IPC Research Institute at the request of the Mazovian Office of Regional Planning situated in Warsaw. The source of report data was a direct survey among E75 railway line passengers carried out by the IPC Research Institute at the request of the Mazovian Office of Regional Planning (Appendix 5). The aforementioned report contains detailed information about the analysed sample, while this section is focused on the evaluation of the current condition and passengers' expectations of the quality of railway services and transport attractiveness on the E75 railway line. The survey was conducted at the Warszawa Rembertów – Sadowne section.

The travellers' opinion on the connection offer around midday was the most favourable. They were also satisfied with the connection offer in the morning and in the afternoon. The respondents suggested that the number of connections at night is too small. They also had various opinions on the connection offer in the evening and they depended on respondents' age – the respondents aged 25–34 and over 65 were dissatisfied, while the respondents aged 18–24 and below 18 were satisfied. The vast majority of the respondents are of the opinion that the train journey time along the analysed section is short. They also think that it takes much less time to travel this distance by train compared to by car or bus. If trains are taken out of the equation, it seems that travelling by car is more convenient that by bus. The respondents were satisfied with train reliability. The vast majority of them believe that train delays, cancellations, or failures are very rare or rare.

Two thirds of the travellers said that they use a monthly season ticket. Over one fifth of the respondents use one-way tickets to travel, while every tenth uses another ticket, primarily an urban pass. One-way tickets is most frequently used by the oldest travellers, while the youngest ones generally use monthly season tickets. Passengers' educational background does not affect the type of purchased tickets because all groups tend to choose the monthly season ticket most often. Only the travellers who received primary education tend to choose one-way tickets as frequently as monthly season tickets. Nearly half of the respondents think the ticket price is too high, but it is lower that costs associated with transport by bus or car.

The respondents were satisfied with travel comfort. They were satisfied with train comfort to the greatest extent. In addition, the majority of the travellers feel safe on trains and express a positive opinion on train cleanliness. In respondents' opinion, congestion levels on trains are too high.

When it comes to railway stops and stations, the passengers were satisfied with video surveillance, timetables, and parking lots. However, only every twentieth passenger said that there is a shop or kiosk at a given railway station/stop. The availability of ticket offices and ticket machines turned out to be negative. When it comes to the availability of displays, the Wołomin railway station and the Kobyłka railway stop were ranked the highest and the lowest respectively; as far as timetables and passenger information are considered, Chrzęstne and Jasienica were evaluated best and worst respectively. The passengers had the best and worst opinion on ticket offices/machines in Jasienica and Wołomin respectively. As for parking lots and video surveillance, the travellers were satisfied with them in Jasienica and dissatisfied with them in Chrzęstne and Tłuszcz.

The evaluation also included the distance and quality of the road between the railway stop/station and another means of transport as well as the time needed to reach either of them. The distance and quality of the road to reach a bicycle parking rack and the time needed to reach it turned out to be the most favourable; the bicycle parking rack was followed by a

parking lot, and a bus stop, which was ranked the lowest. The shortest distance, the best quality of the road to reach a bicycle parking rack and the shortest time needed to reach it were recorded in Wołomin and Mokra Wieś, while the lowest values of these indicators were found in Jasienica. On the other hand, the shortest distance, the best quality of the road to reach a parking lot and the shortest time needed to reach it were recorded in Jasienica, while the lowest values of these indicators were found in Mokra Wieś. According to the respondents, the Wołomin and Tłuszcz railway stations and the Warszawa Mokry Ług railway stop feature the best access to a bus stop. This access was ranked the worst in Mokra Wieś and Dobczyn.

In general, only every twentieth traveller has a negative opinion on the quality of railway transport on the Warszawa Rembertów–Sadowne line.

3.3.2. Integration with alternative means of transport

3.3.2.1. Spatial availability of railway stations/stops using public transport

Table 12. Spatial availability of railway stations/stops using public transport

Railway station/stop	Distance [m]	Bus stop	Line	Number of trips on a weekday	Towards
Zielonka	200	Urząd Miasta 01	L26	21	Kobyłka (PKP, rondo Cudu nad Wisłą)
	250	Urząd Miasta 02	LZ-1	8	Warsaw (Mokry Ług)
			LZ-2	10	Zielonka (Wituś district, ul. 11 Listopada)
Kobyłka Ossów	200	PKP Kobyłka Ossów 01	L27	18	Turów
	250	PKP Kobyłka Ossów 02	L27	18	Kobyłka (church), Wołomin (hospital), Kobyłka (Zalasek), Nadma
Kobyłka	150	PKP Kobyłka 01	L26	21	Kobyłka (rondo Cudu nad Wisłą)
			L40	9	Kobyłka (church, Zalasek), Nadma, Marki
	150	PKP Kobyłka 02	L26	21	Kobyłka (church), Zielonka (town hall)
			L40	9	Wołomin (hospital, Nafta district, PKP Słoneczna, PKP Wołomin)
Wołomin	100	PKP Wołomin 01	L35	10	Wołomin (Niepodległości district), Nowe Lipiny, Duczki, Nowe Grabie, Stare Grabie
			L37	12	Wołomin (Niepodległości district), Stare Lipiny, Majdan, Ossów, Turów, Kobyłka
			L40	9	Wołomin (Niepodległości district, Nafta district, hospital), Kobyłka (PKP, church, Zalasek), Nadma, Marki
Wołomin Słoneczna	300	os. Niepodległości 03	L38	14	Wołomin (PKP Słoneczna, hospital)
			L40	9	Wołomin (Niepodległości district, hospital), Kobyłka (PKP, church, Zalasek), Nadma, Marki
	150	PKP Wołomin Słoneczna 01	L38	14	Wołomin (Graniczna)
			L40	9	Wołomin (PKP)
	300	PKP Wołomin Słoneczna 02	NS	10	Radzymin
			NS	10	Wołomin
			L38	14	Wołomin (hospital)
Zagościniec	200	Duczki Willowa 02	L35	10	Nowe Lipiny, Wołomin (Niepodległości district, PKP)

Source: Study of the MBPR on the basis of Google Maps and bus timetables

The analysis includes bus stops located in the closest vicinity of individual railway stations and stops, starting from the Zielonka railway station. Out of 11 railway stops and stations,

local public transport stops were located near 6 of them. They included: Zielonka, Kobyłka Ossów, Kobyłka, Wołomin, Wołomin Słoneczna, Zagościniec, i.e. stations/stops situated near Warsaw as well as in the urban area of the north-eastern part of the Warsaw Metropolitan Area. Local public transport was not available near railway stops/stations located further (Table 12).

In general, local routes operate through towns located next to the railway line. As a result, they make it possible to reach the railway station/stop from districts located far from it, and from which access on foot to such stations/stops is not convenient. Several lines travel to adjacent suburban towns located in a similar distance – up to a few kilometres – from the railway line. The route connecting Wołomin with Radzymin is an exception; Radzymin is the only larger centre situated considerably far from railway line no. 6. The number and frequency of trips for individual lines cannot be considered as meeting the standards of local transport. The number of trips varies from approx. 10 to approx. 20 per day, which is reflected in the frequency of a maximum of 30 minutes during peak hours. This is characterised by the fact that local bus routes are operated less frequently than the railway line in most cases, especially when sections of this railway line near Warsaw are considered.

No spatial integration of bus and railway stops on a small scale is another inconvenience. Walking distances, measured from the edge of the nearest railway platform to a bus stop, amount to between 100–300 metres, while potential bus stops located in an even higher distance from the platform edge were not considered available.

3.3.2.2. Spatial availability of railway stations/stops using private transport

The case study area features 11 communes, 4 of which are urban communes: Kobyłka, Marki, Ząbki, Zielonka, 3 of which are urban-rural communes: Radzymin, Tłuszcz, Wołomin, and 4 of which are rural communes: Dąbrówka, Klembów, Poświętne, Zawodzie; there is also the Rembertów district of the capital city of Warsaw. With regard to these types of communes, they are arranged depending on the distance from Warsaw. Rembertów, its district, is part of the south-western end of the case study area. The urban communes of Ząbki and Zielonka are located in the immediate vicinity of Warsaw, while the next two communes are adjacent to the first two. The urban-rural communes of Radzymin and Wołomin are adjacent to them. The urban-rural commune of Tłuszcz is situated in the eastern and external end of the case study area. Rural communes make up the remaining external parts of the case study area: Dąbrówka and Zabrodzie in the northern part and Poświętne in the south-eastern part. The rural commune of Klembów is the only one located in the middle of the case study area. The Zielonka urban commune is peculiar when it comes to the type. Apart from the part with urban functions, which is adjacent to the Ząbki urban commune, Zielonka also features extensive uninhabited wooded land, which spans in the eastern direction in the form of a band and constitutes the southern end of the case study area.

The case study area was analysed in terms of access to the railway line by measuring theoretical time needed to reach the nearest railway stations or stops by car. The case study area was divided into three zones: with a travel time of up to 15 minutes; with a travel time of between 15–20 minutes; and with a travel time of over 20 minutes. Entire towns are included in individual zones; if the town was located on the border between zones, it was included in the zone in which most of its buildings were situated. Given that there is no data concerning the number of inhabitants in particular towns, the population of particular parts of a commune proportionally to the number of towns was estimated instead. The urban commune of Marki was not included in the analysis. Due to the fact that it is located near Warsaw and next to express road S8 – while at the same time being located in a certain distance from railway line no. 6, access from Marki to Warsaw directly and to the analysed railway stations/stops by car

is similarly easy. As they are located near the railway line, the towns of Ząbki, Zielonka, and Kobyłka, then the urban-rural commune of Wołomin, followed by the rural commune of Klembów, and finally the urban-rural commune of Tłuszcz are within a 15-minute distance by car. Other communes are located in other zones – partially, at least. However, most of the population of these communes are situated within this 15-minute distance. In case of three of such communes, it is true for the vast majority of their population. The aforementioned values vary for only one commune. When it comes to the Radzymin urban-rural commune, the Radzymin town itself is in this 15-minute zone. In addition, this zone also included 19 out of 23 villages with an estimated population of 11,400. On the other hand, the remaining 4 villages with an estimated population of 2,400 belong to the 15–20-minute zone. Similar proportions apply to the rural communes of Poświętne and Zabrodzie. 24 out of 27 Poświętne villages and 20 out of 22 Zabrodzie villages are in the 15-minute zone, which amounts to an estimated population of 5,500 and 5,300 respectively. By analogy, 3 villages of Poświętne and 2 villages of Zabrodzie belong to the 15–20-minute zone; their estimated population is 700 and 500 respectively. The Dąbrówka commune is located in the longest distance from railway line no. 6. The 15-minute zone features 8 out of 27 villages of Dąbrówka, the population of which is estimated at 2,400. 6 villages with an estimated population of 1,800 belong to the 15–20-minute zone. The largest part of the commune, which features 13 villages with an estimated population of 3,900, is included in the 20-minute zone. Apart from the Rembertów district and the urban commune of Marki, 193,000 inhabitants of the case study area generally live within a 15-minute distance from the railway stations and stops. 5,400 inhabitants belong to the 15–20-minute zone, while it takes over 20 minutes for 3,900 residents at the edges of the case study area to reach the railway stations/stops by car.

The Wołomin Słoneczna railway stop is the only railway station/stop featuring designated parking spaces in the form of a ”Park and Ride” parking lot (Photo 8 A). The parking lot has 140 car parking spaces and a roofed bicycle rack for 44 bicycles. It was built as a result of the Wołomin Commune initiative in 2014 and the Commune is responsible for it. The parking fee for the first hour is PLN 3, while every next started hour is charged at PLN 0.5. The use of the parking spaces was 86% on the day of analysis.

Photo 8 (A-F). Parking lots next to the E75 railway line

Source: NTview Tomasz Nizielski

As for other railway stations and stops, travellers park their cars at free parking lots near these stations/stops (Zielonka, Tłuszcz, Wołomin, Kobyłka) or at illegal parking lots next to the railway line, which is much more frequent (Photo 8 C-D). A similar situation applies to travellers with bicycles. Bicycles may be attached to racks at a few railway station/stops only (Wołomin, Zagościniec, Kobyłka, Chrzęsne, Klembów, Nowa Wieś) (Photo 8 B). Due to an insufficient number of parking spaces or a lack of organised parking lots, bicycles end up being attached to road signs, barriers or fences – frequently near passages – thus making it difficult to get to platforms (Photo 8 E-F). This state of affairs is due to the fact that the modernisation of the railway line and auxiliary infrastructure is still underway. According to plans, railway companies and local authorities are to build parking lots near the railway stations and stops along railway line no. 6 once the aforementioned construction works are over.

To examine the spatial availability of the railway stops and stations using private transport, the *ArcGIS* programme, a *Network Analyst* tool, was used. The software makes it possible to designate an area from a given point, i.e. the railway station/stop in this case, available within a specified time frame. For analysis purposes, input data included the road network and points determining the location of the railway stop. The road network included the following parameters: road section length and the speed at which a given section is travelled. The speed parameter was dependent on the type of road section surface and allowable maximum speed, including whether the course of a road is within or outside towns. As a result, times required to travel a section of a road were obtained. The outcome of this analysis includes theoretical[37] availability isochrones, i.e. the areas in which a given railway station/stop can be reached within a specified time frame – 1–15 minutes by car. The travel time of up to 15 minutes was considered satisfactory. As for travelling on foot, the satisfactory time was 10 minutes. It was the most frequently indicated time by the survey respondents[38]. Given a small scale of the study and the use of an isochrone map to cover a small area compared to the entire case study area, the study does not contain a graphical representation of isochrones of availability on foot. On the other hand, the 15-minute isochrone was used to determine an estimated population of the area covered by the isochrone and a proportion of the inhabitants who live in the area with the easiest access to the railway line (Figure 43).

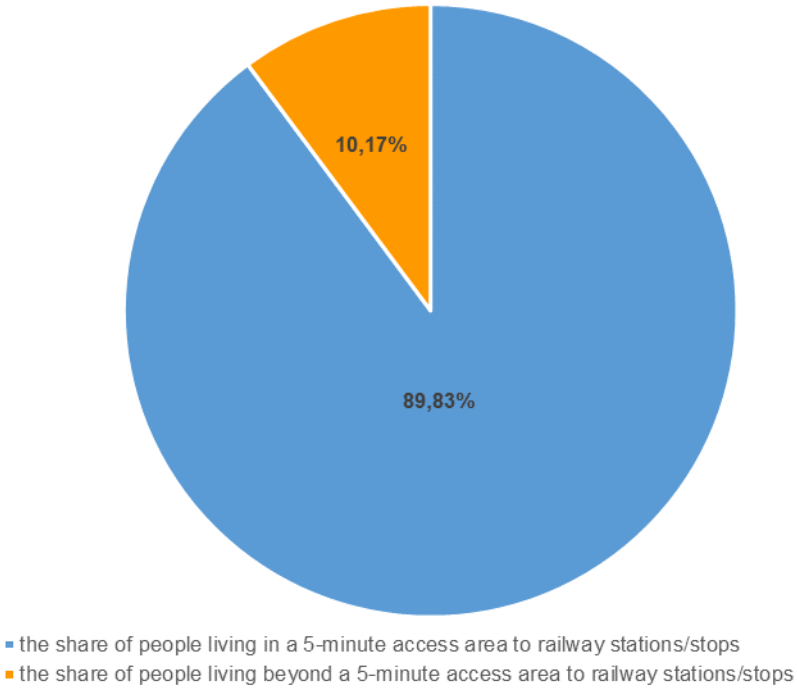


Figure 43. Share of the population living in the area designated by a 5-minute isochrone of availability to railway stations/stops on the E75 railway line compared to the total population in the area

Source: Study of the MBPR on the basis of BDL

131 out of 158 territorial units are in the area located in a 15-minute distance by car from railway stations and stops along the E75 railway line. The population of the aforementioned territorial units is 235,241, which is 89.83% of all inhabitants in the case study area (Figure 44).

[37] The analysis did not consider traffic.
[38] According to the survey, over 60% of passengers go to the station/stop on foot.

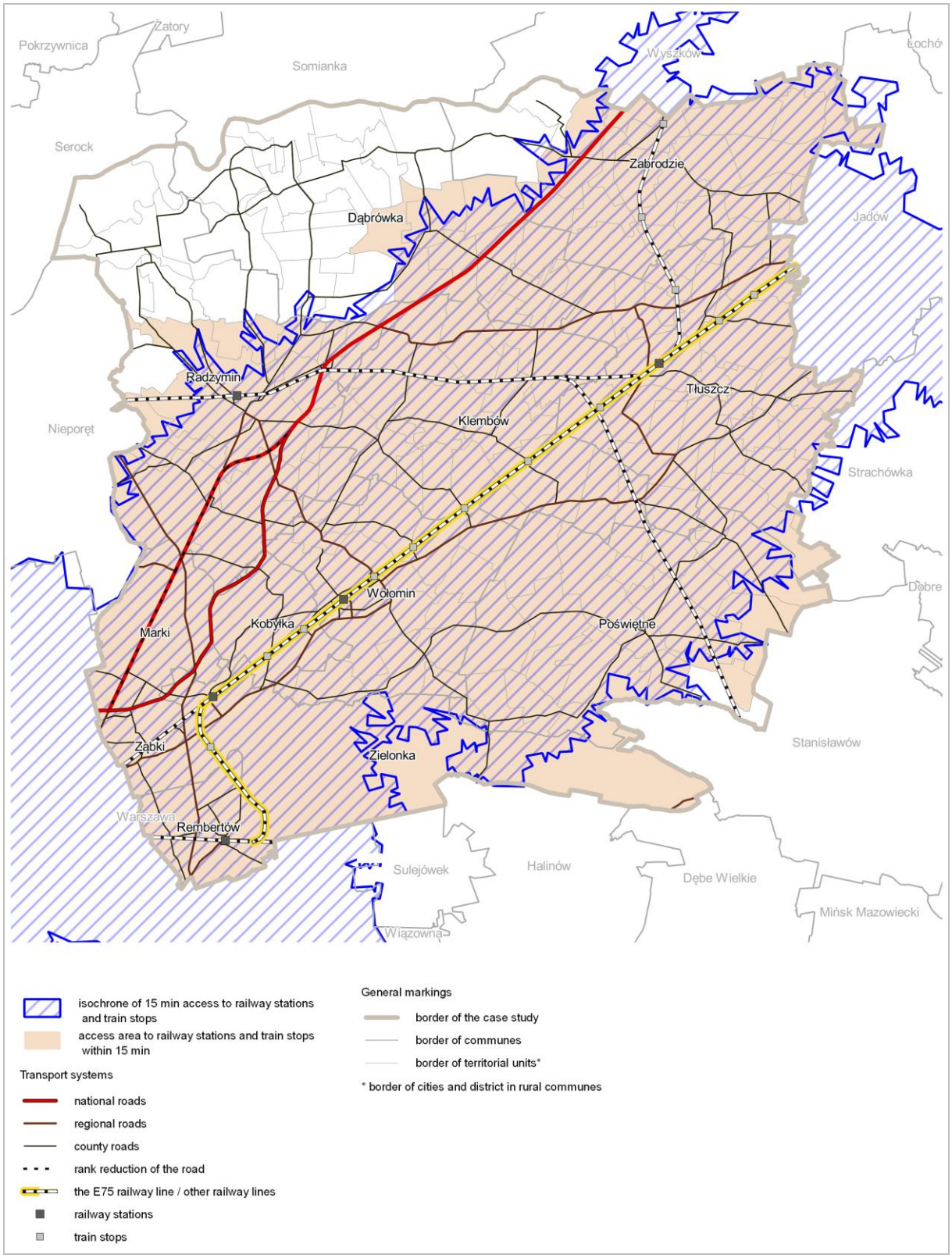


Figure 44. Area with a 15-minute availability to railway stations/stops on the E75 railway line by private transport (by car)

Study of the MBPR on the basis of the TBD and transport network

3.3.2.3. Spatial availability of the Warsaw city centre using railway and private transport

The analysis of the spatial availability of the Warsaw city centre using railway and private transport made use of the methodology for determining availability, which is provided in the *Suggestions for the Warsaw Metropolitan Area delimitation* study. The study report within the framework of the *Programming Development of the Warsaw Metropolitan Area (PROM)* project.

To determine the range of railway transport in 2013, train journey times according to the Koleje Mazowieckie timetable of regional and suburban trains were used. The range of railway transport was determined in such a way as to ensure that the journey from the Warsaw city centre was made by train, while a further journey was made by car, but the changing time of 5 minutes was added in case of the latter. The analysis assumed that the acceptable time needed to reach the destination from the station by car cannot exceed 15 minutes and the total journey time cannot exceed 60 minutes. For example, if it took 50 minutes (in 2013) to get from the Warszawa Śródmieście railway stop to the Mińsk Mazowiecki railway station by train, the remaining time for the traveller to reach its destination from the station was 5 minutes keeping in mind that the changing time is 5 minutes and the total journey time cannot exceed 60 minutes. However, if the train journey takes less than 40 minutes (e.g. 38 minutes to the Piaseczno railway station), the journey to reach the destination by car is 15 minutes because this journey time cannot exceed 15 minutes. To determine the time of journeys by car and the available range of such car journeys, a web map was used, in which it is possible to determine a route from point A to point B and show the time needed to travel it considering traffic. Such routes were determined along national, regional, county, and commune roads. Points located near appropriate roads were transferred into a comprehensive map and were connected to form a range of car journeys to a station/stop within a specified time frame. Availability ranges were generalised to the boundaries of territorial units in order to calculate the population living in the area within the availability range. Territorial units partially covered by the availability range were considered separately in order to verify whether this range covered most of the area with residential buildings. As for travelling from Warsaw using trains that start their journey at the Warszawa Wileńska railway station, 20 minutes needed to reach this station and for changes from the Warsaw city centre were added (in 2013).

To conduct the NSB CoRe case study, the availability area near railway lines no. 6 and no. 449 analysed in 2013 was distinguished from the case study and a similar analysis was carried out in 2017. Both analyses were conducted on weekdays and during the academic year. The outcome of the analysis comprised of two availability areas: one from 2013 and the other from 2017 (Figure 45).

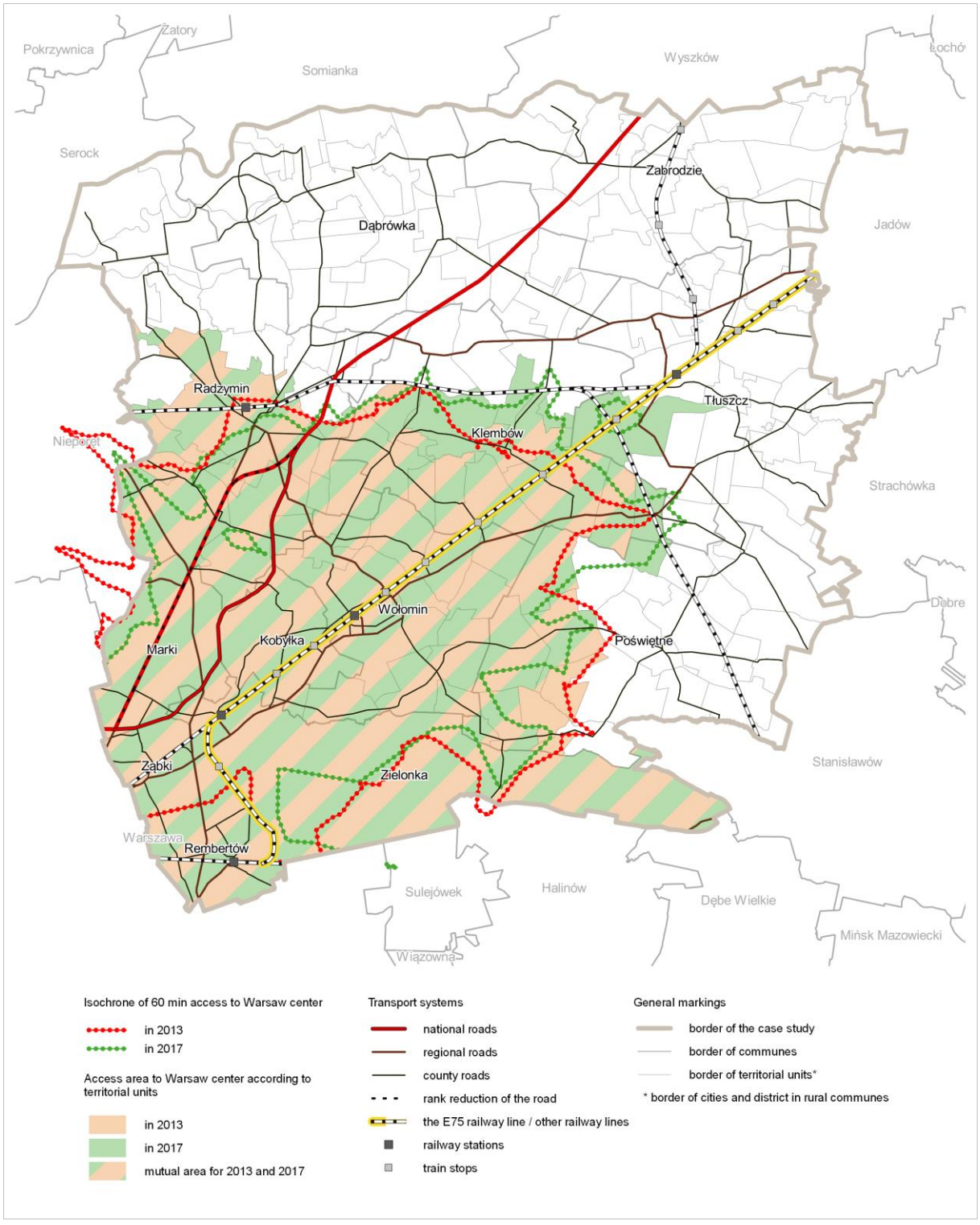


Figure 45. Areas with a 60-minute availability from the Warsaw city centre by railway and private transport (by car) in 2013 and 2017

Source: Study of the MBPR on the basis of the TBD and transport network

As a result, it was found that the difference in the size of the area causes:

a) availability to be reduced in the western, north-western, and south-western parts due to:

– the ongoing construction of express road S8 (the Marki ring road), which makes it difficult to access the area located to the north-west of the construction site,

– the ongoing modernisation works near railway stops/stations along the E75 railway line, which make it difficult to access these stations/stops from areas located to the north-west and south-east of the E75 railway line,

b) availability to be increased in the northern and north-eastern parts due to:

– the increase in maximum speed following the E75 railway line modernisation. As a result, the journey time from Warszawa Wileńska to railway stops/stations in the case study area was reduced by 3-5 minutes, which allowed for the possible journey time to the station to be increased (acc. to the analysis methodology). These changes are noticeable in the north-eastern part of the availability area,

– the reduction of the journey time from the Warsaw city centre to the Warszawa Wileńska railway station by 5 minutes compared to the time assumed in the analysis thanks to the opening of the second line of the Warsaw metro. As a result, the entire journey from the Warsaw city centre to the station on the E75 railway line takes less time, while the maximum journey time to the station by car assumed in the analysis was increased,

– the use of new and modernised trains on the analysed line – the modernised EN57 trains have higher maximum speed and acceleration, which has a positive impact on the journey time.

Due to the changes in the size of the 2017 isochrones in relation to the 2013 ones, the availability area increased by 6 territorial units, while the number of territorial units decreased by 4 territorial units. 44 territorial units were included in both the 2013 and 2017 isochrones.

Figure 46 demonstrates changes in the population of the territorial units covered by the 2013 and 2017 isochrones. In 2013, 201,300 inhabitants lived in the area covered by the isochrones, while this number went up to 218,100 in 2017. Such a considerable difference results primarily from the increase in the population in the area covered by the 2013 and 2017 isochrones: this increase amounted to over 13,000. The increase in the size of the availability area in 2017 caused the population covered by the 2017 isochrones to go up by over 4,000.

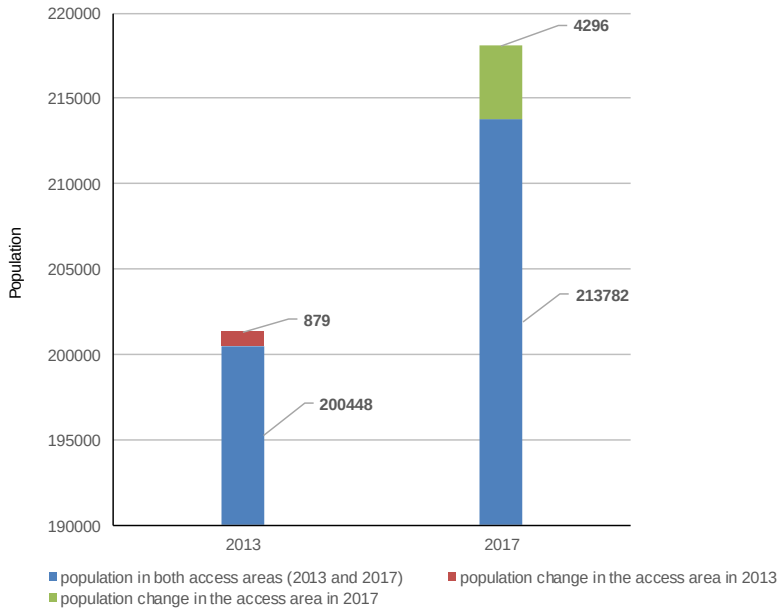


Figure 46. Change in the population covered by the isochrone of availability to Warsaw in 2017 compared to 2013

Source: Study of the MBPR on the basis of BDL

Conclusions:

1. The E75 railway line modernisation had a beneficial effect on travel times, which became shorter. Given the above, the availability area is larger in the north-eastern part of the case study area; The introduction of new and modernised trains also had an impact on the increase in the availability area.
2. The reduction in the size of the availability area results from difficulties arising out of the construction of express road S8 at the Marki – Radzymin section during the case study;
3. The increase in the population compared to the year 2013 results from, in particular, an actual increase in the population in the area covered by the 2013 and 2017 isochrones. The effect of the increase in the size of the availability area on the increase in the population was smaller.

3.3.3. Traffic on alternative roads

There are two alternative transport routes along the E75 railway line in the case study area:

– national road no. 8 – regional road no. 636

– regional road no. 636 – regional road no. 634

In 2010 and 2015, the General Directorate for National Roads and Motorways conducted General Traffic Measurements (GPRs), the results of which are presented in Tables 13–18 for the aforementioned routes.

Table 13. Vehicle traffic along the national road no. 8 – regional road no. 636 route in 2010

Road no.	Section description		Total number of vehicles	Types of vehicles						
	Distance [km]	Section name		Motorbikes	Cars minibuses	Light goods vehicles	Lorries		Buses	Tractors
							w/o trailer	w/ trailer		
8	2.7	WARSAW–MARKI	56852	219	48486	3709	1623	1892	913	10
8	5	MARKI / TRANSITION	38551	109	31454	2892	1482	1787	818	9
8	4.2	MARKI–RADZYMIN	31067	124	24087	3019	1413	1738	681	5
S8	5.7	RADZYMIN / RING ROAD	21043	53	16192	1719	949	1710	419	1
S8	3.4	RADZYMIN–WOLA RASZTOWSKA	22876	56	17289	2266	1012	1760	490	3
S8 S8d	18.8	WOLA RASZTOWSKA–LUCYNÓW	23207	70	17897	2198	823	1750	468	1
636	11.3	WOLA RASZTOWSKA–WÓLKA KOZŁOWSKA	4892	64	4021	352	166	220	54	15
636	17.9	WÓLKA KOZŁOWSKA–JADOW–ZAWISZYN	2671	43	2172	232	112	88	21	3

Source: Study of the MBPR on the basis of the GDDKIA, 2010 General Traffic Measurement

Table 14. Vehicle traffic on regional road no. 634 in 2010

Road no.	Section description		Total number of vehicles	Types of vehicles						
	Distance [km]	Section name		Motorbikes	Cars minibuses	Light goods vehicles	Lorries		Buses	Tractors
							w/o trailer	w/ trailer		
634	2.9	WARSAW – ZĄBKI/TRANSITION	15766	126	13464	1135	489	394	158	0
634	3.8	ZĄBKI–ZIELONKA / TRANSITION	18727	169	15918	1554	655	262	169	0
634	4.6	ZIELONKA–KOBYŁKA–WOŁOMIN	16902	118	15179	1048	304	118	135	0
634	3.3	WOŁOMIN/TRANSITION	10697	86	9135	1027	235	96	107	11
634	22.2	WOŁOMIN–MIĄSE–TŁUSZCZ–WÓLKA KOZŁOWSKA	5816	52	5194	372	116	47	29	6

Source: Study of the MBPR on the basis of the GDDKIA , 2010 General Traffic Measurement

Table 15. Vehicle traffic along the national road no. 8 – regional road no. 636 route in 2015

Road no.	Section description		Total number of vehicles	Types of vehicles						
	Distance (km)	Section name		Motorbikes	Cars minibuses	Light goods vehicles	Lorries		Buses	Tractors
							w/o trailer	w/ trailer		
8	2.1	PIŁSUDSKIEGO INTERCHANGE–MARKI	59332	303	48071	5119	1629	3696	1003	6
8	5.0	MARKI / TRANSITION	40301	176	31783	3374	1172	3471	322	3
8	4.2	MARKI–RADZYMIN	42173	161	32485	3292	1613	3731	337	4
S8	5.7	RADZYMIN / RING ROAD	30177	67	22065	3062	1365	3100	513	0
S8	3.4	RADZYMIN–WOLA RASZTOWSKA	29018	77	21102	2629	1430	3210	569	1
S8 S8d	18.8	WOLA RASZTOWSKA–LUCYNÓW	29704	97	21226	3854	721	3350	456	0
636	11.3	WOLA RASZTOWSKA–WÓLKA KOZŁOWSKA	3828	31	3304	122	119	180	61	11
636	17.9	WÓLKA KOZŁOWSKA–JADÓW–ZAWISZYN	2571	49	1982	206	67	136	121	10

Source: Study of the MBPR on the basis of the GDDKIA, 2015 General Traffic Measurement

Table 16. Vehicle traffic on regional road no. 634 in 2015

Road no.	Section description		Total number of vehicles	Types of vehicles						
	Distance [km]	Section name		Motorbikes	Cars minibuses	Light goods vehicles	Lorries		Buses	Tractors
							w/o trailer	w/ trailer		
634	2.9	WARSAW – ZĄBKI/TRANSITION	17436	105	15378	976	349	401	227	0
634	3.8	ZĄBKI–ZIELONKA / TRANSITION	17012	136	15260	749	391	272	187	17
634	4.6	ZIELONKA–KOBYŁKA–WOŁOMIN	16677	117	14826	1051	300	183	200	0
634	3.3	WOŁOMIN / TRANSITION	12667	89	11298	836	241	152	51	0
634	22.2	WOŁOMIN–MIĄSE–TŁUSZCZ–WÓLKA KOZŁOWSKA	7871	71	7265	275	181	55	24	0

Source: Study of the MBPR on the basis of the GDDKIA, the 2015 General Traffic Measurement

Table 17. Changes in vehicle traffic along the national road no. 8 – regional road no. 636 route in 2010 and 2015

Road number	Distance (km)	Section description	Total number of vehicles		Change [%]
		Section name	GPR 2010	GPR 2015	
8	2.7	WARSAW–MARKI	56852	59332	4
8	5	MARKI / TRANSITION	38551	40301	5
8	4.2	MARKI–RADZYMIN	31067	42173	36
S8	5.7	RADZYMIN / RING ROAD	21043	30177	43
S8	3.4	RADZYMIN–WOLA RASZTOWSKA	22876	29018	27
S8 S8d	18.8	WOLA RASZTOWSKA–LUCYNÓW	23207	29704	28
636	11.3	WOLA RASZTOWSKA–WÓLKA KOZŁOWSKA	4892	3828	-22
636	17.9	WÓLKA KOZŁOWSKA–JADÓW–ZAWISZYN	2671	2571	-4

Source: Study of the MBPR on the basis the GDDKIA, 2010 and 2015 General Traffic Measurements

Table 18. Changes in vehicle traffic on regional road no. 634 in 2010 and 2015

Road number		Distance [km]	Section description	Total number of vehicles		Change [%]
			Section name	GPR 2010	GPR 2015	
634		2.9	WARSAW –ZĄBKI / TRANSITION	15766	17436	11
634		3.8	ZĄBKI–ZIELONKA / TRANSITION	18727	17012	-9
634		4.6	ZIELONKA–KOBYŁKA–WOŁOMIN	16902	16677	-1
634		3.3	WOŁOMIN/TRANSITION	10697	12667	18
634		22.2	WOŁOMIN–MIĄSE–TŁUSZCZ–WÓLKA KOZŁOWSKA	5816	7871	35

Source: Study of the MBPR on the basis of the GDDKIA, 2010 and 2015 General Traffic Measurements

Overall traffic at individual sections increases along with the reduction of the distance from Warsaw. However, it can be noticed that changes in traffic are more noticeable along with the increase in the distance from Warsaw. There was a decline in traffic along with the increase in the distance from express road S8 on regional road no. 636, which runs from the interchange with express road S8 towards national road no. 6. This reduction of traffic on the above-mentioned road is most noticeable at the initial section, which starts at the interchange with express road S8. As for regional road no. 634, changes are most noticeable between Tłuszcz and Wołomin. Similar to the express road S8 and regional road no. 636 route, traffic on the road increases along with the reduction of the distance from Warsaw (Figure 47).

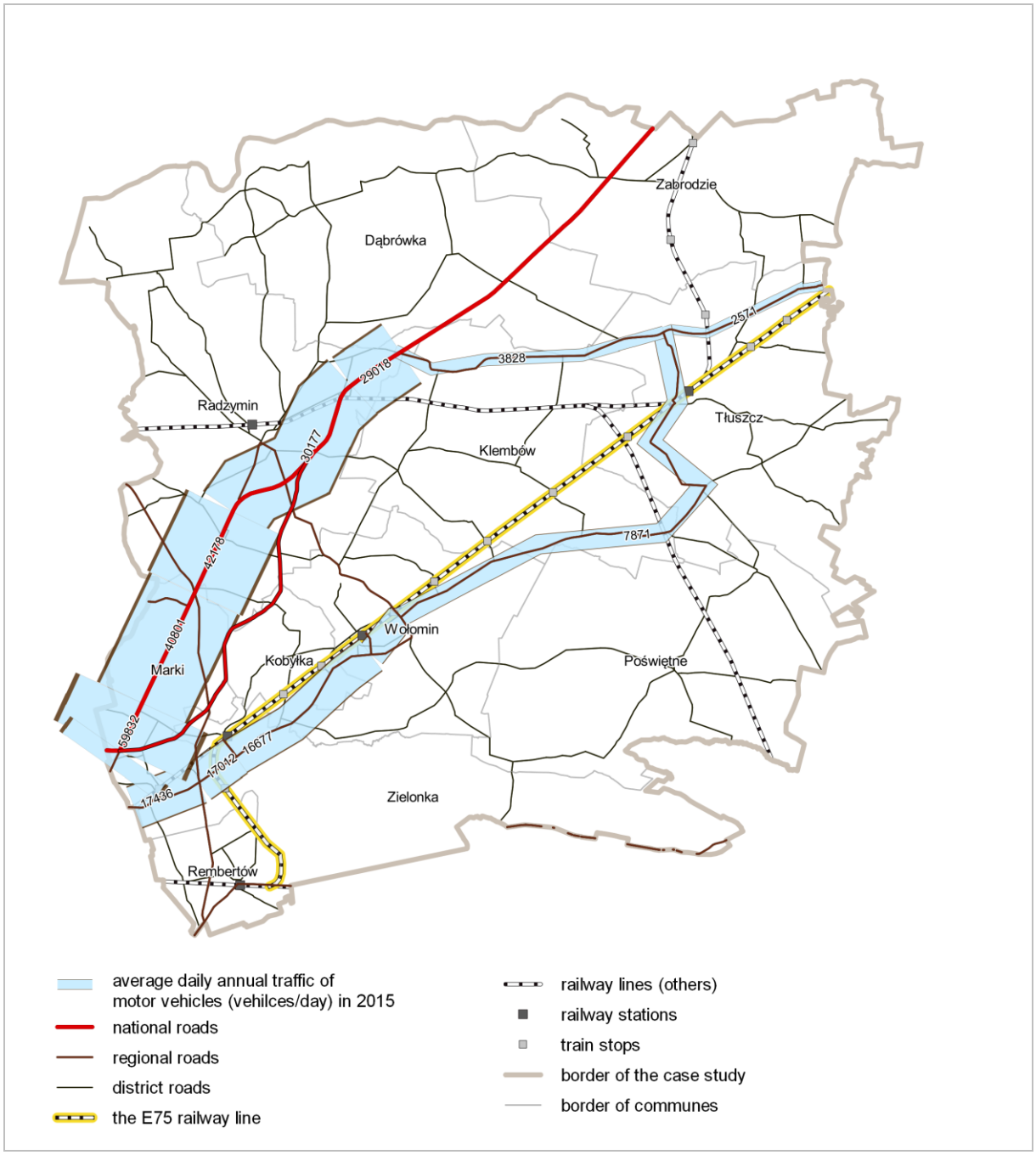


Figure 47. Average daily vehicle traffic at the section of national road no. 8 (S8) and regional road no. 634 in 2015

Source: Study of the MBPR on the basis of GDDKIA, 2015 General Traffic Measurements

4. CONCLUSIONS AND RECOMMENDATIONS

4.1. Conclusions

It is extremely difficult to identify the impact of the E75 railway line modernisation on spatio-functional processes as well as socio-economic situation in the case study area due to the fact that such changes are the aftermath of constant conditions and a lot of ongoing processes that very often result from regional or national trends, formal and legal changes as well as policies implemented at the governmental level. However, the role of the modernisation of the railway line in the development of the case study area should not be marginalised, and the impact of the investment should be identified several years or decades after the completion of, not during, the investment process. Nevertheless, taking the constant conditions into account, the case study attempts to analyse the intensity of phenomena occurring in space, which may be indirectly caused by the implementation of the transport investment project.

This analysis was carried out based on 8 quantitative indicators representing the spatio-functional as well as socio-economic processes (Appendices 3, 4). The intensity of the above-mentioned processes was evaluated in two aspects, i.e. in terms of distance zones from the E75 railway line in each year of the implementation of the investment project, and in terms of territorial units in the five-year period of the railway line modernisation. Individual indicators (calculated for territorial units and distance zones) are ranked from 1 (the lowest indicator value) up. Then these ranks for individual areas were averaged out to identify the intensity of the analysed processes. In the absence of a phenomena in the area, the value of the indicator was 0.

A considerable dichotomy is noticeable between the intensity of the analysed processes in the case study area. The scope of differences in the intensity of the analysed phenomena is affected by the location in relation to Warsaw, location of urban centres (the biggest players in the area) as well as location in relation to the KI transport corridor, i.e. the E75 railway line (being a symbolic border that divides the case study area into the northern and southern parts) and national road no. 8.

Between 2012–2016, the average intensity of the analysed processes in the zones determined by the distance from the E75 railway line increased proportionally along with the reduction of the distance from this line[39]. During the individual years of the E75 railway line modernisation, zones 1 and 2 were affected by the most noticeable changes (Figure 48). These two zones are in a better position in terms of transport availability, i.e. they are located within a 5–10-minute ride by car from the E75 railway line as well as within a 1-hour journey using railway or private transport from the Warsaw city centre (this concerns over 50% of the areas belonging to zones 1 and 2). In practical terms, a high intensity of the analysed processes was recorded along the entire length of zone 1, while towns, especially those located within a 25-km radius of the Warsaw city centre (suburbs of Warsaw), were highly distinctive. In addition, the areas of zone 2, for which national road no. 8 was an important transport route, featured a similar intensity of the processes. However, a high intensity was only recorded in the northern part of zone 2, which is included in the suburbs of Warsaw. The prevalence of urban areas in zones 1 and 2 may have a considerable influence on high values of the indicators in these zones. The development of urban centres is dynamic and, thus, the intensification of the processes occurring there is particularly high (Figure 49).

[39] Intensity of the analysed processes by distance zones between 2012–2016: zone 1 – 3.6; zone 2 – 2.9; zone 3 – 1.9; zone 4 – 0.9.

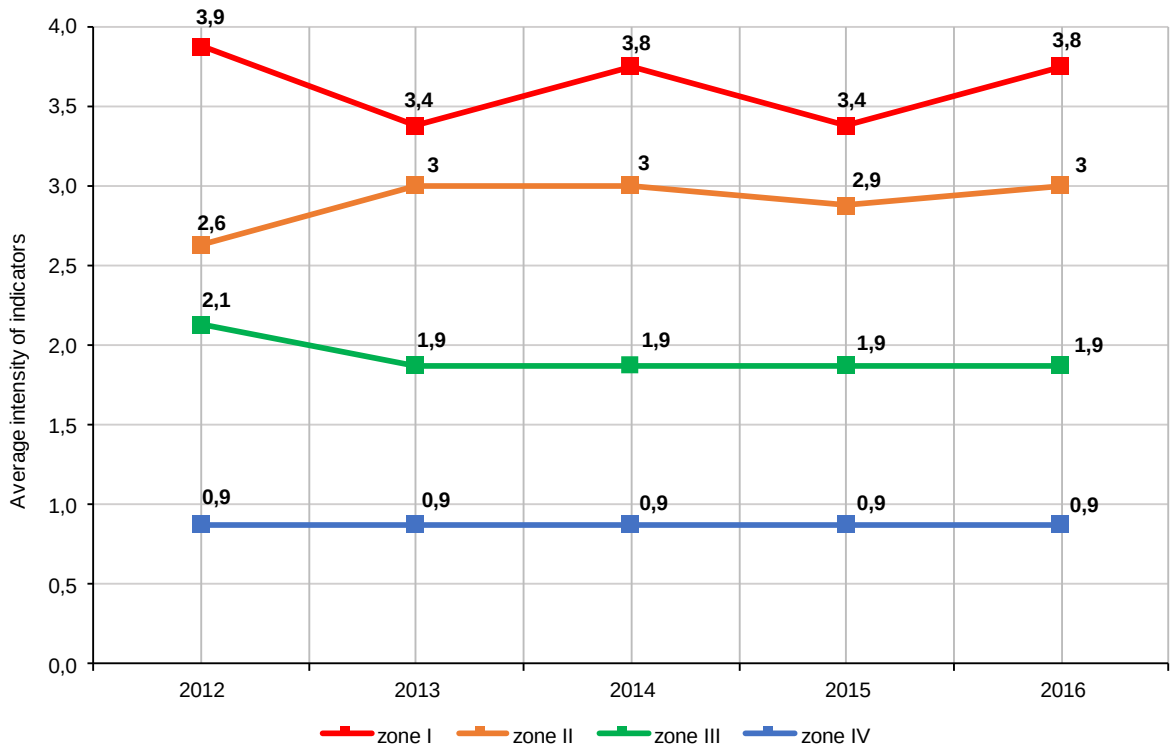


Figure 48. Average intensity of spatio-functional processes and socio-economic processes by zones of distance from the E75 railway line between 2012–2016

Source: Study of the MBPR

The highest intensity of the analysed phenomena (indicator value is over 50) was recorded in the towns of Ząbki, Marki, Radzymin, and Kobyłka as well as in the Rembertów district of the capital city of Warsaw. Of all urban centres, low values of the indicators (indicator value of 38) in Wołomin are especially puzzling, which may result from ongoing urban depopulation and the effect of national road no. 8, which indicates the direction for spatial development. As for the next zones (zones 3 and 4), the average intensity of the analysed indicators was considerably smaller, while their values virtually remained unchanged throughout the analysed 5 years. A relatively high intensity of the analysed phenomena was noticed in zone 3 (its northern part) – in the suburbs of Warsaw, i.e. in Radzymin and territorial units, through which national road no. 8 runs, and in zone 4 – in the Bug river valley, which belongs to the Radzymin commune and is located considerably far from the main transport routes in the case study area. The lowest intensity of the indicators was found in rural areas located in the eastern and southern parts of the case study area, for which travel times to the Warsaw city centre exceed one hour.

Observed for the southern part of the case study area, no increase in the intensity of the analysed processes along with the reduction of the distance from the E75 railway line may reflect a marginal effect of this railway line on this part. The range of impact of the railway line includes only the areas located in zone 1. National road no. 8 is another factor affecting the intensification of the occurring processes (e.g. construction activity, influx of inhabitants, development of business activities) in northern part of the case study area. What is more, the development of the areas located in the north-western part is also dictated by its natural qualities (the Bug river valley, closeness to the Zegrze Reservoir).

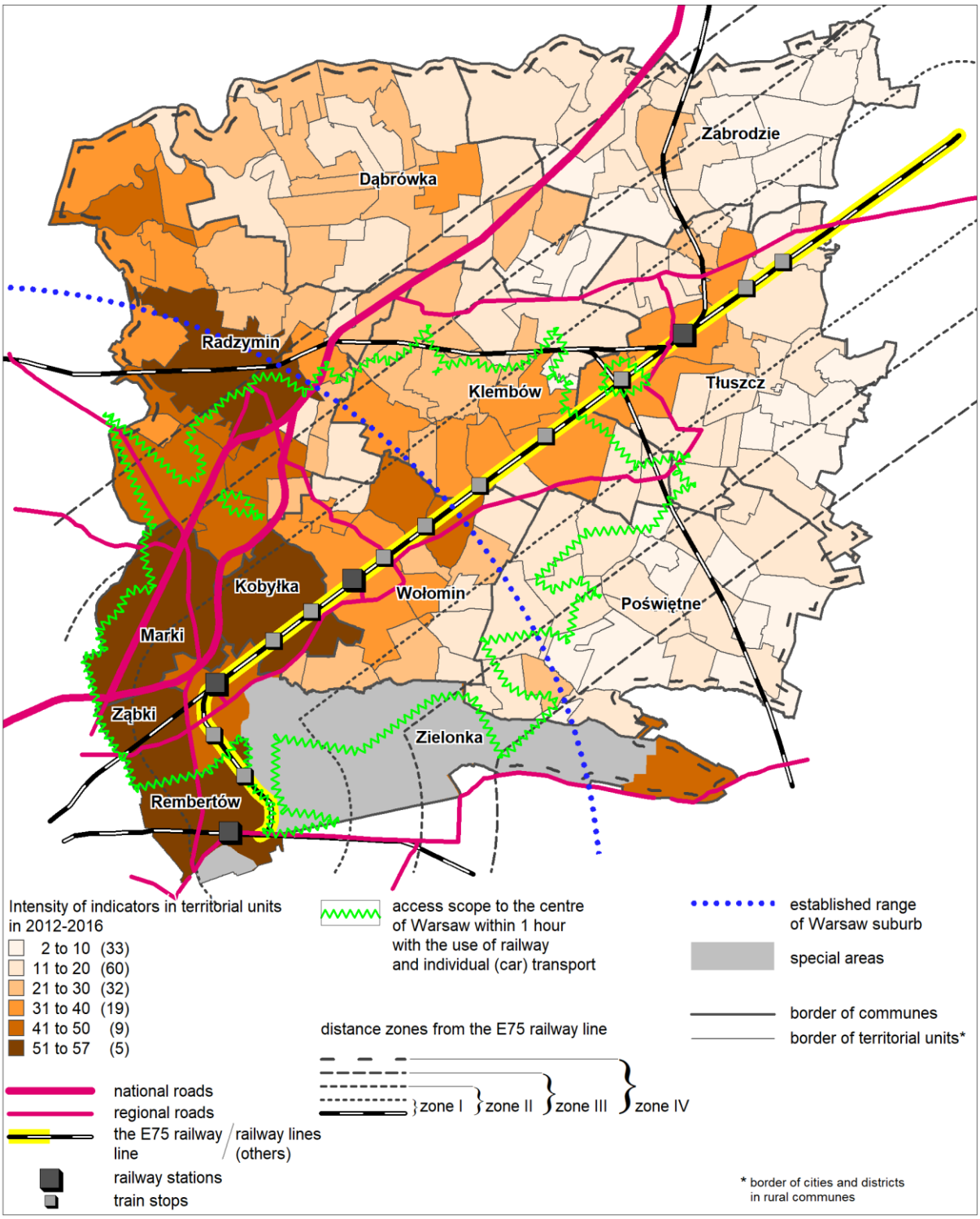


Figure 49. Average intensity of spatio-functional processes and socio-economic processes by transport availability

Source: Study of the MBPR

The analysis of the data in similar periods of time prior to the railway investment implementation indicates a steady progress of the analysed processes, i.e. there were no considerable fluctuations of the intensity of the indicators. In particular, a steady increase in the intensity of the indicators in zone 1 indicates continuous development of the areas located in the closest to the E75 railway line, which also occurred prior to the railway investment implementation. In comparison with the periods prior to the E75 railway line modernisation, a slight increase in the intensity of the analysed phenomena was recorded in the north-western

part of the case study area between 2012–2016, which may be associated with the suburbanisation shift from the communes near Warsaw to more attractive areas with greenfields as well as with the growing impact of national road no. 8.

Surveys conducted among local governments concerning possibilities of developing communes as a result of the E75 railway line modernisation confirm that the impact of the investment on spatial processes and the economic sector is small. Only four out of twelve communes see the implementation of the investment as a chance to develop. However, the communes through, which both the E75 railway line and the alternative national road no. 8 (S8) run lay particular stress on the fact that the road has higher significance in their development. Therefore, they designate investment areas next to the national road. It should be noted that the impact of the railway investment will probably be more measurable after several (dozen) years following its completion. Even though the majority of the communes do not see the railway investment implementation as the opportunity for their development at the moment, considerable greenfields may become their advantage. When transport availability and road access improve, greenfields may attract new inhabitants and entrepreneurs and, thus, contribute to the development of the case study area.

4.2. Recommendations

To increase the influence of the modernised E75 railway line, strengthen its potential, and to develop a cohesive, functionally complementing, and visually attractive area near this railway line, it is necessary to carry out multidirectional projects by public administration and territorial self-government authorities operating at various levels. Given the above, the following recommendations and conclusions concerning the most important investment and organisational activities are presented:

- to public administration:
  - completion of the railway line modernisation at the Czyżew–Białystok section and start of the investment at the Białystok–Suwałki–Trakiszki section;
  - complement of missing infrastructure and modernisation of existing infrastructure at a section of the Warsaw–Łódź–Poznań–Berlin corridor;
  - synchronisation of long-distance transport with regional and local transport systems in cooperation with territorial self-governments;
- to the Sejmik of the Mazowieckie Voivodeship, counties and commune governments:
  - rational spatial development, i.e. construction investments in greenfields (new investment areas) only after gaps in brownfields (the existing built-up and urbanised areas);
  - conversion of excess planned land use for residential buildings into production and service buildings;
  - revitalisation of degraded areas near the E75 railway line;
  - development of service infrastructure in investment areas, creation of investment incentives (e.g. tax advantages) for investors and entrepreneurs and formal and legal assistance for them;
  - implementation of projects in the areas indicated in the survey by commune governments, which may constitute potential places for developing business activities following the E75 railway line modernisation;

- cooperation with neighbouring territorial self-governments to ensure consistency in actions taken on the border of communes;
- promotion of the E75 railway line as a fast way to travel to Warsaw and Białystok (and to other Baltic states at a later time) in order to attract new inhabitants and investors;
- arrangement of the regional rail offer: differentiation of the offer into train categories depending on the type of operated centres (number of train stops); introduction of an integrated model for a periodic timetable, designation of transfer nodes; restoration of normal rail operation on railway lines running crosswise;
- matching the local bus transport offer to the rail offer so that the former could serve as a means of transport to the station/stop for railway passengers;
- works on the inclusion of all organisers and railway companies to the transport association of the Warsaw Metropolitan Area in order for timetable and price integration;
- improvements to changing means of transport at railway stations and stops: bringing bus stops closer to railway platforms, introduction of common timetable information offices;
- organisation of the areas around major transfer nodes – creation of public spaces with a legal priority of pedestrians and public transport.

APPENDICES

App. 1. ”Spatial policy of communes” survey

1. Please choose the factors that had an impact on the decision to alter the Study of conditions and directions of the spatial management of the Dąbrówka commune (Resolution no. IX/53/2003 of 10 July 2003)

Select at least one of the factors below:

☐ regulatory changes
☐ expectations of inhabitants/investors
☐ performance of the tasks of the commune resulting from Art. 8 of the Act on Commune Government
☐ consideration of public purpose investments of supra-local importance that result from higher-ranking documents (voivodship and national documents)
☐ other (which one?)

2. Please specify to what extent the following had an effect on making a decision to alter the Study of conditions and directions of the spatial management:

a) railway line no. 6 (Warsaw – Białystok) modernisation
☐ considerable effect – it was one of the leading factors
☐ moderate effect – it was one of many factors
☐ small effect – it had a marginal impact on making the decision
☐ it had no effect whatsoever.

b) improvements to technical parameters of national road no. 8
☐ considerable effect – it was one of the leading factors
☐ moderate effect – it was one of many factors
☐ small effect – it had a marginal impact on making the decision
☐ it had no effect whatsoever.

3. Have the railway line no. 6 (Warsaw – Białystok) modernisation and improvements to transport availability associated with it created new development opportunities and possibilities for the commune?
☐ yes
☐ no

If so, move on to question 4.

4. What actions does the commune plan to implement in order to increase development possibilities resulting from the railway line no. 6 modernisation?

☐ designation of new investment areas for residential buildings in the Study
☐ designation of new investment areas for production and technical/service buildings in the Study
☐ development of infrastructure in existing investment areas
☐ creation of investment incentives for entrepreneurs and investors
☐ revitalisation of degraded areas
☐ other (which one?)

5. Is the commune able to specify the areas in which the actions selected in point 4 are to be implemented?
   ☐ yes
   ☐ no
   If so, move on to question 6.

6. In which areas (territorial units/sołectwos – subdivisions of a commune) does the commune plan to implement the aforementioned actions?

……

Source: Study of the MBPR

App. 2. Building land reserves in the communes of the case study area – as at 31 December 2016

Commune/ district	Total area of urbanised and investment land* [ha]	Area of residential and service land** (urbanised and investment) [ha]	Area of residential and service land (urbanised) [ha]	Area of residential and service land (investment) [ha]	Area of production and technical and service land*** (urbanised and investment) [ha]	Area of production and technical and service land (urbanised) [ha]	Area of production and technical and service land (investment) [ha]	Total reserves [%]	Residen-tial and service land reserves [%]	Production and technical and service land reserves [%]
Radzymin	8,558.0	6,994.0	2,037.0	4,957.0	1,564.0	108.1	1,455.9	74.9	70.9	93.1
Dąbrówka	3,806.0	-	581.1	-	-	10.2	-	55.7	-	-
Zabrodzie	1,693.3	1,677.0	488.1	1,188.9	16.3	11.1	5.2	71.0	70.9	31.9
Klembów	2,673.4	2,513.0	654.5	1,858.5	160.4	128.9	31.5	70.7	74.0	19.6
Tłuszcz	3,424.2	3,290.0	1,192.0	2,098.0	134.2	80.9	53.3	62.8	63.8	39.7
Marki	1,691.3	1,515.0	1,106.0	409.0	176.3	125.1	51.2	27.2	27.0	29.0
Kobyłka	1,372.8	1,147.0	972.3	174.7	225.8	98.6	127.2	22.0	15.2	56.3
Wołomin	3,468.5	3,206.0	2,341.0	865.0	262.5	70.0	192.5	30.5	27.0	73.3
Poświętne	1,529.4	1,491.0	546.8	944.2	38.4	13.2	25.2	63.4	63.3	65.6
Ząbki	756.5	665.7	571.3	94.4	90.8	84.3	6.5	13.3	14.2	7.1
Rembertów	1,145.4	857.8	739.4	118.4	287.6	182.1	105.5	19.5	13.8	36.7
Zielonka	939.1	780.0	616.0	164.0	159.1	35.1	124.0	30.7	21.0	78.0
Total	27,251.8	24,136.5	11,845.5	12,291.0	3,115.3	947.6	2,167.7	53.1	50.9	69.6

* investment areas – vacant land intended for residential and service buildings or production and technical and service buildings

** residential and service areas

*** production and technical and service areas

Source: Study of the MBPR on the basis of the CODGiK and county offices

App. 3. Spacio-functional and socio-economic indicators in zones of distance from the E75 railway line

Granted building licenses						
Zone:	**2012**	**2013**	**2014**	**2015**	**2016**	**2012–2016 (average)**
zone I	578	601	529	520	508	547,2
zone II	243	204	271	265	211	238,8
zone III	200	142	181	170	167	172,0
zone IV	135	132	102	120	120	121,8

Population						
Zone:	**2012**	**2013**	**2014**	**2015**	**2016**	**2012–2016 (average)**
zone I	157935	159660	161505	162951	164166	161243,4
zone II	39070	40017	40802	41875	43063	40965,4
zone III	22874	23838	24779	25724	26701	24783,2
zone IV	11727	12007	12322	12591	12808	12291,0

Population density in urban areas (pers./ha)						
Zone:	**2012**	**2013**	**2014**	**2015**	**2016**	**2012–2016 (average)**
zone I	43	43,5	44	39,9	40,2	42,1
zone II	26,3	27	27,5	25,1	25,88	26,3
zone III	29,9	21,3	22,2	19,5	20,2	22,6
zone IV	12,4	12,6	13	11,8	13	12,6

Number of new registered business entities						
Zone:	**2012**	**2013**	**2014**	**2015**	**2016**	**2012–2016 (average)**
zone I	656	825	857	1096	1239	934,6
zone II	156	212	222	285	371	249,2
zone III	103	116	142	171	203	147,0
zone IV	35	47	50	57	79	53,6

Number of transactions on real estate market						
Zone:	**2012**	**2013**	**2014**	**2015**	**2016**	**2012–2016 (average)**
zone I	910	1101	1121	1286	1672	1218,0
zone II	305	460	363	645	889	440,4
zone III	115	208	218	301	309	230,2
zone IV	96	163	128	198	189	154,8

Average price of dwelling transactions (zl/ sg.m)						
Zone:	**2012**	**2013**	**2014**	**2015**	**2016**	**2012–2016 (average)**
zone I	4779,9	4367,8	4569,2	4498,4	4551,8	4553,4
zone II	4165,3	4288,4	4365,8	4366,4	4235,3	4284,2
zone III	4380,2	3893,1	4132	4122,4	4074,5	4120,4
zone IV	0	0	0	0	0	0

Average price of developed real estates with residential building (zl/ sg.m)						
Zone:	**2012**	**2013**	**2014**	**2015**	**2016**	**2012–2016 (average)**
zone I	1124,2	1031,7	956,4	922,8	1017,7	1010,6
zone II	1053,2	1009,3	970,6	781,2	1037,1	970,3
zone III	411,9	567	428,7	666,1	462	507,2
zone IV	312,7	374,9	274,9	179,6	236,3	275,7

Average price of unbuilt real estates (zl/ sg.m)						
Zone:	**2012**	**2013**	**2014**	**2015**	**2016**	**2012–2016 (average)**
zone I	194	187	199	197	164	188,2
zone II	124	199	171	160	197	170,2
zone III	58	65	68	62	80	66,6
zone IV	38	39	34	45	40	32,4

Average intensity of spatio-functional and socio-economic indicators						
Zone:	**2012**	**2013**	**2014**	**2015**	**2016**	**2012–2016 (average)**
zone I	3,9	3,4	3,8	3,4	3,8	3,6
zone II	2,6	3	3	2,9	3	2,9
zone III	2,1	1,9	1,9	1,9	1,9	1,9
zone IV	0,9	0,9	0,9	0,9	0,9	0,9

Source: Study of the MBPR

App. 4. Spatio-functional and socio-economic indicators in territorial units of the case study area between 2012–2016

No.	Commune	Territorial unit	Location in zone of distance from the E75 railway line	Number of granted building licenses – total (2012–2016)		Change of population (2012–2016)		Change of population density (pers./ha) (2012–2016)		Number of new registered REGON (2012-2016)		Number of transactions on real estate market – total (2012–2016)		Average price of dwelling transaction in 2012–2016		Average price of developed real estate with residential building in 2012–2016		Average price of unbuilt real estate in 2012–2016		Intensity of indicators in territorial units in 2012–2016
				Number of granted building licenses – total (2012–2016)	ranking	Change of population (2012–2016)	ranking	Change of population density (pers./ha) (2012–2016)	ranking	Number of new registered REGON (2012-2016)	ranking	Number of transactions on real estate market – total (2012–2016)	ranking	Average price of dwelling transaction in 2012–2016	ranking	Average price of developed real estate with residential building in 2012–2016	ranking	Average price of unbuilt real estate in 2012–2016	ranking	Average from rankings
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	Ząbki	m. Ząbki	I	369	52	3577	76	0,5	48	1159	39	1795	51	4928	15	1236	90	410	83	57
2	Marki	m. Marki	II	711	54	3199	75	-0,2	40	1017	38	2183	52	4300	14	1067	89	320	81	55
3	Kobyłka	m. Kobyłka	I	572	53	1874	73	-1,0	32	657	35	1006	49	3599	9	1047	88	248	79	52
4	Rembertów	dz. Rembertów	I	267	49	471	71	-3,2	10	689	36	1110	50	5770	16	1590	91	403	82	51
5	Zielonka	m. Zielonka	I	243	48	2	20	-5,7	3	528	34	560	46	3963	12	743	85	308	80	41
6	Radzymin	m. Radzymin	III	295	50	2736	74	1,1	53	388	33	597	47	4166	13	666	82	109	75	53
7		Słupno	III	103	46	489	72	0,2	45	100	31	118	44	3388	8	533	74	126	77	50
8		Nadma	II	55	40	318	70	1,8	57	38	25	68	41	2510	5	379	59	92	69	46
9		Cegielnia	III	30	29	177	67	1,0	52	40	26	29	27	0	0	743	85	93	70	45
10		Ciemne	II	24	24	194	68	0,3	46	25	22	43	35	2572	6	420	65	95	71	42
11		Stare Załubice	IV	31	30	224	69	3,2	61	18	18	42	34	0	0	380	60	78	63	42
12		Stary Dybów	III	19	19	101	63	-0,7	35	14	14	17	17	0	0	440	68	86	66	35
13		Arciechów	IV	40	36	44	48	0,4	47	5	5	91	43	0	0	278	45	49	48	34
14		Sieraków	IV	9	9	45	49	1,2	54	9	9	7	7	0	0	571	78	83	65	34
15		Nowe Załubice	IV	33	31	128	65	1,6	56	17	17	51	36	0	0	144	22	37	36	33
16		Łąki	IV	17	17	54	54	0,5	48	9	9	21	21	0	0	431	67	43	42	32
17		Ruda	IV	21	21	84	61	0,8	50	10	10	26	25	0	0	323	51	39	38	32
18		Borki	IV	23	23	35	45	0,1	44	6	6	26	25	0	0	245	39	90	67	31
19		Nowy Janków	II	12	12	29	42	0,4	47	6	6	11	11	0	0	405	63	71	59	30
20		Łosie	IV	22	22	78	60	1,5	55	4	4	31	28	0	0	121	17	48	47	29
21		Mokre	IV	13	13	68	58	-0,5	37	11	11	19	19	0	0	334	53	35	34	28
22		Wiktorów	III	6	6	21	38	0,3	46	2	2	10	10	0	0	340	54	56	52	26

No.	Commune	Territorial unit	Location in zone of distance from the E75 railway line	Number of granted building licenses – total (2012–2016)		Change of population (2012–2016)		Change of population density (pers./ha) (2012–2016)		Number of new registered REGON (2012-2016)		Number of transactions on real estate market – total (2012–2016)		Average price of dwelling transaction in 2012–2016		Average price of developed real estate with residential building in 2012–2016		Average price of unbuilt real estate in 2012–2016		Intensity of indicators in territorial units in 2012–2016
				Number of granted building licenses – total (2012–2016)	ranking	Change of population (2012–2016)	ranking	Change of population density (pers./ha) (2012–2016)	ranking	Number of new registered REGON (2012-2016)	ranking	Number of transactions on real estate market – total (2012–2016)	ranking	Average price of dwelling transaction in 2012–2016	ranking	Average price of developed real estate with residential building in 2012–2016	ranking	Average price of unbuilt real estate in 2012–2016	ranking	Average from rankings
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
23		Zawady	IV	5	5	51	53	2,1	59	6	6	9	9	0	0	107	14	54	51	25
24		Stary Janków	II	4	4	31	43	3,1	60	7	7	1	1	0	0	0	0	119	76	24
25		Emilianów	III	22	22	38	46	-2,0	22	8	8	19	19	0	0	0	0	52	50	21
26		Zwierzyniec	IV	10	10	34	44	-0,4	38	7	7	7	7	0	0	0	0	44	43	19
27		Rżyska	II	13	13	25	40	-3,1	12	5	5	13	13	0	0	0	0	48	47	16
28		Dybów-Kolonia	III	4	4	64	57	-0,1	42	8	8	1	1	0	0	0	0	0	0	14
29		Popielarze	IV	0	0	3	21	1,6	56	0	0	6	6	0	0	0	0	27	27	14
30	Wołomin	Duczki	I	62	42	169	66	-1,4	28	59	30	57	39	0	0	563	77	126	77	45
31		Zagościniec	I	58	41	48	51	0,5	48	57	29	54	37	0	0	507	72	102	73	44
32		Lipinki	I	50	39	102	64	-0,6	36	20	20	36	32	2331	4	349	56	106	74	41
33		m. Wołomin	I	352	51	-684	1	-6,4	1	961	37	779	48	3606	10	652	80	201	78	38
34		Czarna	I	27	27	48	51	-1,4	28	23	21	24	23	0	0	345	55	93	70	34
35		Stare Lipiny	I	24	24	43	47	-3,2	11	11	11	21	21	0	0	598	79	99	72	33
36		Nowe Grabie	I	16	16	29	42	-0,2	40	8	8	29	27	2749	7	230	36	63	56	29
37		Nowe Lipiny	I	29	28	-23	2	-2,7	16	25	22	23	22	0	0	539	75	80	64	29
38		Leśniakowizna	II	12	12	19	37	-0,2	40	7	7	23	22	0	0	289	47	70	58	28
39		Turów	I	11	11	-8	10	-1,8	24	4	4	4	4	0	0	511	73	93	70	25
40		Ossów	I	15	15	0	17	-1,1	31	12	12	32	29	0	0	465	71	15	15	24
41		Cięciwa	II	10	10	10	28	-1,0	32	5	5	13	13	0	0	124	18	45	44	19
42		Majdan	II	14	14	10	28	-1,0	32	3	3	15	15	0	0	0	0	57	53	18
43		Mostówka 1	II	6	6	13	31	-0,5	37	4	4	5	5	0	0	193	32	24	24	17
44		Stare Grabie	I	14	14	11	29	-1,5	27	14	14	10	10	0	0	0	0	45	44	17
45		Helenów 2	II	12	12	-4	13	-1,6	26	6	6	10	10	0	0	69	8	62	55	16
46	Klembów	Dobczyn	I	69	44	62	56	-2,1	21	35	24	35	31	1344	1	543	76	91	68	40

No.	Commune	Territorial unit	Location in zone of distance from the E75 railway line	Number of granted building licenses – total (2012–2016)		Change of population (2012–2016)		Change of population density (pers./ha) (2012–2016)		Number of new registered REGON (2012-2016)		Number of transactions on real estate market – total (2012–2016)		Average price of dwelling transaction in 2012–2016		Average price of developed real estate with residential building in 2012–2016		Average price of unbuilt real estate in 2012–2016		Intensity of indicators in territorial units in 2012–2016
				Number of granted building licenses – total (2012–2016)	ranking	Change of population (2012–2016)	ranking	Change of population density (pers./ha) (2012–2016)	ranking	Number of new registered REGON (2012-2016)	ranking	Number of transactions on real estate market – total (2012–2016)	ranking	Average price of dwelling transaction in 2012–2016	ranking	Average price of developed real estate with residential building in 2012–2016	ranking	Average price of unbuilt real estate in 2012–2016	ranking	Average from rankings
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
47		Lipka	I	89	45	91	62	-1,6	26	47	27	41	33	0	0	319	50	52	50	37
48		Pasek	I	38	34	25	40	-0,4	38	8	8	25	24	0	0	717	84	72	60	36
49		Klembów	I	58	41	50	52	-1,5	27	20	20	20	20	0	0	461	70	46	45	34
50		Stary Kraszew	II	36	33	19	37	-1,3	29	5	5	33	30	0	0	754	86	35	34	32
51		Michałów	II	20	20	19	37	-0,2	40	8	8	32	29	0	0	385	61	49	48	30
52		Wola Rasztowska	III	50	39	44	48	-1,2	30	18	18	62	40	2229	3	23	3	66	57	30
53		Nowy Kraszew	I	15	15	21	38	-1,7	25	5	5	15	15	0	0	898	87	47	46	29
54		Rasztów	II	19	19	10	28	-0,9	33	4	4	16	16	0	0	450	69	34	33	25
55		Sitki	I	7	7	17	35	0,6	49	5	5	14	14	0	0	130	19	38	37	21
56		Krusze	II	24	24	15	33	-1,1	31	3	3	27	26	0	0	0	0	36	35	19
57		Krzywica	I	16	16	15	33	-0,4	38	9	9	20	20	0	0	0	0	25	25	18
58		Roszczep	II	11	11	15	33	0,0	43	2	2	10	10	0	0	34	5	18	18	15
59		Karolew 1	II	10	10	15	33	-1,9	23	2	2	5	5	0	0	143	21	14	14	14
60		Tuł	II	8	8	18	36	-1,0	32	2	2	4	4	0	0	0	0	4	4	11
61		Pieńki	I	0	0	2	20	0,6	49	0	0	0	0	0	0	0	0	0	0	9
62	Dąbrówka	Dąbrówka	IV	47	38	56	55	-1,3	29	16	16	25	24	0	0	413	64	59	54	35
63		Kuligów	IV	35	32	5	23	-0,1	42	9	9	69	42	0	0	182	29	38	37	27
64		Józefów	IV	6	6	19	37	-0,4	38	8	8	19	19	0	0	379	59	42	41	26
65		Ostrówek	IV	9	9	13	31	-1,4	28	3	3	12	12	0	0	658	81	42	41	26
66		Kołaków	IV	26	26	11	29	-2,8	15	8	8	20	20	0	0	424	66	33	32	25
67		Guzowatka	IV	16	16	22	39	-0,5	37	16	16	17	17	0	0	212	34	36	35	24
68		Wszebory	III	27	27	25	40	-0,9	33	6	6	16	16	0	0	191	31	38	37	24
69		Ślężany	IV	15	15	17	35	-0,1	42	3	3	21	21	0	0	223	35	30	30	23
70		Czarnów	IV	14	14	11	29	-0,3	39	5	5	20	20	0	0	238	37	28	28	22

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
71		Małopole-Stanisławów	IV	39	35	12	30	-3,3	9	8	8	17	17	0	0	180	28	46	45	22
72		Trojany	III	22	22	4	22	-1,5	27	16	16	7	7	0	0	148	23	50	49	21
73		Marianów	IV	16	16	14	32	-0,6	36	5	5	13	13	0	0	300	48	16	16	21
74		Teodorów-Sokołówek	IV	7	7	16	34	-0,3	39	6	6	12	12	0	0	244	38	27	27	20
75		Kowalicha	IV	15	15	14	32	-0,8	34	5	5	20	20	0	0	88	11	33	32	19
76		Chajęty	IV	8	8	12	30	-1,1	31	9	9	6	6	0	0	0	0	75	62	18
77		Karpin	III	19	19	9	27	-4,3	5	3	3	11	11	0	0	262	40	41	40	18
78		Dręszew	IV	16	16	-1	16	-2,0	22	10	10	18	18	0	0	113	15	17	17	14
79		Ludwinów	IV	8	8	8	26	-0,8	34	5	5	14	14	1676	2	0	0	20	20	14
80		Stasiopole	IV	1	1	1	18	0,1	44	0	0	5	5	0	0	137	20	17	17	13
81		Cisie	IV	4	4	5	23	-0,5	37	0	0	3	3	0	0	0	0	34	33	13
82		Lasków	IV	6	6	3	21	-0,7	35	8	8	5	5	0	0	0	0	18	18	12
83		Działy Czarnowskie	IV	0	0	-5	12	-0,9	33	0	0	1	1	0	0	0	0	40	39	11
84		Karolew 2	II	3	3	6	24	-0,3	39	1	1	3	3	0	0	0	0	5	5	9
85		Chruściele	II	5	5	5	23	-3,5	8	3	3	4	4	0	0	0	0	18	18	8
86		Zaścienie	II	7	7	-18	3	-3,1	12	2	2	5	5	0	0	0	0	15	15	6
87	Tłuszcz	m. Tłuszcz	I	155	47	51	53	-6,1	2	172	32	225	45	3761	11	369	57	75	62	39
88		Jasienica	I	65	43	84	61	-2,0	22	52	28	56	38	0	0	377	58	40	39	36
89		Postoliska	I	41	37	77	59	-1,9	23	19	19	27	26	0	0	674	83	41	40	36
90		Dzięcioły	I	9	9	14	32	0,0	43	5	5	15	15	0	0	269	42	37	36	23
91		Jarzębia Łąka	I	10	10	56	55	0,9	51	14	14	8	8	0	0	58	7	25	25	21
92		Chrzęsne	I	17	17	1	19	-1,0	32	27	23	14	14	0	0	202	33	21	21	20
93		Wólka Kozłowska	I	13	13	13	31	-1,0	32	8	8	18	18	0	0	186	30	21	21	19
94		Rysie	I	5	5	1	19	-0,8	34	5	5	3	3	0	0	152	26	44	43	17

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
95		Szczepanek	II	5	5	15	33	-0,2	40	8	8	16	16	0	0	0	0	14	14	15
96		Miąse	II	14	14	10	28	-0,9	33	17	17	13	13	0	0	0	0	10	10	14
97		Mokra Wieś	I	12	12	16	34	-2,4	19	7	7	9	9	0	0	0	0	25	25	13
98		Łysobyki	II	6	6	-1	16	-0,4	38	6	6	7	7	0	0	72	9	23	23	13
99		Stryjki	II	2	2	10	28	0,6	49	5	5	3	3	0	0	0	0	14	14	13
100		Stasinów	II	0	0	6	24	1,9	58	0	0	8	8	0	0	0	0	9	9	12
101		Kozły	II	14	14	3	21	-2,6	17	4	4	20	20	0	0	0	0	22	22	12
102		Franciszków	III	2	2	7	25	0,0	43	1	1	16	16	0	0	0	0	7	7	12
103		Kury	II	5	5	6	24	-0,9	33	0	0	9	9	0	0	75	10	9	9	11
104		Wagan	I	2	2	2	20	-0,6	36	0	0	5	5	0	0	101	13	12	12	11
105		Rudniki	II	1	1	-6	11	-1,1	31	1	1	4	4	0	0	0	0	29	29	10
106		Brzezinów	I	3	3	-2	15	-1,1	31	3	3	6	6	0	0	0	0	17	17	9
107		Białki	II	2	2	-5	12	-1,8	24	4	4	10	10	0	0	0	0	10	10	8
108		Pawłów	II	0	0	-3	14	-0,7	35	2	2	2	2	0	0	0	0	2	2	7
109		Jaźwie	III	5	5	-9	9	-1,4	28	0	0	7	7	0	0	0	0	3	3	7
110		Waganka	I	1	1	-3	14	-0,7	35	1	1	0	0	0	0	0	0	0	0	6
111		Grabów	II	5	5	2	20	-3,5	8	3	3	2	2	0	0	0	0	11	11	6
112	Poświętne	Trzcinka	III	13	13	19	37	-0,4	38	6	6	19	19	0	0	316	49	29	29	24
113		Ostrowik	III	6	6	10	28	0,8	50	2	2	5	5	0	0	274	44	23	23	20
114		Nowe Ręczaje	II	12	12	9	27	-0,2	40	6	6	7	7	0	0	333	52	12	12	20
115		Zabraniec	III	13	13	3	21	-2,4	19	6	6	20	20	0	0	403	62	8	8	19
116		Poświętne	III	17	17	11	29	-3,0	13	15	15	11	11	0	0	177	27	30	30	18
117		Międzypole	III	6	6	5	23	-1,6	26	4	4	3	3	0	0	267	41	25	25	16
118		Czubajowizna	II	17	17	9	27	-0,7	35	2	2	14	14	0	0	0	0	23	23	15

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
119		Choiny	III	12	12	14	32	-1,4	28	8	8	5	5	0	0	0	0	31	31	15
120		Międzyleś	III	15	15	15	33	-1,1	31	4	4	11	11	0	0	22	2	18	18	14
121		Nadbiel	II	6	6	5	23	-1,9	23	1	1	12	12	0	0	151	25	13	13	13
122		Krubki Górki	IV	16	16	-2	15	-3,0	13	1	1	23	22	0	0	0	0	31	31	12
123		Wola Cygowska	IV	9	9	6	24	-4,0	6	2	2	10	10	0	0	120	16	29	29	12
124		Dąbrowica	III	4	4	9	27	-0,1	42	2	2	7	7	0	0	0	0	7	7	11
125		Ręczaje Polskie	II	17	17	6	24	-2,4	19	7	7	5	5	0	0	0	0	14	14	11
126		Cygów	IV	16	16	-10	8	-2,9	14	10	10	13	13	0	0	33	4	19	19	11
127		Nowy Cygów	III	9	9	0	17	-0,4	38	1	1	4	4	0	0	0	0	12	12	10
128		Wólka Dąbrowicka	III	5	5	0	17	-1,3	29	10	10	6	6	0	0	0	0	14	14	10
129		Wola Ręczajska	IV	9	9	-6	11	-0,6	36	3	3	6	6	0	0	0	0	13	13	10
130		Laskowizna	III	0	0	-9	9	-1,7	25	2	2	4	4	0	0	0	0	36	35	9
131		Józefin	II	2	2	0	17	-1,7	25	0	0	2	2	0	0	0	0	17	17	8
132		Małków	IV	2	2	-1	16	-1,7	25	3	3	6	6	0	0	8	1	7	7	8
133		Helenów 1	IV	0	0	-2	15	-0,5	37	1	1	1	1	0	0	0	0	2	2	7
134		Rojków	IV	5	5	0	17	-6,1	2	5	5	4	4	0	0	0	0	23	23	7
135		Turze	IV	8	8	-8	10	-2,7	16	6	6	5	5	0	0	0	0	11	11	7
136		Kolno	III	3	3	-16	4	-1,8	24	1	1	1	1	0	0	0	0	10	10	5
137	Zabrodzie	Zabrodzie	III	29	28	47	50	-0,1	42	16	16	10	10	0	0	286	46	48	47	30
138		Mostówka 2	III	27	27	8	26	-0,9	33	16	16	12	12	0	0	0	0	50	49	20
139		Słopsk	IV	25	25	26	41	-0,9	33	10	10	21	21	0	0	52	6	22	22	20
140		Wysychy	III	18	18	10	28	-1,3	29	3	3	4	4	0	0	0	0	70	58	18
141		Niegów	III	24	24	-12	6	-3,3	9	13	13	9	9	0	0	273	43	27	27	16

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
142		Młynarze	IV	7	7	-3	14	-0,9	33	1	1	23	22	0	0	149	24	27	27	16
143		Gaj	III	13	13	10	28	-0,8	34	6	6	14	14	0	0	0	0	24	24	15
144		Zazdrość	III	11	11	3	21	-2,3	20	5	5	12	12	0	0	0	0	34	33	13
145		Lipiny	II	8	8	13	31	-0,3	39	1	1	3	3	0	0	0	0	16	16	12
146		Adelin	II	18	18	-9	9	-3,3	9	2	2	14	14	0	0	130	19	26	26	12
147		Anastazew	III	12	12	4	22	-1,4	28	3	3	9	9	0	0	0	0	9	9	10
148		Głuchy	III	7	7	6	24	0,2	45	2	2	2	2	0	0	0	0	1	1	10
149		Basinów	II	10	10	-5	12	-2,8	15	2	2	9	9	0	0	0	0	31	31	10
150		Choszczowe	III	11	11	-11	7	-3,3	9	4	4	18	18	0	0	93	12	15	15	10
151		Dębinki	II	16	16	-5	12	-4,0	6	15	15	4	4	0	0	0	0	8	8	8
152		Podgać	III	4	4	-5	12	-2,9	14	2	2	12	12	0	0	0	0	8	8	7
153		Obrąb	II	4	4	-3	14	-2,1	21	1	1	7	7	0	0	0	0	3	3	6
154		Przykory	I	1	1	-13	5	-1,6	26	4	4	3	3	0	0	0	0	6	6	6
155		Kiciny	II	9	9	-2	15	-3,6	7	3	3	5	5	0	0	0	0	5	5	6
156		Płatków	II	3	3	-5	12	-2,5	18	1	1	2	2	0	0	0	0	4	4	5
157		Mościska	II	2	2	-5	12	-4,9	4	0	0	3	3	0	0	0	0	2	2	3
158		Karolinów	I	1	1	-8	10	-3,6	7	0	0	0	0	0	0	0	0	0	0	2

Source: Study of the MBPR on the basis of the CODGiK, commune offices and county offices

App. 5. Survey of passengers who use the E75 railway line concerning the quality of rail services and transport attractiveness

Survey date (underline the date):

A. Monday B. Tuesday C. Wednesday D. Thursday E. Friday

Starting railway station/stop	End railway station/stop

Availability

1. **How did you get to the railway station/stop <u>today</u>?**
   a) On foot
   b) By bicycle
   c) By car
   d) Using public transport
   e) Using other means of transport, which one(s)? ……..
2. **How do you usually get to the railway station/stop?**
   a) On foot
   b) On foot
   c) By bicycle
   d) By car
   e) Using public transport
   f) Using other means of transport, which one(s)? ……
3. **Does the way to get to the railway station/stop depend on the weather?**
   a) Yes
   b) No
4. **What is an approximate distance from the place of residence/workplace/school to the railway stop/station:**

PLACE/DISTANCE	Up to 3 km	3–6 km	Over 6 km
Place of residence			
Work			
School			

5. **How long does it approximately take to reach the railway station/stop from the place of residence/workplace/school:**

PLACE/TIME	Up to 30 minutes	Between 30–60 minutes	More than 60 minutes
Place of residence			
Work			
School			

6. **What is the purpose of your today's trip:**
   a) School
   b) Work
   c) Shopping
   d) Entertainment
   e) Doctor
   f) Other (please specify) …….

Transport offer

7. Please rank the number of trains (connections) on a scale from 1 – 5 where 1 means very small and 5 means very high.

	1– Very small	2	3	4	5 – Very high
In the morning (5 a.m. – 10 a.m.)					
Around midday (10:01 a.m. – 2 p.m.)					
In the afternoon (2:01 p.m. – 6 p.m.)					
In the evening (6:01 p.m. – 10 p.m.)					
At night (10:01 p.m. – 4:59 a.m.)					

8. Please rank the train journey time on a scale from 1 – 5 where 1 means very long and 5 means very short.

1 – very long	2	3	4	5 – very short

9. Please evaluate the train journey time compared to other means of transport:

A. Compared to journeys by car:

a) Longer
b) Shorter

B. Compared to journeys by bus:

a) Longer
b) Shorter

Reliability

10. How often do you experience the following situations? Please rank them on a scale from 1 to 5 where 1 means very often and 5 means very rarely

	1 – very often	2	3	4	5 – very rarely
Delays					
Train cancellations					
Train failures					

Ticket offer

11. Which ticket do you use to travel?

a) One-way ticket
b) Day ticket
c) Monthly season ticket
d) Other (please specify) ……

12. Please rank the ticket offer in terms of price and costs on a scale from 1 to 5 where 1 means very low and 5 means very high.

	1 – very low	2	3	4	5 – very high
Price					
Ticket price compared to costs associated with travelling using other means of transport (buses, cars)					

Comfort of travel and condition of railway infrastructure

13. Please rank the comfort of travel on a scale from 1 to 5 (where 1 means very low/bad and 5 means very high/good) taking the following into account:

	1 – very low/bad	2	3	4	5 – very high/good
Comfort					
Aesthetic qualities, cleanliness					
Congestion levels					
Personal safety					

14. Please rank the equipment at railway stations/stops on a scale from 1 to 5 where 1 means very bad and 5 means very good.

	1 – very bad	2	3	4	5 – very good	Not applicable (they are not present at a given railway station/stop)
Displays						
Timetable						
Passenger information						
Shop/kiosk						
Ticket office/machine						
Parking lots						
Video surveillance						

15. **Please rank the following on a scale from 1 to 5 where 1 means very bad and 5 means very good:**

RESPONSE/ RANK	1 – very bad	2	3	4	5 – very good
Distance to a bus stop					
Time needed to reach a bus stop					
Quality of the route to a bus stop					
Distance to a parking lot					
Time needed to reach a parking lot					
Quality of the route to a parking lot					
Distance to a bicycle parking rack					
Time needed to reach a bicycle parking rack					
Quality of the route to a bicycle parking rack					

16. **Please rank the quality of railway transport on the Warszawa Rembertów – Sadowne line where 1 means very bad and 5 means very good:**

1	2	3	4	5

Personal information

17. **Sex**:
    a) Female
    b) Male
18. **Age:**
    a) Below 18
    b) 18–24
    c) 25–34
    d) 35–44
    e) 45–54
    f) 55–64
    g) Over 65
19. **Education:**
    a) Primary
    b) Middle
    c) Vocational
    d) Secondary
    e) Incomplete higher
    f) Higher

20. Occupational status:

a) student, pupil
b) labourer, blue-collar worker
c) clerk, administration worker
d) entrepreneur, manager
e) teacher
f) liberal profession (lawyer, doctor, artist)
g) craftsman, trader
h) farmer
i) housewife
j) pensioner
k) currently unemployed
l) other profession/occupation (please specify)

21. Do you have a car?

a) Yes
b) No

SURVEY FORM

Interviewer's first name and surname ……

Survey no.: ……..

Source: Study of the MBPR

App. 6. KI transport corridor in the light of national and regional documents

This chapter includes an analysis of planning and strategic documents (at a national and regional level) in terms of the status and development prospects of railway infrastructure in the KI transport corridor (railway line no. 6/E75) (Table 19).

The following documents were analysed:

National level

- ***Responsible Development Strategy*:** it is the most important strategic document for the development of Poland. Its legal basis is the Act on Conducting the Development Policy of 6 December 2006 (Journal of Laws of 2016, items 383, 1250, 1948, and 1954 and of 2017, item 5). It was adopted by the Council of Ministers in February 2017. As provided in the introduction to the document, it specifies the priorities when it comes to the development of Poland in economic, social, and spatial terms by 2020 and 2030. This document is of strategic and operational significance: it indicates actions and strategic projects that ensure the document is implemented. The *Responsible Development Strategy* constitutes a revision of a mid-term national development strategy, i.e. the *National Development Strategy 2020* adopted by a Resolution of the Council of Ministers of 25 September 2012.
- ***National Spatial Development Concept 2030*:** As provided in the introduction, this document is the most important strategic document of Poland with respect to the spatial development of the country. Its legal basis is the Spatial Planning and Land Development Act of 27 March 2003. It was adopted by the Council of Ministers in December 2011. The document contains the findings and recommendations concerning the preparation of voivodship spatial development plans. It also contains a vision of the spatial development of Poland over the next twenty years. It has many qualities of a general development strategy: it integrates the spatial development area with factors of socio-economic development.
- ***Infrastructure and Environment Operational Programme 2014–2020*:** It is the largest operational programme. According to the document, the major objective of the *Programme* – to support a resource efficient and low carbon economy in pursuit of territorial and social cohesion – results from one of the three priorities of the Europe 2020 strategy, which includes sustainable growth in the form of promoting a more resource efficient, low carbon, and more competitive economy in which environmental objectives are complemented by actions in favour of economic, social, and territorial cohesion. Railway investments are financed under Priority Axis 5: Development of Railway Transport in Poland. It was adopted by the European Commission in December 2014.
- ***Transport Development Strategy until 2020*:** as provided in the document, it is a mid-term planning document, which – according to the Act on Conducting the Development Policy of 6 December 2006 and the Resolution of the Council of Ministers on the Development Strategy Arrangement Plan of 24 November 2009 – constitutes an integral element of a cohesive system of management of national strategic documents. The essence of the *Strategy* is to indicate objectives and outline transport development prospects in order to ensure that it is possible to achieve goals specified in the Long-Term National Development Strategy (DSRK) and *Mid-Term National Development Strategy* (SRK 2020) in phases by 2030. It was adopted by the Council of Ministers in January 2013. Further, the document specifies the most important guidelines necessary to be followed by 2030. In particular, these guidelines include capital-intensive and time-consuming investments in transport infrastructure,

transformation of management systems, and implementation of innovative (”smart”) solutions that make it easier for the infrastructure to operate within the entire transport system and in an intermodal direction.

- ***Master Plan for railway transport in Poland until 2030*:** this document presents a concept of the development of railway transport in Poland until 2013. Revitalisation of the railway sector will involve concentrating actions and resources where required by market expectations. Efforts will be put into winning and maintaining the trust of customers and passengers. It will be possible to gain this trust by making considerable improvements to the quality of services, using modern infrastructure, IT technology, and integrating territorial and intermodal transport services. Simultaneously, assets will be revitalised and available financial resources will be allocated effectively. It should be emphasised that changes in the railway market environment will require the *Master Plan* to be verified periodically. The document was adopted by the Council of Ministers in December 2008.
- ***National Railway Programme until 2023*:** this document specifies financial frameworks and conditions of the implementation of Poland's plans in terms of railway projects to be carried out until 2023. It is a long-term programme in view of the Public Finance Act of 27 August 2009. Its legal basis is the Act on Railway Transport of 28 March 2003, the Act on Conducting the Development Policy of 6 December 2006, and the Act of 11 July 2014 on the Principles of Implementing Programmes in Terms of Cohesion Policy Financed in the Financial Perspective 2014–2020. This programme specifies all PKP PLK S.A. investments implemented using financial resources the administrator of which is the Ministry responsible for transport matters. The document complies with the conditions of the development strategy, which in this case is the *Transport Development Strategy until 2020 (with a perspective until 2030).* The programme was adopted by the Council of Ministers in November 2016.

Regional level

- ***Development Strategy of the Mazowieckie Voivodship until 2030*:** it is the most important strategic document of the voivodship and specifies its development vision until 2030. Its legal basis is the Act on Voivodship Government of 5 June 1998 and the Act on Conducting the Development Policy of 6 December 2006. It was adopted by the Sejmik of the Mazowieckie Voivodeship in October 2013. Most of all, the strategy specifies the vision, main objective, priority strategic objective, and voivodship development strategic objectives as well as courses of action in a territorial dimension assigned to them.
- ***Spatial Development Plan for the Mazowieckie Voivodship*:** as specified in the document, it is part of regional strategic planning together with the *Development Strategy of the Mazowieckie Voivodship*. Decisions in the *Plan* constitute an adaptation of the decisions in the *Development Strategy of the Mazowieckie Voivodship* for spatial layouts. As for the spatial planning system, its function is to coordinate between local and national planning. Its legal basis is the Act on Voivodship Government of 5 June 1998, the Spatial Planning and Land Development Act of 27 March 2003, and the Act on Conducting the Development Policy of 6 December 2006. It was adopted by the Sejmik of the Mazowieckie Voivodeship in July 2014.

Local level

- ***Warsaw Development Strategy until 2020*:** this document primarily specifies the vision, mission, strategic objectives, and operational objectives of Warsaw development assigned to them. Its perspective is to the year 2020. The strategy was adopted by a Resolution of the Warsaw City Council of 24 November 2005**.**

Table 19. Status and development prospects of infrastructure in the KI transport corridor

Document level	Document name	Adoption year	Time horizon	Document type (strategic, planning, programme)	Status	Development prospects
National documents	Responsible Development Strategy (SOR)	2017	2020 with a perspective until 2030	strategic/ programme	Inadequate integration of Poland with the single European market due to uncompleted railway investments on the TEN-T line, especially with the Baltic states and Southern Europe	Plan to integrate Poland with the TEN-T core network corridor – North Sea – Baltic Sea – fully by 2030
	National Spatial Development Concept 2030 (KPZK 2030)	2011	2030	planning	No specific records	Increse in average speed to 120–160 km/h on the Warsaw – Białystok – Ełk – Kaunas line, modernisation of the Warsaw – Łomża – Ełk – Kaunas corridor (Via Baltica). In the ”Improvements to availability in case of areas with the lowest level of time availability to the largest cities” subsection, it is planned to provide an investment priority for the Warsaw – Białystok – Ełk – Suwałki railway line
	Infrastructure and Environment Operational Programme 2014–2020 (POIiŚ 2014–2020)	2014	2014–2020	programme	Not applicable	Intervention from EU funds will be primarily aimed at main railway corridors including E75 The ”List of Major Projects” appendix contains the following investments: Works on the E75 railway line at the Białystok – Suwałki – Trakiszki (national border) section
	Transport Development Strategy until 2020 (SRT 2020)	2013	2020 with a perspective until 2030	strategic	No specific records	In 2020, the maximum speed on railway line no. 6 (E75) at the Zielonka – Białystok section will be 120–200 km/h

Document level	Document name	Adoption year	Time horizon	Document type (strategic, planning, programme)	Status	Development prospects
	Master Plan 2030	2008	2030	strategic	No specific records	In 2030, the maximum speed on railway line no. 6 (E75) at the Zielonka – Białystok section will be 160–200 km/h. E75 railway line modernisation at Warsaw – Tłuszcz and Suwałki – border with Lithuania sections has been mentioned under the Infrastructure and Environment Operational Programme 2007–2013. It is also planned to continue the E75 railway line modernisation between 2014–2020 (the Tłuszcz – Białystok section) and between 2021–2030 (the Białystok – Ełk – Olecko – Suwałki section)
	National Railway Programme until 2023 (KPK 2023)	2016	2023	programme	No specific records	As part of objective 1 – Strengthening the effectiveness of railway transport in Appendix 1, an investment priority is planned; it would concern improvements to the technical condition of the TEN-T core and comprehensive network including, in particular, continuation of works in the E75 corridor. List of main and reserve projects of the Connecting Europe Facility and Infrastructure and Environment Operational Programme financed from the Cohesion Fund covered by the National Railway Programme until 2023. the following investments concerning the E75 railway line were included: Modernisation of the Rail Baltica E75 railway line at the Warsaw – Białystok – border with Lithuania section, stage I, the Warszawa Rembertów – Zielonka –

Document level	Document name	Adoption year	Time horizon	Document type (strategic, planning, programme)	Status	Development prospects
						Tłuszcz (Sadowne) section, Main Phase 1, estimated value of PLN 343.1 million, the project financed under the Infrastructure and Environment Operational Programme 2007–2013 Modernisation of the Rail Baltica E75 railway line at the Warsaw – Białystok – border with Lithuania section, stage I, the Warszawa Rembertów – Zielonka – Tłuszcz (Sadowne) section, Main Phase 2, estimated value of PLN 560.3 million, project implemented in stages. Works on the E75 railway line at the Sadowne – Czyżew section along with the remaining works at the Warszawa Rembertów – Sadowne section, main list, estimated value of PLN 1,032.8 million, project financed under the CEF Works on the E75 railway line at the Czyżew – Białystok section, main list, estimated value of PLN 1,694.5 million, project financed under the CEF Works on the E75 railway line at the Białystok – Suwałki – Trakiszki (national border) section, reserve list, estimated value of PLN 2,500 million, application is planned to be submitted during the third CEF call

Document level	Document name	Adoption year	Time horizon	Document type (strategic, planning, programme)	Status	Development prospects
Regional documents	Development Strategy of the Mazowieckie Voivodship until 2030 (SRWM 2030)	2013	2030	strategic	No specific records	One of the activities in the Space and Transport area is to reduce congestion levels in the TEN-T node in Warsaw. The following statement is included in the details on courses of action: ”Passenger trains operating on the railway lines being part of the TEN-T network should run at a maximum speed of 160 km/h”.
	Spatial Development Plan for the Mazowieckie Voivodship (PZPWM)	2014	unspecified	planning	No specific records	The plan sets forth the modernisation of the current railway layout of national significance in order to improve train journey efficiency and times as well as to improve railway traffic safety, including the modernisation of line no. 6/E75 at the Zielonka – Białystok section
Local documents	Warsaw Development Strategy until 2020 (SRW 2020)	2005	2020	strategic	No specific records	In Programme 3.1.2. ”Improvements to public transport in the Warsaw Metropolitan Area”, it is suggested to create a network of Szybka Kolej Miejska (Fast City Rail) running, in particular, between Tłuszcz and Warszawa Wileńska railway stations

Source: Study of the MBPR on the basis of strategic, planning, and programme documents at various levels

Among the aforementioned documents, the *Responsible Development Strategy* is the only document that contains an indirect record concerning the necessity to complete the investment in the KI transport corridor in its diagnostic part. It is the most recent document among all analysed documents; therefore, it contains the most up-to-date spatial analyses and decisions at a national level. Given the capacity of the National Railway Programme until 2023 and the Infrastructure and Environment Operational Programme 2014–2020, they are the only documents that include specific records concerning the modernisation of adequate sections of the KI transport corridor. As for the remaining documents, they touch on the issues of the modernisation of the aforementioned corridor merely in general terms.

App. 7. Course of the E75 railway line modernisation in the Warsaw Metropolitan Area between 2012–2016

Prior to the E75 railway line modernisation, pre-project works were carried out between 2002–2012. These works were co-financed from pre‑ accession and EU funds (the latter after accession of Poland to the European Union). Project works were carried out following the reception of two decisions on environmental conditions of the investment in October 2009 and 2011. In October 2011, a call for tender for the design and performance of construction works on the line was announced, while the contract with the contractor was concluded in December 2012.

In March 2013, a co-financing agreement concerning the PKP PLK project ”Modernisation of the E75 Rail Baltica (Warsaw – Białystok – Lithuanian border), stage I, the Warszawa Rembertów – Zielonka 0– Tłuszcz (Sadowne) section” was concluded.

The scope of modernisation in the Warsaw Metropolitan Area was divided into sections: Ia - section of railway line no. 449 Warszawa Rembertów – Zielonka; Ib – the Zielonka railway station along with adjacent sections of railway lines no. 449, 21, and 6; II – route of railway lines no. 6 and 21 between Zielonka and Wołomin; IIIa – Wołomin railway station and Wołomin Słoneczna railway stop along with adjacent routes of railway line no. 6 and 21; IIIb – route of railway line no. 6 between Wołomin and Tłuszcz; IVa – Tłuszcz railway station with adjacent sections of railway lines no. 6, 10, 29, and 513; IVb – route of railway line no. 6 between the Tłuszcz and Łochów railway stations. In the mid–2013, modernisation works on Legionowo – Tłuszcz railway line no. 10 began in order to use it as a bypass line during the E75 railway line modernisation at the section between Warsaw – Tłuszcz.

The first decision on the site location of the investment was granted for section IVb (km 39.050 – 57.500) in May 2013.

A similar decision was granted for the Tłuszcz railway station section in July 2013. In turn, the decision on the site location for section IIIb (between Wołomin and Tłuszcz) was issued in September 2013. During that period, construction materials required to carry out the modernisation (rails, railway sleepers) started to be collected, while personnel and equipment bases began to be organised.

In November 2013, the contractor began demolition works at one of the tracks along the Tłuszcz – Łochów route, while railway traffic was maintained along the other track of the route. During the Tłuszcz – Sadowne section modernisation, part of freight trains ran through bypass railway line no. 29 to Ostrołęka and railway line no. 34 from Ostrołęka to Małkinia with the use of diesel locomotives.

In December 2013, the decision on the site location of the investment was issued for Warszawa Rembertów – Zielonka railway line no. 449, which remained in force in April 2014 following appeals (Figure 50).

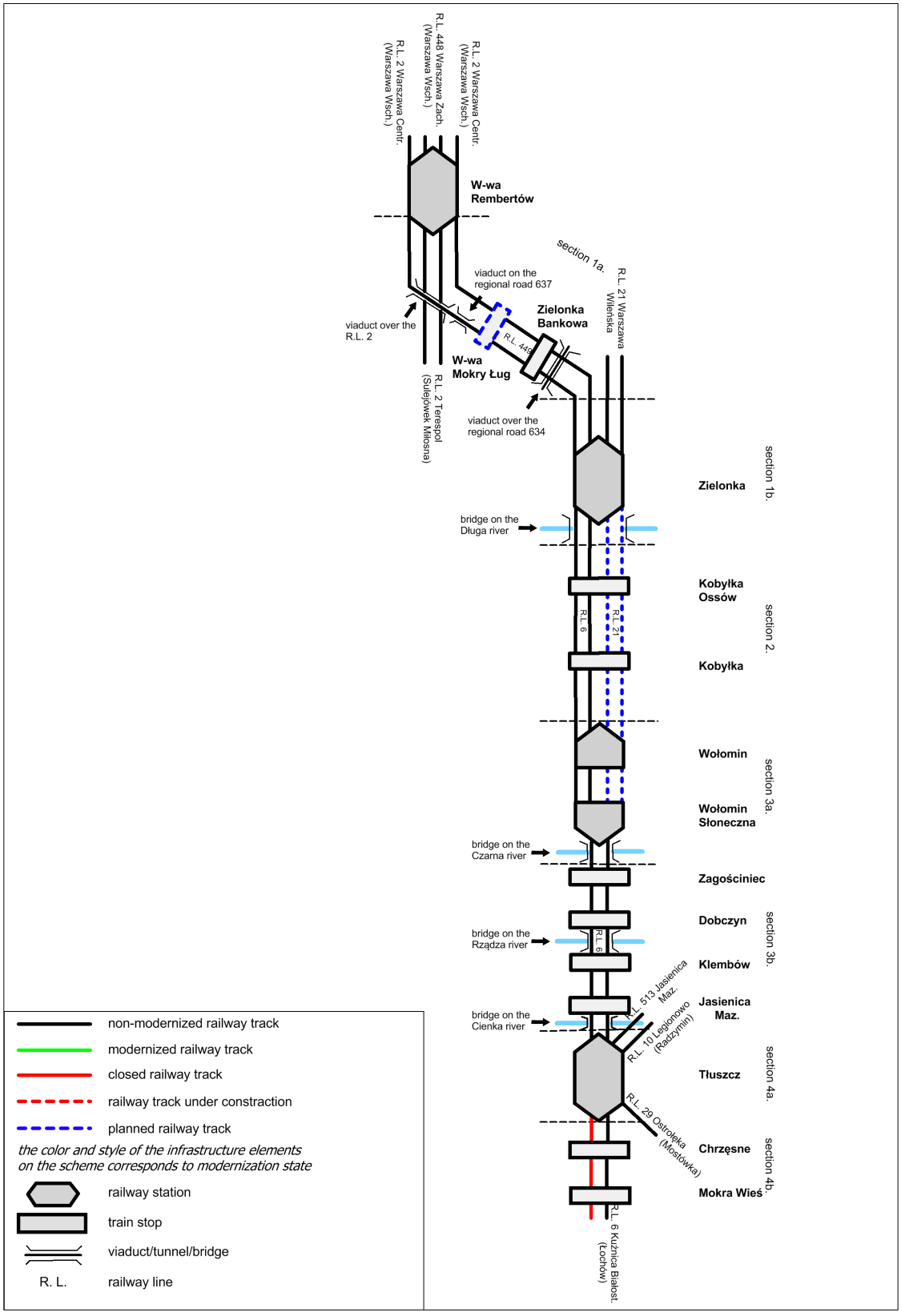

Figure 50. Progress on the E75 railway line modernisation as of 2013

Source: Study of the MBPR on the basis of project documentation concerning of E75 line modernisation and information provided by contractors

In January 2014, Warszawa Rembertów – Zielonka railway line no. 449 was closed and long-distance trains to/from Białystok use a bypass line through Legionowo and Radzymin. It was at that time that demolition works on railway line no. 449 started.

The contractor of a design of a viaduct along regional road no. 636 in Mokra Wieś was chosen in February of that year.

In March, performance of works (under a design–build contract – D–B) on underpasses at Zielonka and Wołomin railway stations and over the viaduct on regional road no. 634 over railway lines no. 6, 10, and 513 in Tłuszcz began.

A building contract (D–B contract) was concluded for a viaduct along regional road no. 634 over railway line no. 449 in Zielonka in April of that year. In the same month, building licenses were issued for the construction of section IVb from Tłuszcz to Szewnica; as a result, construction works at that section started.

One track (no. 2) was closed at the Wołomin – Tłuszcz section from the end of April 2014 and demolition works began.

In May 2014, the decision on the site location of the investment was granted for section Ib (Zielonka railway station), which remained in force in March 2015 following appeals.

In July 2014, a building license for a part of section IIIb between Wołomin and Tłuszcz was issued. As a result, construction works began and the decision on the site location was granted for the Wołomin railway station section, which remained in force in December 2014 following appeals. In the same month, a contract for a design of a railway level crossing along ul. Inżynierska in Zielonka was awarded as well.

In October 2014, building licenses were granted for the construction of sections of the Tłuszcz railway station railway line and for the northern part of railway line no. 449. In addition, it was decided in the same month to close the line section from Tłuszcz to Łochów to speed up construction works at that section. Construction works at the Tłuszcz railway station started as well.

In December, a building license for section Ia was granted, which constitutes the southern part of railway line no. 449. Construction works also started at that time (Figure 51).

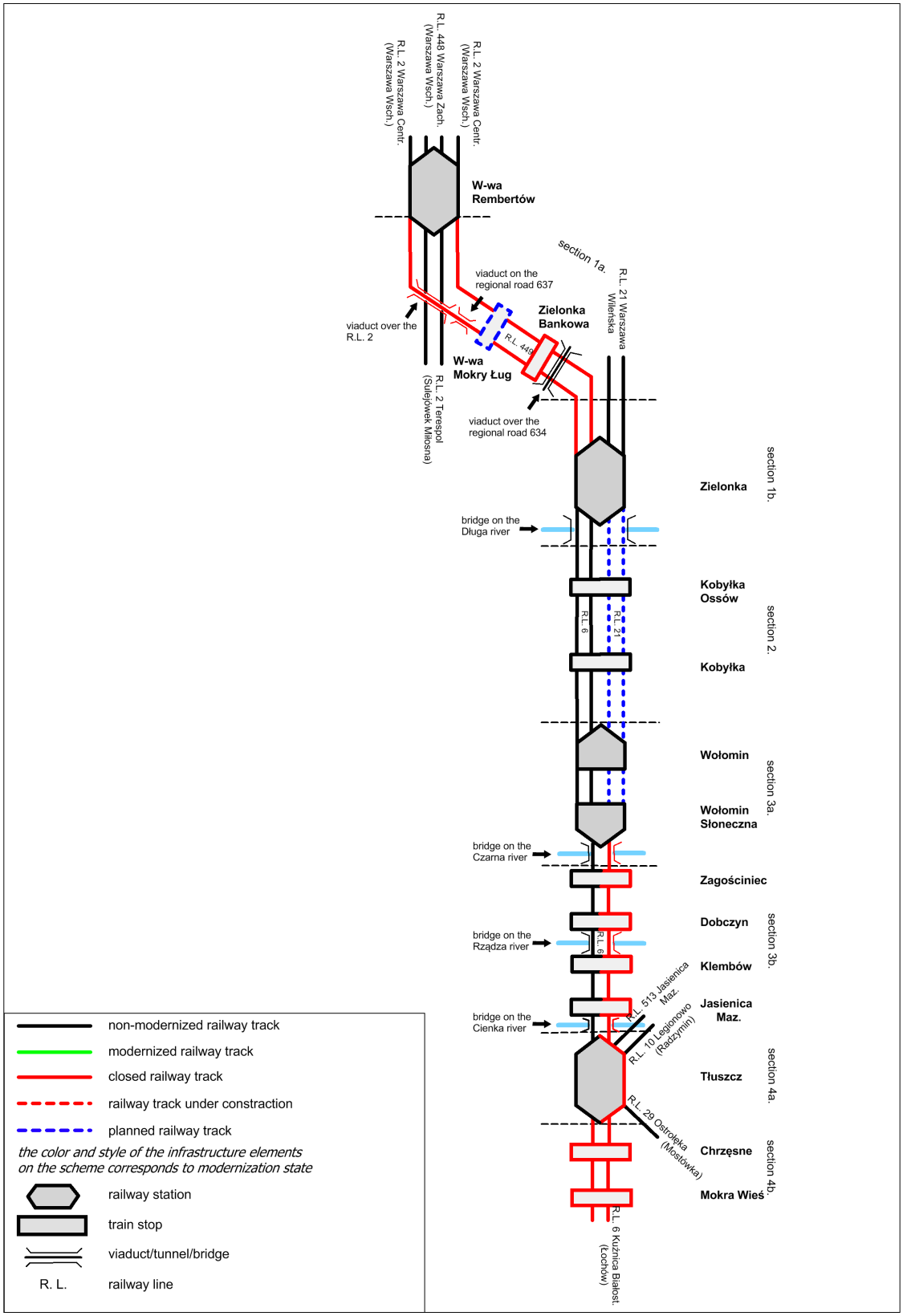

Figure 51. Progress on the E75 railway line modernisation as of 2014

Source: Study of the MBPR on the basis of project documentation concerning of E75 line modernisation and information provided by contractors

In February 2015, demolition works at the Wołomin railway station began. In addition, the decision on the site location was issued for a longer part of section II (from km 16.708 to km 20.200).

During the works at the Tłuszcz railway station, railway lines no. 10 and 513 were temporarily closed in March of that year.

During the works at the Tłuszcz railway station, railway line no. 29 was temporarily closed in May. In late May 2015, modernised track no. 2 at the Tłuszcz – Wołomin section was opened along with platforms adjacent to the track. Finishing works are still being carried out on the platforms. Railway line no. 513 was opened as well. An appendix was signed with the contractor in May. It removed the viaduct and tunnel in Kobyłka from the scope of works. They will be built under the financing period 2014–2020.

The last decision on the site location concerning the modernised E75 railway line section was granted in early June. It concerned a shorter section in stage II. In addition, construction works concerning a pedestrian underpass near the Wołomin Słoneczna railway stop started. As a result, unmodernised track no. 1 along the Wołomin – Tłuszcz section was closed and demolition and construction works began at that track. Railway line no. 29 towards Ostrołęka was opened in late June. At the same time, construction works concerning a viaduct for regional road no. 634 over railway line no. 449 began in Zielonka.

Demolition works at the Zielonka railway station started in early July. Tree clearing began at the Zielonka – Wołomin route.

The last building licenses were granted in August; they concerned 2-km section II, the Zielonka railway station section – Ib, and the Wołomin railway section – IIIb. The first modernisation works started at the Zielonka railway station.

In early September, track no. 2 at the Wołomin – Zielonka section was closed and overhead lines and the track began to be demolished. The last building license was issued also in September and it involved section II between Kobyłka and Wołomin. New tracks began to be built to the north of the current tracks.

In October, the construction works at the Tłuszcz – Łochów section started to be commissioned.

Along with the introduction of a new train timetable, the line section between Tłuszcz and Łochów was opened in December; however, works on railway level crossings were still ongoing. Track no. 1 at the Wołomin – Tłuszcz section was opened at the end of December (Figure 52).

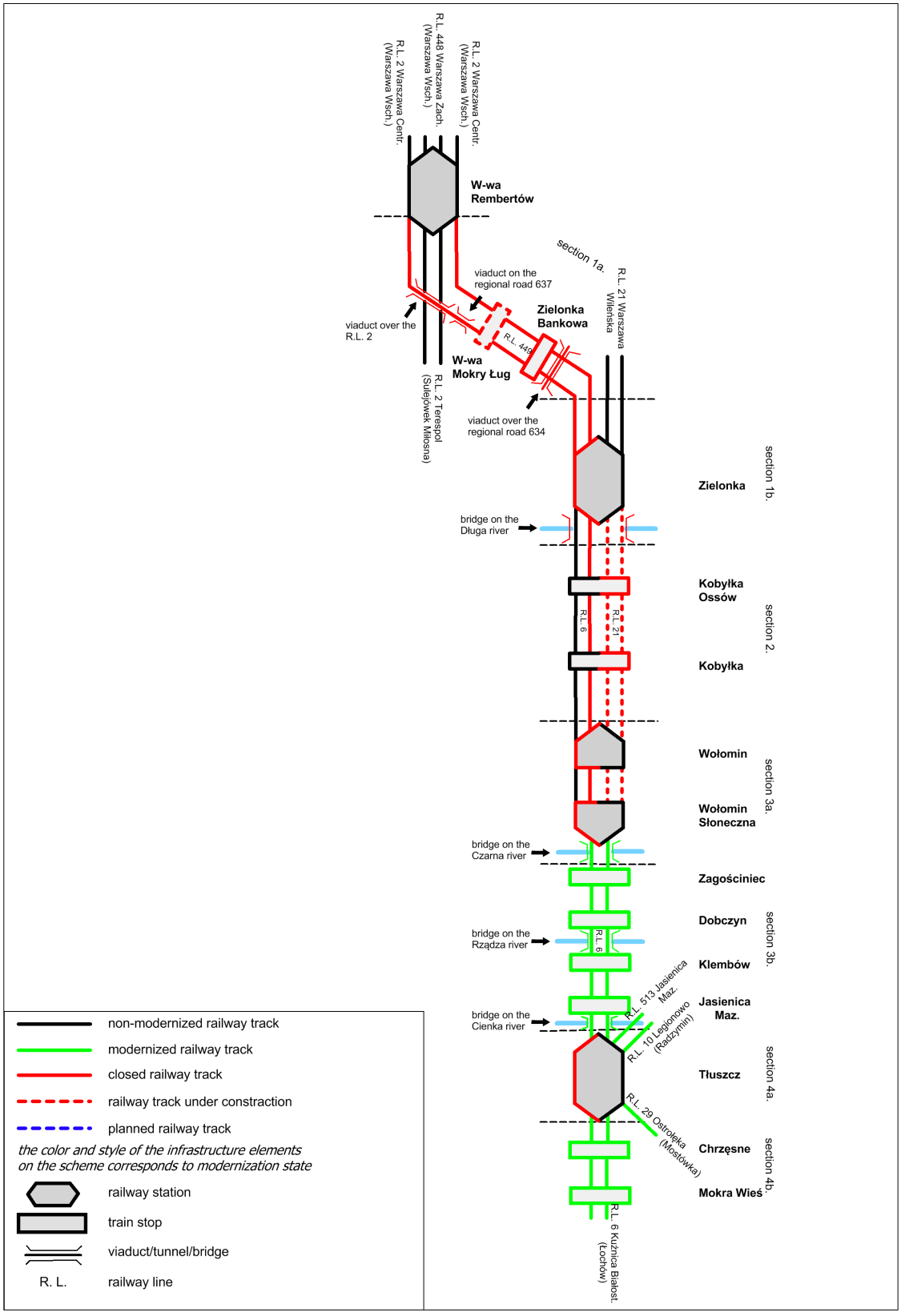

Figure 52. Progress on the E75 railway line modernisation as of 2015

Source: Study of the MBPR on the basis of project documentation concerning of E75 line modernisation and information provided by contractors

Track no. 2 at the Wołomin – Tłuszcz section was temporarily closed in January 2016. This closure was associated with modernisation works at the Wołomin railway station and the construction of bridges.

The Wołomin Słoneczna railway stop was temporarily closed in May in order to build a new platform adjacent to the tracks being constructed for suburban rail. Track no. 1 at the Wołomin – Tłuszcz section was closed at the same time, while track. no 2 next to track no. 1 was opened.

In July, tracks of railway line no. 21 at the Zielonka – Wołomin section intended for suburban rail were opened. Underpasses providing access to platforms and platform facilities are still under construction. Simultaneously, both tracks of railway line no. 6 (the long-distance part) were closed. In addition, two new platforms were opened at the Tłuszcz railway station. In mid-July, the contract with the contractor concerning the construction of the viaduct over railway line no. 449 for regional road no. 634 in Zielonka was cancelled due to construction delays.

Railway line no. 449 from Warszawa Rembertów to Zielonka was opened in early August except for the connection between track no. 1 with the Zielonka railway station. Two railway stops are located on the line: Warszawa Mokry Ług – a new stop, and Zielonka Bankowa – opened following its modernisation.

Track no. 2 at the Tłuszcz – Wołomin section was opened in September. As a result, two modernised tracks were opened along this section on railway line no. 6.

Construction works concerning the viaduct over railway line no. 449 for regional road no. 634 in Zielonka were resumed in November following the selection of a new contractor.

A call for tender for the construction of viaducts/underpasses in Kobyłka, Kobyłka Ossów and Jasienica was announced in December. In addition, tracks of railway line no. 6 at the Zielonka – Wołomin section intended for long-distance trains were opened following the introduction of a new timetable (Figure 53).

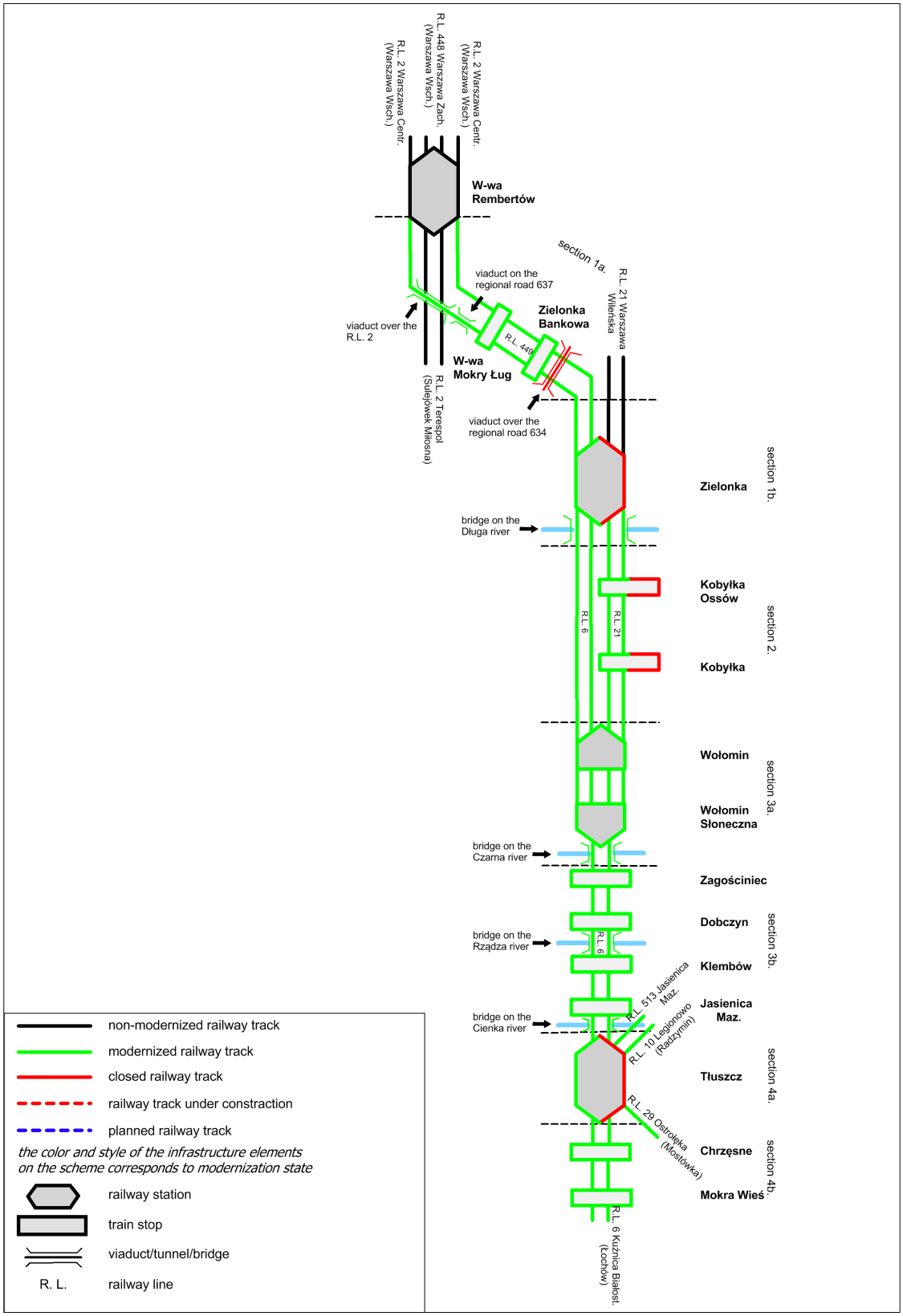

Figure 53. Progress on the E75 railway line modernisation as of 2016

Source: Study of the MBPR on the basis of project documentation concerning of E75 line modernisation and information provided by contractors

The basic part of works to be performed during the E75 railway line modernisation under the contract concluded with the contractor in 2012 was completed. As for track works, track no. 1 of railway line no. 449 needs to be connected with the Zielonka railway station. The connection is planned to be completed by the end of May 2017.

When it comes to platform works, passenger information systems and architectural details remain to be installed and built. The passenger information systems are planned to be put into operation by March 2017.

As far as works concerning multilevel crossings are concerned, underpasses in Wołomin, Zielonka, and Kobyłka are still under construction. They are planned to be completed by the end of May 2017. The viaduct over railway line no. 449 for regional road no. 634 in Zielonka is planned to be completed in June 2017. There are ongoing design works for intersections in Kobyłka Ossów (viaduct), Kobyłka (underpass), Jasienica (underpass under railway line no. 13), and in Łochów (viaduct). Their completion date is late July 2019. These intersections will be built as part of the project involving works on the E75 railway line at the Sadowne – Czyżew section along with works at the Warszawa Rembertów – Sadowne section. In addition, there are plans for an underpass in Łochów, the completion of which is planned for autumn 2018. There are still intersections to be built in Zielonka (underpass along ul. Inżynierska), Mokra Wieś (viaduct along regional road no. 636), and in Tłuszcz (viaduct along regional road no. 634 over railway lines no. 6, 10, and 513).

GLOSSARY OF TERMS AND ABBREVIATIONS

BDL – Local Data Bank of the Statistics Poland;

Business cluster – a geographic concentration of interconnected businesses, specialist suppliers, service providers, companies operating in similar sectors and associated institutions in particular fields that compete and interact with each other;

Business entities registered by a natural person – a company registered in the Central Registration and Information on Business database;

Central Registration and Information on Business – a register of natural persons exercising their individual business activity or being part of civil law partnerships;

CODGIK – Centre of Geodetic and Cartographic Documentation

Corine Land Cover / Land use (CLC) – one of the inventories of the CORINE system that concerns gathering data on forms of land cover; the main source of information includes satellite data;

Demographic polarisation – a process used to diversify the population in a given area, e.g. a large concentration of population in urban areas and in areas adjacent to towns compared to a small concentration of population in rural areas or in areas located peripherally in relation to towns and main transport lines/roads;

Dwelling – a room or group of rooms separated by permanent walls and used by people to live on a permanent basis; together with ancillary rooms, they satisfy housing needs;

EU – European Union;

GDDKiA – General Directorate for National Roads and Motorways;

GDP per capita – gross domestic product per capita;

Green ring – a strip of land surrounding a city/town consisting mainly of forests, grasslands, and river valleys; its function is to control the growth of the city/town and to protect suburban areas;

ICT sector – a sector focusing on information and communication technology; it is included in the tertiary sector of the economy;

KI – (Helsinki – Tallinn – Riga – Kaunas – Warsaw) – a pan-European transport corridor that includes national road no. 8 (S8) and the E75 railway line;

KPZK 2030 – *National Spatial Development Concept 2030* adopted by Resolution no. 239 of the Council of Ministers of 13 December 2011 on the adoption of the National Spatial Development Concept 2030 (Monitor Polski of 2012, item 252);

LTV ratio – a basic parameter used to express the ratio of a loan to the value of real property, i.e. interest on the loan; the lower the ratio, the more attractive the loan;

MBPR – Mazovian Office for Regional Planning in Warsaw;

Net migration rate – the difference between the number of immigrants (people coming into an area) and the number of emigrants (people leaving an area) within a specific time limit;

NSB CoRe – North Sea Baltic Connector of Regions;

NSP – National Census**;**

NUTS – nomenclature of territorial units for statistics;

PAIiIZ – Polish Information and Foreign Investment Agency;

Pan-European transport corridor – a route of international (European) significance, through which at least two different transport systems with high technical standards pass;

PKD 2004 – Polish Classification of Activity specified in the *Regulation of the Council of Ministers of 20 January 2004 on the Polish Classification of Activity* (PKD) (Journal of Laws of 2004, item 289);

PKD 2007 – Polish Classification of Business Activity specified in the *Regulation of the Council of Ministers of 24 December 2007 on the Polish Classification of Activities* (PKD) (Journal of Laws of 2007, no. 251, item 1885);

PZPWM – *Spatial Development Plan for the Mazowieckie Voivodship*;

Region – the Mazowieckie Voivodship;

REGON – the National Official Business Register run as an IT system in the form of a central database;

R&D (research and development) institutions – institutions that conduct creative work (research or development activities) on a regular basis in order to increase knowledge and uses for it;

Satellite town – a self-sufficient town in terms of services and employment, but dependent on a nearby larger urban centre in terms of specialised services (higher education, culture, administration) and better paid jobs;

SEZ – Special Economic Zones;

Specialised services – services provided by highly qualified personnel; they include e.g. high-level public administration, higher education, specialist medical services, arts and culture (theatres, operas, concert halls, art galleries, museums), business-related institutions, design and advertising companies, specialty retail outlets;

Sustainable development – socio-economic development which integrates political, economic, and social activities while maintaining natural balance and permanence of basic natural processes in order to guarantee the possibility of satisfying basic needs of particular communities or citizens of the existing generation and the generations to come. (*Act of 27 April 2001 – Environmental Protection Law*);

TEN-T – Trans-European Transport Network – an EU programme aiming to develop and modernise primary road, rail, air and European transport networks;

TBD – Database of Topographic Objects;

The case study – *Case study of the impact of the E75 railway line modernisation on the development of the Warsaw Metropolitan Area;*

Three sectors of the economy – all business entities producing goods or providing services of a similar nature; they are divided into the following three groups/sectors:

Primary (agriculture) – including agricultural, fishing companies as well as companies from the wood industry;

Secondary (manufacturing) – including companies operating in the processing industry and construction;

Tertiary (services) – involving companies operating in services;

USSR – Union of Soviet Socialist Republics.

WMA – Warsaw Metropolitan Area designated in the *Spatial Development Plan for the Mazowieckie Voivodship* adopted by Resolution no. 180/14 of the Sejmik of the Mazowieckie

Voivodeship of 7 July 2014 (Official Journal of Laws of the Mazowieckie Voivodship of 2014, item 6868);

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Legal acts and documents

Analysis of changes in spatial development for the Klembów commune between 2011–2015, Resolution no. VIII/2/2015 of the Klembów Commune Council of 28 May 2015.

Analysis of changes in spatial development for the capital city of Warsaw, Resolution no. XIV/284/2015 of the Warsaw City Council of 9 July 2015.

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Analysis of changes in spatial development of the Ząbki commune and the evaluation of the validity of local plans and the study of conditions and directions of the spatial management of the town, Resolution no. V/44/2015 of the Ząbki Town Council of 10 March 2015.

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Spatial Development Plan for the Mazowieckie Voivodship, Resolution no. 180/14 of the Sejmik of the Mazowieckie Voivodship of 7 July 2014 (Official Journal of Laws of the Mazowieckie Voivodship of 2014, item 6868).

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Study of conditions and directions of the spatial management of the Dąbrówka commune, Resolution no. IX/53/2003 of the Dąbrówka Commune Council of 10 July 2003.

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