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## VISION AND REALITY BASED ON THE PLANNED TRAMWAY INVESTMENTS IN THE POZNAN AGGLOMERATION

### WIZJA I RZECZYWISTOŚĆ NA PODSTAWIE PLANOWANYCH INWESTYCJI TRAMWAJOWYCH W AGLOMERACJI POZNAŃSKIEJ

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**ABSTRACT:** This article describes opportunities for tramway-system development in the south-western part of the Poznan Agglomeration, in compliance with the need to implement sustainable development in the suburban and city space. The article is based on the authors' original concepts and current urban studies.

**KEY WORDS:** public transport development, accessibility of public transport, tramway to Plewiska, tramway to Kopernika housing estate, Copernicus Project

**ABSTRAKT:** W artykule przedstawiono możliwości rozwoju systemu tramwajowego w południowo-zachodniej części aglomeracji Poznania, zgodnie z koniecznością wprowadzenia zrównoważonego rozwoju w przestrzeni podmiejskiej i miasta. Artykuł został opracowany na podstawie koncepcji autorów oraz na podstawie obowiązujących strategii planistycznych.

**SŁOWA KLUCZOWE:** Rozwój transportu publicznego, dostępność komunikacji miejskiej, tramwaj do Plewisk, tramwaj do osiedla Kopernika, Projekt Copernicus.

## Introduction

The scale of socio-economic processes taking place in the Poznan metropolitan area, in particular in its spatial dimension, which is reflected in the phenomenon of sub-urbanisation (urban sprawl), is a serious challenge to local government authorities, especially in the context of sustainable development. As results from the conducted research (Funkcjonowanie drogowego układu komunikacyjnego... 2015) show, the proximity of the centre of the metropolitan area means that in the municipalities surrounding Poznan there is a dynamic urbanization process, mainly by reducing

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agricultural areas and transforming them into construction sites (e.g. Plewiska in Ko-morniki commune near Poznan). Also, the system of public mass transport inside the city requires improvements, including some directions of travel from large housing complexes to the city centre (e.g. the Kopernika housing estate in Poznan).

The construction of new tram routes should be associated with the introduction of facilities for this mode of transport, primarily in the organization of traffic, so that it becomes fast and competitive to individual commuters. Just like in Hannover, for example, trams should stop at stops only. “You have to do it so that the tram between the stops goes non-stop, even at the expense of drivers of passenger cars” (Rusak 2012). That is why the city authorities are successively introducing priorities for public mass transport in Poznan.

It should also be noted that nowadays – on a global scale – we are dealing with the renaissance of the tram, which can be seen in many European cities (including Strasbourg, London, Lyon, Paris, Istanbul) or the US, e.g. Cincinnati and Portland (Górny 2014).

The renaissance of the tram is due to the opinion that it is the best means of transport both in economic and ecological terms. It is no longer seen as outdated, loud and expensive in construction (Górny 2014), and the European Commission’s recommendations for reducing CO<sub>2</sub> emissions give priority to rail transport before extending roads to access EU assistance funds (the tram is considered the most ecological public transport).

Trams also returned to the streets of South American Rio de Janeiro, which despite the very long history of this mode of transport, dating back to the nineteenth century,



Pict. 1. Tram route in the centre of Istanbul

Source: B. Majewski (2015).



Pict. 2. Tram route in Rio de Janeiro

Source: B. Majewski (2017).

gradually reduced its role beginning with the 1950s to make it virtually exclusively a tourist attraction in the 1970s. This was due to the dynamic development of the city, combined with the increase in the share of cars and buses in the division of the modal split. Over the years, the role of trams has partly been taken over by the subway. In Latin America, the BRT system (Bus Rapid Transit) is particularly popular, which was first introduced in the Brazilian Curitiba. However, Rio de Janeiro's authorities, due to the inefficient public transport system before the Olympic Games (2016), started in 2013 to build a tram network in the northern part of the city, which was integrated with the other elements of the agglomeration's transport system. An interesting fact is that due to the protection of the urban landscape, instead of the traction network, the trams are powered by means of the so-called third rail (APS system, also used in French cities, e.g. in Bordeaux).

A good example of tram transport solutions connecting the agglomeration centres with the periphery and even more distant towns is Germany (e.g. the regional tram connection between Mannheim and Heidelberg), as well as the Irish Dublin, where two independent tram routes connecting the city centre with suburbia were opened in 2004.

The foundations of the concept of tram route to Plewiska near Poznan (Komorniki Commune), which in the years 2003-2013 noted one of the largest population increases (Funkcjonowanie drogowego układu komunikacyjnego... 2015) and to the Kopernika estate in Poznan, which next to Naramowice (Majewski 2012) is a large residential district without direct tram connection, are based on the West European solutions.

## The vision: the concept of a tram route to Plewiska near Poznan

Over recent years, the phenomenon of suburbanisation has intensified in the Poznan Agglomeration. The desire to have your own “house with a garden” (or its substitutes in the form of a segment in a private house) causes more and more transportation problems, especially in the link between Poznan and the suburban area (Beim 2009). The factor confirming the necessity for public transport development outside Poznan is the fact that in the years 2000-2013 the population of the Poznan Agglomeration increased by as much as 36.5%, and the vast majority of commuting from the outskirts is towards the centre of the agglomeration, which is the city of Poznan (Fleischer 2016).

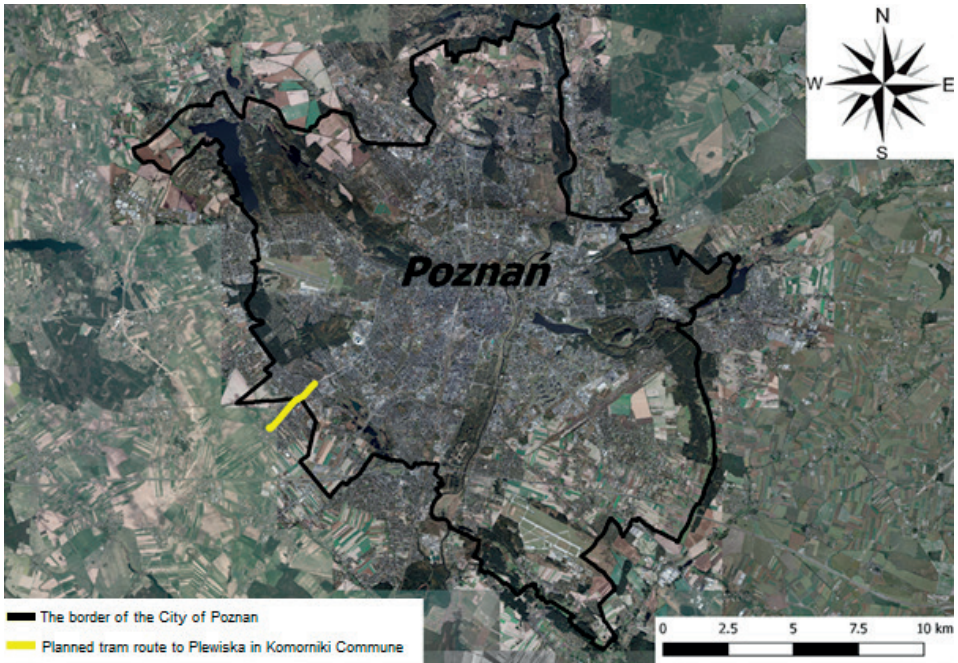
One of the examples of this unfavourable phenomenon is Plewiska, located in the Komorniki Commune, near the border with the City of Poznan (the Junikowo region). At present, Plewiska has over 10,000 residents. However, it should be noted that this number is constantly growing due to village expansion. Zielarskie housing estate, in which a tram line could be established, is a representation of a typical suburban development. The Kminkowa Street itself, being the axis of the housing estate, is extensively pledged by cars parked by the residents.

The existing buildings considerably limit the possibility to implement a tram route. The varied types and shapes of buildings cause changes in the width of the street on some sections. However, the distance of residential buildings located on the opposite sides of the street allows for collision-free tram tracks, having no impact of the existing buildings and complying with legal requirements. A part of Kminkowa Street is



Pict. 3. Kminkowa Street in Plewiska – the current state

Source: W. Fleischer (2016).



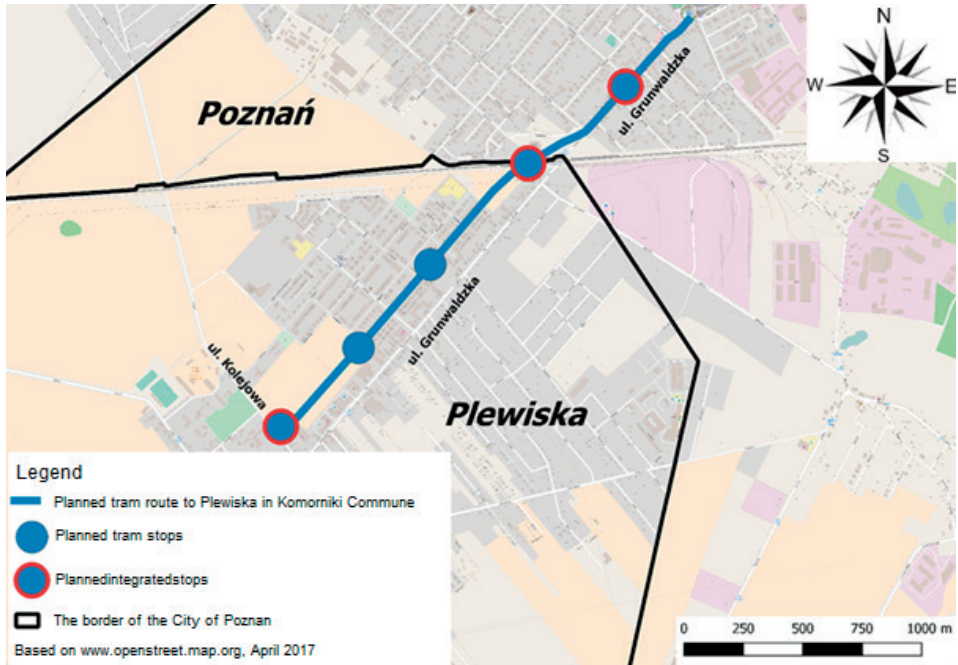
Pict. 4. The concept of extending the tram route to Plewiska on the map of Poznan

Source: Public Transport Authority in Poznan (orthophotomap from [geoportal.gov.pl](http://geoportal.gov.pl)).

privately owned, therefore, before the investment begins, it is necessary to organize the land and legal situation in such a way as to select the most satisfactory solutions for the residents. The final section of the route is an undeveloped area, thanks to which this concept provides a fully integrated solution with tram and bus loop and Park & Ride and Bike & Ride interchange parking spaces.

Currently, the main interchange is located in Poznan, near the intersection of Grunwaldzka and Malwowa streets, where in 2013 the bus and tram city station “Junikowo” was opened. Unfortunately, the tram lines do not directly support neighbouring Plewiska, and commuting by suburban buses through the often-capped Grunwaldzka Street is not very convenient (the street runs through the railway crossing on the main national rail line, which is often closed).

The Plan for the Sustainable Development of Public Transport for the City of Poznan for the Years 2014-2025 (the so-called Transport Plan) and the Study of Conditions and Directions for Spatial Development of the City of Poznan (abbreviated Studium...) define the location of an integrated interchange (railway-tram-bus) of agglomeration nature in the vicinity of the “Poznan Junikowo” railway station, together with the Park & Ride and Bike & Ride parking lots (the deadline for implementation is planned after 2025; until then this function is satisfied by the existing “Junikowo” bus and tram city station).



Pict. 5. Suggested route of the tramway to Plewiska

Source: Public Transport Authority in Poznań (map from [openstreetmap.org](http://openstreetmap.org)).

The extension of the tram route from Junikowo to the city border (railway station “Poznań Junikowo”) envisaged in the *Studium...* will definitely improve the integration between various means of transport, however it will not serve directly a large (and still developing) housing estate in Plewiska. In addition, the area reserved in the local plan project for the future loop is far too small in relation to the planned needs.

In connection with the above, considering the importance of the public transport system for sustainable development of urbanized areas, it was proposed to extend the tramway in Grunwaldzka Street in Poznań, from the “Junikowo” bus and tram city station, through the “Poznań Junikowo” railway station to the new housing estates in Plewiska (along Kminkowa Street), where it is possible to locate an integrated bus and tramway loop with good traffic parameters. Stops along the route were designed in locations covering the area of residence of potential passengers in districts with a radius of 400 m (the tram range specified by Loose 2001).

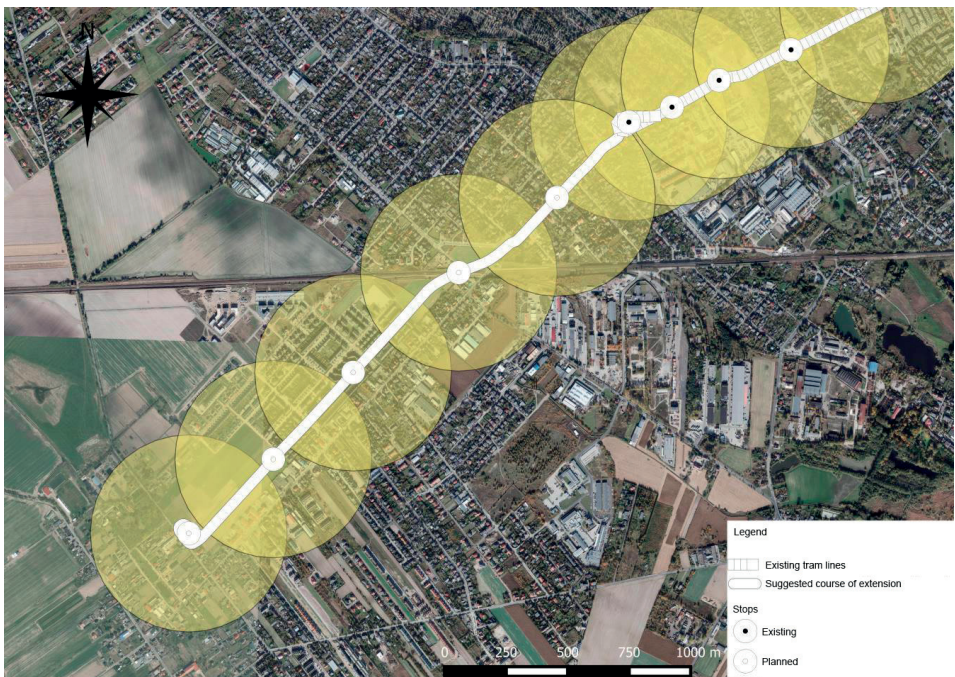
In addition, the collision-free construction of the new tram route over the railway tracks along the Poznań and Plewiska border will shape the integrated tram-and-train interchange, which not only complies with strategic planning documents, but also interacts with the Poznań Metropolitan Railway project.

The new tram and bus loop with the accompanying Park & Ride and Bike & Ride parking lots were located at the end of the housing estate in Plewiska, and within the



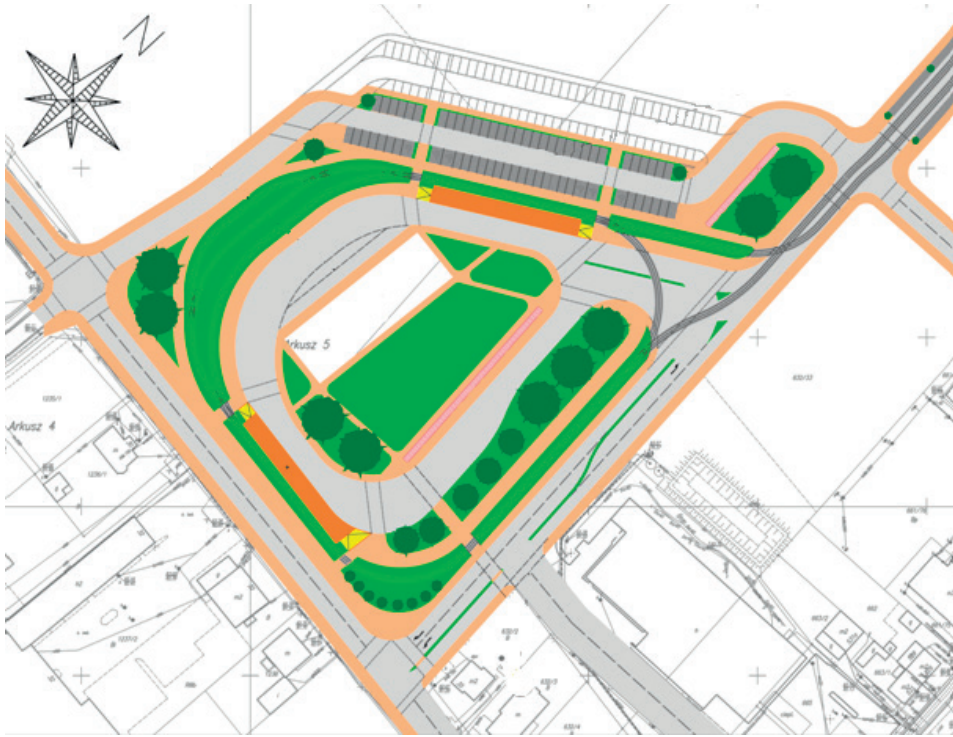
Pict. 6. Tram route in Dublin run on the flyover

Source: B. Majewski (2014).



Pict. 7. Range of stops on the tram route to Plewiska

Source: Fleischer 2016 (own study based on an orthophotomap from geoportal.gov.pl).



Pict. 8. Situational plan of the new tram and bus loop in Plewiska

Source: Fleischer 2016 (own study).

loop a platform layout was set up that allows changing between buses and trams in the door-to-door system.

The route of the tramway through the Plewiska area requires clearance of some parking spaces along the Kminkowa Street, which should be compensated by the construction of a collective parking lots on the outskirts of the housing estate. For example, this is the way it operates in Vauban estate in Freiburg in Breisgau (Germany), where the tram enters the middle of the built-up area, while the car traffic inside the housing estate is kept to a minimum.

The implementation cost of the proposed tram route was initially estimated at approximately PLN 150 million. The estimation was based on available approximate data and cost of previous investments in Poznan.

### **The reality: the concept of a tram route to the Kopernik housing estate in Poznan**

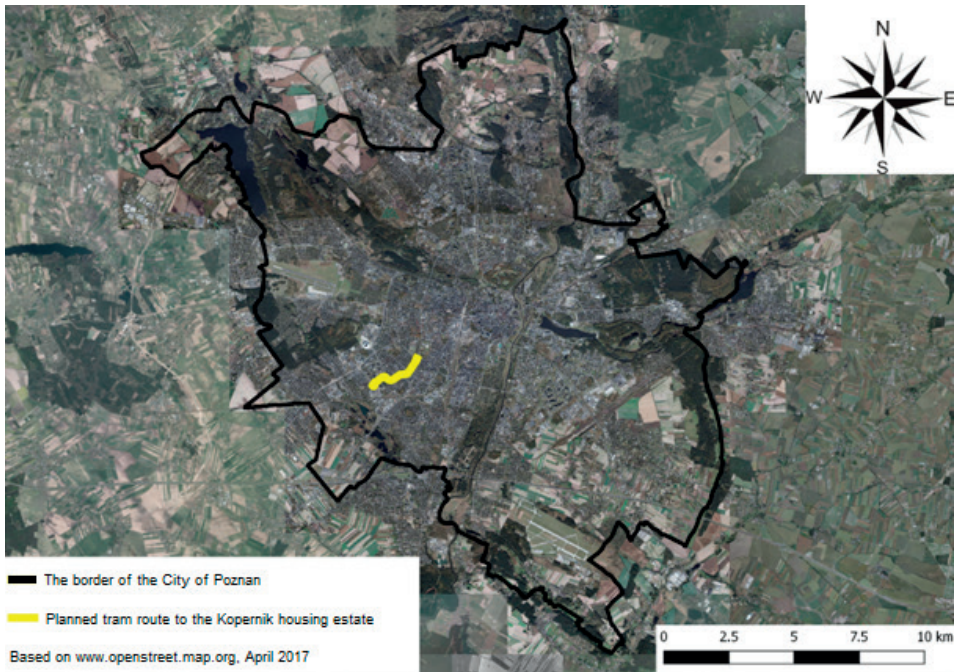
The Kopernik housing estate is a large residential complex, located in the southwestern part of the city, in the administrative area of the Grunwald district, between



Jugoslowianska, Smardzewska and Jawornicka streets, divided into two parts by Promienista Street. The residential streets in this district are named after great astronomers: Newton, Galileo and Kepler. The estate, consisting of 27 multi-family buildings with a large slab structure, for 12,000 residents was created as a result of an architectural competition announced in 1973, while construction works were carried out at the turn of the 1970s and 1980s. In the 1990s, new buildings were erected to the south-west of the original estate, and there are plans for further developments, as a continuation of the original Kopernik housing estate (Koncepcja... 2016).

Currently, this area is served only by bus transportation. At some distance from the Kopernik housing estate, in Grunwaldzka Street, there is a tram route, however, due to its location, it does not directly serve the housing estate, and the tram stop is inconveniently situated within from 500 m to even 1500 m walking distance. You can also get to the tram by bus, but transfers at any node crossing bus and tram traffic are not organized in the “door-to-door” system, which does not foster use of public transport and impacts the traffic pressure from this area.

In the Transport Plan, the Kopernik housing estate was noted as one of the heaviest traffic generators in the city, therefore the proposal of a tram route was considered significant to increase accessibility of this area.



Pict. 9. The project of extending the tram route to the Kopernika housing estate against the background of the map of Poznan

Source: Public Transport Authority in Poznan (orthophotomap from [geoportal.gov.pl](http://geoportal.gov.pl))

The route of the tramway to the Kopernik housing estate was designed many years ago and was mentioned in strategic documents regarding urban development. The corridor reserved for the tram route has also been defined in the current *Studium...* and leads from the existing track at the intersection of Hetmańska and Reymonta streets through the following ones: Arciszewskiego, Zamknieta, Pogodna, Remberowska and Promienista. The new bus and tramway loop was designed at the end of the estate, at the planned junction of the future III Poznan Communication Framework. Park & Ride car park is also included in the above-mentioned node in the *Studium...* The area of the planned tram route is also partially covered by the local spatial development plan.

In 2016, for Public Transport Authority, urban-technical, environment and economic-social concept was elaborated, together with cost estimate.

The course of the route has been delineated across the area of dense residential buildings (about 25,000 people) and additionally close to the Gorczyński Cemetery, which also constitutes a large traffic generator. Stops have been located in places of the largest traffic flows. Thanks to this, access to the tram will serve the whole Kopernika housing estate, as well as buildings along Raszyn or Arciszewskiego Street, and thanks to locating the stop at Zamknieta Street (on the plot of the existing allotment gardens) the cemetery will also be connected to direct tram service.



Pict. 10. The route of the tramway to the Kopernik housing estate

Source: Public Transport Authority in Poznań (map from [openstreetmap.org](http://openstreetmap.org)).

Considering the above, it should be stated that accessibility to stops will be very high, and the functionality of transfer nodes will ensure high-quality infrastructure, adapted to the needs of disabled people and showing no significant architectural barriers limiting pedestrians' access to the stops. The Bike & Ride lots will also be built at the main stops, which will be linked to the surrounding infrastructure of bicycle routes.

The concept of a tram route to the Kopernik housing estate will also have a positive impact on optimization of bus connections in this area. The main assumption is to improve the route of bus lines, on the one hand, not to duplicate them with tram lines, and on the other one – to handle areas remote from the tram and bring passengers to the integrated transfer nodes (on the shared tram and bus route in Arciszewskiego Street transfers between buses and trams will be made in the door-to-door system).

At the turn of 2016 and 2017, a wide informative campaign and public consultations were carried out on this project supported by open meetings with residents and project website ([www.projektcopernicus.pl](http://www.projektcopernicus.pl)) that provides all information pertaining to this investment such as concept description, drawings and sample visualizations.

As a result of surveys carried out (both on the Internet and during the above-mentioned meetings), project plan was very well received. Of the 1,295 votes collected, as many as 943 people approved of the construction of the tram route to the Kopernik housing estate, and 813 respondents declared their willingness to change their daily



Pict. 11. Visualization of a fragment of the tram route to the Kopernik housing estate

Source: Public Transport Authority in Poznan ([www.projektcopernicus.pl](http://www.projektcopernicus.pl)).

commuting mode by abandoning the car in favour of the tram. At the same time, 618 people stated that they were dissatisfied with the current public transport service in this area. The questionnaire also aimed to identify the commuters' routes used most frequently by the respondents residing in the Kopernik housing estate and the obtained results will be utilized in the future by Public Transport Authority in order to shape and improve on the public transport network with passenger focus.

The full report on social consultations and their summary can also be found on the website: [www.projektcopernicus.pl](http://www.projektcopernicus.pl).

The cost of the tram route to the Kopernik housing estate in Poznan, including the accompanying infrastructure and purchase of necessary land, was estimated at PLN 138 million (Konceptcja... 2016).

By the end of 2018, upon the request from Public Transport Authority in Poznan additional documentation had been prepared in order to apply for additional EU funds, which, as in the previous perspective, may appear at the end of the current one (2014-2020/2023).

## Summary

The purpose of this article was to compare two concepts regarding the development of a tram network in the south-western part of Poznan. The first one presents the vision of introducing tramway directly to the suburbs, while the second one – the reality of the preparatory (pre-design) stage of the transportation investment based on bringing the tram route to a large housing estate in Poznan, together with a short description of the social participation process.

The main objective of both projects is to increase the coverage of the tram network in the suburbs, along with facilitating commute to the city centre, and increase competitiveness of the tram solution versus individual transport.

At present, the travel time of collective transport in the discussed areas depends mainly on road congestion and waiting time for a bus (the average waiting time outside traffic peak is 20 minutes). According to the analyses carried out, the travel time, e.g. from Plewiska to the centre of Poznan, with tram line extension from Junikowo, would be shortened by about 12 minutes as scheduled (considering the starting point at the new bus and tram loop in Plewiska and the end at Old Market Square in Poznan).

Thanks to the forecast travel time reduction by tram in selected sections, public transport has a chance to become more competitive to the passenger cars, which is consistent with the idea of sustainable development and the Poznan's transport policy.

In both projects, it is also planned to create integrated interchange nodes, also within the Park & Ride and Bike & Ride systems.

The concept of a tram route to the Kopernik housing estate is in line with the city planning documents as well as expectations of the local community, based on the survey carried out. On the other hand, the extension of the tram route from Poznan (Junikowo) to the Komorniki Commune (Plewiska) requires an appropriate inter-



Pict. 12. Bike & Ride parking at the tram stop in Dublin

Source: B. Majewski (2014).

communal agreement, and also requires changes to the local spatial development plan in Plewiska and the change of strategy for the local plan “Osiedle Kwiatowe – part B” in Poznan. Although the proposed route of the tramway is not reflected in any planning documents of the City of Poznan or those of Komorniki Commune, the presented concept has initiated a public discussion on the development of collective transport in the Poznan Agglomeration.

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