Rail Baltica
Regional Impact Studies

Regional Railway Services: Engine of Socio-Economic Development
Inception Report

01.11.2021

Contents

List of Figures

List of Tables

List of Abbreviations

Abbreviation	Explanation
ALG	Architecture and Landscape Guidelines
EU	European Union
HSR	High-Speed Rail
ICT	Information and Communications Technology
KPI	Key Performance Indicators
LVC	Land Value Capture
MaaS	Mobility as a Service
NMT	Non-motorized Transport
PMD	Person Medium Day
PT	Public Transport
PRM	Passengers with Reduced Mobility
RB	Rail Baltica
TOD	Transit-Oriented Development
WP	Work Package

Executive Summary

The introduction or improvements in regional railway services plays a decisive role in regional economic growth and social and environmental sustainability. According to international experience, introducing regional rail services or connecting rural and suburban communities to a high-speed rail corridor, not only provides increased mobility and greater access to socio-economic activities to the individuals living in those areas, but it also promotes further economic development and growth through higher access to labour markets and opportunities for entire industries to expand and thrive.

These benefits extend beyond providing communities to access to economic and social activities. They also provide important benefits to employers to find accessible land, more competitive locations near housing, attraction for tourists and access to markets that were not previously available. The main benefits of regional connectivity emerging from linking regional rail lines to high-speed rail services can be bundled in at least the following categories:
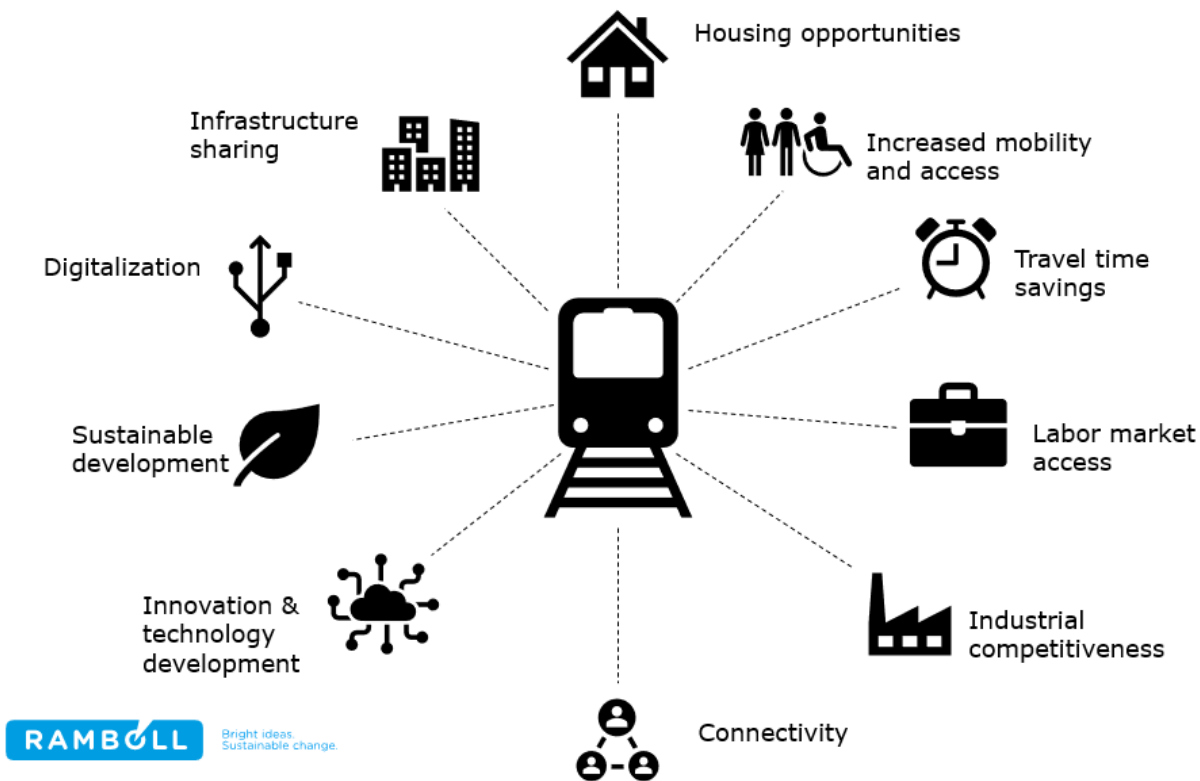
FIGURE 1 CONNECTIVITY OF A REGIONAL RAILWAY STATION WITH VARIOUS URBAN DEVELOPMENT ELEMENTS AND CATEGORIES (SOURCE: AUTHOR)

To ensure benefits are maximized, it is important that railway stations themselves and their surroundings, are optimized to support the increase in services and opportunities that will result in the achievement of these benefits, thus, support regional growth to its fullest potential.

International experience

Connecting rural and suburban communities to new or improved rail services promotes access and mobility for large amounts of passengers. In recent history, regional railway services were available to a limited number of users and the stations served one purpose: to take a user from and to their destination. However, in recent years, a more holistic approach to the development of stations and their surroundings has gained momentum due to the potential of generating and capturing higher social and economic value. Such value can be seen when commercial and housing developments are integrated as a mix of land uses, thereby effectively attracting employers, workers, shoppers, and other types of users and elements contributing to the creation of vibrant and dynamic centers of activity.

In order to maximize the socio-economic impacts of a regional railway megaproject, as the Rail Baltica regional services, it is important to engage all project stakeholders during early planning stages of the project to best understand the needs and expectations of different user groups and the clearly identify the potential to include other non-transport services during the construction. Some of these include pipeline, cable, and digital infrastructure among others. The stakeholder list should include, but not be limited to, government authorities, users, operators, real estate agents, retail/commercial/trading groups, contractors, and other commercial players.

Best Practices Comparable to the Rail Baltica regional railway services

Within the context of maximizing economic and social benefits from new or improved regional railway services, the research on international best practices identifies regional station and their surroundings as one of the key components for achieving such benefits. Based on this finding, the consultant has constructed a three-step approach to identify international best practices comparable to the Rail Baltica regional railway stations: i) overview of regional Rail Baltica stations; ii) Development of a long list of comparable international good practices (44 stations), and; finally, iii) compile the collected international best practices into lessons learned to be considered during the planning and design of the Rail Baltica regional services.

International Best Practices and Lessons Learned

The consultant has categorized the international best practices for maximizing socio-economic value from regional railways services into three categories:

    i)   **Station internal space usage and commercial opportunity maximization;**

    ii)   **Regional mobility and Transit-Oriented Development**, and;

    iii)   **Integration with the local environment and effects on local and regional regeneration.**

Each of these best practice categories contain five (5) lessons learned.

The general best practice categories and lessons learned content are briefly expanded in the section below.

Station Internal Space Use and Commercial Opportunities

This best practice highlights the importance of simple and efficient but pleasant internal space and the opportunities for supporting commercial services within and around the station. The concept is to create simple, versatile, and agile station designs focusing on functionality, sustainability, social placemaking, integration through traversability[1], as well as focus on truly mixed-use commercial opportunities inside and around the stations.

Regional Mobility and Transit-Oriented Development

Under this category, special attention was paid to the integration potential between the stations their immediate areas and its surroundings, especially understanding the potential for improving multimodal connectivity and ensuring future development is carried out under the TOD principles to capitalize attributes that will generate and capture value. The consultant focused on potentials for the development of regional development plans, capitalize on density and other principles that will be used during Work Package 2. The key findings of the international station analysis cover integration between stations, services, and station area mobility plans, station access, regional freight logistic chain optimization, and densification.

Integration with the Local Environment and Effects on Local and Regional Regeneration

Under this category of lessons learned, the consulting team briefly discusses the importance of Public-Private Participation and ensuring that contractual agreements between infrastructure owners and to-be operators must be clear, straightforward and should strive outcomes to benefit the user of the railway system. It also points out the importance of community participation. This section also raises importance on ensuring financial sustainability of the system and the critical stakeholders that can be mobilized to strive towards

---

[1] Traversability means the ability to move through the station with ease and connectivity.

efficiency. Lastly, Digital connectivity and freight and Logistics strategies are some of the most important aspects that will ensure than any regional railway service provides large socio-economic benefits that will go beyond the railway line.

1. Introduction

1.1 Assignment Authority

This Inception Report was prepared under the authority of the contract signed between the RB Rail AS (The Client) and by the leading company Ramboll Denmark A/S, together with the project sub-contractors: Soini & Horto Architects and Realidea Ltd (The Consultant). The current study is being developed under the "Rail Baltica Regional Impact Studies, LOT 2 Transport Modelling and Economics" project, being co-financed by the European Union (EU).

The Rail Baltica project has achieved significant progress in both design process and construction of a number of the international railway stations (Type I) and is currently in the planning and design process of the regional (Type II-VI) stations along the entire Rail Baltica corridor.

Currently, the RB project is comprised of a network of seven (7) international passenger stations and thirty-four (34) railway passenger regional stations[2] in the Baltic States (see figure 1 below). The regional passenger stations are at different early stages in the planning and design processes. Within the current framework of this project, the Client desires to develop a good understanding of the broad range of socio-economic impacts stemming from the Rail Baltica regional passenger stations and services. Figure 2 below provides a general overview of the project study area.

In this context, the current report sets up the framework and methodology to develop an assessment of regional socio-economic effects and developments driven by the introduction of regional railway stations, including passenger and local logistics services. This inception report will present a summary of the relevant literature on regional railway station design and planning, the proposed methodology for a benchmarking exercise for regional railway stations, and a list of 42 international best practices, mostly from the Nordic experience.

During the inception process, the project team has put in place a systematic approach to brainstorm, discuss, and analyse the objectives of this project to maximize the value provided to the Client while providing the highest quality in the deliverables of WP 1. During the phases leading to this deliverable, the team has had

---

[2] At the time of the submission of this report, the GIS tool provided by the Rail Baltica organization listed 34 regional stations. The consulting team understands that the total number of regional stations is continuously evolving and will incorporate new information as the project progresses. The consulting team will include the most current information regarding number of stations.

several online meetings with the Client. The following communication approaches were put in place to ensure highest quality and efficiency for delivering the WP for this project:

1) **Align the expectation levels on the deliverables** between Consultant and the Client;

2) **Effectively divide the different activities between expert teams** to ensure the highest quality, efficiency, and a holistic approach; and,

3) **Create a thorough understanding on the impacts** related to modern regional railway passenger stations.

1.2 Project Scope of Work and Study Area

The objective of the study is to deliver international knowledge related to obtaining socio-economic impacts for regional railway stations and how these integrate with the overall regional mobility systems. Moreover, the expected outcomes will provide clear recommendations for the maximization of the socio-economic impacts stemming from the Rail Baltica regional stations and services, with a focus on:

- **benchmarking** of best practices in the optimization of station space and surrounding areas as engines of socio-economic development and growth;

- investigating some of the key **socio-economic impacts** focused on overall **regional mobility** improvement, access, and **local logistics connectivity** improvements; and,

- investigating the **impacts of integrating regional railway services on overall mobility supply**, TOD potential, and freight logistics optimization.
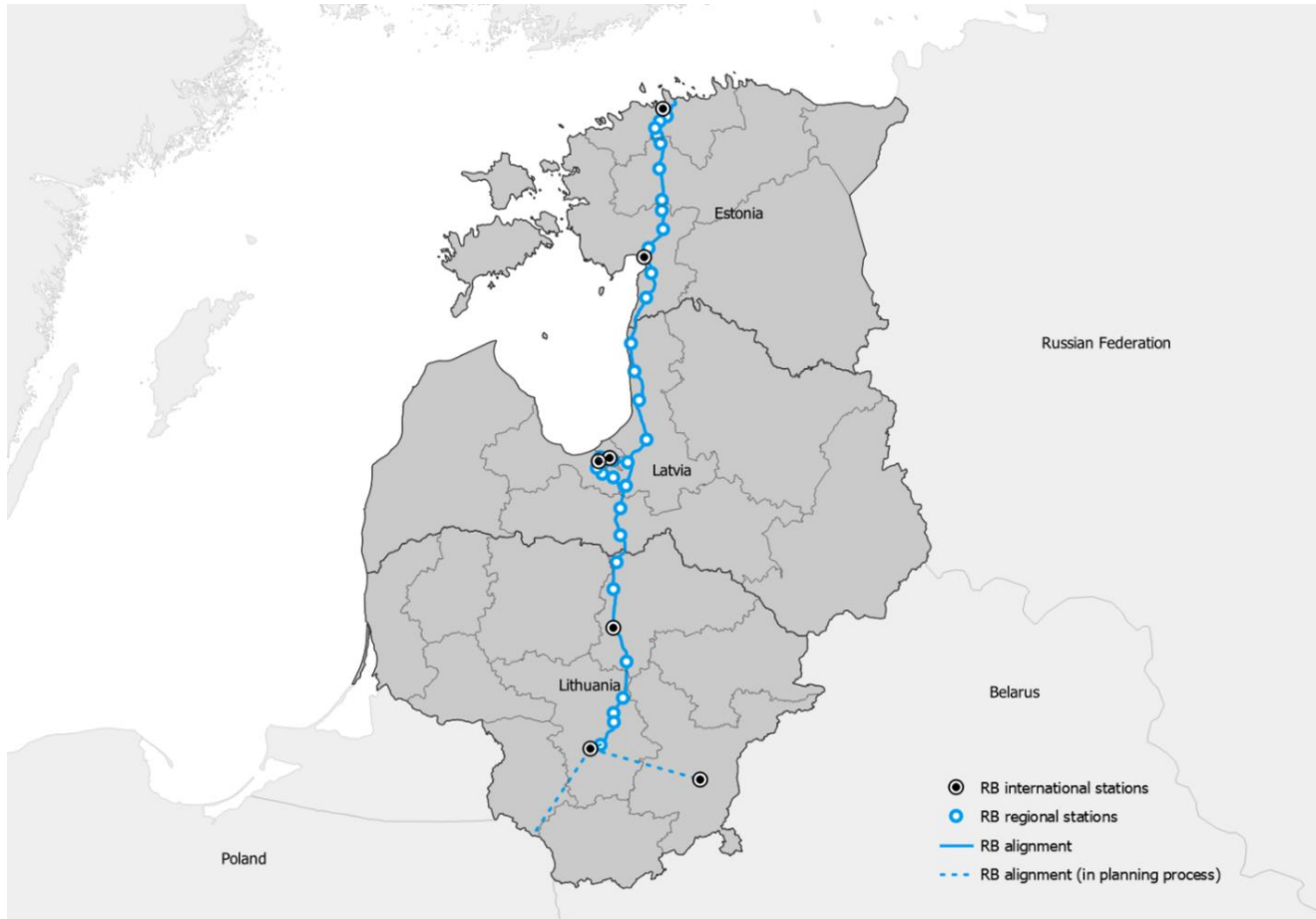
FIGURE 2: PROJECT STUDY AREA INCLUDING REGIONAL STATIONS (SOURCE: GIS DATA, RB)

The study area will cover the entire corridor of the Rail Baltica railway. However, the Consultant will focus on specific regional stations based on their typology and local characteristics.
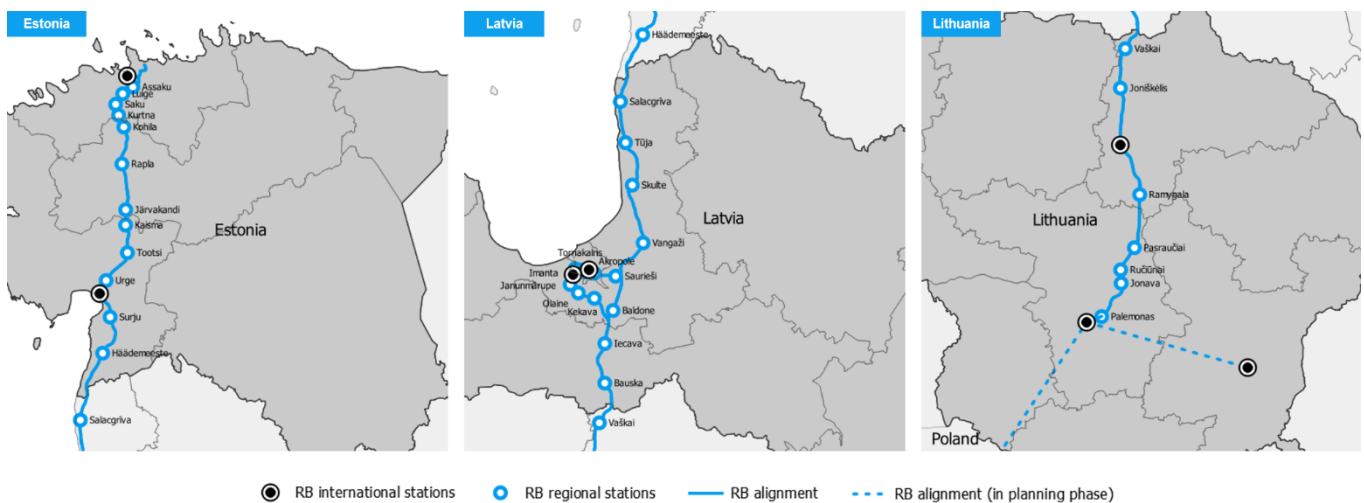
FIGURE 3: REGIONAL STATIONS ALONG THE RAIL BALTICA RAILWAY (SOURCE: GIS DATA, RB)

The Consultant work will be performed in three Work Packages (WPs) that will be delivered as separate reports. The consultant team proposes to organize these deliverables utilizing a linear approach and holistic project management, ensuring that each WP is delivered with the highest quality, consistent with the objectives, and provides as much value as possible to the Rail Baltica organization and the local organizations working in this project. Ramboll´s approach will focus on the application of cross-sectional management and results discussions, with separate workstreams within each WP working in parallel to one another. This approach results in individual WPs providing a flow of critical information both vertically and horizontally throughout the assignment. FIGURE 4 below presents the proposed delivery of each WP.

FIGURE 4: WORKFLOW OF THE REGIONAL IMPACT STUDIES PROJECT (SOURCE: AUTHOR)
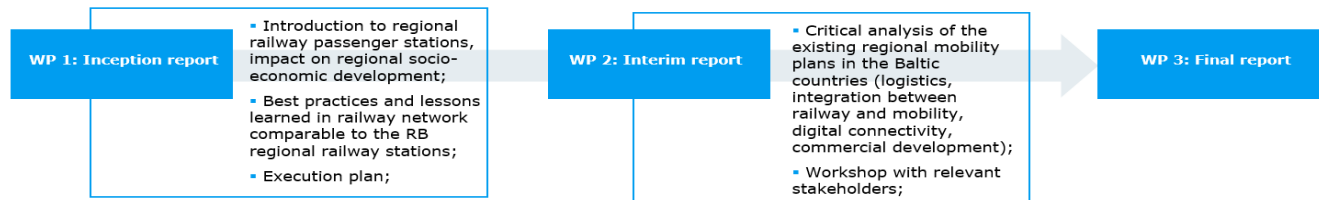
The outcomes of the current study will provide the Rail Baltica team with information on international best practices and recommendations on aspects that could support in maximizing social and economic benefits that could stem from regional station development, including potential regional opportunities beyond the stations.

Furthermore, beyond station development recommendations, during WP2, the consulting team will also evaluate existing mobility plans and advice on the potential future synergies of the Rail Baltica railway, which might have additional added value to the regional station developments.

1.3   Structure of the Inception Report

The current inception report is structured with the objective of providing the client with the highest value regarding international experience through the development of station benchmarking and the benefits that steam from the availability of rail services.

Furthermore, the report also includes sections that allow the Client to clearly understand the progress the consultant has made in project management, data collection and detail methodology on the development of the study and how policy and design recommendations were developed.

The inception report sections are structured in the following categories (please refer to the structure below):

Introduction

Brief project information, overview and approach to deliver the inception report;

Data Collection Assessment

Overview of data needs and its collection efforts. A brief data assessment to highlight progress and next steps;

Inception Report – Main Content

WP 1 content with its literature review, overview of socio-economic impact, proposed a long list of international best cases utilized for the RB station types;

Execution Plan

A full overview of the project implementation plan, milestones, final deliverables based on the consultant project contract;

Team and Project Communication

Overview of the Consultant's PM activities to improve project communication and quality assurance;

Risks and Quality Management

Overview of identified project potential risks and mitigation measures to handle project management quality.

During the process of developing this report, the team has leveraged Ramboll's Nordic heritage and global expertise in the development of transport infrastructure, engineering and design, and transport and urban planning knowledge. In this process, the team has also benefitted from the rich experience of our architectural partners to strengthen the existing planning efforts via the following process:

1. **Careful and meaningful communication and ideation** through critical-thinking exercises with highly skilled architects, transport economists, engineers, and planners, who have reviewed benchmarking from previous relevant studies. The team provides rich experiences on rail development in several Nordic countries and other experiences within the EU;

2. **Establishing a prioritized draft list of custom benchmarking criteria** for each regional station and defining best practices specific to the subject stations and adjacent areas. The consulting team has started the identification of relevant criteria for regional railway station KPIs based on its international practice and aligning it with the ToR given criteria;

3. **Careful evaluation of Rail Baltica regional stations and urban elements**; the Consultant will critically evaluate each station´s planning, design status, and urban element documentations to provide the Client with sound recommendations to strengthen the socio-economic effects of these stations. Gathering of relevant documentation will also be implemented through engagement of relevant stakeholders via workshops, as needed.

4. **Preparing draft guidance and recommendations** to strengthen and optimize plans and designs for future Rail Baltica regional railway stations.

The above-referenced process has been taken into consideration in the contextual frames of urban regeneration, commercial development, environmental integration, and mobility. Ramboll's work will be based exclusively on the character of existing station classifications as illustrated by the Rail Baltica Architectural, Landscaping and Visual Identity Design Guidelines report (B) and any previously developed station plans, with an understanding of the visions, reflected against best international best practices incorporated to the work.

2. Data availability and assessment

During the inception phase, the Consultant developed a system to identify critical data required for the development of WP 1 and WP 2. At an early stage of this project, the following project materials were provided by the Client. These resources have been used by the consultant to construct project outcomes.

PROJECT MATERIAL PROVIDED BY THE CLIENT

1. Rail Baltica Design Guidelines

2. Rail Baltica Detailed Technical Design Scope Documentation

3. Rail Baltica Architecture and Landscape Guidelines

4. Rail Baltica Operational Plan

5. Rail Baltica Cost-Benefit Analysis

6. UIC, European Commission, European Parliament, European Rail Agency, and ITF/OEC Documentation

7. One Works Whitepaper – Effective Stations Integration

8. Comouk Mobility Hubs Documentation

9. Rail Baltica Passenger Demand initial estimation per Station type

For the identification of benchmarking cases and developing recommendations for the Rail Baltica regional stations, the Consultant has used the Rail Baltica technical guidelines on station design and typological characteristics.

During the kick-off meeting held on September 3rd, 2021, the Rail Baltica team and the Consultant discussed available materials and data to be reviewed under the current project. It was noted that for regional railway stations, there are still some crucial data, such as station development and planning documentation, passenger demand estimations that is still under development at the time of delivery of this final inception report.

Moreover, through additional alignment conversations between the consultant and the Client, it has been agreed that during the development of WP2, consultant will generally analyse the location of selected regional stations but that the focus of the discussion and detailed analysis about international best practices and lessons learned will be based on a narrower group of selected stations in each of the Baltic States. The consultant will generally analyse the 11 stations illustrated in Figure 5 below and will choose six (6) of these stations (2 per country) to analyse more in detail during WP2.
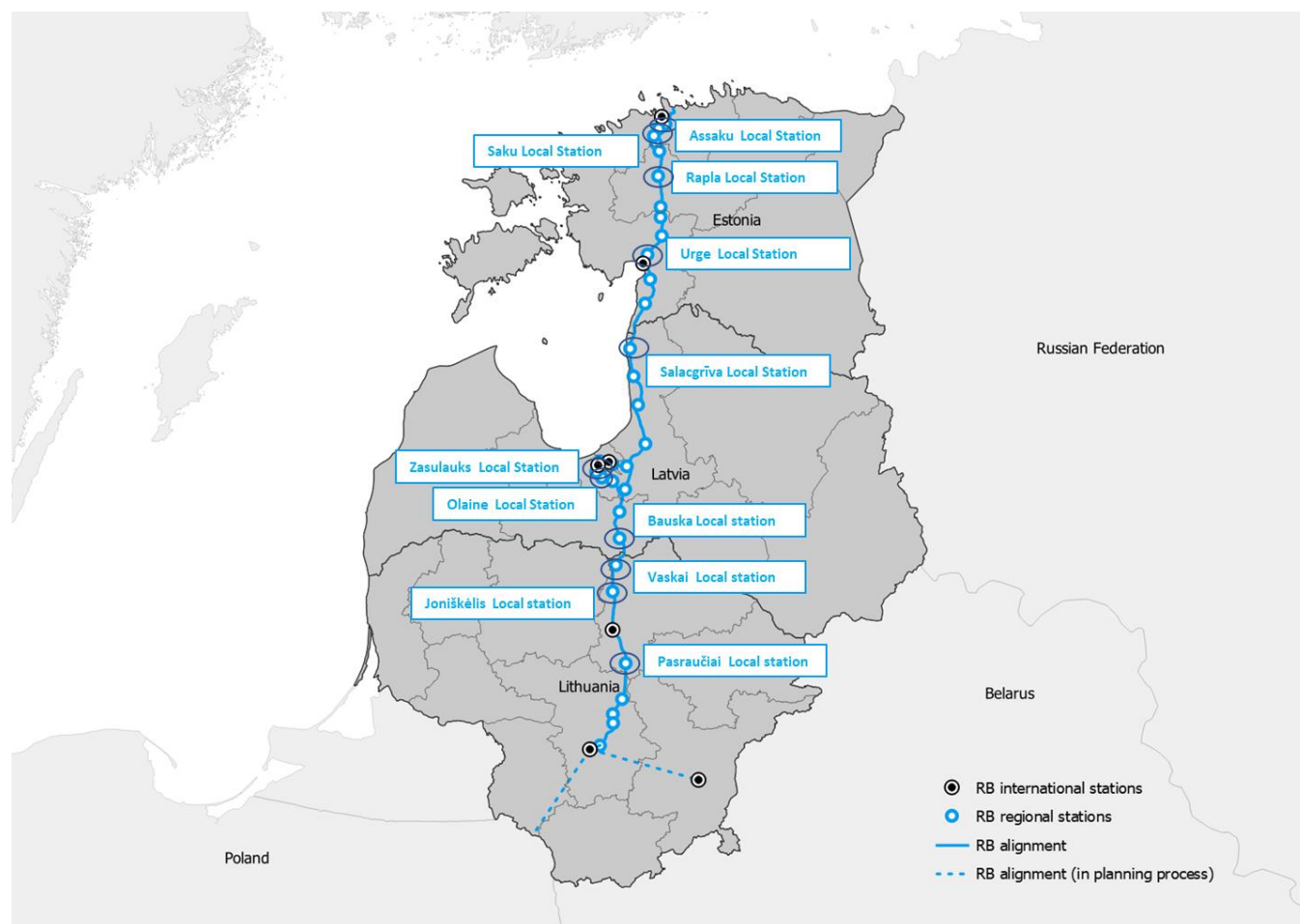
FIGURE 5 PROPOSED REGIONAL RAILWAY STATION TO BE ANALYZED UNDER THIS STUDY (SOURCE: GIS DATABASE, RB)

The stations shown in Figure 5 above were suggested by the Client and reviewed by the Consultant. During the development of WP2, the Consultant will continue to work together with the Client to finalize the six stations to be analysed and the analysis methodology will be proposed. After the project kick-off meeting, the Consultant requested the Client to share the data listed in Table 1.

TABLE 1: OVERVIEW OF RECEIVED REQUIRED DATA FOR DEVELOPMENT OF WP 1 (SOURCE: AUTHOR)

Key Content	Status
• Design guidelines for regional railway stations (ALG documentation)	Delivered
• Classification of regional railway stations	Delivered
• Railway network and Rail Baltica regional passenger stations in GIS format	Delivered
• Detailed development plans of the regional stations	In progress
• Municipal development plans	In progress
• Existing development plans at and around the stations	In progress
• Planned station passenger volumes (Travel Demand Model)	Not available

Moreover, as agreed with the Client, the Rail Baltica team has been facilitating contact details from relevant stakeholders that have been providing some of the above-indicated information. A list of the stakeholders that have been participating in this project is listed in Table 2 below.

TABLE 2: LIST OF KEY STAKEHOLDERS FOR THE CURRENT CONTRACT

Stakeholder Type	Specific Relevant Stakeholders
Elected Officials	• Municipalities, cities, or regions; • City Council;
Public Institutions	• Ministries of Transport; • Public transport authorities; • Public transport organizations (other than government agencies) • Departments of transportation and mobility; • Departments of housing, planning, and economic development; • Departments of architecture;
Private Sector	• Real estate developers (commercial and housing); • Business associations/ retail or commercial trading groups; • Mobility development organizations; • Developers and architects;
NGOs	• Passenger with Reduced Mobility (PRM) and cyclists' organizations; • Community groups;

3. Regional railway services: Engines of socio-economic development

3.1.   Regional Economic Development and Growth Opportunities

3.1.1 Introduction to regional socio-economic benefits

The introduction of regional railway services plays a decisive role in regional economic growth and social and environmental sustainability. According to international experience, connecting regional stations with a high-speed rail corridor not only provides increased mobility and greater access to socio-economic activities for those living in suburban and rural areas, but it also promotes further economic development and growth. Moreover, the benefits extend beyond providing access to labour markets; but also provide important benefits employers to find accessible land, housing, and markets that were not previously available. The main benefits of regional connectivity emerging from linking regional rail lines with a high-speed rail corridor are listed in Figure 6 and further described in the section below.

FIGURE 6 – MAIN REGIONAL SOCIO-ECONOMIC BENEFITS OF INTRODUCING RAILWAY SERVICES

- **Connectivity and increased access:** Increased socio-economic, health, and leisure opportunities for populations living in suburban and rural areas;

- **More efficient travel:** shorter travel times, and more efficient commutes to important labour markets in regions with low-growth and/or limited job opportunities;

- **Increased access to labour markets:** Opportunities to access potentially higher-income employment or more competitive employers, thus achieving higher levels of regional growth and development;

- **Housing availability and affordability:** Increased opportunities for city-dwellers to access potentially more affordable housing opportunities outside of dense urban areas;

- **Healthy population balance:** Opportunities for small-to-medium cities to maintain or even accelerate population growth and thus thrive socially and economically;

- **Opportunities for large employers to expand** their operations outside of large metropolitan areas, thus increasing opportunities for growth and utility maximization;

- Opportunities for regional **firm specialization and clustering;**

- Opportunities to **accelerate the transition to low-carbon and efficient transport** through mass electric-powered transport and support to regional climate change mitigation goals;

- **Accelerate digital connectivity** and narrowing the digital divide between urban and non-urban areas by the "Dig Once" concept i.e. FOC/ICT co-deployment through infrastructure sharing among operators and across various sectors of the economy incl. telecom operators, IT providers, energy and transport infrastructure.

- Support and empowerment of **small local enterprises**

Given the above-referenced opportunities that can be achieved by the implementation of regional railway services and connections to High-Speed service, it is important to ensure that the stations themselves are optimized to provide the services and opportunities that will result in general socio-economic benefits and support regional growth to its fullest potential.

In this case, following the European Union definition, a high-speed railway (HSL) service is faster than the normal speed of rail traffic (120 km/h), and could be between 200 km/h- 250 km/h. In some cases the HSL could be presented by intercity railway connections. The supporting elements for establishing a HSL should be paid on increasing a speed in transport corridors, assume environmental acceptance, provide a comfort ride, reduce

general urban stress (noise, pollutions and vibrancies). Moreover, mobility and urban transport infrastructure could additionally guarantee a high grade of passenger travel freedom and service quality for citizens.

Furthermore, in order to increase the potential to attain these benefits, our team of economic development, rail, commercial development, and architectural experts will provide general recommendations. These recommendations span from analysing station size, architectural design solutions, as well as operational and commercial service allocations. In this way, regional railway stations can be optimized to provide the necessary connections (public transport, non-motorized transport, and others), services, and potential opportunities for future growth. In order to capture the full benefits of existing solutions to develop regional railway stations, and to maximize value creation opportunities, it is critical to conduct a literature review exercise that can help guide the discussion of how to induce socio-economic impacts on regional stations during the station planning and design process.

In Chapter 3.2.1.2, below, the Consultant presents an extensive review of selected literature (the list of references is attached to the Annex I) and with such literature in mind, has proposed a list of regional railway stations which were reviewed under the benchmarking exercise. Moreover, in order to provide a complete assessment of best cases, the Consultant has selected, based on knowledge and experience, best examples and developed a detailed assessment against the contract criteria. The Consultant's main objective for developing outcomes of this WP was to focus on station type (per Rail Baltica guidelines), location and space usage, existing passenger traffic per day, rail operational service, station planning and commercial services, as well as station integration with the local environment and its mobility level around the station.

Rail Baltica | RAMBØLL

What aspects of TOD could be highlighted to add value in the development of the RB regional stations?

Existing and planning digital integration and connectivity between transport modes

Current location of a regional railway station (entirely greenfield, suburban) and its regional characteristics

Regional logistic characteristics and possible impact on developing urban logistic service at a regional railway station

Land availability and its usage for a railway and for new mobility services

Typical aspects of station design and development that should be integrated into the new railway stations in order to generate positive socio-economic impacts

Specific concerns or needs to be reviewed and solved under regional station development

Regional railway station development aspects

Literature highlight as transformative in terms of generating socio-economic value, especially for areas where Type II-IV regional stations will be developed

Railway stations to built, integrate and promote the use a sustainable mobility options even in low density areas

Development plans or objectives underway or in the near future, at or near the stations, that may impact (positively or negatively) the planning

Current forecasted population and purchasing power in the areas and the regions

Specific environmental sustainability goals of a region or around/at a regional railway station

Current urban and traffic structures at the region and specific at the station.

Construction of railway stations to contribute into a transformative urban and suburban changes at a station and its surrounding

Most influential aspects of planning and designing a station that should be considered in the RB regional stations

Important regional aspects to be included under station planning and design

FIGURE 7 REGIONAL RAILWAY DEVELOPMENT ASPECTS (SOURCE: AUTHOR)

25

3.1.2. Literature Review of Socio-Economic Impacts of Regional Railway Stations

In recent history, regional railway services were available to a limited number of users and heavily dependent on the train as the single mode of transport, but yet, these services played a major role in facilitating rail and passenger traffic. However, in more recent years, a more holistic approach to the development of stations and their surroundings has gained momentum due to the potential of generating and capturing higher social and economic value. Such value can be seen when commercial and housing developments are integrated as a mix of land uses, thereby effectively attracting employers, workers, shoppers, and other types of elements contributing to vibrant, dynamic centers of activity.

To summarize the key elements, the Consultant team has considered a number of online and offline literature. The focus has been on the identification of the main catalytic impacts related to regional railway passenger stations, as well as on how the development of these projects, especially station planning and design, logistics organizations, station connections with urban transportation, and its environmental integration, could be leveraged to better integrate them with their immediate surrounding areas and beyond (railway corridors with high demand). Below, the team briefly presents a selection of the literature reviewed for this deliverable. These sources are considered as recent publications that will add important value to the project.

FIGURE 8 MOST INFLUENTIAL SOURCES ANALYSED DURING THE INCEPTION REPORT

- Station development opportunities by Oneworks;

- Railway Stations – Planning Manual by Trafikverket;

- Railway Stations - Layout Manual by Trafikverket;

- Atlas of Practices and Experiences of Railway Hubs & Urban Benefits by ENTER HUB;

- The Urban Rail Development Handbook by World Bank Group;

- Railway Stations - Adapting to Future Society by UIC;

- Development Around Stations – Exploring International Experience & Lessons from UK by Tracks;

- Railway Stations – Boosting the City by UIC;

- Station Area Planning for High Speed and Intercity Passenger Rail by US DoT;

- Implementing TOD Around Suburban and Rural Stations: An Exploration of Spatial Potentialities and Constraints by Urban Research & Practice;

- Information and Communications Technology (ICT) and Transport Infrastructure Co-Deployment with Transport and Energy Infrastructure in North and Central Asia by UN ESCAP;

- Accelerating Digital Connectivity Through Infrastructure Sharing by International Finance Corporation (IFC);

- Transit-Oriented Development: Implementation Resources and Tools by The World Bank Group

Moreover, for the RB team a literature for establishing HS2 (as a high- speed railway network) could be valuable for knowledge in increasing a capacity, put a better connectivity and keep cutting carbon:

- Review of the Technical Specification for High-Speed Rail in the UK. A report to Government by HS2 Ltd .

The references in Figure 8 and the content has provided a solid foundation to develop the framework for this report. The Consultant has provided a structural overview of the identified most important five aspects of regional railway station development that are presented in the next section.

1. CONCEPT AND CLASSIFICATION OF A RAILWAY STATION

In order to establish or improve attractiveness of railway stations, it is important to define how the station will be operated in terms of governance and spatial interaction. The classification of railway stations can be based on their local context, landscape and territory availability, potential functionality, surroundings, and future developments. Also, the railway services offering has an appreciable effect on the classification. In some cases, historical aspects may also play an important role

In **Sweden**, railway stations are classified into five subdivisions. Classification is based on the number of boarding passengers and/or number of urban area inhabitants. **Error! Reference source not found.** below provide further details on station classification.

TABLE 3 RAILWAY STATION CLASSIFICATION IN SWEDEN[3]

CLASS	STATION TYPE	PAX VOLUMES/DAY	POPULATION

---

[3] Source: Railway Stations - Planning Manual, The Swedish Transport Administration

CLASS 1 – **Major stations**	High-pax routes	< 30 000	N.A.
CLASS 2 – **Large stations**	Significant pax flows	< 3 000	At least 20 000
CLASS 3 – **Medium Stations**	Medium-sized	< 1 000	At least 5 000
CLASS 4 – **Minor stations**	Minor pax flows	< 200	At least 1 000
CLASS 5 – **Small stations**	Low traffic corridors	> 200	Small districts

In **Finland**, railway stations are classified nationally in three categories depending on their role in the railway network and their annual number of passengers, [4] as shown in Table 4 below.

TABLE 4 - RAILWAY STATION CLASIFICATION IN FINLAND[5]

CLASS	STATION TYPE	PAX VOLUMES/YEAR
CLASS 1 – **Intermodal hub**	Intermodal hub	<250 000
CLASS 2 – **Medium stations**	Medium-sized	50 000 - 250 000
CLASS 3 – **Medium Stations**	Medium-sized	> 50 000

In addition to this classification, a rating of major transport hubs has been established in Finland. For railway stations, the rating considers the number of passengers, number of departures, number of transferring passengers and the station's role in the railway network. Only Class 1 and 2 stations play a role considered significant enough to qualify as a rated station.

However, the rating does not cover the interaction between the station activities and surrounding neighbourhood.

In the case of the RB, the classification of railway stations is divided into four types based on the estimated average daily number of passengers, as show in Table 5 below.

TABLE 5 - RAIL BALTICA STATIONS TYPE AND CLASSIFICATION (SOURCE: RB GUIDELINES)

	TYPE	STATION TYPE	VOLUME OF TRAVELERS
RAIL BALTICA STATIONS	**TYPE I** - International	Main station	International station
	TYPE II – Landmark	Medium station	< 600 PMD
	TYPE III – Basic	Small station	< 300 PMD
	TYPE IV – Platform	Essential station	< 150 PMD

---

[4] Source: https://julkaisut.vayla.fi/pdf12/vj_2019-09_valtakunnalliset_liikenteelliset_web.pdf

[5] Source: https://julkaisut.vayla.fi/pdf3/raportti_2010_henkiloliikennepaikkojen_kehittamisohjelma_web.pdf

A Type I station, also referred to as an International Station or Terminal Station, is the largest type of station located in the center of the main capitals of the Baltic States. With a capacity to accommodate over 600 Person Medium Day (PMD), Type I stations should offer a full range of facilities and multiple transit services in order to become not only a transportation hub, but also a destination of its own. Type II, III and IV stations are defined as regional stations located in urban and less urbanized areas. With a daily number of passengers not exceeding 600 PMD, a Type II station is the largest of the regional station types. It should comprise a station building and platform, but also constitute a landmark offering a selection of retail, cafes, spacious waiting areas, and other essential facilities. Located in more rural areas, Type III and IV stations are focused on offering functionality and fulfilling basic rail services. With the ability to accommodate up to 300 PMD, Type III stations are to be equipped with a basic station building, platform, and a smaller waiting area, while Type IV stations consist only of a sheltered platform with a capacity of 150 PMD.

2. LOCATION OF THE RAILWAY STATION

Today's railway stations are more than just a place that facilitates passenger and freight transport. Being the interface between transport and development, a station is both an intermodal transportation node and, for many people in the surrounding region, a destination. A station should, therefore, be located where its value as a transport node is comparable to its value as a destination. Finding the optimal balance between these is challenging and varies depending on the type of station to be built. Several factors such as accessibility, intermodality, demographics, and land-use functionalities must be considered.
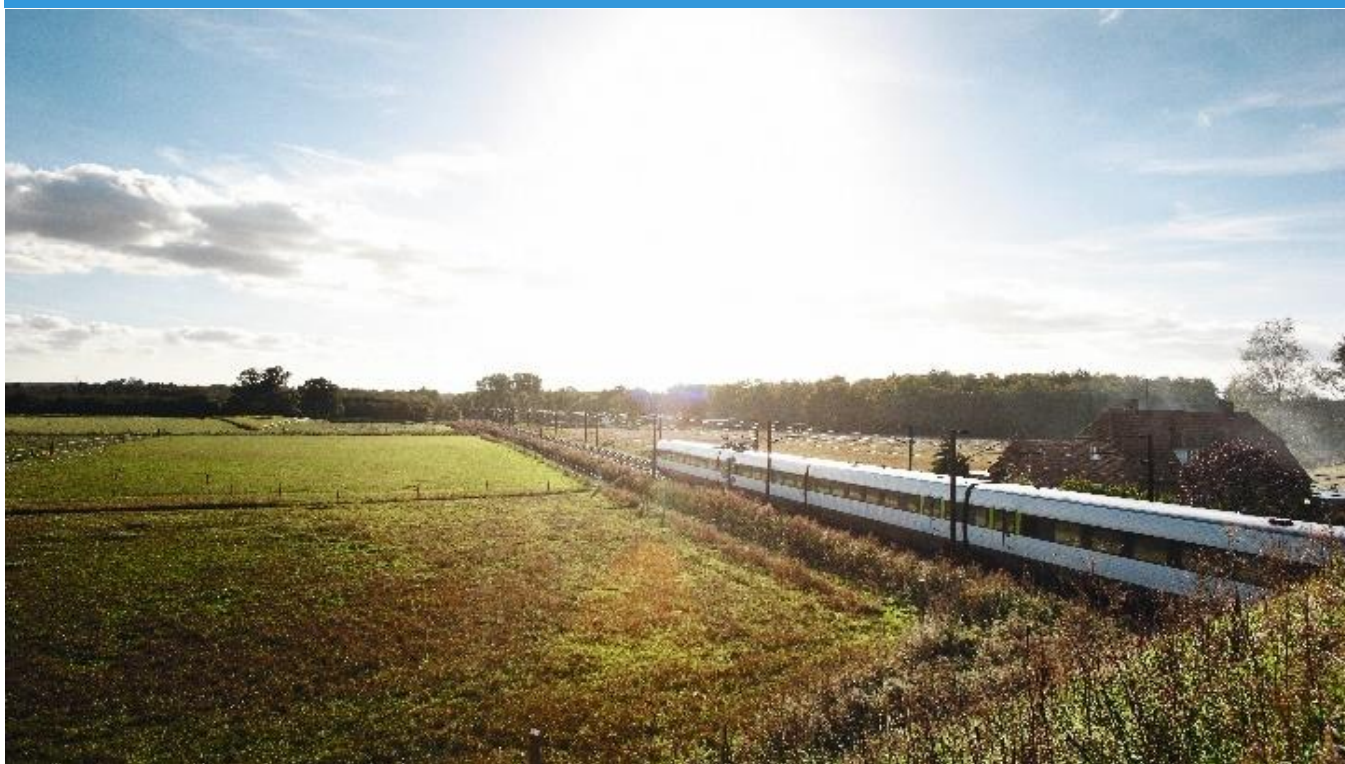
Traditionally, stations have been positioned as central hubs with urban areas, but they may also be located outside urban areas where they can serve as a central location in relation to regional travel patterns. The latter can be of particular value to a number of railways stations along the Rail Baltica corridor.

Several studies have shown that the introduction of a railway station can have different impacts on the surrounding area depending on the size and location of the station, as well as the integration of supporting services and land uses. Whether located in an urban, suburban, or rural area, it is crucial that the station is easy to reach and does not create a barrier to movement and access within the local environment. Connections over or under the railway line can severely stifle mobility at different levels; therefore, these crossings should be planned such that the local and regional walking and cycling network is enhanced, particularly when the surrounding land uses, and residents can derive benefits from these multi-modal connections.

Suburban and rural stations have the inherent disadvantage of inferior connections to the urban public transport network. Consequently, people utilizing these more remote stations tend to rely more on private vehicles as the convenient use of non-motorized modes of transport to access the station is oftentimes limited or the infrastructure to support such mobility options is underdeveloped. A railway station has the potential to stimulate economic activities contributing to long-term economic growth and spatial development of cities/regions. Therefore, the location of the station should be chosen to promote universal accessibility to jobs, services, and other socio-economic opportunities that can enhance the quality of life for its users. Hence, growth potential and businesses along the railway system that could benefit from rail station access should be considered both qualitatively as well as quantitatively when evaluating site locations.

3. URBAN INTEGRATION AND INTEGRATION WITH SURROUNDING AREA

*Urban integration and the integration with surrounding areas connects a railway station with other adjacent land uses and functions, and could include the following aspects: **Multimodal Integration, Economic Activity Generation, Urban Regeneration,** and **Regional and International integration***

Multimodal integration

Multimodal integration refers to the integration between railway, road, and other modes of transport, as well as the integration of these with the surrounding land uses and adjacent development to improve access and develop a redundancy of mobility options to and from the station. As a railway station *per se* does not offer door-to-door services to passengers, it is critical to consider how to provide convenient last-mile journey options that compete with the use of automobiles in terms of comfort, cost, and convenience. This consideration is particularly important for more remote stations with longer distances to the surrounding settlements, as the use of private vehicles plays a different role compared to urban areas. Seamless connectivity between existing and future transport infrastructure, the railway system, public transport, and other modes of access in terms of physical layout, operations, and fare structure are therefore key factors in creating an attractive station.

Economic activity generation

Railway stations promote economic growth and spur development in the station's neighbouring areas. Railway stations can contribute to the improvement of the regional economy by providing universal accessibility and mobility to the labour force, as well as providing accessible employment, shopping, and housing opportunities to inhabitants outside the urban center. These developments can also provide opportunities for value capture that may – in whole or in part depending on the scale of potential and jurisdictionally-allowable development – cover project capital investment costs and operational costs or provide additional streams for municipal finance. In each case, the local development goals can be weighed against the value capture potential of a proposed site to best suit the fiscal needs of respective governmental jurisdictions.

Urban regeneration

A carefully planned railway station development contributes not only to urban regeneration of less vibrant parts of cities, but also spurs new investment and attracts residents and employers in already high activity urban centers. In addition, a regional railway system that is well-integrated with the urban mobility system may initiate the potential for new markets and other socio-economic possibilities and generate economic activity throughout the entire region.

Regional and international integration

Taking into consideration the integration aspects of railway stations, it is extremely important to address international and interregional train traffic, especially due to the privileged location of the Baltic region. The integration of rail passenger traffic of the RB project with the general EU transport ecosystem will add much value region-wide. This is extremely important as sustainability efforts are increasing to incentivize long-distance high-speed rail travel as a preferable alternative to air travel.

4. DESIGN OF RAILWAY STATIONS

According to the Consulting team´s literature review, user needs, and preferences should be considered in the early stages of station planning and design. Whereas larger urban stations with high value-added indicators should be designed to allocate various facilities like shopping areas, eateries, and other commercial spaces, smaller regional stations should focus on a more functional design fulfilling essential needs, like protection from weather, climate control, opportunities to sit down and small shopping activity

FIGURE 9 LUND CENTRAL STATION, SWEDEN

Regardless of station location, it is important to pay attention to the local context when allocating additional facilities such as park-and-ride, bicycle parking, and commuter parking. In order to encourage modal shift and

promote the use of rail, all modes of transport present in the vicinity of the station should be aligned, and dynamic transport information provided. For regional stations located in suburban and rural areas, it is of great importance to provide a station design that enables a convenient last-mile journey in order to make railway transport a competitive alternative to private car. For example, even the simplest type of station located in rural areas should provide a relatively large and clearly signed area near the platform for convenient transfers to regional bus services, as well as sufficient short-stay and long-stay parking possibilities that covers the parking demand.

The literature also notes that although passenger safety and operational efficiency should be at the forefront of the design and implementation of any railway project, user needs and wants should also deemed critical during the design. It is also highlighted that at locations where future ridership is highly uncertain, which can be the case for some remote regional stations, the station design needs to have some flexibility in order to adapt to demand fluctuations over the lifetime of the facility.

FIGURE 10 LANDSKRONA RAILWAY STATION, SWEDEN

5. PUBLIC PARTICIPATION AND PASSENGER NEEDS

Based on the literature reviews, it can be concluded that to maximize the socio-economic impacts of a rail project, particularly a railway station project, it is important to engage all the different stakeholders (both active and passive) during the early planning stages of the project to best understand – and potentially satisfy – the needs and expectations of different user groups. The stakeholder list should include, but not be limited to, government authorities, users, operators, real estate agents, retail/commercial/trading groups, contractors, and other commercial players.

Modern railway station planning stakeholder engagement also considers demographic perspectives, such as age, gender, and those with special needs. For example, passenger satisfaction surveys have shown that, when asked to rank possible improvements to their rail service, passengers rate reliability and punctuality as the top aspect closely followed by value for money and securing a seat on the platform/train. By taking these aspects into account at an early stage of the station development process, extra attention could be given to success factors such as increased seating capacity and the fulfilment of other basic needs in an attempt to offer passengers the services they expect in return for their fares.

3.1.3. Selection of international best practice comparable to the RB regional stations

3.1.3.1 Introduction to the methodology

In order to identify relevant international best practices for the Rail Baltica regional railway stations and the areas surrounding them, the consultant proposes the following three-step approach, as show in Figure 11 below.

FIGURE 11 METHODOLOGY STRUCTURE (SOURCE: AUTHOR)

The suggested approach provides a clear framework to identify and compare best practice stations based on international experience, highlighting similar location characteristics to those of the Rail Baltica potential stations. This approach is further explained in more detail below:

Overview and analysis of the regional Rail Baltica stations. Included a general overview of each station current proposed location (using GIS mapping), classification[6], their context considering surroundings, and their forecasted daily passenger demand. Currently, there are approximately 34 Rail Baltica regional railway

---

[6] As per Rail Baltica Station Guidelines

stations in Estonia, Latvia, and Lithuania. Some of these stations currently exist (five), while the rest will be constructed in the coming years. These stations classifications vary depending on their locations, they range between urban, suburban and rural environments. Each station features different characteristics that define their constraints, strengths and opportunities.

Development of the long list of international "best-practices." These best practices are considered by our rail and economic development experts as representative in a similar context of the Rail Baltica regional stations. The list is developed drawing on vast experiences in the Nordic and central European countries, describing them utilizing a set of KPIs, typology and comparability potentials.

Compile the collected international knowledge and findings applicable to each of the Rail Baltica regional rail station type: Landmark, Basic and Platform, with a strong focus on describing the most relevant KPI categories. The outcome of this step is to provide the framework for developing a summary where "Best Practice" advice to be explained and illustrated characterizing the identified lessons learned from successful international examples. Under this step, the consultant proposes to structure all selected benchmarking as shown in the

Table 6 below. This approach provides the Client with a clear general overview of identified examples as well as the lessons learned. It is critical to note that from the long list of 43 stations, the consultant will shortlist only the most applicable to the for Rail Baltica stations to carry out the benchmarking exercise. A description of station types and the four categories summarized based on a long list that is developed by the Consultant.

TABLE 6: CATEGORIES TO SELECT AND CLASSIFY INTERNATIONAL BEST PRACTICES (SOURCE: AUTHOR)

CATEGORIES	LANDMARK STATION (Type II)	BASIC STATION (Type III)	PLATFORM TYPE (Type IV)
COMMERCIAL OPPORTUNITIES AND INTERNAL SPACE USAGE	"LESSONS LEARNED"	"LESSONS LEARNED"	"LESSONS LEARNED"
REGIONAL MOBILITY AND TOD DEVELOPMENT	"LESSONS LEARNED"	"LESSONS LEARNED"	"LESSONS LEARNED"
INTEGRATION WITH THE LOCAL ENVIRONMENT AND EFFECTS ON LOCAL AND REGIONAL REGENERATION	"LESSONS LEARNED"	"LESSONS LEARNED"	"LESSONS LEARNED"

This approach provides the Client with a clear general overview of identified examples and the lessons learned that were derived from them. Under the each of above-mentioned category the consultant team developed valuable key sub-criteria to be evaluated within the benchmarking, as well as applicable for future development of the Rail Baltica regional railway stations.

3.1.3.2. Review of the best practices against selected categories

<div style="background:#29b6e8;color:#fff;">

CATEGORY 1: COMMERCIAL OPPORTUNITIES AND INTERNAL SPACE USAGE

Regional benefits start at the railway station platform. Internal space conceptualization and design is critical to ensure the provision an optimal user experience, including comfort, safety, ease of movement and other basic functionality aspects.

</div>
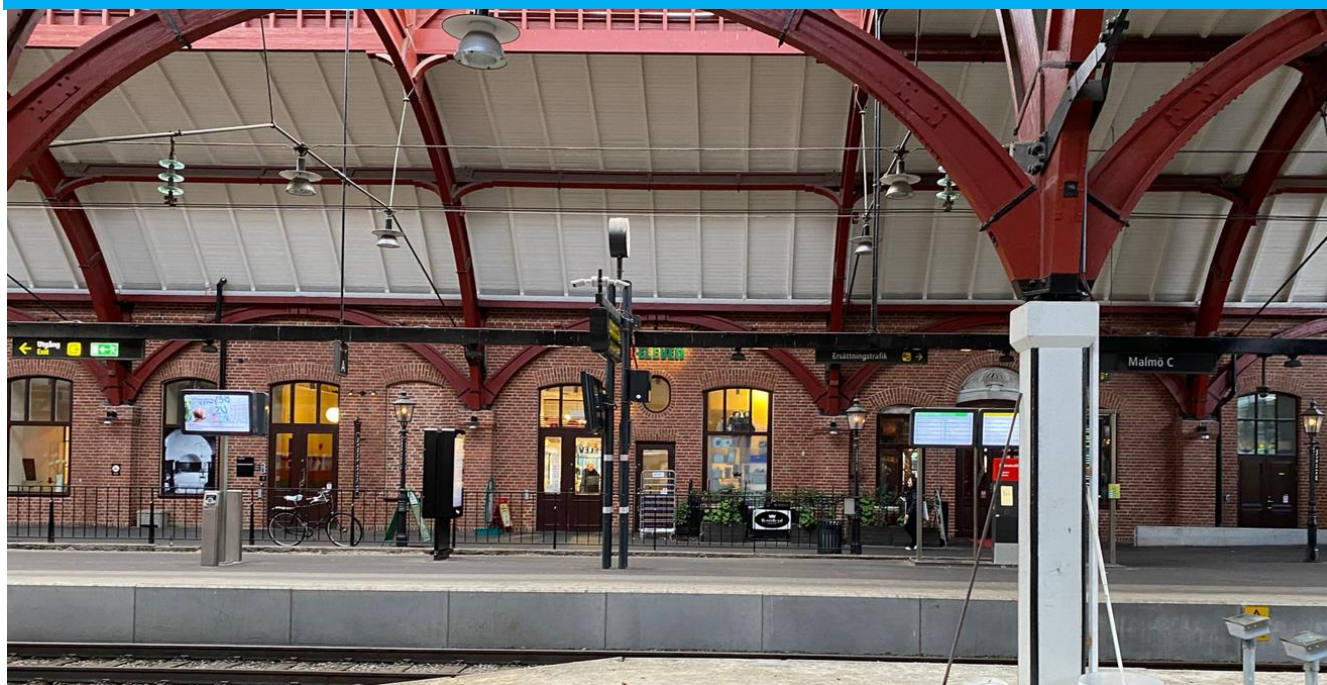
FIGURE 12 MALMÖ CENTRAL STATION, SWEDEN

Internal space design and usage

Regardless of the size and type of a station, critical conceptualization and design of internal space is required to:

1) ensure the provision an optimal user experience (including comfort, safety, ease of movement and other basic functionality aspects); Regional impacts of railway services, from the user perspective, start at the railway station platform.

2) provide commercial activities such as shops, stands or even automatic vending machines. serving as a prime location not only to access transport services but could also be an opportunity to do the daily shopping, access entertainment and, perhaps conducting business.

3) Assign urban logistics services, that require established area for placing smart boxes, or e- commercial parcel services. Under this improvement category is it important to plan the whole connections within a railway station for: picking up parcels and letters from senders (fulfilment centres, offices,

individuals); bringing items to distribution station (or hubs, depending on the assigned service) and parcel sortation station (if any); sorting and preparing parcel and mail for further delivery; distributing items to delivery centres and local depots for 'last mile' delivery, or delivering items directly to recipients (businesses, individuals, etc.); handling returns, which includes all of the above in reverse order.

Railway stations attract a large number of users (and non-users in some cases) everyday, therefore they create great opportunities for developing commercial services within and around the station, specially to rail users who pass through the station in a regular basis. Even in a non-urban setting, adding a grocery shop or carry-on food services can reduce the need for additional travel and adds convenience.

However, thriving business activity should not be assumed solely based on the large volumes of passengers.

There is evidence that shows that the existence of commercial development near passenger flows is not a solid basis for vital service businesses. Public transport services generate passenger volume peaks depending on hour and location of the station.

Therefore, while planning a railway station and formulating a scope of services to be included inside and around the station, existing local conditions, such as passenger volume at a station, connectivity to a station with existing urban environment, and local service structure must be considered. Integration between station services, housing and possibly workplaces is needed to ensure sufficient customer base for commercial services in and around the stations.
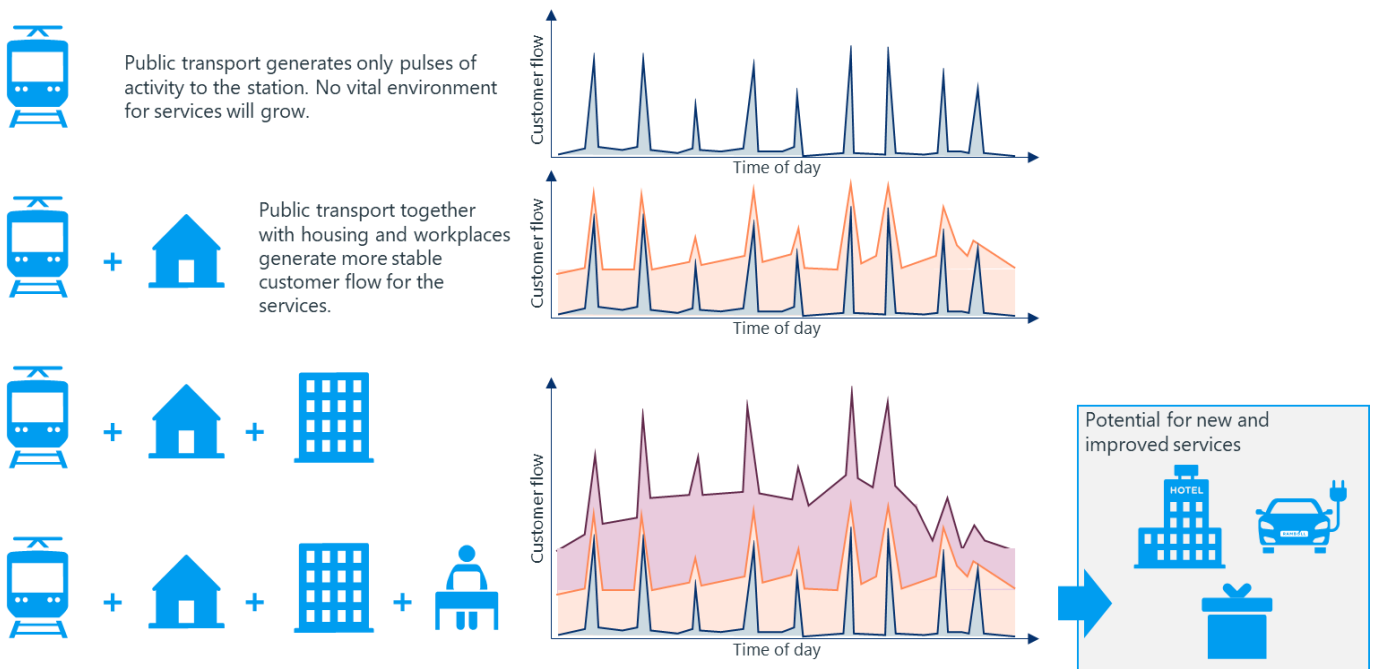
FIGURE 13 EXAMPLE HOW INCREASED FUNCTIONS NEAR AND AROUND THE STATION CREATE IMPROVED POTENTIAL FOR THE DEVELOPMENT OF SERVICES (SOURCE: AUTHOR)

Planning a railway station requires not only available land and floor area, but also clear and logical station space use conceptualization and planning. International best practices on station design reveal that passengers often seek services within a station in a manner that complements their primary purpose of being at the station (e.g. mobility, either boarding or descending from a train). These next-to priorities may include:

- o human-scaled pleasant waiting areas along walkways and platforms;
- o on-the-go food and refreshments, coffee, and snack stands and vending machines;
- o Sit-down restaurants, depending on the volume of passengers and station size;
- o Lockers, foreign exchange booths, banks, or other financial services;
- o information stands, machines to buy tickets or personalized attention booths to buy and return tickets;
- o grocery stores and other convenience shops such as shoe repair, hairdresser and other services that could reduce the need for additional travel legs;

Such services and amenities require careful spatial planning and ultimately have a direct impact on the final station space allocation and user experience (environment). It affects how the arrival space is utilized, service and communication zones, and platforms. Smooth transitions between all these areas is an essential part of the design process and have a large impact on how people use the station.

Even at smaller stops ("Platform type"), a platform itself could offer some of the services described above, effectively providing the commercial services people need before and/or after their journey.

Interaction between users and space

To develop a well-functioning railway station and reap the potential regional benefits that arise from its development, the design of its internal spaces for different flows should be considered, primarily for passengers' movement and user experience (UX), as well as for logistic purposes (when applicable). Small-volume freight and parcel movement should be considered for stations where these needs can be anticipated. For this purpose, space planning becomes key.

In order to develop improved interactions, planning should not only consider station physical location, but also aspects such as building height, the relation to surrounding infrastructure and buildings, art and cultural installations, and other visual amenities which could create obvious differences in passenger flow, orientation, wayfinding, accessibility, station character, and function. The importance of considering interactions between users and space can be exemplified simply by the scale of stations over time. Based on

the analysis of the long list of best practice stations, traditional stations typically constructed as single-story buildings at ground level offer good visibility, simple level crossings, and do not have much impact on a city's topography. However, current trends of more complicated in regard to regional railway stations, while offering better service and experience to users, also feature greater attention to road safety around the station, grade-separated passages that complicate movement, as well as competing (rather than complementary) objectives of the station and adjacent urban environments.

Multimodality and connectivity starts inside the station

Connectivity between the railway station is a function of existing access to other transport modes, its required level of interaction, as well as the potential for external infrastructure that may support access and mobility. To emphasize a smooth passenger journey, it is essential to highlight signage and wayfinding starting once the user has stepped out of the train. Furthermore, number of connecting traffic and crossing streams in and around a station is required. These should be clearly planned, designed, and connected with the station. This connectivity starts from the station platforms and continues through the facility (via the most direct route possible) to all possible intermodal options. Station connectivity should be a fundamental element influencing station type, its complexity and functionality: from a high-density network at a larger regional station on one hand to a very simple system for stations in small towns, at greenfield or rural areas.

CATEGORY 2: Regional Mobility and Transit-Oriented Development

Rail-based transport is often considered as the backbone of urban and regional mobility and an important driver for economic development, growth, innovation and technological development

FIGURE 14 KÄVLINGE, RAWILWAY STATION, SWEDEN

Rail-based mass transport is often seen as the backbone of urban and regional mobility and an important driver for economic development and growth. As mentioned earlier in this report, many benefits stem from the provision of regional rail services, especially high-speed rail. Based on such potential benefits, providing access to rail services, and enabling the environment for rail stations to become not only a transport hub but a meeting place where people shop, relax, and can be entertained, can provide users with opportunities that go well beyond mobility and more comprehensively integrate the station with the adjacent community. Furthermore, capitalizing on the value capture of station development in previously under-developed areas around regional stations can feed back into the potential value generated by the railway itself. Developing commercial opportunities around stations can generate jobs to regions that may not have been as accessible in the past. Also, consolidating housing development around the station and achieving good mixed-used development can provide mobility benefits by ensuring the housing/jobs ratio is more equitably balanced, travel distances are shorter, and different land uses are more accessible.

With respect to Transit-Oriented Development (TOD), the existing built-form context in which each station is planned defines the strategy. In the case of an area that is already developed and, in most cases, exhibits the characteristics of an urban environment, the implementation of a TOD strategy is done as a way to consolidate development and establish consolidated centers of activity so that the built area is more efficient and delivers socio-economic value, while at the same time, providing residents with easily accessible land uses. In other words, this "pull" of existing urban infrastructure responds to railway stations planned with a TOD strategy such that the center of a pre-existing community (e.g., a community that has grown organically utilizing

traditional twentieth-century zoning practices but has no recognizable center) is more clearly recognized and associated with mobility options that do not default to the use of private automobiles.

Alternatively, in places where there is little to no existing development, the TOD strategy works to "push" the region into establishing a new center of activity and, it is strongly recommended that station development and urban planning efforts work together to create or incentivize a new thriving and compact community where walkability, micro-mobility, and public transport are the primary ways of getting around, or at the bare minimum, from and to the station.

It is important to note the difference in potential services and user experiences between the different types of stations planned for the Rail Baltica Regional railways services. While stations in Type II may have a higher potential for the development of commercial opportunities and additional services in and around them, Station Types III and IV may require more attention to integrating them to public transport and other forms of transport that are adequate to the area (regional, suburban, rural), unless a concerted effort is made across all regional stakeholders that this station would serve as the heart of a new TOD area.

In order to consider the potential for each of the station types, the consulting team will provide a review for each station type that will **include the following aspects**:

Integration between stations, services, and station area mobility plans

Regional transport and urban mobility/development plans are key to understanding the needs of the local population to access new (or improved) railway stations and adjacent services. Developing adequate planning documents ensures understanding of access needs and can provide a clear understanding of potential solutions to integrate current regional public transport services to the new or improved railway services. Furthermore, developing local and regional plans also provides an opportunity to identify potential solutions that can be implemented to accommodate automobile drop off, potential connections utilizing non-motorized transport (NMT) and potentially utilizing or facilitating spaces and facilities to incentivize the use of micromobility, ride-sharing, or other Mobility as a Service (MaaS) offerings. Considering these new mobility services has an important impact on social, economic and environmental benefits that include:

- Increased employment from local activities such as micromobility operators, bicycle shops and repair services, shared vehicle operations and other related services;

- reduction of Greenhouse gases (GHG) that contribute to climate change;

- reduction in air criteria pollutants that have an impact on health and wellbeing;

- increase physical activity, which is known to improve health outcomes;

- reduction in travel times due to more integrated urban development;

- money savings from not owning a private automobile and associated costs;

In order to consider some of the new mobility solutions as part of a station's environment and design, it is necessary to provide a backdrop for future discussions about ways in which spatial and transportation planning, particularly in small- and medium-sized cities or suburban communities, can ensure sustainable mobility solutions and enhance local and regional integration, supporting regional development in the Baltic regions.

Maximizing access to and from stations

FIGURE 15 LUND CENTRAL STATION, SWEDEN

In transport and mobility planning, special consideration is given to what is known as the "first and last kilometer" problem. This means providing a solution to connect travellers between their origin (a user's home or office, for example) to the railway station and vice versa. These connections are essential for maximizing

value, realizing the multimodal approach expected by modern travels, and optimizing access and mobility for all users. In order to provide adequate access to and from stations, the Consultant proposes that, well before the planning and development of the regional stations, an analysis should be carried out at, say, 1 km, 3 km and 5 km radii from each station to better understand:

o **Pedestrian infrastructure needs** such as multi-use paths and adequate sidewalks are in place in order to accommodate pedestrian volumes forecasted. Other important infrastructure is also needed such as illumination to ensure safety and comfort regardless of time of day, tree placement and green space installation to provide accommodating, adequate and good quality pedestrian experience. The principle of promoting walking environments is convenience and safety, and therefore more than the width, length and quantity of sidewalks and pedestrian crossings. Such infrastructure around the stations should thrive to make the walking environments active and living with, for example, transparent facades, shops and access to green environments.

FIGURE 16 WELL DESIGNED PEDESTRIAN PATH AND BIKE INFRASTRUCTURE, LUND CENTRAL STATION ACCESS, SWEDEN

o **Bicycle infrastructure needs**, including multi-use paths, grade-separated routes, dedicated unidirectional or bi-directional bicycle paths, and clearly defined bike routes[7]. Convenience and safety are the same principles for cycling as for walking. Adequate and well-placed bicycle racks of high quality are important. It is decisive for whether the citizens choose to arrive by bicycle at the station. The bike rack parking capacity should be slightly higher than expected daily number of users and it is recommended to leave room for future growth. It is important to plan for covered parking due to inclement weather. Furthermore, in most cases it has been observed that visibility and proper lighting also has an impact on both the cyclist's safety and reduced bike theft. Covered and vault bike parking depends on the station size and location and need to fulfil the same criteria as above.

FIGURE 17 BICYCLE PARKING AREA INSIDE AND AROUND LUND CENTRAL STATION, SWEDEN

o **Intersections optimized to incentivize sustainable modes of transport** crossings and intersections around the station should prioritize walking and biking by developing designs that reduce obstacles, ramps, and other walking impediments. Infrastructure elements that have been observed in international best practices include at level crossings, paint markings, sign elements, motorized vehicles speed humps or other installations to reduce speed, and other elements to reduce pedestrian-motorized vehicle conflicts.

---

[7] Bike routes are defined as low volume roads where biking can be direct, comfortable and pleasant.

- o **Adequate infrastructure and facilities for persons with reduced mobility** or different abilities, including walking aids, tactile signs and aids, sound signals at intersections, sidewalk ramps, and other accessibility elements relevant to the environs in and around stations

- o **Strong intermodal interconnectivity** with existing and future public transport networks and the regional railway stations, including bus-and-rail-based services. Enhanced sustainable transport services, including bike storage, car sharing, electric vehicles facilities. Ensuring the stations accommodate for all-mode integration is an important aspect of planning for inclusive and sustainable transport. Some of the most important aspects of planning a regional railway station is to accommodate for all type of potential users from the planning and design phase. This includes bike parking, garages and/or lockers, adequate station curb side space for automobile drop offs or ride sharing service drop offs and taxi service waiting areas, paid charging spaces for electric vehicles. A way to take this into consideration in transport and mobility planning is to focus on to what is known as the "first and last kilometer" problem. This is providing a solution to connect travellers between their origin (a user's home or office, for example) to the railway station and back again. These connections are essential for maximizing value, realizing the multimodal approach expected by modern travels, and optimizing access and mobility for all users.

- o **Parking regulation** – especial attention should be given to parking regulation in order to incentivize public transport use without incentivizing potentially excessive or unnecessary automobile use, and thus contributing to regional road congestion. For example, in urban areas, it is clear that free or low parking pricing is conducive to several negative externalities including increased levels of traffic congestion, increase in the concentration of local air pollutants and greenhouse gas emissions. For this reason, it is important to ensure adequate short-and-long term parking is provided at stations at the optimal quantities and right pricing. Parking should have a price based on its location (on-street directly in front of shops is more expensive than a garage two blocks away), as well as regular assessments are part of the local ordinances about pricing so that utilization can be targeted for 1-2 spaces available on each block. Likewise encourage dispersed, shared facilities rather than enormous central ones and "flex zoning" allowing developers to swap out parking requirements for other land uses if regular assessments demonstrate that less parking is needed than previously calculated. A way to optimize this is to build shared parking and parking maximums into the code.

Regional freight logistic chain optimization

Railway freight transportation could be a part of a supply chain not only in national/ international, but also in an urban and regional logistics network context. Under the TOD sector at a railway station, regional logistics

could be presented by mainly allocation of smart boxes for private/ business parcels or assigning last mile delivery points, post offices, or other relevant small cargo logistics services, which might also be possibly connected to small rail containers (to provide regional deliverables).

FIGURE 18 CARGO LOCOMOTIVE AT LUND CENTRAL STATION, SWEDEN

Required elements of establishing such service and create a freight logistic chain would require: allocation of space within a railway station building, which will have a barrier free and quick access to connected transport modes (for example besides rail to car parking stations, cargo bikes, taxis, bus stops etc.), setting a cooperation with suppliers and its supply management system, logistic organizations within a station itself and between a station a manager and a railway operator, developing relevant to the freight service facilities, establishing required digital and technical solutions, etc... Essentially the whole railway logistic supply chain could consist of a network of many smaller supply chains which are linked or integrated to varying degrees. In most cases it is to be expected that regional stations will be connected to the local passenger transport system (e. g. bus). These services will be either on-demand (very small stations) or timetable based (cyclic timetable). This offers the opportunity to establish new service formats for carrying smaller assignments. While these regional freight logistics services do not necessarily be connected to rail the inauguration of such services will bring added value to the community. Vice versa on the rail side the regional passenger trains could be utilized to transport small-size consignments (e. g. classical courier service), as far as the cargo can be rapidly exchanged at the

stations. Related best practice examples and their potential benefits and related requirements to passenger station infrastructure will be studied. This is a logical development since the area around the stations is not always occupied and there might be the opportunity to develop new industrial and business estates closed to the stations since an attractive road access (and pedestrian/bike access as well) and local transport services need to be provided anyway to ensure the functionality of each regional station. This is supported by initial check of examples of newly introduced commuter stations (like Limburg Süd in Germany, where such spatial development is envisaged).

Densification

Density is proportional to the size of the railway station as well as the surrounding built landscape. Density should be planned so that building sizes increase closer to the TOD station, where the activity and passenger volumes can justify the additional development. Calculations for Floor-Area-Ratios should be proportional to station ridership. The street network is planed with minimum dimensions so that speeds are controlled passively via narrow carriageways: Zoning for the "right" Land Uses. All vehicular activities (including loading, taxi stands, etc.) are planned outside the pedestrian corridors, so that the flow of pedestrians to and from the railway station is unimpeded by these activities. Instead, the area should primarily be designed at the pedestrian level. Pedestrian crossings are designed as passive speed control devices so that walking speeds are maintained while driving speeds are lowered. Multiple options are provided to connect to the railway station.

CATEGORY 3: Development and integration with a local environment and its effects on Regeneration
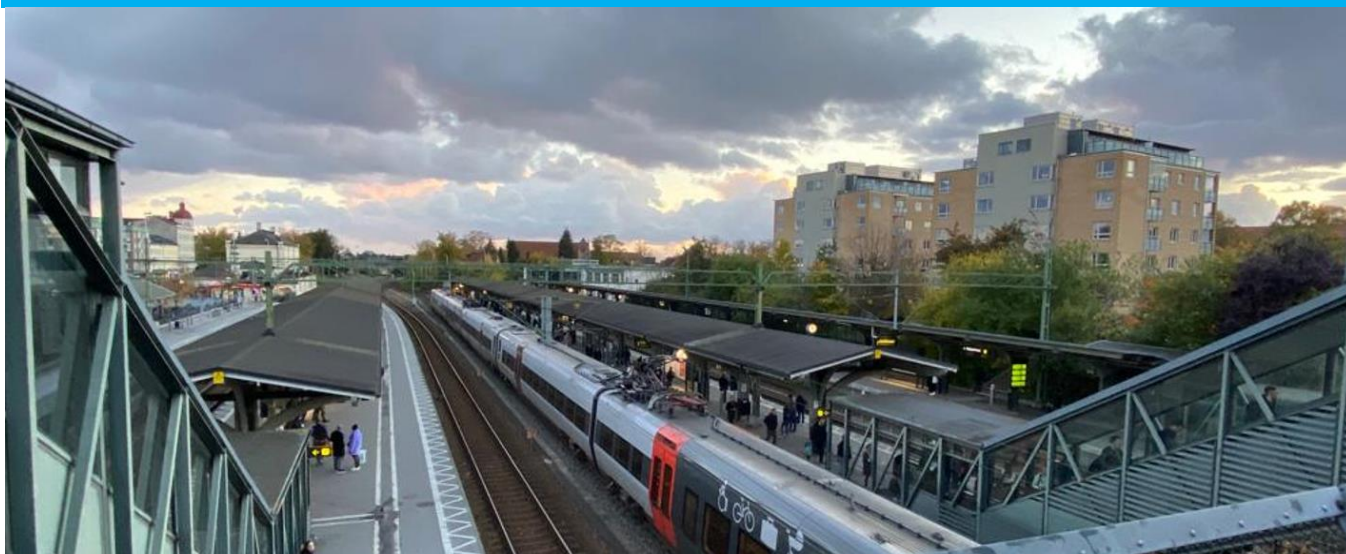
Local authorities and broader stakeholders

Stakeholder cooperation is one of the main components to planning a railway station that is integrated with urban needs and best complements urban mobility. A railway station is a point of interest for a broad selection of stakeholders: mobility providers, commercial services, logistics activities, housing, education, cultural institutions, tourism facilities.

Stakeholders can be organized into two main categories:

- Decision-making (who could also finance a railway station development, take decision on land-use, and give rights for any new construction opportunity, attract international investments, etc.). Moreover, to this category we could also assign companies (if there are different organizations than a railway operator) who run and operate trains, stations, and railway infrastructure.

- Broader number of stakeholders, who could be public (transport operators, ticketing service operator, etc.) and private companies (commercial companies, shops and any sales offices or private transport operators, like cars-, bikes-and scooters sharing) and have both interests: to get a place at a railway station, to sell their services and generate income.

Digital connectivity

Construction of a railway line includes a heavy interference with the environment. By its nature, the railway line is built to pass through the landscape as directly as possible. A railway line could be utilized to serve as corridors for digital connections. When improving the digital network infrastructure at the same time as the railway line is built, the effect to the environment can be minimized. The service roads for the railway line can be utilized if any repairs for the network infrastructure needs to be done.

Freight logistic network improved

Access to a freight logistic at a regional railway station plays an important role for daily users and it provides a great value for a suppliers and a railway operator/ station manager. Logistic networks have an impact on a railway station, as well as on a city by forming and allocation its service in an urban area (geographical aspect of a station location) and concern goods movement within urban area (transportation aspect) and service-related trips by commercial entities (commodity aspect; i.e. transport of things). Developing any logistic network at a railway station should be in a synergy with existing regional competitiveness of companies and existing mobility services, as well as its infrastructure within a city and at a railway station. Development of a specific logistic service with providing a required access at a railway station strongly depends on potential regional stakeholders and potential cooperation partners:

- Shippers – manufacturers, wholesalers, retailers, etc. Shippers send goods to other companies, or persons using facilities at a railway station, and who usually located outside of a city. Here an attention should be paid of goods or service types, which will give to a railway operator an understanding of their needs, and what kind of facility would they require to be allocated at a railway station, or nearby;

- Transport operators – delivering organizations who use various transport modes (cars, freight bicycles), which could assure intermodality at a railway station. At the same time, it will help a railway station operator to assign parking areas (its size and numbers of slots) which will be close to delivering point;

- Receivers – shopkeepers, offices, construction sites, residents, tourists, and other traffic participants (pedestrian and cyclists). Receivers are located in the urban areas and are mostly the endpoint of the logistics chain. In order to establish a free and quick access for receivers at a railway station, the next could be applied: allocation of delivering office (or boxes) next to walking zones or directly at railway platforms with a diversity planned access; allocate smart locks for small private deliveries at a railway station entrance, which will be helpful not only for railway transport users, but also for residents, who just live in the district; allocate information stands and signs for a quick access to the delivering zones-rooms or points.

Tight connection between land-use planning and improvements on railway services has been highlighted in several cases both on urban and suburban areas. On urban areas re-development of former railway yards and workshop areas with rail connection has been emphasized as good accessibility and connectivity has been recognized as key element to attract people to move in and work on new housing and job districts. For all that, regional railway lines construct a notable opportunity to develop land-use also on suburban and inter-urban areas, as there are no such space limitations as in dense urban areas. Railway connection brings possibility to utilize the high capacity on railway transport to offer fast and convenient connections for commuting and leisure travel. Leaning on the location around and between cities and towns, close to countryside, widens the opportunities to access activities in wide scope.

Firms clustering and regional cohesion

Station locations near dense labor markets are attractive for most companies to locate their business as they offer easy access for the workers, customers and suppliers. In order to utilize the potential, the surrounding land-use should be planned to offer interesting spots for business premise development. Also, it should be done with volume that enable wide range of companies as companies attract others and the more companies operate close to each other, the more economic benefits arise from their closeness. For example, critical

customer base is achieved for certain local actors that offer services for companies located within a particular area. General Overview of the Rail Baltica Regional Stations.

3.1.3.3. General analysis of the Rail Baltica regional stations

In addition to the literature review presented in the Chapter 3.2.1.2. with the aim of developing the benchmark analysis being comparable to regional railway stations in RB, the consultant has developed a general overview of existing and planned RB regional stations with their brief description and characteristics. Such an approach ensures that the emphasis will be directed to the selected best comparable cases, and their lessons will be applicable to the RB development needs.

Therefore, in order to have a first status overview of the RB regional stations, the consultant looked through the existing railway alignment and structured the proposed by the Client stations assigning their general characteristics.

Moreover, the consultant team generally analysed the attached to the stations area land-use availability and its structure, current population number around each station (within radius of 3km) district and special characteristics, like other railways or main road close by and tourist attractions.

The analysed data was developed in OpenStreetMap data for land-use analysis (© OpenStreetMap contributors) and GIS population data in form of 1km x 1km grids. The outcomes are presented in the Table 7 below.

TABLE 7 OVERVIEW AND GENERAL ANALYSIS OF THE RAIL BALTICA REGIONAL STATIONS (SOURCE: AUTHOR)

Nr	Name	Country	Function type	Construction status	Proposed station type	Pop. R=3km	Station Characteristics
1	Assaku Local Stop	Estonia	Passenger	New	Type 2	8.200	Capital metropolitan area / greenfield
2	Häädemeeste Local Station	Estonia	Passenger	New	Type 3	60	Greenfield
3	Järvakandi Local Station	Estonia	Passenger	New	Type 3-4	1.300	Greenfield
4	Kaisma Local Stop	Estonia	Passenger	New	Type 3-4	200	Greenfield
5	Kohila Local Station	Estonia	Passenger	New	Type 2-3	4.300	Greenfield
6	Kurtna Local Station	Estonia	Passenger	New	Type 2-3	2.100	Greenfield
7	Luige Local Stop	Estonia	Passenger	New	Type 2-3	3.000	Capital metropolitan area / greenfield
8	Rapla Local Station	Estonia	Passenger	New	Type 2	6.200	Greenfield
9	Saku Local Stop	Estonia	Passenger	New	Type 2-3	7.000	Greenfield
10	Surju Local Stop	Estonia	Passenger	New	Type 3-4	600	Greenfield
11	Tootsi Local Station	Estonia	Passenger	Existing	Type 3-4	800	Greenfield
12	Urge Local Stop	Estonia	Passenger	New	-	700	Greenfield
13	Akropole/ Slāvu tilts Local Station	Latvia	Passenger	New	Type 3-4	209.000	Capital metropolitan area / in urban environment
14	Baldone Local Stop	Latvia	Passenger	New	Type 3-4	2.200	Greenfield
15	Bauska local Station	Latvia	Passenger	New	Type 2	1.200	Greenfield
16	Iecava Local Station	Latvia	Passenger	New	Type 3	1.400	Greenfield
17	Imanta Local Stop	Latvia	Passenger	Existing	Type 2-3	82.700	Capital metropolitan area / in urban environment
18	Janunmārupe Local Station	Latvia	Passenger	New	Type 3	4.500	Greenfield
19	Ķekava Local Stop	Latvia	Passenger	New	Type 4	1.500	Greenfield
20	Olaine Local Stop	Latvia	Passenger	New	Type 3-4	1.700	Greenfield
21	Salacgrīva Local Station	Latvia	Passenger	New	Type 2	3.000	Greenfield
22	Saurieši Local Stop	Latvia	Passenger	Existing	Type 3	7.500	Capital metropolitan area / in urban environment
23	Skulte Local Station	Latvia	Passenger	New	Type 3	800	Greenfield
24	Torņakalns Local Stop	Latvia	Passenger	Existing	Type 2-3	155.000	Capital metropolitan area / in urban environment
25	Tūja Local Stop	Latvia	Passenger	New	Type 3-4	60	Greenfield
26	Vangaži Local Stop	Latvia	Passenger	New	Type 3-4	2.800	Small town, connected to detached house district
27	Zasulauks	Latvia	Passenger	New	-	148.000	Capital metropolitan area / in urban environment
28	Jonava Stop	Lithuania	Passenger	New	Type 4	11.300	Greenfield
29	Joniškėlis Station	Lithuania	Passenger	New	Type 2-3	1.700	Small town, connected to detached house district
30	Palemonas Stop	Lithuania	Passenger	Existing	-	8.700	Small town, connected to detached house district
31	Pasraučiai Station	Lithuania	Passenger	New	Type 2-3	400	Greenfield
32	Ramygala Local Stop	Lithuania	Passenger	New	-	200	Greenfield
33	Ručiūnai Stop	Lithuania	Passenger	New	-	500	Greenfield
34	Vaškai Station (LT)	Lithuania	Passenger	New	-	200	Greenfield

Capital metropolitan area / in urban environment	
Capital metropolitan area / greenfield	
Small town, connected to detached house district	
Greenfield	

[8] Source: Rail Baltica Technical Notes, indicative classification

The analysis shows that most stations have very little indicator of potential travellerstravellers as the population base is thin. At the same these stations are often greenfield locations with long distance to central locations of the towns and relatively poor connected or potential of connection to existing urban environment.

Furthermore, the forecasted population changes between 2019 and 2050, showed in the Figure 5 below, show that until 2050 most of the regions will face a risk of highly decreasing population. This underlies that extreme caution should be exercised when developing the stations and their surroundings out of the metropolitan areas, in order to maximize the capacity of attraction in terms of population relocation, commercial and employment opportunities, and overall socio-economic regional cohesion improvement.
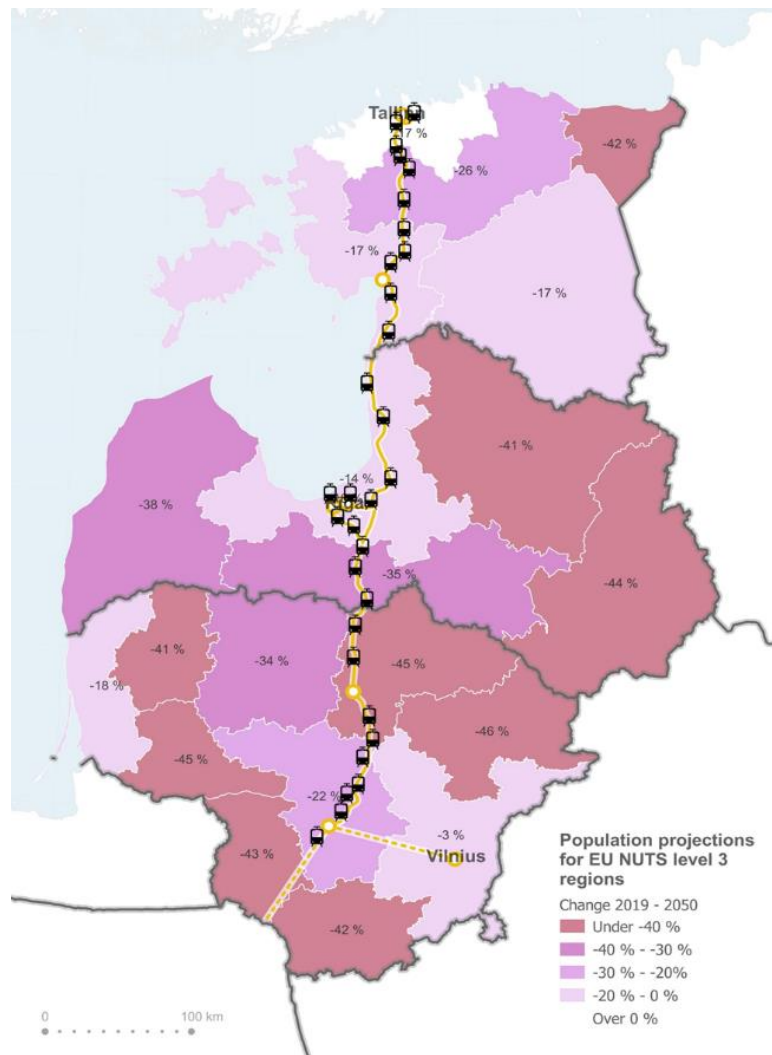
FIGURE 19 REGIONAL ALONG THE RB AUTHOR)

POPULATION GROWTH & PASSENGER STATIONS CORRIDOR (SOURCE:

Sub- urban number of locations with high population in the surrounding areas have totally different situation when it comes to potential urban development and thus the station development. Sub-urban locations with improving rail connections are among the most attractive

places for new city development as they offer high-valued locations for citizens to live and work in. This leads to high demand for multiple types of real estates in the surrounding areas and enables multiple uses to be integrated also to station building itself. Related to high potential, some interesting contradictions rises when proposed station type and the population surrounded are compared in table 5. For example, Riga's dense sub-urban locations seem to offer high commercial potential when the surrounding population is counted but the proposed station type does not indicate commercial ambition.

As it is seen from the table 4, most of the regional stations are to be types 2-3, which means that the daily passenger flow should be at least in average 400 travellers, and therefore serves not only city residents, but also small villages nearby. It is important to notice, that these station types are mostly located outside of the city center and would require to establish a strong mobility concept with a focus on public transport, on-demand service or (in case the distance is between 2-3 km) bikes.

Beside two main types of locations, the consultant team could identify two additional future development cases for some of the RB regional stations. Two stations close to Tallinn (Assaku and Luige) might have relatively high potential of urban development even though the locations are mostly surrounded by greenfield. The improved accessibility the rail connection offers decreases distance (travelling time) to the core of the metropolitan which naturally increases the attractivity for sub-urban development. Also, some stations (e.g. Baldone, Bauska and Olaine) are located close to other regional rail lines and/or main roads clearly indicating higher need for mobility integration even in greenfield locations.

To conclude, this general analysis supports the previous typology of the Rail Baltica that proposed the cases being mostly relatively small stations and stops with low amount of passenger flows. Moreover, it also clearly indicates that sub-urban locations might have potentials for wider development of the stations and their surroundings. This will be discussed with the RB team and stakeholders during the implementation of the next project phase.

3.1.3.4. Long-List of International Regional Benchmark Stations

In order to provide the Client with existing international best practices of efficient operation of regional railway stations, the consultant prepared a long- list of various stations in developed counties, which have different scales, types and typologies, functions, all comparable to RB rail passenger stations classification and to the RB line.

The initial long- list of stations proposed for the benchmarking process is presented in the Table 5 below.

TABLE 8: LIST OF THE PROPOSED BEST REGIONAL RAILWAY STATIONS

Nr	Benchmark stations	Country code	Urban context	Population data [9]	PAX/ per day [10]	International categorization/ Type	Station Type per RB Guide	Summary
1	Jyväskylä railway station	FI	Central/ historical location within a midsize city with a connection to a harbour	140 000	n.a	Type I-II	-	- Compact medium size and well-designed station with allocated travel center - Direct connections to bus station - Grand waiting hall, fitness studio - A small freight terminal for private companies/ users
2	Mikkeli railway station	FI		53 000	1 021[11]	Type II	-	- The station serves three other neighborhood areas and small suburbs - Overpass with integrated bus terminal - Few hotels in the area with a direct pedestrian access
3	Espoon Keskus Station	FI	Sub-central location within a metropolitan area	290 000	4 913	Type II	Type I	- Enclosed overpass to SC Espoon tori and SC shopping centers - Directly connected to office buildings and bus terminal in the area - Reservation for a light rail
4	Kivistö Station	FI	Outer ring of a metropolitan area	10 000	2 665	Type II	Type I	- One of the new stations of the Ring Rail Line. Located underground and is a part of a metropolitan area, serving a large new suburban district - The service at the station is quite limited and does not offer any commercial activities or any mobility offers
5	Leinelä Station	FI		3 000	4 070	Type II	Type I	- Enclosed overpass station serving new suburban district in a metropolitan area - There is no actual station building, but number of pedestrian routes connected to quarter including retail and housing, alongside Ringrail to Airport, Helsinki Commuter Rail;
6	Mäntsälä Station	FI	Small regional station at a city boarder	20 800	1 544	Type III-IV	Type I	- Enclosed crossing bridge in "railway – valley" with access to grocery store next to station
7	Toijala Station	FI	Small regional railway stations with a strong connection between villages	16 000	1 021[11]	Type III-IV	-	- The station is located at a crossing point of three different railway tracks: from Riihimäki to Tampere, from Turku to Toijala, and from Toijala to Valkeakoski. Originally, all three tracks served both passenger and cargo traffic.
Nr	Benchmark stations	Country code	Urban context	Population data [12]	PAX/ per day [13]	International categorization/ Type	Station Type per RB Guide	Summary
8	Kemi railway station	FI		20 000	660[11]	Type III-IV	-	- Historical station building with limited new mobility services - At the station there are car rental services, a café and a second-hand store

---

[9] Source: Wikipedia – Sources will continue to be revised during the first interim report
[10] Source: Wikipedia - Sources will continue to be revised during the first interim report
[11] Derived from annual number of passengers 2008 using a daily factor of 280
[12] Source: Wikipedia – Sources will continue to be revised during the first interim report
[13] Source: Wikipedia - Sources will continue to be revised during the first interim report

Nr	Benchmark stations	Country code	Urban context	Population data [17]	PAX/ per day [18]	International categorization/ Type	Station Type per RB Guide	Summary
9	Iittala Station	FI		3 000	85[11]	Type III-IV	-	- Artistically decorated small station with no additional services, beside regional (commuter) rail traffic which connects the village to larger cities - Small car parking area provided at the station
10	Parkano Station	FI		6 000	428[14]	Type III-IV Greenfield	-	- Fully isolated station with no additional services (waiting hall, info center, shops) - The station is an important urban switch and link to urban workplaces (Rail-Bus)
11	Haarajoki Station	FI		1 500	654[15]	Type III-IV	Type II	- Underground crossing station with no station building - Direct access to food store
12	Henna Station	FI		n.a	100	Type III-IV	Type IV	- Platform station without station building - Example of unsuccessful regional development project
13	Riihimäki Station	FI		28 700	2 193[11]	Type III-IV		- Small station including shops adjacent to existing railway station - Integrated with local bus services
14	Koria – Kohta Station	FI		4 000	25[11]	Type III-IV		- Small station with a great architectural solution in the form of a wooden shelter with direct access to the railway platforms
15	Växjö Station	SE	Centre location of medium sized city	71 000	3 000[16]	Type II	Type I	- Newly opened in 2021 and connect other central traffic center/meeting places/retail. The example shows a high level of urban integration
16	Ørestad, CPH Metro Station	DK	Outer ring of a metropolitan area	21 000	n.a	Type II-III	-	- Elevated line, significant TOD development, focus on urban integration, green spaces, urban permeability, metro station type that could be still interesting to link to regional station case.
17	Køge Nord Station	DK		38 000	n.a	Type II-III	-	- Enclosed overpass station connected only to a commuter railway line. At both sides there are parks and B+R, P+R facilities, as well as private bicycle stations. Around the station there are walking zones.
Nr	Benchmark stations	Country code	Urban context	Population data [17]	PAX/ per day [18]	International categorization/ Type	Station Type per RB Guide	Summary
18	Flintholm Station	DK		n.a	n.a	Type II-III	-	- Small regional intermodal hub station where platforms are located on two levels crossing each other. A large glass roof features a focal design element, dispersing indirect light across the platforms and the entire station area.
19	Lysaker Station	NO	Subcentre location of a metropolitan area	n.a	5 200[19]	Type II	Type I	- Located around 7 km from Oslo Central - Underpass with curving walls, coloured glass and small integrated kiosk, café, restaurant, and waiting room below rail track - An important node with 25 000 workplaces within a 800 m radius, rail bus link connected to urban square

---

[14] Derived from annual data using a daily factor of 280
[15] Data from 2015
[16] Data from 2014. Source: Inventering av stationer och stationsnäramiljöer – Region Syd, Trafikverket
[17] Source: Wikipedia – Sources will continue to be revised during the first interim report
[18] Source: Wikipedia - Sources will continue to be revised during the first interim report
[19] Data from 2008

Nr		Country code	Urban context	Population data [20]	PAX/ per day [21]	International categorization/ Type	Station Type per RB Guide	Summary
20	Solec Kujawski Station	PL	Typical regional station	15 000	1 200	Type II	Type I	- A small regional hub with an exceptional architectural solution and high level of urban integration; part of BiT City - the modern high-speed rail network connecting the two capital cities of Kujawsko- Pomorskie region in Poland;
21	Fs Marina di Cerveteri Station	IT	Outer ring of metropolitan area	n.a	n.a	Type II-III		- Located around 30 km away from Rome centre. It is a touristic place with a "box beside rail track + underpass" building system, similar to RB concepts but more compact. - High urban integration and streets connections
22	Assen Station	NL	Central location	67 000	8 569	Type II	Type I	- Ambitious architecture- "station as public plaza" and well-integrated with a city gate function
23	Barneveld Noord	NL	Small regional stations	35 000	n.a	Type III-IV	-	- Opened in 2013, and has a simple container structure building, which includes a small waiting hall, toilets, as well as a shop. - Park and ride facility provided
24	Hoshakuji Station	JP	Smaller regional stations	30 000	2 251	Type III-IV	Type I	- Elevated station with a bridge connecting the station to the surrounding communities via Chokura Plaza - Interesting canopy concept. It is not a box station design but is as an aperture. - Passenger station and freight terminal
25	Altötting railway station	DE	City center	12 650	1 200	Type II	Type I	- Great PT connections and integration, as well as allocation some of new mobility services (bikes and carsharing) and facilities for daily travels;
Nr	Benchmark stations	Country code	Urban context	Population data [20]	PAX/ per day [21]	International categorization/ Type	Station Type per RB Guide	Summary
26	Rottenbach railway station	DE	City side/ partly green field	4 657	150	Type IV	Type IV	- Plays a central role for regional connections to the village. The station is well integrated with PT, allocates E-bikes stations and charging facilities, as well as P+R;
27	Winterberg railway station	DE	City center	13 710	300	Type III	Type III	- A small station with a directly access to PT, as well as provide a parking slots for private bicycles;
28	Bayerisch Eisenstein station	DE	Green field with a direct access to nature and hiking routes	1 049	760	Type II	Type II	- The building and station location has a function of touristic attraction and located directly at the border. Within a building there is a museum;
29	Ludwigsfelde railway station	DE	Green field	24 179	n.a	Type IV	-	- Fully reconstructed building which strongly connects service railway and NMT, PT and offers parking for private cars;
30	Bad Bentheim railway station	DE	Subcentral location	15 682	1 200	Type II	Type I	- Small modern building with a barrier free solutions in and around the station. It has a strong integrated services with PT, as well as NMT. The building has a small travel center information stand, and a café place;
31	Vinge Station	DK	Green field	n.a	n.a	Type III		- Small station which offers few bicycle stations and P+R. Well connected to a local bus network;
32	Ishøj Station	DK	Central location	21 000	n.a	Type II	-	- Purely city station which is well integrated with PT and commuter rail. At the station there are B+R & P+R facilities, as well as some small shops;

[20]Source: Wikipedia – Sources will continue to be revised during the first interim report
[21] Source: Wikipedia - Sources will continue to be revised during the first interim report

Nr	Benchmark stations	Country code	Urban context	Population data[23]	PAX/ per day[24]	International categorization/ Type	Station Type per RB Guide	Summary
33	Vordingborg Station	DK	Subcentral location	18 000	n.a	Type II	-	- Regional station with both regional and some international train services. Around the station there are some shops, as well as P+R, B+R facilities;
34	Abcoude Station	NL	Partly green field	8 175	2 035	Type II	Type I	- Regional station with a direct connection to the living district. Offers a strong buses connection, P+R, and some of charging stations;
35	Landskrona Station	SE	Sub-central location	33 308	7 889[22]	Type II	Type I	- Platform station integrated with the urban environment and local/regional bus services to improve the connectivity. Extensive car and bicycle parking provided.
36	Nordmaling Station	SE	Located in the outer ring of the town centre	7 143	n.a.	Type III-IV	-	- Small station along the new coastal line. Combined bus/train station well-integrated with the environment. Waiting area, toilet digital traffic information and kiosk available. Short /long-term car park and bicycle parking provided.
Nr	Benchmark stations	Country code	Urban context	Population data[23]	PAX/ per day[24]	International categorization/ Type	Station Type per RB Guide	Summary
37	Tomelilla Station	SE	Sub-central location within a metropolitan area	7 171	1 264[22]	Type III-IV	Type I	- Very small basic station with indoor waiting area and toilet. Most passengers wait at the platform where shelters are provided. Directly connected with local bus services
38	Sävsjö Station	SE	Central location in a minor suburban area.	11 677	500[25]	Type IV	Type II	- Platform station integrated with local environment and regional bus traffic. Underpass and overpass to cross the tracks are provided for pedestrians and bicycles. Simple orientation, tourist info, toilet. Commuter parking and sheltered bicycle parking.
39	Bromölla Station	SE	Sub-central location in the outer ring of a metropolitan area.	8 092	1 394[22]	Type III	Type I	- Small station building with basic functions. Well-integrated with local/regional bus services. High standard bicycle parking.
40	Bjuv Station	SE	Central location within a minor town.	10 911	1 488[22]	Type IV	Type I	- Platform station with shelters. Digital traffic information available, ticket machines. Well-integrated with regional bus services. Commuter parking and bicycle parking provided.
41	Alingsås Station	SE	Central location in the metropolitan area.	27 423	n.a.	Type II	-	- Station served by regional and interregional train services. Station building equipped with waiting area, kiosk, restaurant. Integrated with local/regional bus services and the environment.
42	Triangeln Station	SE	City center	344 166	26 042[22]	Type II	Type I	- Underground station connected to shopping center and surrounding environment above ground. Awarded for its architecture.
43	Kerpen-Horrem Station	DE	Sub-central location in the outer ring of a metropolitan area.	65 800	13 500[26]	Type II	Type I	- Europe's first climate-neutral station. Incorporates high-tech eco-friendly design and sustainable technologies.

---

[22] Source: Skånetrafikens tågresande 2019, Skånetrafiken
[23] Source: Wikipedia – Sources will continue to be revised during the first interim report
[24] Source: Wikipedia - Sources will continue to be revised during the first interim report
[25] Data available from 2014. Source: Inventering av stationer och stationsnäramiljöer – Region Syd, Trafikverket
[26] Source: StationGreen, DB Station&Service AG , https://gruen.deutschebahn.com/04_Massnahmen/007_flinkster/006_gruener-bahnhof/Broschuere-GRUENER_BAHNHOF_englisch.pdf

44	Korneuburg Railway Station	AT	Sub-central location	13 000	n.a.	Type II	n.a.	-	Good integration of new mobility options including micromobility (e-bikes and scooters),bus physical integration, car sharing and more.

3.1.3.5. Best Practices: Summary and Lessons Learned

The following sections have been designed to compile and summarize the identified best practices and lessons learned from studying the list of 44 stations presented in Table 8 above.

The consulting team has identified a finding for each KPIs related to the different station categories (Type II, Type II, Type IV). Best practice findings are illustrated with photos and diagrams of the chosen benchmark stations.

Lessons Learned
Commercial opportunities and internal space
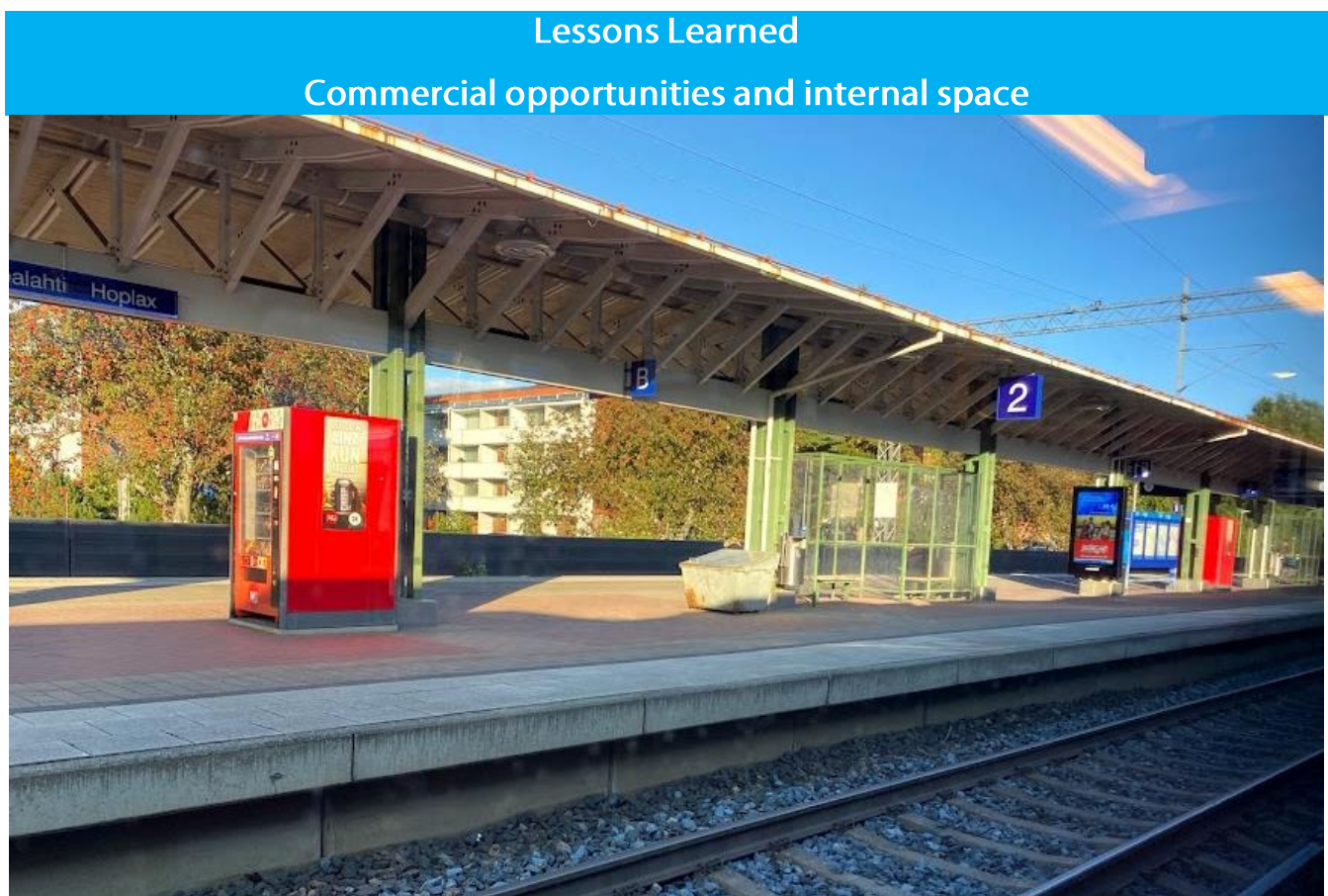
FIGURE 20 HUOPALAHTI RAILWAY STATION, FINLAND

Railway stations attract a large number of users every day, therefore creating opportunities for supporting commercial services within and around the station. Often, stations are placed in prime accessible and attractive locations not only to access transport services, but also to do shopping, access entertainment opportunities and, perhaps, conducting business.

Given the importance of commercial opportunities in the attainment of wide regional socio-economic benefits (increased access, trip reduction potential, job creation and others) , our team has identified the following lessons learned to be able to be considered during the planning and design of the Rail Baltica regional stations:

TABLE 9 LESSONS LEARNED FOR COMMERCIAL OPPORTUNITIES AND INTERNAL SPACE CATEGORY

LESSONS LEARNED			
COMMERCIAL OPPORTUNITIES AND INTERNAL SPACE USAGE	**LANDMARK STATION (Type II)**	**BASIC STATION (Type III)**	**PLATFORM TYPE (Type IV)**
	"Versatile station design"		
	"Urban integration thru traversability"		
	"True mixed-use entities"		
		"Social placemaking to create identity"	
	"The green station"		

In the next boxes, the Consultant expands on the importance of the selected lessons learned. Furthermore, the team provides insights on policy and planning recommendations to be taken into consideration during the development of the Rail Baltica Regional Stations.

Rail Baltica | **RAMBØLL**

1/5   LESSON LEARNED 1: VERSATILE STATION DESIGN

Keywords: Internal space design and usage - Interactions between users and space:
Matching stations from the long list: Tikkurila Station, Barneveld Noord Station

Regardless station size and type, it was identified that a typical regional railway station layout corresponds to the following operational and functional structure:
1. Arrival areas;
2. Service areas;
3. Communication zone;
4. Platform;

Each of these spaces provides specific utility and value to the individual user all users as a whole.

Effective transitions between these zones should be well planned and have a gradual functionality.

With an easy to navigate and simple layout, proximity of different station features supports a well-functioning spatial system

ARRIVAL AREAS
The arrival areas at railway stations are often segmented to comfortably receive pedestrians but also public transport users and bicyclists. Pick-up zones or kiss-and-ride areas are also easily accessible; however, priority should be given to walking, cycling and public transport users.

Such area is divided to provide public transport stop/or terminals, a taxi bay, bicycle parking, or micromobility service areas and the pedestrian walkways leading to the central station entrance.

SERVICE AREAS
These areas are used to provide services to travellerstravellers. Primary functions within the area could be ticket sales, allocation of an information desk, traffic information, W.C. rooms and waiting areas with benches. Secondary functions are allocation of retails (kiosks, eateries), car rental stations, luggage storage lockers and others.

Depending on services type and their location, these features could be widened and integrated concepts that connect adjacent shops, workplaces and perhaps even hotels.

Also, public functions such as libraries, communities' spaces are possible to attach to the service area zone.

COMMUNICATION ZONE
Serves as a connection between the arrival area to the platform. It´s the zone where grade-separated walkways (bridges/underpass) create a smooth and safe connection.

Especially in that zone visual clarity, lighting, daylight, generously sized stairways, elevator, escalators are critical.
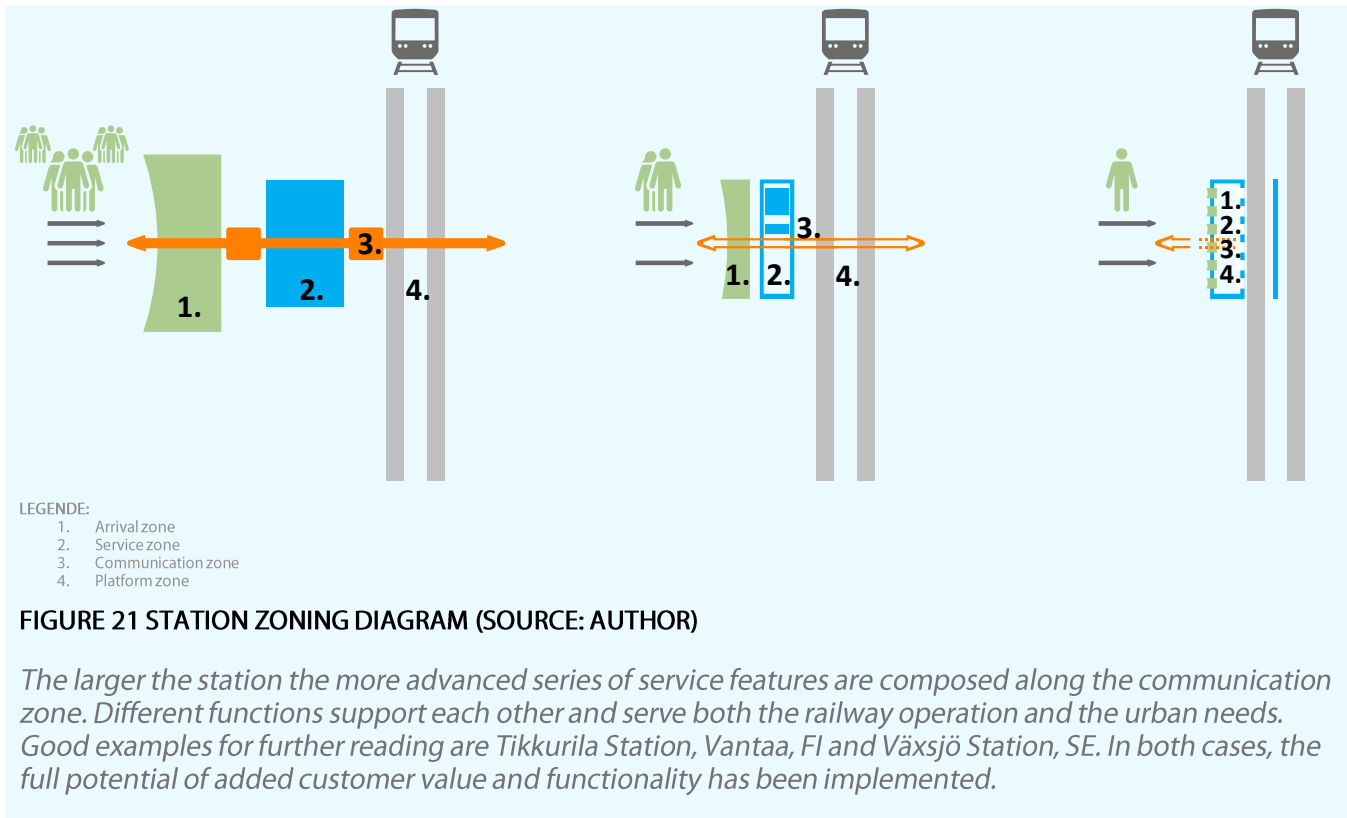The platforms are the interacting elements between the station and the train. Safe and sheltered waiting spaces with good views towards the running trains. Accessibility, security, and clarity are key parameters for those areas.

A well-performing station environment means that it provides needed functions, features and comfort tailored to the type of station. It concerns designing for different flows, primarily for passengers, but also for vehicles and goods/parcel. Regardless the size and type of the station The Flow – The Wait – The Orientation are always responsible for its success.

TYPE II Stations – Landmark   Type III Station – Basic   Type IV Station – Platform

LEGENDE:
1. Arrival zone
2. Service zone
3. Communication zone
4. Platform zone

FIGURE 21 STATION ZONING DIAGRAM (SOURCE: AUTHOR)

The larger the station the more advanced series of service features are composed along the communication zone. Different functions support each other and serve both the railway operation and the urban needs. Good examples for further reading are Tikkurila Station, Vantaa, FI and Växsjö Station, SE. In both cases, the full potential of added customer value and functionality has been implemented.

For small rural regional stops the similar basic concepts of station zoning applies but with a reduced service and complexity level. A gradual functionality concept which is typically used for larger stations has the potential to be transferred to small regional stops and to be used as a condensed multifunctionality within one compact spatial zone. Some examples show that stations of Type III, IV can be planned efficiently with almost the same functional content as Type II transport nodes. The level of functional features can be stretch beyond the pure and essentially needed room program. In some cases, these small stations allow for a condensed layout with innovative micro-mixed-use functionality. The widened service level will boost the role of the stop. A case like Barneveld Noord Station, NL can be a model for such a Type III, IV station where compact room program covers ticket sales, info, meeting point, pop-up commercial services, staff-free retail, bike repair. The entire functionality gathers close to the platform which become the true heart of the station.
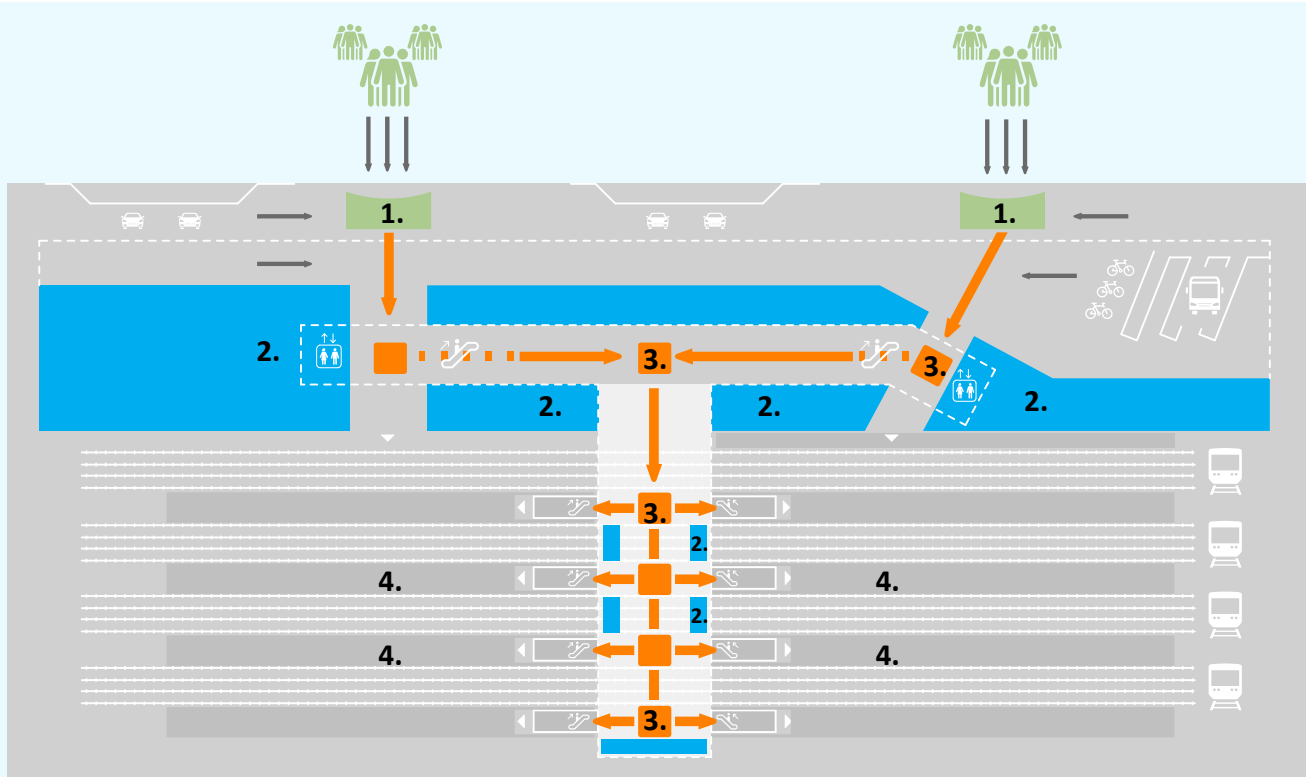
LEGEND:
1. Arrival zone
2. Service zone
3. Communication zone
4. Platform zone

FIGURE 22 TIKKURILA STATION, VANTAA, FI: SCHEMATIC ZONING DIAGRAM (TYPE II STATION) –
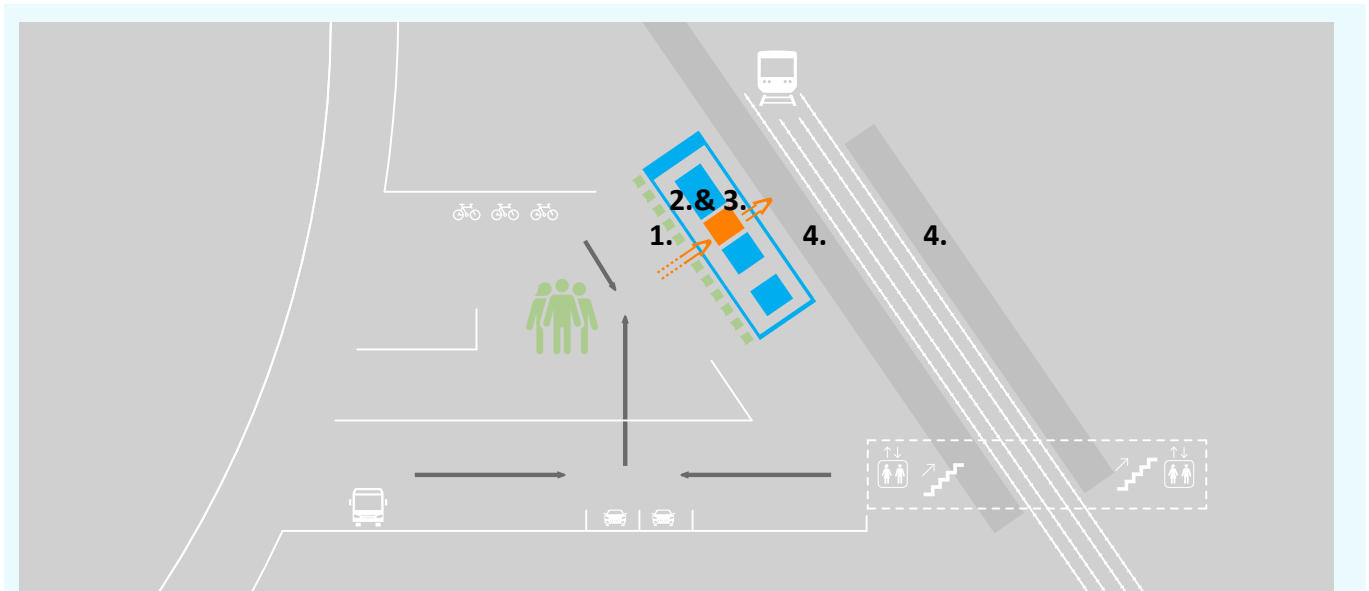
(SOURCE: AUTHOR)

The Type II station like Tikkurila, Vantaa benefits from large service and retail areas (Zone 2) that are placed alongside the passenger route. The scale and density of service/retail reacts on the urban context: larger shops and daily goods are located towards the city side and smaller kiosks and cafes are placed at the bridge above the platforms.

FIGURE 23 BARNEVELD NOORD STATION, NL – (SOUCE: WIKIPEDIA)

During the analysis of the long list of stations, it was found that non-urban stations are characterized by lower train service frequencies, which was found to be significantly more pronounced in smaller stations. For this reason, it is especially important to endure that regional stations are versatile and meaningful places where people feel comfortable waiting for trains. In the Netherlands, the waiting areas of a total of twenty Dutch stations throughout the country have been / will be upgraded, both functionally and cosmetically: introduction of washrooms, Wi-Fi, floor heating, railway TV. One of the keys to the success of a similar station called Prettig Wachten is to introduce human presence on these stations, to create some sort of informal supervision. An effort is made to create small multifunctional shops. In Wolvega for instance a flower shop will be opened, the florist will also be serving coffee and will even be cleaning the restrooms. In Barnefeld Noord a bike-Repair shop will be included. This project is an innovative example on providing a multifunctional space with minimalistic construction methods – only standardized shipping container were used to erect the landmark building - Barneveld Noord / NL Architects – archdaily.com

LEGEND:
1. Arrival zone
2. Service zone
3. Communication zone
4. Platform zone

FIGURE 24 BARNEVELD NOORD STATION, NL: SCHEMATIC ZONING DIAGRAM (TYPE III, IV STATION) – (SOURCE: AUTHOR)

Smaller station types such like Barneveld Noord (type III-IV) are able to boosts its attractiveness by including micro-scale retail and transportation services all into one zone. Such approach reveals that innovative design solutions with extended features do not necessarily require large amounts of space. Rather they prove that simplicity and minimalism go a long way by only providing no more than the minimum required washroom, information screens and sheltered waiting area.

.

2/5 LESSON LEARNED 2: HIGH LEVEL URBAN INTEGRATION – "TRAVERSABILITY"

Keywords: *smooth integration in urban fabric, Interactions between users and space passenger flow through the station*
Matching stations from the long list: *Mikkeli Station, Växjö Station, Lysaker Station, Barneveld Noord, Nordmaling, Triangeln, Leinelä*

Where a station is located in relation to its surroundings, determines its ability to provide accessibility, character and function.
Based on the analysis of international best practices, four typical station location findings are highlighted:
• Stations on ground level (typical for Type III, IV)
• Station on a bridge (increasing common for Type II)
• Terrain integrated stations (increasing common for Type II)
• Underground stations (common for Type I, II stations – in dense central location)

Different station types (II-Landmark ,III-Basic ,IV-Platform) do not relate always directly to a specific terrain typology.

But often small regional stops in rural areas or close to small towns are typically considered as Stations on ground level.

Simple rail track solutions and less important urban context refer to stations at ground level, but with good visibility, level crossings and without any impact on the city's form. But this this type results often in problems or conflicts with already established urban environments.

Moving closer to medium-sized cities or sub-centers of metropolitan areas this traditional station typology does not always fit.

Not only station size and the scope of features will be more demanding but also the necessity of urban integration.

Planning accessibility to station platforms is a crucial topic for regional stations. Best practices try to avoid excessive grade separation to ensure pedestrians have the most direct and comfortable access and traversability.

In some instances, however, Increased safety demands or engineering challenges create the need for grade-separated passages for instance, Stations on a bridge or terrain integrated are favourable. A station on ground level inside urban fabrics can easily become a major pedestrian obstacle and cuts off certain parts of the city. Therefore, making stations below ground or on a bridge become increasingly common. A better traversability for pedestrians, bikers and increased visual connections between the city parts are not the only benefits of such model.

Station on ground level   Station at a bridge level   Terrain integrated stations   Underground level
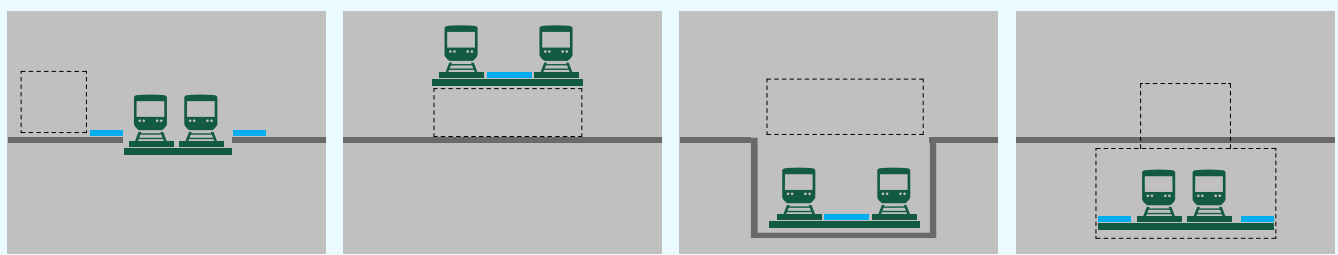
FIGURE 25 STATION SECTION DIAGRAM – STATION TYPOLOGY IN RESPECT OF RELATION TO SURROUNDING

Potentials and challenges of different station terrain typologies:

*Stations on ground level (typically used for Type III, IV)*
- *Widely used, regarded as "natural" type*
- *the connection to a station is comprehensible and visible, albeit not always functional*
- *platform fronting the town allows straightforward set-down/pick-up*
- *bus transfers can take place on same plane directly across the platform*
- *multiple platforms create an obstacle for urban traffic flow*
- *grade-separated connection to platform needed (bridge/underpass)*

FIGURE 26 MIKKELI STATION, FIN – STATION ON GROUND – IMAGE BY VR, FINNISH RAILWAY

Mikkeli Station shows the typical challenge with on ground station typologies and their major impact on city planning. The on-ground rail tracks cut off the urban center from the attractive harbour area. The Mikkeli case shows an innovative approach on combining the needed bridge structure with waiting areas for the bus terminal and even with a direct connection to an adjacent hotel.
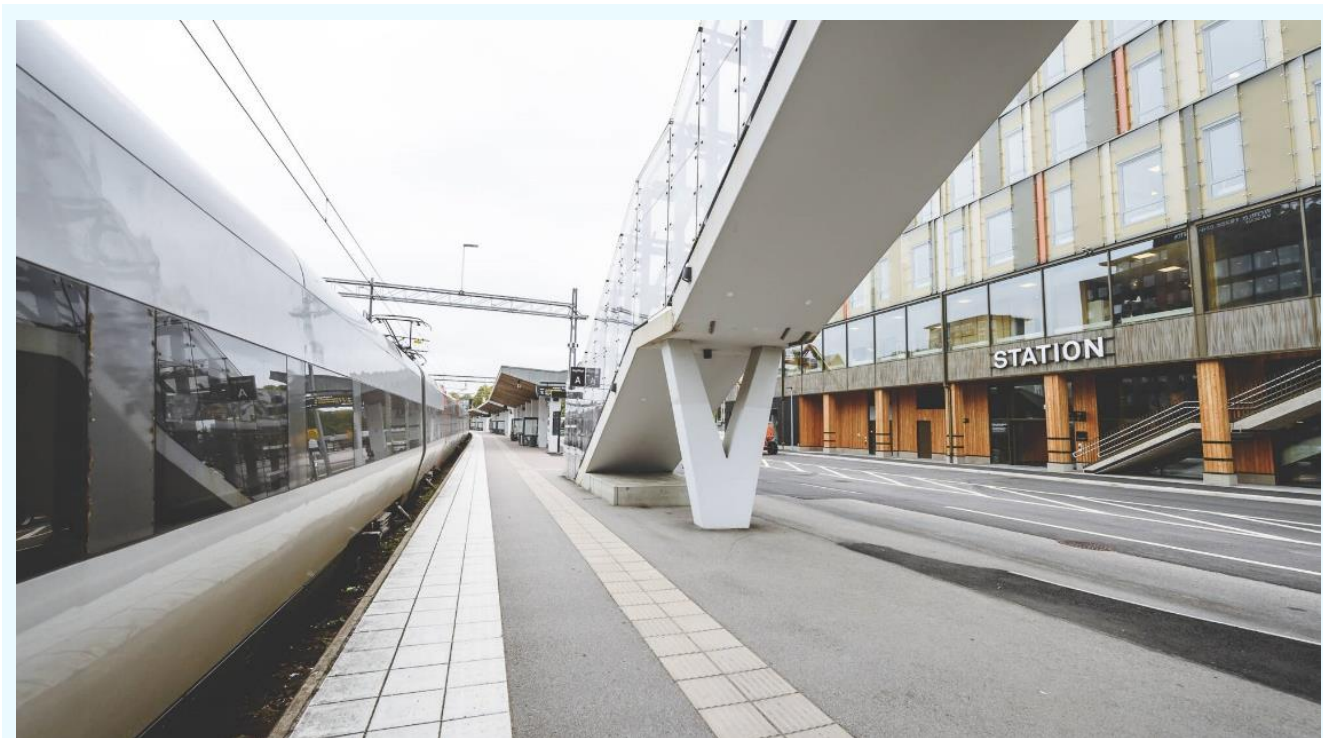
FIGURE 27 VÄXJÖ STATION, SE - STATION ON GROUND (PHOTO BY JONAS LJUNGDAHL)

Växjö Station is another example of an on-ground station with required bridge structures to connect city parts with each other. In this Swedish experience, an excellent integration between rail, public and commercial functions provides ease of movement for passengers within the different areas of the station and its surroundings. The integration of the townhall and the station are enriched with restaurant, cafes, meeting places located right at the urban center and merges all its site related potentials in a compact and exciting architectural solution.

FIGURE 28 LYSAKER STATION, OSLO, NO - STATION ON A BRIDGE[27]

Lysaker Station in Oslo features rail platforms built on bridge. The platform and service areas occupy the deck and the area below the bridge, which allows pedestrian traffic to flow smoothly through the building. Spaces below the bridge are occupied by cafes and retail and show a strong presence towards the surrounding. Functionality, colours, transparent materials ensure high quality and attractiveness in the below-bridge-area. Bridge, Platform roof and coloured shopfronts unite their visual strength to highlight the station in its surrounding.

Potentials and challenges of different station terrain typologies:

Rail platform on a bridge (increasingly common for Type II)
- *the concept of a passenger overpass can be extended to host the entire station facility within the bridge construction*
- *advantage is the clear reduction of the urban obstacle effect*
- *a station on a bridge creates clear wayfinding, landmark, "advertisement" for the place*
- *enables for weather-protected set-down/pick-up zones, retail spaces, parking and waiting areas below and inside it becomes an integral part of the in urban environment, recommended for larger city district and more central locations*
- *Risks: with a wrong lighting design and insufficient spatial planning the underpass can become an unpleasant, tunnel where customers could feel of unsafe*

---

[27] Image by BaneNor – Norwegian national railway

FIGURE 29 TERRAIN INTEGRATED STATIONS IN NORDMALING (GOOGLE MAPS)

Terrain integrated stations (increasing common for Type II, III)
- *pairs the advantages of underground station in terms of city flow with natural daylight and less construction costs*
- *demands extensive remodelling of the terrain and crossing bridges medium level of urban integration*
- *Best practice Benchmark: , Leinelä Station, Vantaa. FI, Nordmaling Station, SE*

FIGURE 30 TRIANGELN STATION, MALMÖ SE - UNDERGROUND STATION (SOURCE: WIKIPEDIA)

The presented benchmark examples show that local adaptations, smart urban integration methods, and choosing the best matching station typology for the site condition has a major impact on the quality level and can anchor the functions in the urban landscape. To achieve the highest socio-economic benefits of the region, high levels of interaction between the station and the context must always be one of the most important goals during station planning. The higher urban integration around the station, the highest potential for such area to become a catalyst of regional economic and social growth and development.

Underground stations (common for Type I, II stations)
- *avoids direct conflicts with adjacent urban fabric*
- *most efficient type for stacked transportation crossing*
- *allows for highest utilization of, and more dense land use*
- *entrance to station can be integrated into buildings or be a single object*
- *natural daylight integration is challenging*
- *most expensive solution*
- *high level of urban integration*
- *Best practice Benchmark: TRIANGELN, MALMÖ, SE , KIVISTÖ STATION, FI*
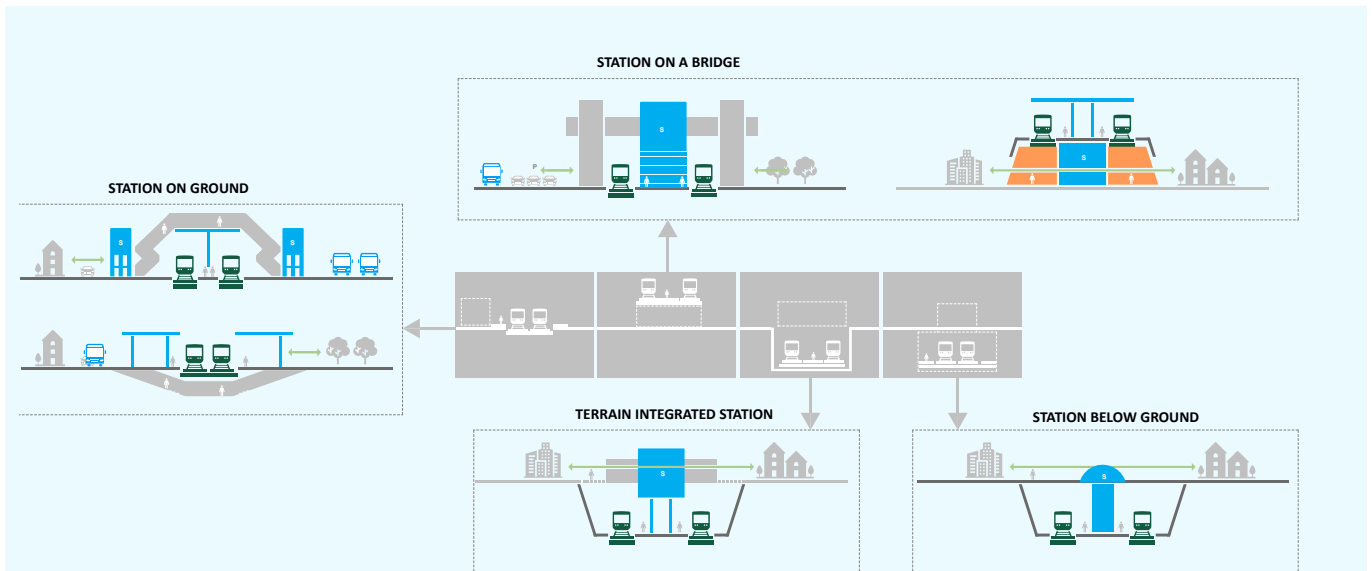
FIGURE 31 SECTION DIAGRAM – STATION TYPOLOGY IN RESPECT OF CONTEXT INTEGRATION

Different station types offer different levels of urban integration and potential for commercial activities. Especially in central and sub-central locations an obstacle-free city fabric and a high level of station integration into its surrounding are beneficial for the overall quality and the success of the station.

3/5 — LESSON LEARNED 3: TRUE MIXED-USE ENTITIES

Keywords: *Internal space usage, commercial opportunities and-use around the station*
Matching stations from the long list: *Växjö, Bayerisch Eisenstein, Lysaker*

Stations internal space can work as a prime location not only to access transport services, but also for local businesses. This is the case especially when the station has central role in urban structure or when special points of interest, like tourist destinations, shape the user characteristics. At the same time, a station building can be a meeting place and a useful location for obtaining everyday products, serving travellers and the whole community around.

International benchmark study on station commercial concept reveals that multiple types of services have business potential as part of the station building and its surroundings. The following table shows that on the wider end of the scope the station buildings can work as a true mixed-use entities (e.g. Växjö, SW and Bayerisch Eisensten, GE) while the smaller stations cannot provide enough customer flows for significant commercial services. Still, even with smaller stations it's possible to create added value by innovative micro-mixed-use concepts as the example of Barneveld Noord (NL) shows.

In most cases, the most common commercial activity inside a regional station (or platform) is related to a single store kiosk, café or a combination of both. International best examples show that this low levels of commercial activity can actually be increased. Station underpass and connected retail premises can form a functional station where almost all of the indoor spaces at the station have a large potential for generating income (rents).

Benchmark Station	Växjö	Bayerisch Eisensten	Lysaker	Jyväskylä	Alingsås	Vordings-borg	Ishoj	Assen	Barneveld Noord	Mäntsälä	Iittala
TYPE (RB typology)	II	II	II	II	II	II	II	II	III	IV	IV
Kiosks	√	√	√	√	√	√	√	√	- (indoor self-service)	-	-
Cafes	√	-	√	√	-	√	√	√	-	-	-
Restaurants	√	√	√	√	√	-	-	-	-	-	-
Grocery store	√	-	√	-	√	√	-	-	-	- (1 close by)	-
Pharmacy	√	-	√	-	-	-	-	-	-	-	-
Special retail stores	√	-	-	-	-	-	-	-	-	-	-
Clustered special retail	-	-	-	-	-	-	-	-	-	-	-
Accommodation	-	√	-	-	-	-	-	-	-	-	-
Offices	√	-	-	-	-	-	-	-	-	-	-

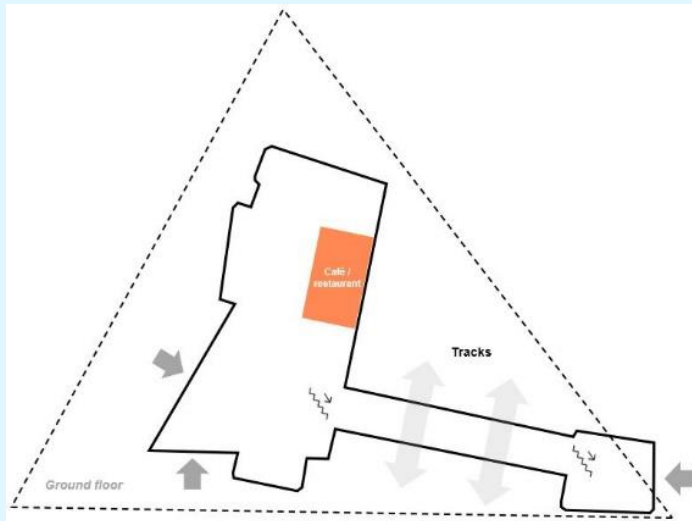**FIGURE 32 COMMERCIAL SPACES IN SOME INTERNATIONAL BEST PRACTICE CASES**

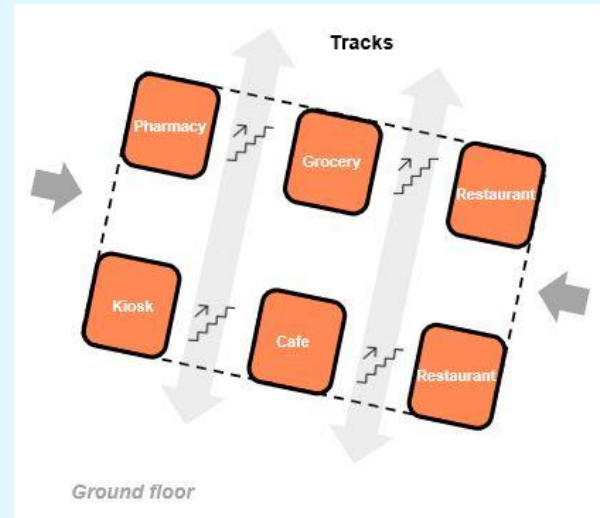**FIGURE 33 COMMERCIAL PREMISES IN ASSEN STATION**
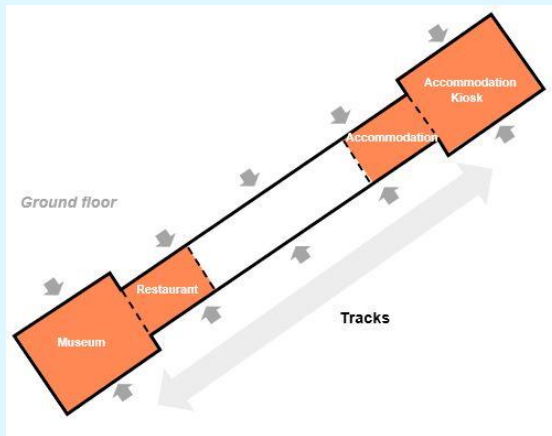

FIGURE 34 COMMERCIAL PREMISES IN LYSAKER STATION

FIGURE 35 COMMERCIAL PREMISES IN BAYERISCH EISENSTEN STATION

FIGURE 36 THE NEW VÄXJÖ STATION BUILDING (PHOTO BY: ANDERS BERGÖN)

Some stations have excellent accessibility from the neighbourhoods and also from regional level. That can create possibilities also for accommodation and offices in addition to retail. Interesting examples are especially Bayerisch Eisensten, GE with museum and accommodation located in station building (Figure 35) and Växjö, SW (Figure 37), where the station has multiple types of retail and city hall offices together with public station and communal premises.

FIGURE 37 USE SPECTRUM IN VÄXJÖ STATION BUILDING (SOURCE: AUTHOR)

LESSON LEARNED 4: SOCIAL PLACEMAKING

4/5

Keywords: social place making
Matching stations from the long list: Solec Kujawski Station, Koria – Kohta train stop shelters, FIN, Iittala train station, Landskrona Station, Barneveld Noord,

Historically, railway stations, especially those in non-dense urban areas have been regarded as only having one function: providing access to mobility services.
However, in recent years, the concept of placemaking is becoming an important tactic to promote social, commercial and vibrant activity, creating a sense of place within a community.

Local communities' benefit from the social and economic aspects including, safer environments around the station, potential to provide employment opportunities and, in some cases, providing public spaces that have a positive effect in quality of life.

Thriving communities also attract more town dwellers, which in turn can have a significant effect on city/town success. In order to strengthen and sustain smaller communities, the local economy requires increased activity for future growth, even if this activity is at a small scale. Type III-IV rural stations are often or can become the

Meeting points where small businesses can thrive. However, this will only happen if the station design and characteristics allow it.

Best practice shows that non-urban stations can use either the local heritage of an existing station building or can be built as a new station. Even small stations can embrace the wider purpose with retail, social and cultural facilities paired with an architecture that fits and underlines the local settings. In both rural and urban station contexts the benefits of creating a sense of place increases the hedonic value (experience of fun and playfulness). This can be done by engaging communities (inclusive citizen participation) and planners to add on to the unified station design guidelines. Implementing local artwork, a specific entrance or canopy design, landscape design & added urban integration, open stage pop-up retail for local enterprises, cafes, or shared spaces with local communities are features that anchor the station into its local environment.

International best practices show that some lessons learned from social placemaking can be applied to Rail Baltica station types II, III, IV as follows:

- establish an interwoven relationship between a public transport provider and community groups
- include a process which allow the community to make a meaningful impact and create a sense of place at stations
- avoid the character of a non-place, create a "placeful -station area" instead
- go beyond the common unified design guideline and create a "light-house" for the region. This is most important in special locations with touristic intertest & strong urban integration needs
- Best practice Benchmark: Solec Kujawski Station, PL, Koria – Kohta train stop shelters, FIN, Iittala train station, Landskrona Station, SE, Barneveld Noord, NL,

FIGURE 38 SOLEC KUJAWSKI STATION, POLAND (SOURCE: WIKIPEDIA)

The design of Solec Kujawski station was determined by an existing landscape, an undeveloped greenfield and deemed a suboptimal urban environment with an old railway station building. The main idea of the development project was to provide bus station, railway platforms, a service point for travellers under one, uniform roof. Furthermore, the slope of the trackways was transformed into a public amphitheater, which gives an attractive elevation seen from the square located in the front of the hub. Thanks to its simple and light form it does not overwhelm the city. The arrangement of the greenery and a clear form of the complex has changed a non-social place into an urban square and a public space not only friendly to passengers but also passers-by[28]. This example shows how simple architectural shapes and exiting landscape features can create a small-scale landmark building with added value for the users and nearby residents.

[28] *https://archello.com/project/the-transport-hub-in-solec-kujawski.*

FIGURE: KORIA TRAIN STOP SHELTERS IN KOUVOLA, FIN (SOURCE: AUTHOR)

The recently constructed train stop shelter is a manifestation of a Finnish lifestyle seen through the eyes of 17 students from 10 different countries around the world working at Aalto University. The shelter was inspired by a walk in the forest. With its straight, leaning, and twisted elements it organizes nature into a wooden sanctuary. Due to its geometric composition and carefully designed elements, a variety of spaces are created, allowing the user to choose their experience within. Its purpose is to provide shelter from the windy and rainy winters while allowing open spaces during the summer months[29].

Koria train stop shelters translates regional experiences into a formal design language and builds a memorable place with a strong identity. Not all stops can have such ambitious custom-made solutions but few focal points at important sites can break the unified design manual.

---

[29] https://www.archdaily.com/924780/kohta-train-station-aalto-university-wood-program

FIGURE 39 – LANDSKRONA STATION, SWEDEN

Landskrona train station follows the local design language of the region. The roofs of the building are created by simple geometrical shapes with a strong visual silhouette. Steel and glass lead natural daylight into the interior. The station, which is about 2.5km from the city center, features large bike parking lots adjacent to the station, two small-to-medium sized grocery stores and a convenience store. It also features a comfortable waiting room with few amenities that make it comfortable and convenient.
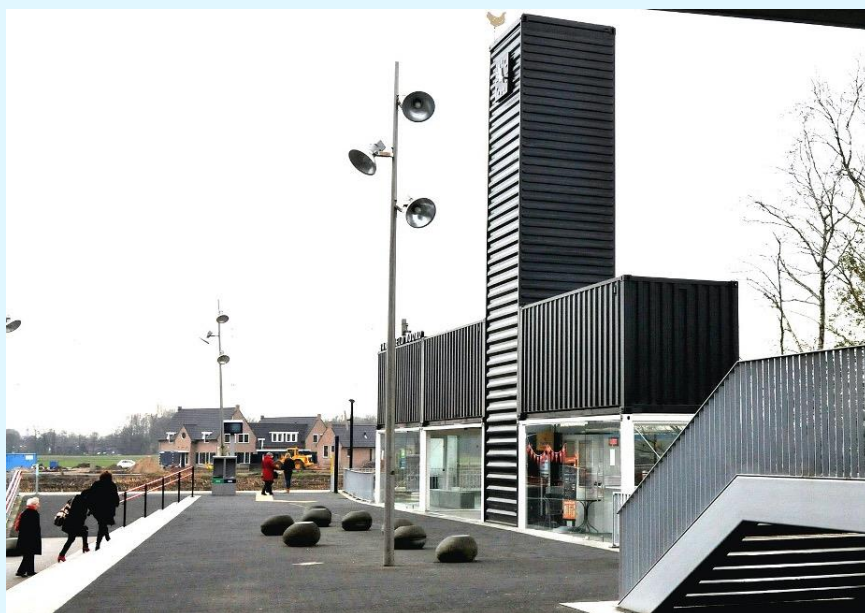
FIGURE: BARNEVELD NOORD STATION, NL (WIKIPEDIA)

The extremely simple and visually powerful arrangement of Barneveld Noord´s has been achieved by stacking shipping container in an unconventional way. It´s shape achieves a meaningful contrast to the surrounding, marks the location and host important station features on a small footprint.

Rail Baltica | **RAMBØLL**

5/5	LESSON LEARNED 5: GREEN STATION – LEADING THE WAY TO CARBON NEUTRAL

Keywords: Sustainability-oriented design and maintenance
Matching stations from the long list: Assen Station, Kerpen- Horrem

The growing urgency around climate change and the move towards net-zero building approaches has also arrived at the railway and infrastructure projects. Germany has been a world leader in the adoption of green tech and transportation practices.

One of the best examples of this has been the "Green Station" initiative led by Deutsche Bahn.

The project made headlines in 2010 when the company produced the world's first zero-carbon train station in Kerpen-Horrem (GER).

A station has the major advantage of combining green building principles, low emission public transportation and an efficient multi-use spatial program. Those three factors together have a significant ecological impact.

Green station recommendations which apply same way to station types II, III, IV

- A compact open-accessible station with integrated emission free public transport, bikes and car sharing schemes
- energy saving building technique, LED lighting, natural light, natural ventilation
- low carbon construction materials with long maintenance cycle and possibility for disassembly
- building adaptability allows to use and modify spaces in the long term
- regenerative energy production and rainwater capture
- maximum biodiversity through green roofs, gardens, living/green walls
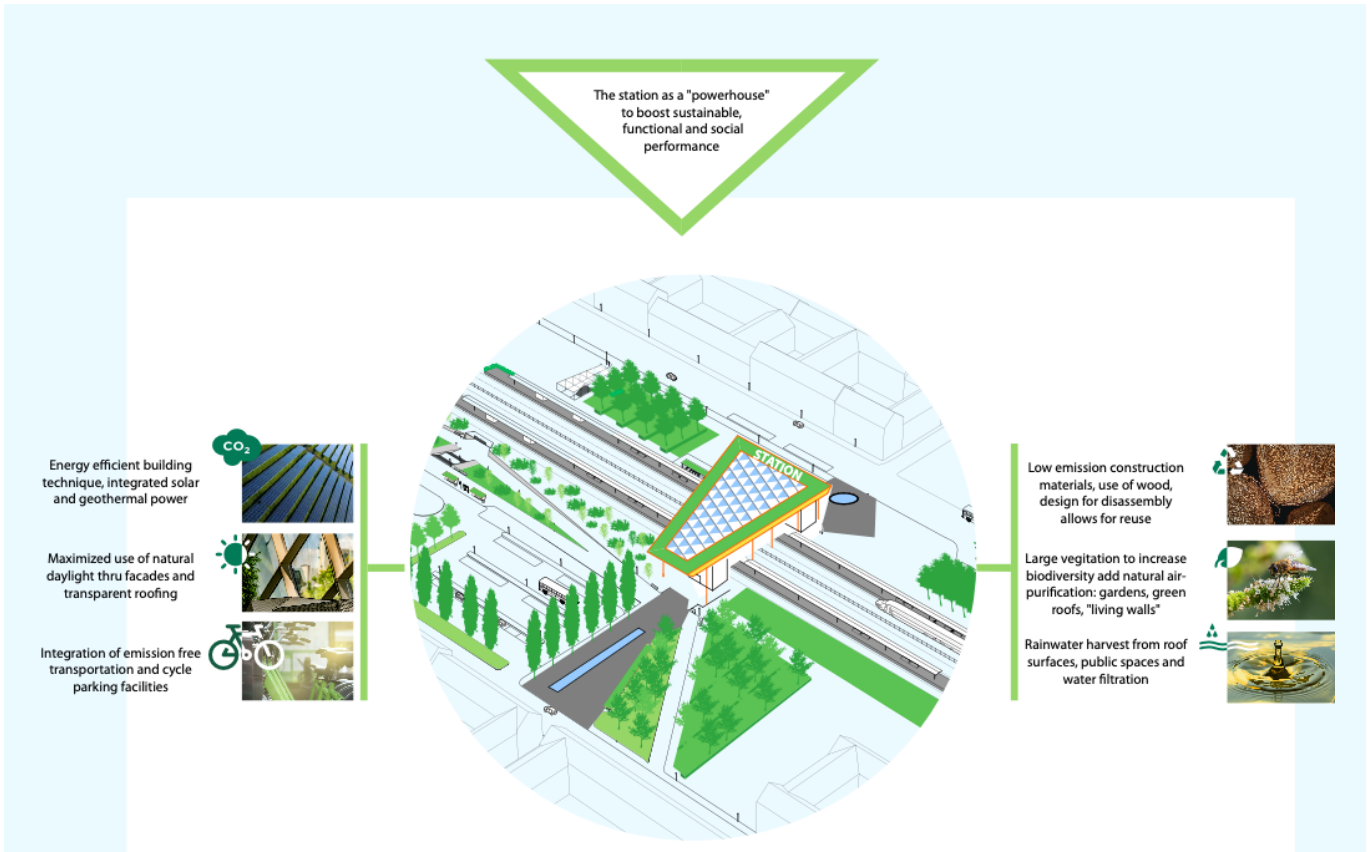- Best practice benchmarks: Kerpen Horrem Station, GER Assen Station, NL

FIGURE 40: STATION AS A "POWERHOUSE" (SOURCE: AUTHOR/TRAFIKVERKET, SE)

Railway stations have the great opportunity to bundle low emission transportation, net-zero architecture and low energy building system which makes them to a strong player fighting climate change, while at the same time delivering other social benefits around the station.
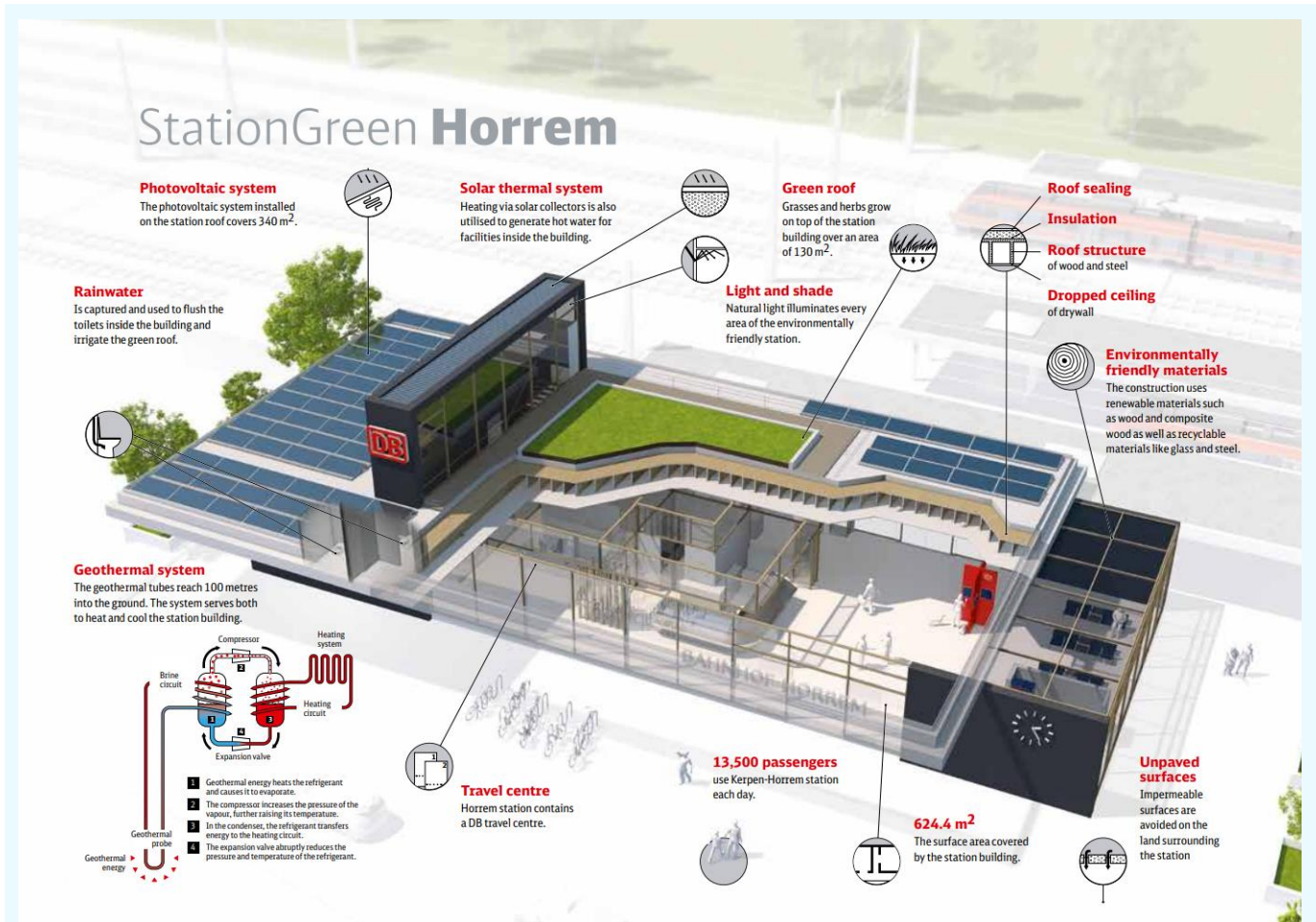
FIGURE 41 KERPEN HORREM STATION, GER – FIRST CARBON ZERO TRAIN STATION[30]

The station includes sustainable features, such as a photovoltaic energy system and a geothermal system which heats and cools the building while solar thermal systems produce hot water. Its green roof allows the building to harvest rainwater which is then used to service the toilet facilities. Generous skylights allow daylight into the building. A new lighting model uses both natural light and energy-saving LED light technology[31].

---

[30]   Source: Brochure "Green station", DB Netz
[31]   https://ec.europa.eu/environment/europeangreencapital/carbon-neutral-station/

Rail Baltica | RAMBØLL

FIGURE 42 ASSEN STATION, NL – MULTI-LEVEL SUSTAINABLE DESIGN APPROACH (SOURCE: WIKIPEDIA)

It's the only example in the Netherlands where a station roof over the train tracks has been entirely constructed utilizing wood. The design team took their responsibilities seriously when it came to sustainability. A green sedum roof surface has been added along the edges for buffering rainwater. For durability and easy maintenance, the columns and roof edges are finished in a coated metal finish in a champagne colour that harmonizes with the wooden beams. By constructing the roof with freestanding columns, the program beneath can easily be adapted. This sustainable design thus provides for future changes in passenger numbers and commercial facilities in the pavilions. Under the wooden roof construction, detached buildings offer space for the commercial and station-related functions. A logical organization of the functions results in an open and accessible station. (text: https://urbannext.net/assen-station/)

Lessons Learned
Regional mobility and Transit-Oriented Development

Under the Regional Mobility and TOD category, special attention was paid to the integration level between existing regional development plans, density or any existing city area improvement projects/ idea which consider regional railway services, as part of the implementation of urban transport solutions.

While reviewing the long list of stations, the consultant paid particular attention to the regional impacts that regional station development could spark through the services tied to them, in the areas where they are potentially being planned.

The consultant also choose some of examples of stations with information related to social impacts with its regional specifications at railway stations. Through the analysis of benchmarking cases, there were a range of different experiences in regard to regional mobility integration, TOD, freight/parcel logistics, stations accessibility and other compared categories. The results of this analysis and the construction of the lessons learned is summarized in Table 10 below. This exercise has been constructed to provide best practices and design recommendations to the current and future Rail Baltica regional passenger stations.

TABLE 10 LESSONS LEARNED ON REGIONAL MOBILITY AND TRANSORT-ORIENTED DEVELOPMENT

LESSONS LEARNED			
	LANDMARK STATION (Type II)	BASIC STATION (Type III)	PLATFORM TYPE (Type IV)
REGIONAL MOBILITY AND TOD	Railway stations: hubs of sustainable and new mobility	Regional railway station seamlessly integrated into the urban context and resident social lives beyond transport	
	Archiving sustainability though strong connection of NMT		
	Strong connections of public transport established around rail regional stations		
	Regional and urban logistic at railway stations		
	Enhancing personal mobility by establishing adequate parking facilities		
	Regional railway station integrated into an urban life offering residents open meeting places		

The lessons learned summarized above are described in detail including attached relevant illustrations below.

Rail Baltica | **RAMBØLL**

LESSON LEARNED 1: SUSTAINABLE RAILWAY STATIONS OFFERING NEW MOBILITY SERVICES

Keywords: *Integration between stations, services, and regional mobility plans*
Matching stations from the long list: *Bahnhof Altötting, Korneuburg railway station, Ludwigsfelde and Kivistö railway stations*

Future sustainable mobility at regional railway stations is not only public transport, but also environment friendly sharing services that could be easily booked via smartphone apps. Moreover, a strong focus of rail and new mobility services lies at offering a door-to-door journeys to and from railway stations.

Therefore, in benchmarking it is quite often seen that regional passenger railway stations allocate new mobility services with their relevant facilities.

New mobility could be presented by such services as:
- Sustainable carsharing;
- Bike sharing;
- E-scooter sharing (very rare, since it is still new urban transport mode);

Additionally, new mobility service at some of regional stations could be presented by on- demand transportation, especially in rural areas, where public transport is quite limited. This is however, still under development, and more typical for commuter railway station at metropolitan regions.

Supporting facilities for the above-mentioned services are:
- Parking areas both for free floating and station-based services;
- Charging infrastructure both for cars, bikes, and e-scooters, etc.;
- Repair shops;

In order to assure convenient use of sharing services, regional railway stations have special free Wi-Fi zones, which are close to exchanging nodes (also to public transport station). For railway stations, which are located in "greenfield" areas and might have a poor mobile network, this service could be a great asset to attract more travellerstravellers.

While assigning any types of new mobility a greater attention is paid to city and regional mobility plans. To reap the full benefits of the new-mobility revolution, cities should plan a full integration of "mobility stations", which will be integrated with other existing stations in the city, that could guarantee to users nurture the transition.

Allocation of mobility services also depend on land availability, and station planning, as well as design. Parking spots and relevant facilities should directly be accessible for travellers from railway

platforms and a station central hall. The practice shows that the walking distance to such mobility areas should not exceed 5 min. walk.

Within the selected benchmarking cases the mobility services are presented by mix of possible transportation modes with a high focus on car and bike sharing services.

In selected cities, the complimentary services were assigned based on the railway area characteristic, railway function and existing public transport connection to the station, as well as sustainable city plan/ strategies.

Altötting station is located in a rural area in Germany (GER) and offers high-quality mobility services. Parking and charging stations for E-Bikes are suitable for a wide range of e-bikes - 95 % of the bike brands, and it is the best example in GER. Dedicated carsharing service also provided by the station. Information center also provides alternative mode information. These services could be relevant for the RB station type II and III.

FIGURE 43 PARKING AND CHARGING FACILITIES FOR SHARED E- BICYCLES AT THE ALTÖTTING STATION[32]

Since 2020 the city of Korneuburg (Austria) in cooperation with ÖBB (railway operator) allocated innovative mobility services at the railway station. The station offers residents, commuters and tourists a practical and environmentally friendly alternative to private cars on site, for excursions and as a connection between the train station and the destination (last kilometer problem). All services can be found and booked also via railway operator mobile application, which provides a MaaS solution.

Such service could be relevant for the RB station type II and perhaps III.

FIGURE 44 E-SCOOTER SHARING AT THE KORNEUBURG STATION[33]

---

[32] Allianz-pro-schiene, video
[33] www.korneuburg.gv.at

2/5 — LESSON LEARNED 2: ARCHIVING SUSTAINABLE MOBILITY THROUGH NON-MOTORIZED TRANSPORT AND RAIL

Keywords: Integration between stations, services, and regional mobility plans
Matching stations from the long list: Alingsås station, Triangle station, Vordingborg station, Bahnhof Altötting

Biking and walking should be prioritized and incentivized to connect to regional railway stations. Many large and small cities are paying attention to reducing car traffic and therefore setting a smart concept of a combination between rail and bicycles for daily travels. The increase of such intermodal trip chain offers could improve railway operational efficiency and attract more users. Moreover, the use of private bicycles can reduce travel costs for users and make their trips more time efficient by not relying on other modes of transport.

New trends in improving this travel modes combination rely not only on allocation of various existing facilities solutions at a railway station, but also on some digital improvements, like BiTiBi (Bike Train Bike), where a door-to-door transportation could be improved though contact less check in and payment system for a user. It is, however, still more relevant for bigger stations with higher passenger flow.

The benchmarking cases show that the one of the preferred connection at regional railway stations is given to NMT.

The factors which might influence of NMT development around railway stations are:

- Small radius and easy access to get to the railway station by walking and using bicycles/micromobility
- Relative low costs to allocate and construct parking facilities for private/shared bicycles with minimum land dedication ;
- Walking areas and NMT accessibility to a railway stations are one of the priorities for mobility transport plans, and the best practice points towards removing barriers for pedestrians and bicyclists
- Almost all of benchmarking cases have strategy of improving sustainability and therefore developing bicycling network and routes, as well as pedestrian, which are already connected to regional railway stations;
- Additionally, allocation of bicycle rental and repair services could be a **complementary source of revenue for railway station operators.**

Here however an attention should be paid to required investments from a railway station operator and manager to implement safe direct and convenient pedestrian routes towards railway stations and parking facilities for bikes near railway stations, which

are necessary elements for a successful exploitation of a railway line. Depending on a regional station size, the facilities for private bicycles could be installed:

- Simple outdoor stations;
- Bicycle boxes that could be rented out to private users;
- Indoor parking structures;
- For bicycles which are often parked at train stations for longer periods of time (even overnight), protection against theft and vandalism;
- Connection of city bicycle network with station areas and parking, where needed ramps.;

The most important recommendation for regional stations is to designate space close to platforms for most of the bicycle parking (outdoor) and another strategic covered parking house. Moreover, limited bicycle parking capacity often leads to obstructions for other train users, especially when bicycles tied to traffic lights and signposts block pedestrian paths or fire brigade access points and guiding strips for the blind. For planning any walking/ pedestrian zones, the attention should be paid on accessibility to the railway station building and platforms, walking time, allocation of some rest areas, and creating a navigation system (signs).

FIGURE 45 OPEN BICYCLE PARKING FACILITIES AT THE ALINGSÅS RAILWAY STATION (SOURCE: AUTHOR)
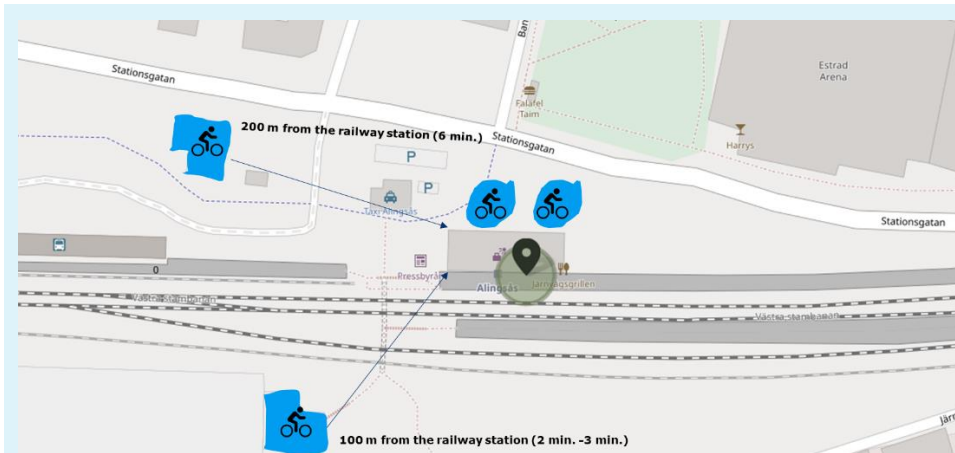
The regional railway station offers significant parking space in front of the building, and 2 parking areas at the radius of 150 m (approx. 150 weather protected parking slots). The accessibility to the station by bicycles is quite well organised since the whole bicycle network and routes are fully integrated with the railway station and the area.

The railway station is located at the central living area, and therefore it provides not only typical regional services, but plays a crucial role for a city life, and attract visitors by providing them an access to an significant walking/ pedestrian zone located in front of the station entrance. The waking area directly connected to small parks, as well as to shopping centre. Therefore, visitors and residents could use the area also for their free time.

The railway station allocated more than 100 parking slots for private bicycles. Therefore, it is perfectly organised for commuting travellers. Moreover, e- scooter sharing services can be directly taken from a station and used for last miles.

FIGURE 46 WALKING ZONES AND BICYLE PARKING IN FRONT OF THE TRIANG STATION (SOURCE: GOOGLE)
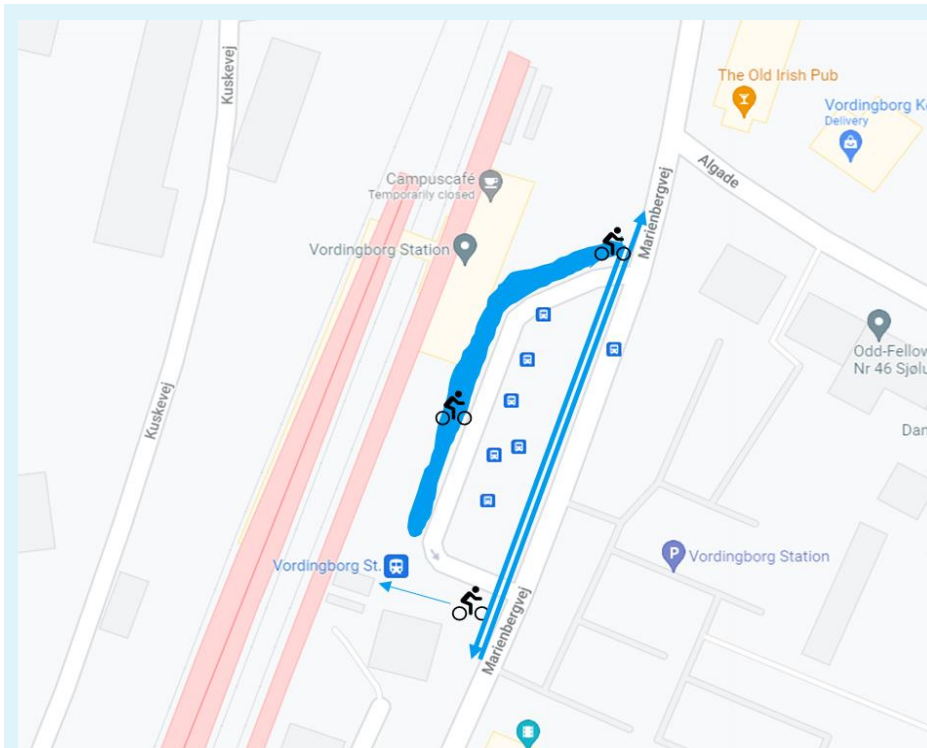
The regional railway station is a small hub, which provides cycling, but also public transport connections. The design of the area is done with a strong focus on often commuting travels. Therefore, the bicycle parking facilities are also offering protected from vandalism offering parking boxes which could be closed during day/ night-time.

The railway area is isolated from any commercial services at the area, however it allocated around 7 small shops for snacks. The location of the station offers a direct access to a highway (400 m).

FIGURE 47 ALLOCATION OF BICYCLE PARKING STATION IN FRONT OF THE VORDINGBORG STATION (SOURCE: GOOGLE MAPS)

The city of Altötting put a strong focus on developing the railway station with a strong connection for bicycle users. The railway station serves to travellers not only a typical open parking station, but also repair shop, bicycle charging station, as well as changing rooms. The model of such organization is unique and often used as best practice for small German regional stations.

Additionally for tourists there are special offers for bicycling in the city and region directly at the ticket point.

FIGURE 48 BICYCLE STATION ZONE AT THE ALTÖTTING RAILWAY STATION (SOURCE: RFO VIDEO, BAHNHOF DES JAHRES)

2/5 — LESSONS LEARNED 2: STRONG CONNECTIONS OF PUBLIC TRANSPORT ESTABLISHED AROUND RAIL REGIONAL STATIONS

Including adequate parking

Keywords: Maximizing access to and from station
Matching stations from the long list: Bahnhof Winterberg, Bahnhof Bad Bentheim, Nordmaling station, Vordingborg station

Traditionally, for most of urban trips to a railway station users seeking an alternative to private car options which generally would have a choice of several alternative modes ranging from a relatively low-cost for a public transport service to a higher- cost, like comfortable taxis, or on- demand transport providing door-to-door services. Nevertheless, in more urban areas, public transport is seen as a more reliable option. Furthermore in non-urban areas public transport connectivity may not be as optimal as compared to large cities, which brings extra focus on public transport improvements. Many of the regional benchmarking locations put a strong focus on design a public transport network with an attention of otherwise for railway station being as interchange point for many PT routes, or a railway station being well connected through several PT routes which lead to central (as well as living) city areas especially if a railway station is located at a green field area.

In both cases a regional railway station is a focus point for public transport. As seen from the benchmarking, the mode of public transport serving railway station in most cases presented by buses. It mainly depends on the fact that this mode does not require expensive infrastructure, can operate at the same area/roads as private cars and could easily assign sustainable fleet.

Therefore, for small cities, where investments are less in comparison with larger cities, this solution is most applicable.

The most important user factors for establishing strong and attractive PT connections and its integration with a regional railway station are traveling time to a railway station, physical connection of PT station with railway platforms, operational integration and sufficient service hours, Availability of tickets services of vending machines, designed points with operational information of both transport modes at stations, high safety and security, diversity design,

and availability of special services for travellers with reduced mobility (both stations, and its integration).

Moreover, a combination of well-developed local public transport to regional railway station and railway service itself is an attractive and environmentally sound alternative to many journeys that are otherwise often made by car.

It is important to mention that although the recommendation is to build strong connections for Public Transport services to railway stations, providing adequate parking space in regional stations and setting the optimal price for such services should also be considered in order to strengthen the utilization the railway service. More on parking lesson learned in lesson 5 below.

The regional railway station has a modern building and is integrated with bus network. That means that there is a high physical interchange point, frequent and live bus operation information, which is tailored to regional railway schedule.

Moreover, while construction of a modern railway building it was decided to convert the old station area into a central bus station, where some sub-urban bus routes are connected. Within the building there is a special ticketing services and information point for both transport modes: buses and rail.

FIGURE 49 ALLOCATION OF BUS STATION AT THE WINTERBERG RAILWAY STATION (SOURCE: GOOGLE)

The railway station is located almost at green field area with a direct access to a highway. The station however plays an important role for residents and it provides the main link for regional and long-distance travel. There are more than 68 train destinations, and the station is served by more than 30 bus routes. The bus stop, however, is quite small and allocates only 3 seats and one place for a wheelchair. The bus station design is simple and is a typical bus shelter with a glass protection. The physical integration between both station are high and gives a direct and barrier free access with a walking time of less than 2 min (approx. 50 m).

FIGURE 50 PUBLIC TRANSPROT STATION CONNECTED TO THE NORDMALING STATION (SOURCE: GOOGLE MAPS)

3/5 LESSON LEARNED 3: REGIONAL AND URBAN LOGISTICS AT RAILWAY STATIONS

Keywords: *Regional freight logistic chain optimization*
Matching stations from the long list: *Ludwigsfelde station,*

Regional railway stations could have an important impact on improving and solving regional and urban logistics, which could offer allocation of urban logistic points with efficient freight distribution and mitigating externalities such as congestion and emissions.

At benchmarking stations, the typical logistic service was quite limited. However, typical logistic services at regional railway stations are small smart boxes for parcels, some of services for last mile delivery points, typical post offices (national and international), which might be connected to small rail containers (to provide regional deliveries). At small stations (type II and IV) most of urban logistic is presented by allocation of post service points combined with DHL and other parcel services, or allocation of parcel or letter boxes at railway station halls.

However, allocation of any such service types depends first on a railway station function in order to understand what the demand and private (users) needs is, understanding of any regional or city speciation's (in case there is any regional productions), station size (in order to allocation logistic office) and

its possible logistic organization within the building and attached areas, which will have a barrier free and quick access to connected transport modes (car parking stations, cargo bikes stations, taxis and bus stops).

There are also urban and city logistics criteria's for identifying, assigning, or tailoring logistic services at a railway stations:
- Urban: density (low or high), spatial structure (mono- or polycentric), income (low or high), function (productions, distributions, etc.).
- City logistic: main dimension over which city logistics takes place, such as operations (delivery schedules, routing), the involved modes and vehicles, the infrastructure and land use at a railway station, as well as compliance to regulations (speed limits, parking restrictions within the railway area).

Moreover, within the benchmarking important attention was given to setting a cooperation between railway station manager and suppliers. From best practice it is seen that the organization of stakeholder's cooperation is mainly done is a simple form of having between

one and three suppliers.

Establishment and optimization of a regional freight logistic chain at regional railway stations could include the following elements:

- Selection of the most relevant logistic service being located at a railway station, and tailored to the regional characteristics;
- Choice of the most efficient from users and suppliers access point of view location;
- Smarter and targeted infrastructure/ facilities;
- In case of cooperation with several stakeholders a strong interaction between stakeholders, and interfaces between different supply chains should be established;

FIGURE 51 LUDWIGSFELDE STATION ACCESS TO THE URBAN LOGISTIC SERVICE POINT (SOURCE: GOOGLE)
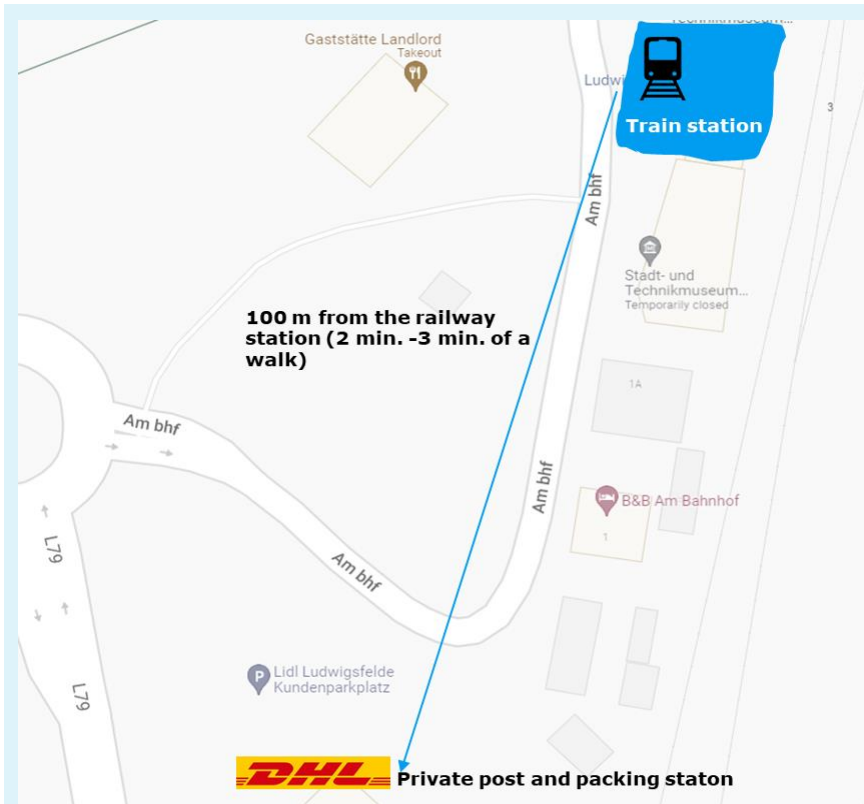
The Ludwigsfeld railway station building (GER) does not locate any logistics services. The space within the building is quite limited and cannot allocate any space for logistic services. Moreover, the station is a historical place building of which is shared with a city technical museum.

Around the railway area is however, few logistic offices, which also service business companies, where partly railway, also in combination with road transportation is used. The region and the city is characteristics by having an industrial services and offering big warehouses.

For small private users there is also a "DHL office" located in 100 m from the central entrance of the railway station, with a direct and barrier free access.

4/5 LESSON LEARNED 4: INTEGRATION OF RAILWAY STATION INTO EVERYDAY LIFE

Keywords: *TOD around the regional railway station*
Matching stations from the long list: *Rottenbach railway station; Ludwigsfelde railway station;*

Some of the regional railway stations across benchmarking were transformed into meaningful places, benefitting not only from passengers alone, but also from the wider communities around them. It means that railway station could be an attractive meeting point being supported by some local suppliers and small industries, with a vision of getting more from their service benefits for local people. The area of railway station could have a role of a physical heart of a community, creating hubs for arts, education, fun places, volunteering, healthy living, and social interaction. Such a concept generates pride and interest in the railway from the community, enhancing stations, and providing a warm welcome for rail passengers.

Ideas and creative solutions of a community concept extracted from the analysis of best practices include:
- Organisation of weekend markets, which offer specific local and regional foods sold by local farmers;
- Opening special cafe places with organised social activities;
- Assign rooms or places for open museums which could attract local artists;

- Use open railway station areas for official city celebrations;
- Attract volunteer's projects for supporting local developments being promoted at a railway stations area;
- In medium size cities a railway station could be a start point for marathons, where publicum can in the meantime enjoy the station area and use services provided by station cafes.

There are however several key elements which should be considering before organizing any of activities at a railway station area:

- A railway station operator should develop a business plan, where potential projects or ideas could be implemented. A strong visibility and communication support will be required;
- Engagement of local administrations for implementing any project and get their support in bringing stakeholders together;
- Building strong relationships, by engaging key partners and relevant community groups. This should lead mainly by a railway station operator;

- "Think creative" – organize special meeting using local or regional traditions. The project could also engage residents or local open communities;

As seen on international practice, regional stations (all types and size) could have a positive contribution into regeneration of stations can make to communities, terms of social inclusion and engagement, economic regeneration, and wellbeing.

Setting a balance between a "commercial" focus and one that recognizes social responsibility isn't always easy, but in many cases both of these could achieve results that make commercial and social sense.

FIGURE 52 ALLOCATION OF LOCAL FOOD STORE WITHIN THE RAILWAY STATION BUILDING WITH A STRONG ACCENT ON ATTRACTING LOCALS OFFERING SPECIAL FOOD DIRECTLY FROM REGIONAL FIELDS (SOURCE: ALLIANZ-PRO-SCHIENE)

The station plays an important role for residents and has a concept of "bringing people together". The strategic idea was also implemented into a new designed building, which was done together in cooperation with local suppliers and residents in 2015. The producers therefore can sells its own regional products alongside general goods. The shop serves residents and visitors alike, providing groceries and local produce to the community. Landscaped islands subdivide the expanse of asphalt, picking up local characteristics in their design, for example through the farm gardens encircled by picket fences. It is a sustainable solution that is the collective responsibility of the citizens. Moreover, for any regional (city) celebration the area in front of the station is used as a meeting place for local communities.

Ludwigsfeld station area supports an important urban role of bringing residents especially on weekend together. The walking area in front of the station are often used for small festivals organised.

Moreover, every weekend there is a local market with regional foods or small productions in a walking distance of 200 m. from the station, as well as one of the biggest in the region kids' playground being about 50 m. distanced from the station. Both of the location are marked with signs and walking information at the railway side

FIGURE 53 PLAYGROUND ALLOCATED ALMOST IN FRONT OF THE REGIONAL LUDWIGSFELDE STATION (SOURCE:GOOGLE)

5/5   LESSON LEARNED: PARKING AND DROP OFF ZONES AT A REGIONAL RAILWAY STATION

Keywords: *Maximizing access to and from station*
Matching stations from the long list: *Assen Station, Mäntsälä station, Flintholm station*

Parking solutions for private automobiles, or drop off zones, also known as kiss-and-ride stations at regional railway stations have had an important demand around railway stations. Parking and drop off solutions provide residents of low-density suburbs and rural areas with a convenient and flexible access mode and reduces congestion on arterial roads.

The combination of two transport modes enable commuters to make part of a journey by trains, saving higher parking costs at the destination and avoiding congested roads and larger contribution to emissions and air pollutants.

In low destiny regions the use of private automobiles to get to a railway station is common, especially in regions where public transport services are limited. In such cases it is important to plan for adequate parking at a convenient location next to the station.

Users who utilize private vehicles to park-and-ride are usually utilizing the station parking in peak hours (morning and in the evening). Therefore, a train departure should be tailored to user's needs, and operate frequency with longer regional trains.

As the objective of the park-and-ride facility is to encourage the model shift to high occupancy vehicles such as trains, the presence of adequate transfer facilities is a catalyst for the success of the system. Overcrowded Park-and-Ride stations and ad-hoc parking (on street) may deter travellers in joining the train service. Furthermore some of the most important concepts for designing parking services near stations include adequate parking wayfinding, ticketing machines at parking areas, high security and lightning systems, waiting areas, WC facilities, among others. Electric Vehicle charging ports could also be provided.

Therefore, from benchmarking cases it is seen that the organization and allocation of Park-and-Ride area offers quick and direct access to railway building entrance or areas and usually the parking is separated from pedestrian flow,

or does not have any crossings with public transport stations.

Allocating excessively large Park-and-Ride area at a railway station could also be problematic because of limited land. Moreover, due to existing road infrastructure, and, in some benchmarking cities, high road traffic, support railway stations to still assume personal mobility by allocate stations for short parking, so called drop off and pick app stations, or Kiss and Ride (K+R) stops. Kiss and ride however in various countries could have different signs and it is non-standardized in EU.

The difference between these two parking options is the Kiss-and-Ride is always limited with parking time, which can be from 10 min. to 30 min. This method of Kiss-and-Ride station access requires no parking spaces and attracts more additional riders. Moreover, Kiss-and-Ride is more characteristically for commuter railroad stations.

The regional railway station allocates more than 190 parking places for private automobiles. Such an option creates to residents a better personal mobility, since the station is a bit isolated from central living districts.

Currently the station is served by 9 bus routes, however they are limited with operational time.

FIGURE 54 CAR PARKING STATION IN FRONT OF THE MÄNTSÄLÄ STATION (SOURCE: GOOGLE MAPS)

The station offers very limited number of private car parking spaces (only three spots).

However the focus of offering a high personal mobility is put into a perfect organization of Kiss-and Ride area, which leads directly to the railway central building entrance. The maximum duration of using this area is no more than 20 minutes. The area is specially marked with a sign and white lines on the road.

Kiss-and-Ride *is also allowed to be used by taxis.*

FIGURE 55 KISS AND RIDE AT ASSEN RAILWAY STATION (SOURCE: GOOGLE MAPS)

Lessons learned
Integration with the Local Environment and Effects on Local and   Regional Regeneration

FIGURE 56 HISTORIC REGIONAL RAILWAY STATION AT LANDSKRONA STATION, SWEDEN

Suburban and rural areas are changing and demand for rail services in these areas is increasing. Firms looking for a cheaper land, more varied labor market opportunities is increasingly important to the regional economy. Furthermore, with the changes to the new labor economy which raises the importance and usefulness of work from home and the digital economy, it is expected to see a rise in importance of sub-urban and rural regions. With more connected towns and cities, the opportunities for regional regeneration in a more environmentally sustainable way, will be more important for regional residents.

In order to reap such benefits, it is important to point out that connectedness, regional regeneration and digital development will only be achieved if all the important stakeholders are involved in sparking such benefits. In this section, we talk about public, private and community stakeholder participation, financial sustainability, digital connectivity and freight and logistics aspects.

TABLE 11 LESSONS LEARNED FOR INTEGRATION WITH THE LOCAL ENVIRONMENT AND EFFECTS ON LOCAL AND REGIONAL REGENERATION

LESSONS LEARNED			
INTEGRATION WITH THE LOCAL ENVIRONMENT AND EFFECTS ON OCAL AND REGIONAL REGENERATION	LANDMARK STATION (Type II)	BASIC STATION (Type III)	PLATFORM TYPE (Type IV)
	Public-Private and Community Participation		
	Ensuring financial sustainability		
	Digital connectivity Strategy		
	Logistics		

Under this category of lessons learned, the consulting team briefly discusses the importance of Public-Private Participation and ensuring that contractual agreements between infrastructure owners and to-be operators must be clear, straightforward and should strive outcomes to benefit the user of the railway system. It also points out the importance of community participation. This section also raises importance on ensuring financial sustainability of the system and the critical stakeholders that can be mobilized to strive towards efficiency.

Lastly, Digital connectivity and freight and Logistics strategies are some of the most important aspects that will ensure than any regional railway service provides large socio-economic benefits that will go beyond the railway line.

Rail Baltica | RAMBØLL

LESSON LEARNED 1: PUBLIC-PRIVATE & COMMUNITY PARTICIPATION

Keywords: Public-Private Participation, stakeholder participation, community engagement and participation
Matching stations from the long list: Espoon Keskus station

Development of railway services provides an important opportunity to improve station accessibility and surroundings. However, in order to achieve the provision of commercial and other services in and around the station, it is important that the design of the station and services is carried with the maximum amount of public, private and community participation, in order to understand the needs of each stakeholder.

Legal and Regulatory Frameworks

Operation of Railway Stations is complex. Clear responsibilities in terms of ownership, financing, operations and management of a station must be established at an early stage. Furthermore, the optimal legal and regulatory frameworks need to be in place before any contracts are designed between public and private entities. It is recommended that these contractual arrangements are uniform across each of the countries and that these are derived from national legal and regulatory frameworks.

Any service development at railway stations requires a strong cooperation between a station operator and stakeholders, whose services to be allocated at the station.

Careful programming & planning

Even in small regional stations (type III-IV), it is extremely important to plan services and understand contracts with different stakeholders with enough time to make the necessary adjustments if needed. The programming phase must explore the potential services and solutions to provide the maximum amount of benefits in terms of service offerings inside and around the station.

A good example of maximization of services around the station is Espoon Keskus station (FI) where the improvement project for the station can be seen as a starting point for wider regeneration process for the station environment.

New shopping center with a library and other public services was established next to the station. Office buildings from 1970s were replaced by new premises combining commercial services, offices, and housing. New appartements were built on nearby housing area.

1) identification of relevant stakeholders within an urban mobility sector with already identified context for their possible involvement and activities. The context of their involvement should include identification of local problems to be

Public-Private participation

It is extremely important to understand the extent to which public-private participation can be developed in terms of the operation and service provision of a railway station. The success of such relationship will be achieved if there is clear understanding of the contractual arrangements and if the risks of the operation is assigned to the party with the best position to mitigate it. There are a myriad of applications for public-private partnerships to be structured for the provision of services. These could take the form of operation and maintenance of single or group of stations within one of the Baltic countries.

Community participation

During both the programming and planning of regional stations, it is critical to organize community participation workshops to i) inform the wider community of the plans for developing the station, ii) understand needs and wants from the community in terms of services around the station and to understand how contracts should be set up in order to ensure the maximization of the potential befits to the community.

Cooperation with stakeholders also means engagement of policymakers and mobility planners in the preparatory phases by sharing information ideas, plans n mobility needs at a station.

Railway operators in this case should receive a clear mandate from planners and policy makers in order to foster the

Stakeholders' engagement & management in this case means building a long- term relationship with assigning communication tasks and their involvement.

In order to put an engagement on its place a general methodology for local stakeholder engagement should be applied:

solved, opportunities, resources, and capitals with a potential grow.

2) Selection and classification of stakeholders with their primary role. The attention here is paid to the service they provide, and what kind of benefits they could bring in a long – term station development.

interest and participation of a broader range of stakeholders – they should facilitate the co- design process in order to keep the focus on the identified context.

Within mobility sector there is an engagement and cooperation model called the Marketplace for Mobility (B2B) is usually used to motivate private mobility providers bring their service at a railway station.
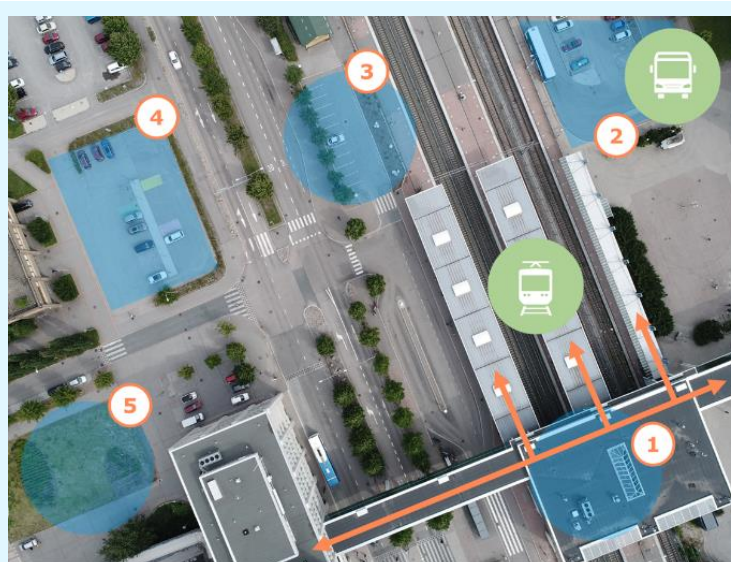
The administrative center from 1970s is transforming into a vivid sub-area center with interest for new public and private services. Station overpass (1) is renovated to fit user needs and connect the railway station to the neighbouring areas. Current small bus terminal (2) will be renewed to be suitable for efficient feeder bus services from surrounding housing areas. Kiss & Ride facilities (3) were built to support accessibility to the station. Former town house parking (4) will be replaced with private housing. Meanwhile before the investments the look and feel for the parking was improved with coloured parking spaces. As the investments take time, some areas are utilized as local parks (5) before the investors are offered to implement the project.

FIGURE 57 STATION DEVELOPMENT AROUND ESPOON KESKUS (ESPOO ESBO) STATION, FI (SOURCE: AUTHOR)

| 2/4 | LESSON LEARNED 2: ENSURING FINANCIAL SUSTAINABILITY |

Keywords: Local authorities and broader stakeholders together to ensure financial sustainability
Matching stations from the long list: Landskrona station

Seamless railway station planning and integration with its surroundings to include available services are factors that combined, creates an attractive railway station and contributes towards financial sustainability.

run several errands in combination with their train ride.

Financial resources to carry out station operations and maintenance

Due to its location, the station serves mainly commuters and has since been established and expanded its park and ride facilities to meet the increasing demand. The station is also fully integrated with local and regional bus

Being able to conveniently provide a myriad of transport and non-transport services integrated in one single station will have an important impact on the station development and successful use.

To achieve a higher rate of rail usage, the last-mile journey for individuals throughout the region have to be optimized in terms of travel time, cost, and convenience. Well-integrated bus services in combination with the provision of new mobility and other ancillary services would encourage travellers to visit and use commercial and transport connection services at the railway station and thus contribute to its financial sustainability.

In rural areas particularly, the provision of for example shopping possibilities, grocery stores, post office, car rental, or logistic and freight services could bring more visitors to the station as they can

Resources used to operation and provide maintenance to the stations (excluding tracks which are usually maintained by the rail operator) require at least the following revenues: i) a portion of the fares (through contractual agreements from the rail operation); ii) non-fare revenues such as advertising, commercial and land development, and; iii) in some cases subsidy payments.

Landskrona station, situated in the outskirt of the town center, constitutes a good example of the aforementioned aspects. The station, which is partly greenfield, was constructed in 2001 as a part of the regional rail project Västkustbanan and have since developed into a regional transportation hub offering a wide range of mobility facilities and services to its users.

services, including a new trolley bus feeder connection initiated by through

Other mobility services offered includes bicycle facilities, charging services for cars (emerging), and other shopping services around the station that are geared to both rail users and non-users.

As the station was moved from its former location in the city center, one of the municipality's goals was to introduce commercial activities to the station area to enhance the areas public facilities and create an attractive district. Hence, passengers are now able to enjoy a coffee at the station café or go shopping in one of two neighbouring grocery stores which are also a destination for other visitors than rail passengers. In short, Landskrona station has become a destination.

FIGURE 58 GROCERY STORE AT LANDSKRONA STATION (SOURCE: AUTHOR)

3/4 — LESSON LEARNED 3: DIGITAL CONNECTIVITY STRATEGY

Keywords: *Digital connectivity, capacity reliability, rail performance for passengers and freight, train control*

Over the past decades, digital connectivity has proven itself to be a major driver of both local and regional development, with the potential to increase economic productivity, generate job opportunities, promote cross-sectional innovation, and increase socio-economic wellbeing.

Digitalization along a high-speed railway means that the planning of the high-speed and regional services must take into consideration at least the following aspects: i) the necessary digital infrastructure that shall be laid out during the construction or renovation of tracks and that would be necessary for digital connectivity of the current and future rail network, which include signalling and train control technology, ii) digital infrastructure that could be shared this with other sectors such as housing and commerce, iii) the provision of high-quality connectivity services (3, 4 and 5G and more) to ensure seamless connectivity with minimal disruption for rail services and beyond.

By providing universal digital connectivity and access, individuals and business throughout a region are given the possibility to connect to each other, to different markets, and to other social and economic opportunities.

Gaining access to digital services such as e-identification, e-payments and e-commerce, in turn, enables a cross-sectional transformation of traditional business models including e.g., financial services, education, and healthcare, as well as delivery and consumptions of goods across regions and the wider economy.

Well-deployed telecommunication network and infrastructure is a key component to increase digital connectivity and reduce the digital divide between urban and rural areas in the region.

When developing a new regional railway line, it is recommended to develop a **Digital Connectivity Strategy.** Such strategy could contribute to the "Dig Once" strategy to gain economic and environmental benefits through shared infrastructure. This concept is particularly beneficial in the construction of greenfield stations and improvements in trackwork.

Under the "Dig Once" concept, participants from different business sectors, including connectivity providers (telecom network operators), digital service providers (tower companies and wholesale broadband companies), and IT infrastructure providers can, share infrastructure in order to reduce the cost and time required for construction and installation of, often redundant, infrastructure components. Emerging network technologies such as 5G require wholesale equipment to be installed on a large number of sites in order to reach sufficient coverage. By sharing mobile broadband infrastructure, the number and location of sites could be optimized, and the visual impacts of the network expansion minimized.

Furthermore, shared infrastructure and, in particular, co-deployment of fiberoptic infrastructure along road and rail networks increases efficiency of both transport and ICT systems, which in turn is essential for infrastructure development, human resource development, trade and transportation, as well as social and economic cooperation among individuals, organizations and countries.

FIGURE 59 KYTÖMAA RAILWAY JUNCTION, FI SERVICE ROAD NEXT TO A RAILWAY LINE PROVIDE SUITABLE ROUTE FOR DIGITAL INFRASTRUCTURE (SOURCE: AUTHOR)

The figure above illustrates the "Dig Once" concept, an example from Kytömaa railway junction, fi, where main line to the north and south diverge. Service roads are built next to the railway lines which provides a suitable route for co-deployment of digital infrastructure.

.

4/4 LESSONS LEARNED 4: FREIGHT LOGISTICS AT REGIONAL RAILWAY STATIONS AND MULTIMODAL PACKAGE SHARING

Keywords: *Urban Freight logistic network improved access, development of freight and parcel strategy*
Matching stations from the long list: *general analysis developed based on all listed stations;*

Freight and small-scale parcel logistic at large urban railway stations has been consolidated in the last few decades in different stations in European railways. However, these are still at a developing phase within small or medium size cities, where a railway station could play an important role in consolidating and delivering small-scale parcel using regional rail services.

There are few components and requirements to ensure small-scale parcel or package delivery could be operational in regional railway services, these include:
i) **logistics and distribution center** facilities near a regional railway station;
ii) **multimodal connection between distribution centers and railway station** (delivery vehicles, electric cargo bicycles etc.);
iii) storage facilities within regional stations to consolidate packages;
iv) adequate space for transporting parcels inside rail cars;
v) lockers at destination stations, and; vi) logistics operators that are able to manage the whole delivery of the parcels.

These only few of the principal aspects that are needed to ensure effective management of small-scale freight or parcel services.

Furthermore, the proposed regional stations to be used as parcel consolidation centres (or adjacent facilitates) should have the supportive facilities to ensure the operations are effective and efficient (parking, drop off/pick up spaces).

Furthermore, the potential regional stations also should feature all the digital connectivity that is needed for such operation.

In order to ensure an efficient planning of resources within regional railway services, it is **recommended that a freight and parcel strategic plan is developed during early stages of the** planning of the regional rail series. It is also recommended, that even in small stations (type III-IV) space is planned for potential future parcel services (when applicable).

Existing regional logistic, productions, as well as operating logistic companies could play a major role on current and

future railway station logistic planning. Cooperation with local companies could identify potential demand at a railway station and allocate supporting resources for a better freight accessibility and extend logistic networks. Regional logistic could identify what kind of goods and services could be allocated at a railway station, and what kind of supportive facilities are required.
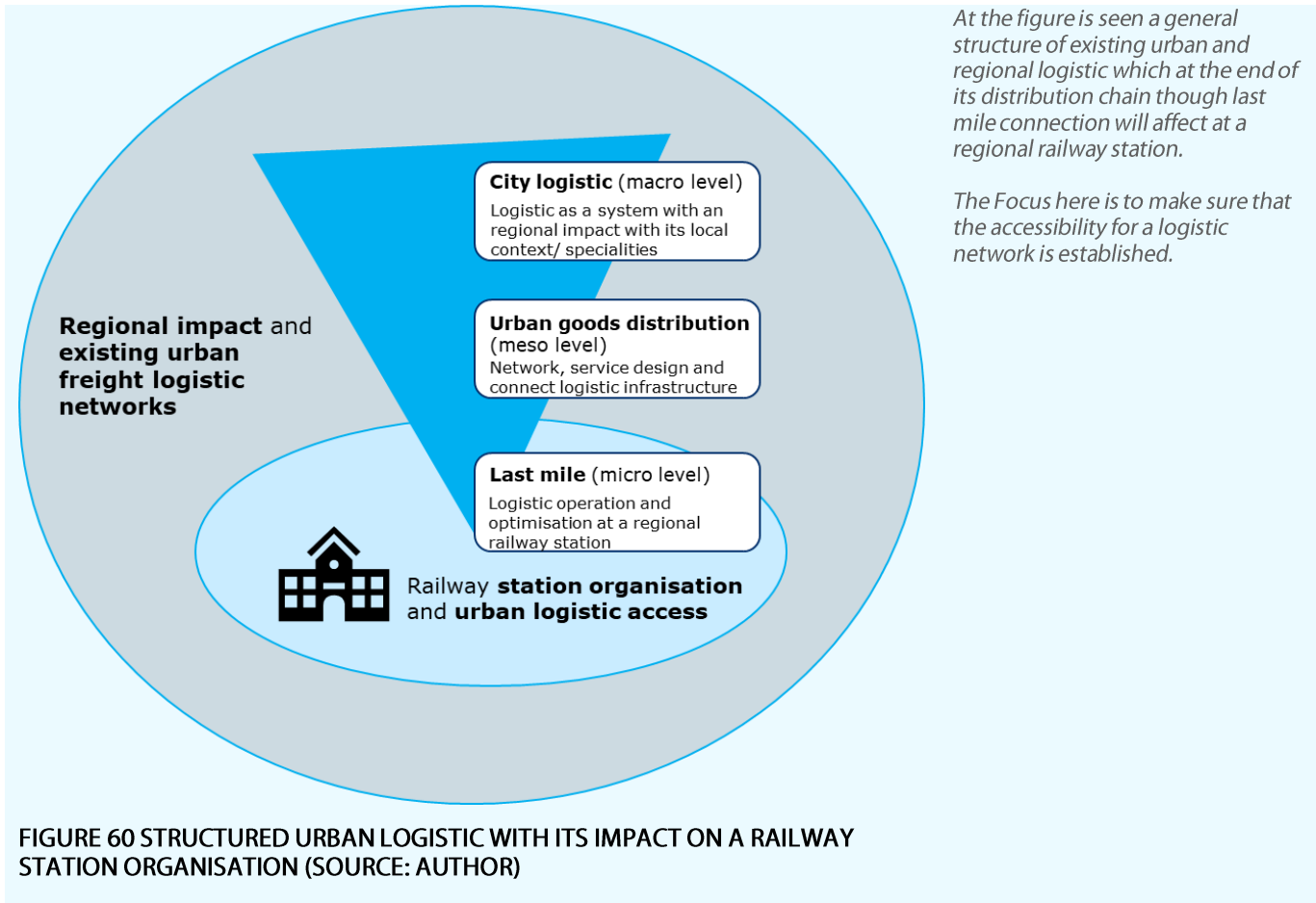
Moreover, it could help to identify a role of a railway transportation within existing urban freight logistic network. Based on the size and railway station involvement, some existing small shops within the railway building could be used as logistic points for private users.

Digital solutions (as a part of supply chain management) and its accessibility consist of:

- Integration of parcel delivery;
- Adaptation of tracking and tracing system of urban deliveries between delivering company, users and packing station at a railway;
- Online tracking, etc.;

In some cases, for bigger packages, railway cars could also be used in order to distribute products between regions.

At the figure is seen a general structure of existing urban and regional logistic which at the end of its distribution chain though last mile connection will affect at a regional railway station.

The Focus here is to make sure that the accessibility for a logistic network is established.

FIGURE 60 STRUCTURED URBAN LOGISTIC WITH ITS IMPACT ON A RAILWAY STATION ORGANISATION (SOURCE: AUTHOR)

4. Project management and execution

4.1 Project Execution Plan

The project duration and delivery schedule of the current study did not change since the Contract of the Assignment was signed (27.08.2021). The timeline and project deliverables were discussed between all project parties and finally confirmed by the Rail Baltica team.

The total duration of the project remains 20 weeks including 4 weeks of reworking last comments for the final report to be received from the Client. In Figure 4 below, a visual project Work Plan is presented.

FIGURE 61: PROJECT EXECUTION PLAN (SOURCE: AUTHOR)
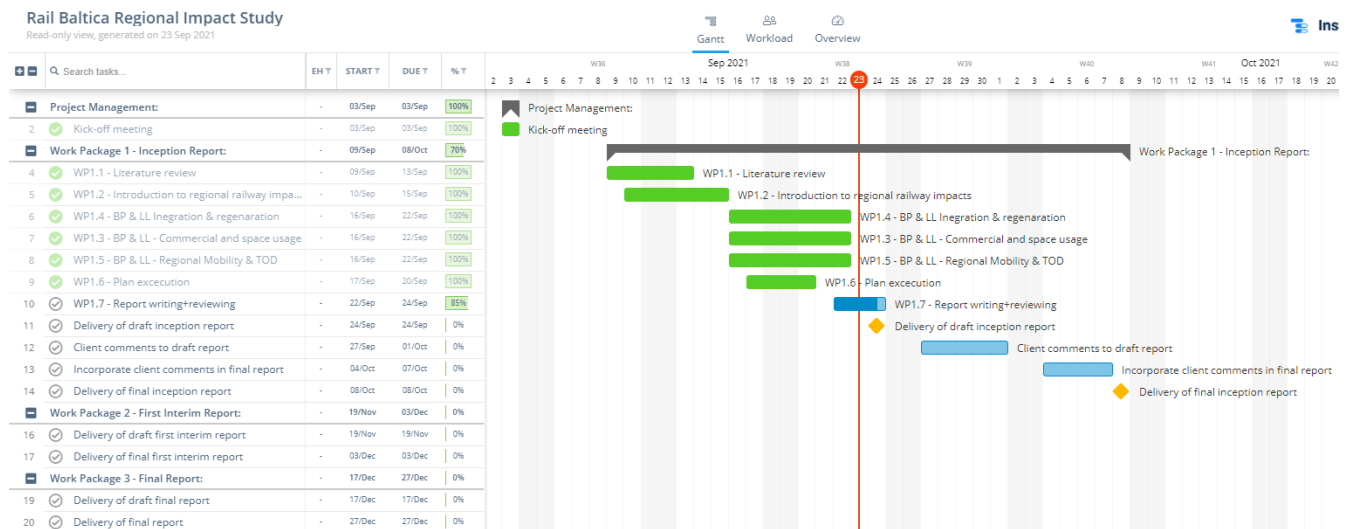
Project deliverables content will be supported by graphics and visual examples, which will be mix of Consultant work and online available materials. Following the ToR scope, the Consultant will not develop diagrams or images which will require complicated architectural tools and will be, as well as budget consuming.

As per ToR the Client has two weeks to provide comments on submitted by the Consultant team draft reports. In order to meet deadlines, the Consultant suggests do not extend this period. If any urgent changes in the implementation of the project are required by the Client, this should be directly discussed with the Consultant team and an agreement should be reached on both sides.

The project has such important milestones, as:

- Conclusions on main impacts of regional socio- economic development on regional railway stations;

- Summary of Benchmarking and identified lessons learned from global best practice, with a strong focus on the Consultant home- based countries;

- Two Stakeholders' workshops;

- Critical analysis of existing regional mobility plans in the Baltic countries;

- Recommendations on improvement, update of RB regional stations;

Moreover, the Consultant team ensures that the project deliverables will be fully compliant with respective EU and national legislations. The study will also elaborate and will be in a line with all findings and station types defined in the RB Architecture and Landscape Guidelines (ALG) for each benchmarking railway regional stations.

4.2 Progress Reporting and Client Communication

The project does not assign any specific dates or requirements for delivering progress reports. However, the Consultant team sees it quite important to keep the Client updated on the project status, therefore a monthly call for discussing upcoming issues or informing the Client about stakeholders' cooperation might be organised. Such calls will be only held by very limited numbers of participants (in general 2-3 project representatives). The main communication tool between both parties will be MS Microsoft Teams.

4.3 Quality of the Project Deliverables

To ensure a good execution of the project, the Consultant has allocated clear responsibilities for the Project Manager (Ramiro Alberto Rios Flores) as follows:

- Ensuring that the agreed success criteria are followed up upon by the project team;

- Ensuring that proposed (human) resources and capacities are available;

- Organizing project progress updates with the Client;

- Quality control for project deliverables;

- Host bi-monthly meeting with the project team based on the following agenda:

- Project implementation status;

- Upcoming scope of work and key deliverables;

- Work break-down, time schedule and critical milestones;

- Risks and opportunities;

- Governance, organization, resources, roles and responsibilities;

- Project finances – budget, payment schedule and cash flow;

- Interfaces;

- Performance monitoring, project KPI's and reporting;

- Change request and early warning procedures;

- Recap meeting decisions and actions.

The standard Ramboll Quality Assurance Procedures shall be followed within the assignment, and these include the use of:

- A Project Execution Plan (WP);

- A Quality Activity Plan;

- A Project Internal Website;

- Pre-defined templates to produce different report types:

- Project reports – including Deliverables and Progress Reports;

- Minutes of meetings;

- Lists of participants in meetings.

- Stakeholder mapping, engagement and communication plan;

- Team responsibility matrix;

4.4 Stakeholder engagement-workshops organization and management

During the project implementation at the interim stage it is planned to organize and hold two stakeholders' workshops by the Consultant team. The Consultant believes that participation of key stakeholders is of most importance, especially in delivering WP 2. The goal of the stakeholder's engagement is to facilitate and create an atmosphere of understanding the project activities which require involvement of project-affected parties in a timely manner, and that these groups are provided sufficient opportunity to voice their opinions and concerns that may influence project outcomes and decisions. Stakeholder engagement will help to obtain an efficient project outcome considering local needs and decision- making principals.

We believe that involving stakeholders in the project we will achieve:

FIGURE 62: PROPOSED FRAMEWORK TO SET A STAKEHOLDER COOPERATION (SOURCE:AUTHOR)

- Improved quality of the project outcomes;

- Early identification of potential issues that could disrupt the project;

- Keep up to date with all relevant and parallel ongoing programs which might have a direct impact on the RB regional railway stations;

- Stakeholder reaction and keep all parties' up to date;

- Increase the interests of all stakeholders, who may be affected by the project;

Nevertheless, it is understood that the stakeholder engagement and management will be covered by the Client, and the Consultant agrees to provide a support in this matter, and fully organize (against online technical settings, content and agenda) and hold workshops. The proposed framework for stakeholder cooperation is illustrated in Figure 5.

5. Team and project communication

5.1. Project Team Introduction

Ramboll has organized a holistic team of global and local experts to deliver the desired results. The project team led by Ramboll's multi-disciplinary PMs, includes the right prowess of planning, railway operations, commercial developers, mobility expertise, economic and real estate analysts who understand the challenges and needs of complex regional railway station facilities. The team is presented by:

LEADING CONSULTANT:

A global engineering, architecture and consultancy company founded in Denmark in 1945. Our 16,000 experts create sustainable solutions across Buildings; Transport; Water; Environment & Health; Architecture, Landscape & Urbanism; Energy and Management Consulting. Across the world, Ramboll combines local experience with a global knowledgebase to support sustainable cities and societies. Ramboll is a global leader with an unmatched track record delivering award-winning projects that realize the very best from integrated land-use and mobility infrastructure. Some of our latest successes include dramatic improvements to major railway stations in Copenhagen, Denmark; Helsinki, Finland; and Oslo, Norway; as well as several international, high speed rail stations in several Asian countries including Singapore. The experience includes continuing collaboration with the RB, such as the CCS Study Ramboll delivered in 2020, Reaalprojekt – Independent third-party review for Rail Baltica (2020), Strategic transport nodes in the Baltic region, Muuga Operational Plan Study, as well as ongoing study of Riga Node operational Study (2021) and Maximalization of GVA for the RB Stations (2021) and Compilation of the basic design conditions, layouts for Muuga rolling stock maintenance depot (2021).

SUBCONSULTANTS:
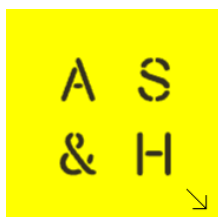
Soini & Horto Architects - will be responsible for benchmarking the best practices in utilization of commercial opportunities and functional space usage together with Realidea. Architects Soini & Horto Ltd is one of the leading Finnish architectural companies, established in 2007, and located in Helsinki. Soini & Horto includes 80 talented architects, interior architects, landscape architects, and other designers. The company has built a reputation as a designer of complicated, mixed-use, and historical building re-use projects. Soini& Horto is focused on creating value for its customers by designing buildings' maximum commercial potential and impressive architecture. Examples include one of the largest mixed-use projects

(railway station, shopping center) at the Nordic sides (Tripla in Helsinki), and the conversion of a section of the Helsinki Central Railway Station into a luxurious hotel use.

Realidea Ltd. will be responsible for benchmarking the best practices in utilization of commercial opportunities and functional space usage. Realidea is an independent Finnish real estate consultant company owned by experienced professionals and established in 2018. Our Realidea' s experienced and enthusiastic team is specialized in the comprehensive development of real estate projects and concepts and in leasing and shopping center management. Its services cover the entire value chain, from project development to planning, including end-user acquisition, and promoting the owners' interests. Realidea staff offer solid experience and proven success in development, analysis, and leasing projects across Finland, including several railway stations projects, international and domestic, relevant to the Rail Baltica project. The structure of each of Consultant involvement and their workload for delivering WPs is illustrated in Figure 6.
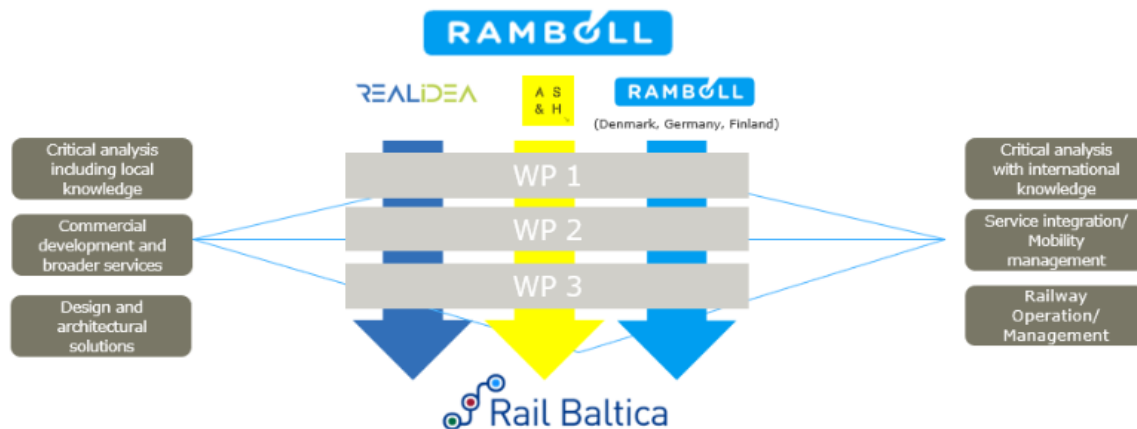

FIGURE 63: VISUALIZATION AND STRUCTURE OF THE FIRMS THAT CONFORM THE CONSULTING TEAM

The project team is presented by the key specialists and technical background staff with similar knowledge of each respected project field: commercial and real estate development at a railway station, environmental and urban integration, mobility development and improvement of railway operation and connections.

Our team has a strong knowledge and experience working with the Rail Baltica. Some of experts were working with the Rail Baltica within several assignments, and they have a strong understanding of Rail Baltica requirements, as well as network and station improvements needs.

Within this project, Ramboll will manage overall project and its operations with a support from the sub-consultant team on delivery of the WP 1 and WP 2. Meanwhile administrative, as well as coordination measures will be undertaken also by the Ramboll PM and backstopping staff. The key project team is presented blow:
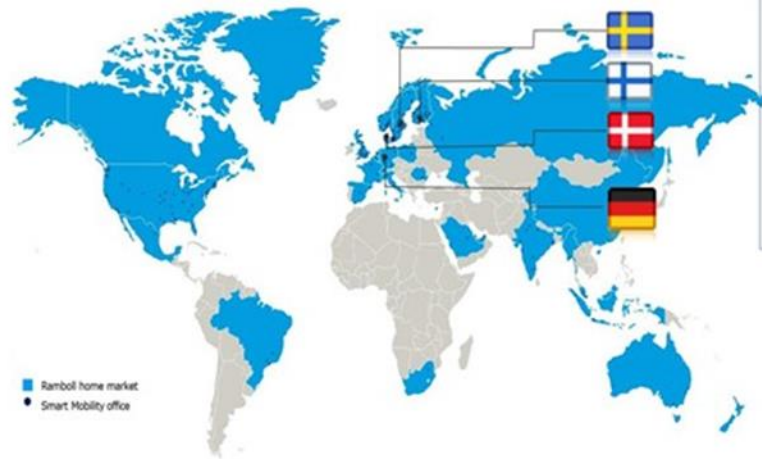
5.2. Project Data Management and Collaborative Tools

SharePoint:

The Consultant has set up a Ramboll SharePoint (Microsoft One Drive) website for the project. All communication within the team and internal processes, such as storage of collected/received project data related to the production of the project deliverables will be uploaded in this website. This process guarantees a truly collaborative environment and maximizes productivity and quality of the deliverables. An overview of the project's SharePoint environment is shown in Figure 7.
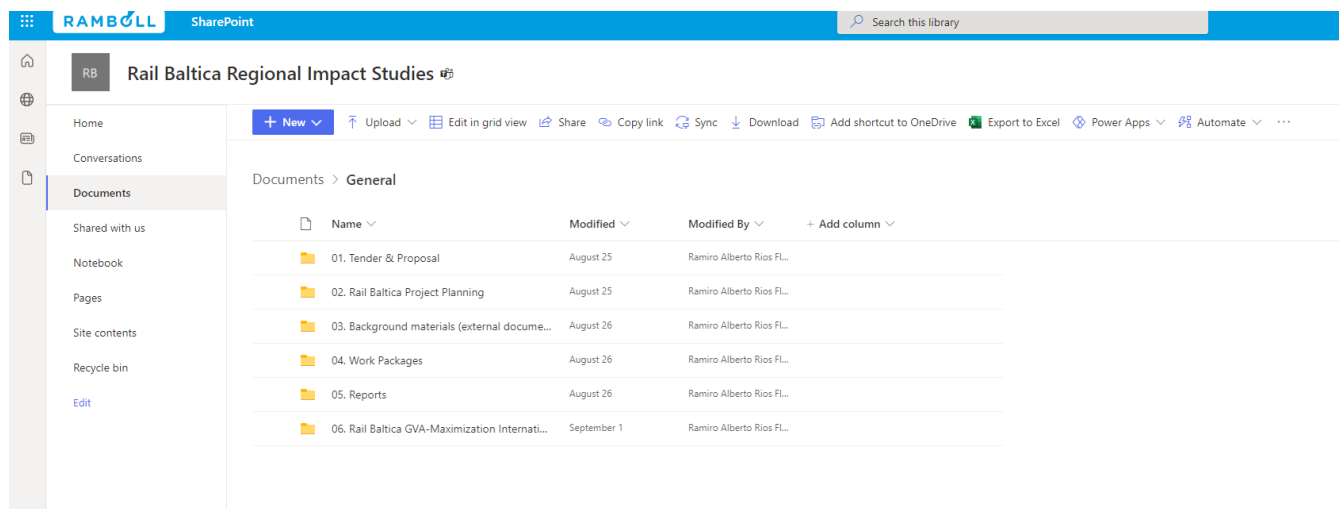
FIGURE 64: PROJECT ONLINE WORKSITE

Share of documents with the Rail Baltica Team:

In order to give a full access to the ongoing progress of the project the Consultant will be giving the RB team access to the SharePoint, in order to improve data collection and feedback for the deliverables. In case of any issues, as an alternative option could be proposed- Microsoft one drive, we will sort out an alternative to enable the client to enable data to be accessed. The SharePoint solution will be available at least for the duration of the project and during successive. All data will be hosted on the server owned and administered by the Contractor. This approach speeds up project work und provides the following advantages:

o   one or more separated team folders for exchange with Client, technical working group and other stakeholder as required;

o   separate internal team folders for internal data exchange ensure that all members of the project team have access to required data regardless of their location (e. g. Germany, Denmark, Latvia);

- o high level of data security and availability (servers are constantly monitored, daily backup is ensured, dedicated administrators and quick support);

- o possibility of collaborative work on reports to speed up project execution, if necessary, involvement of the Client (comment, review);

During inception phase it is ensured that the necessary team members can access the SharePoint to provide data and to follow project documentation (reports, MoM and presentations of stakeholder and WG meetings). Supporting communication between the Client and the Contractor is ensured by telephone and e-mail.

6. Assumptions and Risks Management

To ensure a smooth implementation of the project, the Consultant verified possible risks and proposed mitigation measures. Below is a compiled list of the main and necessary project assumptions as identified by the Consultant in the offer and comments made based on the initial findings.

Project Data

Risks:

- Missing data for a current stations, their locations and development plans of the RB regional railway stations;

- Issues in obtaining required data from relevant stakeholders;

Mitigations:

- Close monitoring on the missing data with the RB;

- Clear communication with the RB team in order to identify relevant responsible bodies to obtain requested data;

- A strong support from the RB team to engage stakeholder and push relevant organizations to provide requested data;

On-Site Visits and Holding Stakeholder Meetings

Risks:

- Due to the COVID-19 situation it will be difficult to organize side- visits of our team and travel to the project country;

- Time- difficulties in order to identify and meet the right stakeholders, visit all regional railway stations and obtain relevant information from the stakeholders;

Mitigations:

- In order to provide a realistic existing situation of the regional railway stations, the Consultant will identify possible periods to travel to the Baltic State, by regularly checking country allowance and rules.

All possibilities will be directly discussed with the RB Health and Safety manager to learn if it is possible to travel, as well as meet at this period of time the Client and relevant stakeholders;

- Before the Consultant team flies to the project counties, a clear agenda and working plan will be provided to the RB team for their review and confirmation;

- A clear priority plan for visiting regional railway stations should be provided by the RB team;

- Moreover, the Consultant will keep updated the RB against upcoming issues which need to be discussed at an early stage;

Project Execution

Risks:

- Project deliverables delays due to longer time for obtaining data, any changes in WP methodologies, requested by the Client and delays for obtaining Client comments on submitted reports;

Mitigations:

- Follow the project working plan, as well as timing identified by the ToR for submitting Consultant reports and obtaining Client comments. Any delays should be immediately discussed with the RB Team and mitigation measures to be taken;

- The data management and data review will be done by the Consultant on a daily basis. Any issues, or missing data, as well as its impossibility to obtain the materials, should be immediately informed the RB Team, and mitigation measures to be discussed by the Consultant and the Client;

- Data analysis will be done in parallel to data collection;

Expectations and Project Deliverables

Risks:

- High expectations from the Client;

- Additional requests by the Client to provide deliverables, which are not assigned within the project scope of work;

Mitigations:

- Alignment of expectations- at the start of each task there will be a need to match the expectations concerning content and level of detail according to the allocated financial resources for the tasks as well as the quality of available data – or put in a slightly different way to develop an operational baseline that can be used for monitoring the impact of the work to be done". This step should always be directly discussed and agreed with the Client;

- Any additional requests from the Client to be agreed with the Consultant team (against timing, budget and level of details to be delivered);

Rail Baltica
Regional Impact Studies

Interim Report

11.03.2022

Contents

List of figures

List of tables

List of abbreviations

Abbreviation	Explanation
B+R	Bike and Ride
CBD	Central Business District
EU	European Union
EV	Electric Vehicles
GDP	Gross Domestic Product
ITS	Intelligent Transport Systems
KPI	Key Performance Indicators
K+R	Kiss and Ride
LEV	Light Electric Vehicle
LVC	Land Value Capture
OECD	Organization for Economic Co-operation and Development
PHEV	Plug-in hybrid for electric vehicles
PM	Project Manager
PMD	Person Medium Day
PPP	Private Public Partnership
PRM	Passengers with Reduced Mobility
PT	Public transport
P+R	Park and Ride
RB	Rail Baltica
TOB	Think Outside of the Box
TOD	Transit-Oriented Development
WP	Work package

1. Introduction

1.1 Purpose of the first interim report

The objective of the first interim report is to develop a critical assessment of the existing regional mobility plans, official development documents around the selected Rail Baltica regional railway stations and services[1] (selected examples), as well as investigate the regional socio- economic impacts on regional development potentially resulting from regional station and project implementation.

Selected by Ramboll and Rail Baltica examples of regional railway stations are used to identify potential developments of all regional stations along the RB corridor by their types (based on the Rail Baltica Guidelines) including their roles and services, which could support elaboration of the Rail Baltica international rail corridor, as well as integration (synergy) with cross-border regional connections and regional mobility systems, freight and industrial developments outside the corridor. As part of this work, additional attention was paid to potential developments of the labor market and population growth in the studied regions.

The content of this report includes:

- The assessment of the broader socio-economic impact of Rail Baltica regional stations, stops and mobility services, with respect to regional cohesion, improved competitiveness of companies operating in the region, digital connectivity, population relocation, firms clustering.

- The integration of RB regional stations, stops, mobility services with the local/ regional mobility.

- A summary of recommendations for Rail Baltica regional stations based on assessment of examples and their outcomes; At the end of the chapter 2 the consultant presented high- level recommendations applied to the entire corridor and the RB station types.

1.2 Selected Rail Baltica regional railway stations

The Rail Baltica is currently planning the development of 47 regional railway stations[2] along the railway corridor. The consultant, with the guidance from the Client, has selected regional stations as examples to **(i) investigate the potential regional benefits** obtained by the development of the railway and **(ii) provide recommendations** based on international best practices, incorporating the Rail Baltica station typologies and identified regional characteristics. The analysis considers each station location, regional and local developments (including freight and industrial development), current land uses and population projections. The final results of this work were used to develop recommendations for the RB rail corridor, including benefits and potential beyond the corridor.

As part of this report, nine Rail Baltica examples of regional railway stations were selected and studied in detail:

STATION NAME	STATION CHARACTERISTICS	REGIONAL CHARACTERISTICS
Assaku	New/greenfield	Large metropolitan area
Rapla	New/greenfield	Rural area
Tootsi	Existing or new/greenfield	Small urban town

---

[1] Based on the online available data, and data delivered by the Rail Baltica and relevant stakeholders
[2] The final number of stations is currently under discussion. These may be subject to change.

STATION NAME	STATION CHARACTERISTICS	REGIONAL CHARACTERISTICS
Skulte	New/greenfield	Rural area
Zasulauks	New in industrial area	Large metropolitan area
Bauska	New/greenfield	Rural area
Kaišiadorys	Existing or new/greenfield	Small rural town
Marijampole	Existing or new/greenfield	Large rural town
Joniškėlis	New/greenfield	Small rural town

TABLE 1 – SELECTED EXAMPLES FOR DETAILED ANALYSIS

The Figure 1 below illustrates the location of each of these selected regional railway stations in their corresponding geographical areas:
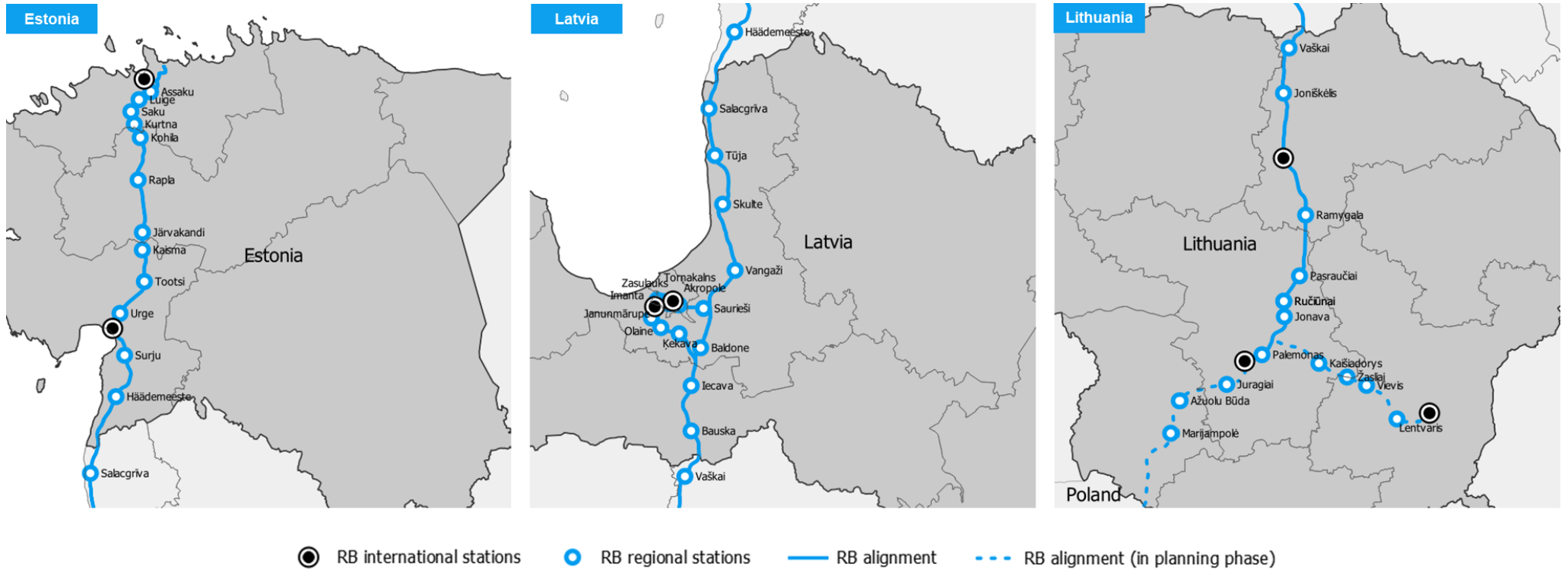
FIGURE 1 RAIL BALTICA REGIONAL RAILWAY STATION TO BE ANALYSED UNDER THIS STUDY

1.3 Methodology for developing a critical analysis of regional impacts stemming from Rail Baltica regional stations and services

In order to deliver the content for this interim report, the consultant used an approach based on combining the assessment of the existing regional development documents and mobility plans with the consultant appraisal of the regional characteristics and railway station area with attached services. To prepare the analysis the consultant relied on a countrywide information (international IFI reports, projections, etc.), where required regional data was not available to the team. Additionally, statistical EU data and official Rail Baltica maps were considered, especially:

- ESPON statistical database for the Baltic countries (Eurostat);
- GIS Map, Rail Baltica (network alignment, population and employment statistics);
- OECD Library for the Baltic States;
- Statistical data from Ugeo Urbistat[3];
- Estonian, Latvian and Lithuanian Statistic data.

To deliver a detailed assessment, identify their impact on the railway stations services, as well as to analyse existing and required mobility and connections at the station, the analysis is divided in two sub-work packages assigning important elements being covered within this framework:
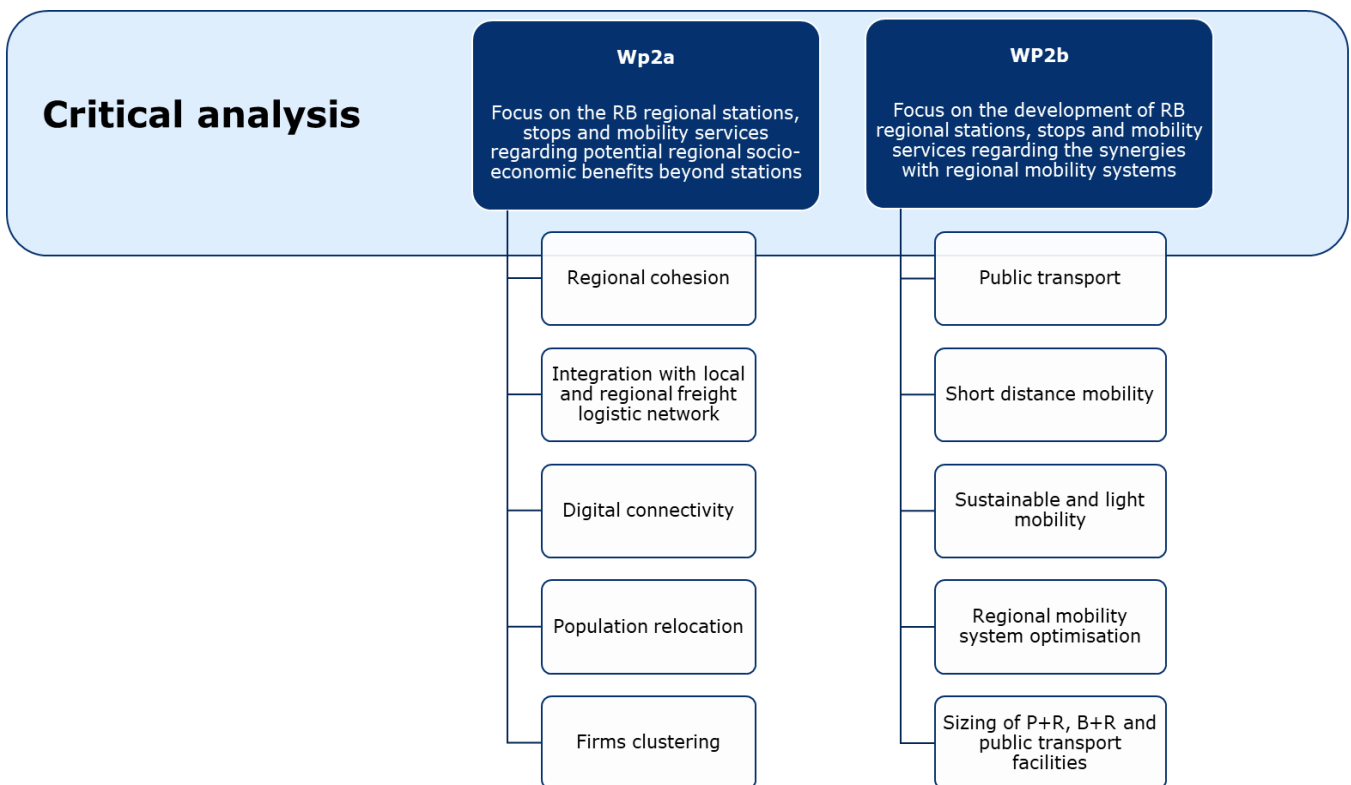
FIGURE 2 STRUCTURAL OVERVIEW OF THE CRITICAL ANALYSIS ELEMENTS (SOURCE: AUTHOR)

Moreover, based on the analysis, the proposed recommendations are connected to forecasted regional changes in population and economic activity. Based on international practice, the consultant utilized assumptions that good, accessible, and quality railway connections could directly impact on population relocation toward small cities and rural areas and therefore promote their population growth. Based on

---

3 https://ugeo.urbistat.com/AdminStat/en/ee/demografia/dati-sintesi/rae-rural-municipality/23278561/4

international experience, new railway infrastructure and services will connect regional small-and-medium-sized cities with larger, economically important urban agglomerations by fast and convenient railway commuter services offering faster travel times, simplified border crossing procedures, and improvements in trade between Baltic States. Such organisation could offer residents access to better working opportunities via railway transport for daily commutes and other travel purposes for over 200 km.

Under the first element of this study, the consultant also identified the potential economic impact from each station into the whole Rail Baltica corridor. The team assigned impact from existing connectivity (200 km from economically important cities) and from interconnected areas with existing network and transport network (infrastructure) to be developed. In the next section, the consultant provides a detailed explanation of the approach to deliver each of the analysed elements.

Regional Cohesion

Regional cohesion, as defined in the European Union Cohesion Policy, refers to "reducing disparities between the various regions" within the European Union. Such disparities do not only refer to economic integration and cohesion, but also to social and intra-personal and territorial cohesion. The economic theory behind promoting and achieving regional cohesion is that trade, or movement of goods, people, capital, technology, and information, will result in regional economies experiencing a tendency towards social and economic convergence.

Regional cohesion in the Baltic context achieved through removing barriers in terms of movement of goods and people through the Baltic States and increasing the physical and trade integration to other European Union Member States – will promote economic and social convergence, in the medium-and-long run. Furthermore, such cohesion will increase the competitiveness of the regional markets, which in turn promotes economic and social development. In this context, the analysis of regional cohesion has been limited to analysing the potential opportunities that Rail Baltica regional services to promote such removal of barriers for social and economic cohesion.

Integration with Local/ Regional Freight Logistics Network

The analysis of this element within the framework of regional and mobility services developments beyond the railway station is directed to deliver a detailed overview of the existing small industrial (where relevant) and logistic (small private with an urban context) services, as well as existing logistic networks which could be potentially connected or directly attached to the listed Rail Baltica railway stations. The outcomes of this analysed element clearly describe and economic impact not only on single station locations, but also on the whole Rail Baltica railway passenger corridor. To structure the approach of the critical review of the existing logistic networks, relevant developments within the region and finding their possible integrations, the consultant developed a set of reference questions while collecting and analysing available data for each of the selected station regions:

- What are the existing logistic and industrial zones next to the Rail Baltica stations?
- What type of industries exist in the region? Possible connection with railway services.
- Are there any potential logistic services organised by small companies? Are there relevant logistic centers or warehouses around regional railway stations?
- Are there any local public facilities around the Rail Baltica station?
- What kind of transport modes are used to build a logistic network and serve distributions?
- How many working places exist in the region, and in which sectors? The focus is to understand if any potential attractiveness could be developed especially for small private logistics companies.
- How is the station area already developed and what are the land characteristics? Is there any close shopping areas? Having this information, the consultant could understand if there is any potential to create an attractive environment for urban logistic services at or around the railway station.

- What is the current interactivity with a railway station? Is there any possibility to assign last- mile connections? What is the walking distance to a railway station? Under interactivity, the consultant reviewed the existing (potential) transport network and connections.

- Are there any local private companies (small family businesses) who distribute their products to small village markets within the region? This information helps the consultant to understand if such existing services could be allocated or attached at a railway station creating therefore a special shopping and a social interaction place for residents.

Digital Connectivity

Digital connectivity from a rail infrastructure perspective not only means the on-board connectivity services that Rail Baltica Rail services will provide, but also the technological installations needed for rail operations and beyond, as illustrated by the list below.

DIGITAL TOOLS & IMPORTANT COMPONENTS WHICH COULD BE CONSIDERED FOR DEVELOPING RB RAILWAY CORRIDOR AND REGIONAL STATIONS

RAILWAY COMPONENTS
- o Installation for 4G-5G connectivity for trains and railway station/facilities;
- o Railway territory ducts containing all electrical and data components;

DIGITAL INFRASTRUCTURE
- o Pipes, ducts, masts/poles7radio towers for existing or future telecom providers (optical fibre and other);
- o Last mile fibre network installation at selected or all regional stations
- o Fibre and other telecom installation for future office and housing land uses in selected areas or supported by assets in the railway corridor;
- o Equipment installation (on ducts, poles and wayside locations)

BULDINGS AND LAND SERVICES (MONITORING)
- o Service, safe crossings, rail track connections;
- o Powerlines , gas installation and other infrastructure for future developments;

OTHER INFRASTRUCTURE
- o Digital monitoring of waste, water and other public infrastructure
- o Digitalisation of mobility services using modern IT technology and booking solutions;
- o Managing & Maintenance of electric vehicle charging infrastructure at stations;
- ♣ Digital facility management;

For digital connectivity, it is known that a successful railway operation requires good internet connections for the railway passengers to enable working conditions during their journeys. We analysed the potential players that might have a role in the digital connectivity. Some of this infrastructure could be extended to local communities around the regional stations. Freight operation could also utilize robust connections for different possibilities. These will be discovered in the analysis and include, for example, online tracking for deliveries.

Population Relocation

The focus is to identify, at a regional level (in some cases, the country level), population indicators, growth, and the possibility for future relocation around the selected stations. Relocation of population may be the result of several influencing factors, most strongly connected to:

- Urban economic and social development;
- Job availability, as well as attractive wages in the region;
- Access to education and job-searching activities;
- Housing and affordable housing availability and land use availability;

- Medical and healthcare services; and,
- Transportation and infrastructure availability (micro level).

Under this topic, the consultant analysed existing studies and statistical indicators on population growth, migration, well-being indicators within the region, as well as forecasts of possible people relocation within project countries. The consultant also analysed the factors key to making suburban or rural places attractive for living which might reduce population relocation to capital regions, or even attract people from capital regions.

Firms Clustering

Business or firm clusters are usually strongly connected with a geographic concentration of interconnected businesses and suppliers related to a particular field of production or provision of services but also to labour availability. Cluster types are influenced by urban/rural agglomerations, their commercial establishments, existing infrastructure, such as transportation networks and facilities, as well as historical services or production developments. One of the strongest elements for developing or promoting clusters is national or regional regulation. National or sub-national governments can use legal and regulatory frameworks for making places attractive for certain industry, usually based on competitive or comparative advantages. Establishing such a regional analysis might help to identify a possible role for regional railway stations and services, and their operational needs.

While developing the critical analysis of the existing regional firm clusters, the consultant considered the following cluster types:

- Industrial and manufactural (Industries providing the factors of production for the cluster industries and serving the local market);
- Financial and banking;
- Retail clusters, including specific shopping offers and even allocations of specific districts; and Culture, outdoor activities, and tourism;

The data were collected from open online resources, information on companies being registered and established in the region, as well as railway station districts.

Public Transport and Related Facilities

Transport connections to and from railway stations is one of the most critical elements making a railway service attractive and integration of these services could positively improve the travel experience. Moreover, following best practise, existing public transportation systems very often serve low- density areas. Railway stations within a regional context are usually located in proximity of small cities or towns, and these stations are often characterized by longer walking distances, wider residential-commercial distances, and dependency on the reliability of local urban public transport services. A broad public transport service network serving a regional railway station, including its frequency and accessibility, makes a railway station more functional and successful. A successful regional railway station offers adequate multimodal integration with public transport, primarily bus services (regional and suburban), and quick physical connectivity from the railway platform to the bus station. Moreover, following the latest trends in European countries, public transport operational gaps can be covered by on- demand services. Under the critical analysis of the public transport services available in the Rail Baltica regional stops areas, the consultant team reviewed the existing situation (using Google Maps, GIS maps, and open online information provided by municipalities' regional public transport networks), analysing transport facilities, connected networks, and service integration.

Short Distance Mobility

Suburban and rural transit users need transport options to complete the first and last miles of their trips. For this reason, it is vital to plan infrastructure and facilities to serve cyclists and pedestrians and provide them a safe, direct routes access to a railway station.

The recommendations provided for each station were based on retrofitting streets around and close to the stations, to reduce vehicle speeds, and to create more space for people. Based on international experience,

the entrance to railway stations should always be a welcoming environment: minimal steps from ground level, well illuminated including clear wayfinding and relevant infrastructure for people with reduced mobility and visitors in a wheelchair as well as with trolleys, comfortable seating or meeting points in and at a regional railway station building.

Sidewalks and other connections are a vital component in the holistic planning of station areas. This provides a better opportunity to utilize well-located areas close to the stations, which are not necessarily covered by the previous station proximity zones. It is primarily recommended to extend the walking area away from the station within a radius of 600 meters. People's willingness to walk decreases significantly after 600 meters. For cycling, the reference radius is 5 km. Nevertheless, both pedestrian and bicycle paths could be extended to connect nearby towns and villages, in a sustainable local mobility as well as (tourism) recreational activity perspective. Despite that, walking and cycling are most commonly referred to as short distance mobility, along with other modes including skateboarding, scooters, micromobility, and mopeds. As research shows, an increase in their usage and the potential to reduce door-to-door service, the latter are also considered in this study.

It is important to note that, although the guidance given in the recommendations section allude to station-specific measures, these have shown to provide benefits that go well beyond the station area and could potentially be determinant in attracting people and businesses to the region.

Sustainable New Mobility Services

A review of new mobility services was conducted focusing on the potential for short distance mobility. The better the infrastructure is for the use of active modes, the better is the potential to increase different uses of new mobilities services. These can be multiple shared services, free-floating, or station based. Bike-sharing systems are increasingly common – now present in well over 1,000 cities worldwide – and can help make cycling more attractive. These schemes allow users to rent bikes for a short time period at a small cost. It can also be on-demand service such as Uber, or Ola, giving users the option to pre-book rides in case there is an unforeseen occurrence. Moving from an ownership-based to a service-based model can be more convenient for users and removes some drawbacks of bike ownership, such as maintenance costs and risk of theft, particularly for journeys that extend beyond commonly travelled areas. It can also be easily combined with other modes of transport within the Mobility-as-a-Service (MaaS) model. Since new mobility services and MaaS do not necessarily require changes to the station area, most stations in this analysis have the potential to use these new services with minimal physical arrangements. Therefore, it is more the quantity in the supply of the various new services that is assessed in the review of each station.

Regional Mobility System Optimization

A review of regional mobility system optimization was also conducted station by station. This exercise was performed based on existing maps and plans available at the time of the assignment. In the context of the existing greenfield conditions, as well as knowledge of any future adjacent development plans, the subject stations were surveyed to identify potential for integration with the local mobility network.

Specifically, interconnectivity with respect to roadways, other public transport services, and walking and bicycle infrastructure were included in the exercise. For sites located in rural areas, emphasis on connectivity to adjacent roadways and to nearby villages and towns was considered. Where the cases studies were located in a more urban context, consideration about how these sites could support a more redundant and complementary transport network, including the potential for new stations to ease the pressure on the main railway stations, was taken into consideration.

Bike Parking and Passenger Drop-off facilities

Cars in rural areas are still one of the main transportation modes being used by residents and car parking is fundamental in the end-to-end journey by rail. It is extremely important to allocate an optimal-sized parking lot at regional railway stations, which could consider the following principals:

- Customer priorities (offer efficient transfer to railway, time-efficient payment methods such as monthly permits, options for reserving parking, etc.);

- Allocation at car parking ancillary facilities such as mail-order parcel lockers or grocery collection for customers on their journey home;
- Developing a strong bike parking facilities (for example parking houses);
- Parking facilities should offer electric bikes, e-scooters and car charging services (it will depend on a station type and a demand);

A station car park[4] should reflect the quality of the station it is part of, and the train services it connects with. It is important to prioritise and encourage the use of sustainable modes to reach stations, but the railway still needs to cater to customers who use the car – especially if this avoids a longer car trip.

Future bicycle parking spaces (B+R) at RB regional railway stations should offer a high level of accessibility to the area and the building itself:

- Bicycle parking spaces could be accessible from the public traffic area at ground level, via ramps or external stairs with ramps.
- Spaces should have a minimum unimpeded travel width of 1.00 m;
- If elevators are available, the access via an elevator should be possible provided that the elevator has a minimum size of 1.40 mx 2.40 m.;
- Bike parking slots shall be allocated as close as possible to the main entrance and accesses to the platforms;
- Railway stations must have clear wayfinding for bicycle users;
- Access to the platform shall be designed to be comfortable to take the bike to the train;

Locations for future B+R need to include concepts and space for identified bicycle parking facilities (Minimum 20 units and according to forecast passengers to Type I), especially at the access points for local rail passenger transport. Optimal B + R parking spaces could be covered and have a bracket type with the option of connecting the bicycle frame and are conveniently located for access to the train station.

The Rail Baltica ALG proposes to organise B+R close to the entrance of a regional railway station without describing details. Based on the international experience[5] possible bicycle ways to a railway station entrance should be short:

- a maximum of 20m for uncovered systems;
- a maximum of 50m for covered systems;
- a maximum of 100m for roofed systems and with secured access.

1.4 Collected and analysed data, development documents and plans in the Baltic States

The consultant team prepared the analysis based on relevant information, including: county-wide spatial national plans, country strategic development, comprehensive local development plans. Where information was not available (mainly for regional cohesion, digital connectivity) the consultant team developed a critical analysis at the country level and developed recommendations considering regional railway station types.

The list of the documentation used for the critical analysis of the selected examples of the RB regional railway stations is summarised below:

---

[4] International examples of P+R are presented in the Annex 2
[5] International benchmarking examples are presented in the Annex 1

SELECTED AND AVAILABLE DOCUMENTS, PLANS, AND REPORTS FOR CRITICAL ANALYSIS

o   Rail Baltica: Architecture and Landscape Guidelines (ALG);

ALG, Rail Baltica Urban Elements, D1 Landscape (D)

ALG, Rail Baltica Network Elements (F)

ALG Station elements (B)

o   Rail Baltica: Preparation of the Operational Plan;

o   The Comprehensive Plan of the Territory of the Republic of Lithuania;

o   Latvia: BTI 2020 Country Report;

o   Riga 2030, Sustainable Development Strategy of Riga, 2030

o   Riga Development programme 2014- 2020;

o   National development plan of Latvia for 2021- 2027;

o   Riga metropolitan area mobility spatial vision (Final report);

o   Territory of Rail Baltica local planning;

o   National spatial plan Estonia 2030+;

o   Estonian Real Estate Review, August 2021;

o   Economic and social situation in the Baltic States: Estonia

o   Harju county-wide spatial plan 2030+;

o   Comprehensive plan of Rae municipality;

o   Rapla county-wide spatial plan 2030+;

o   Tallinn city statistical data and yearbooks;

o   Statistikaameti rahvastikuprognoos aastani 2080 (Statistics Estonia's population projection 2080);

o   Bauska County Development Program 2012-2018;

o   Bauska strategy sustainable development;

o   Rail Baltica Design Guidelines;

o   Rail Baltica Detailed Technical Design scope documentation;

o   Rail Baltica technical note on regional station sizing and type choice: Estonia, Latvia & Lithuania

o   Rail Baltica Operational Plan;

o   Rail Baltica Cost -Benefit Analysis;

o   International studies, such as: UIC, European Commission, European Parliament, European Rail Agency, ITF/OECD; One Works Whitepaper – effective stations integration; Comouk Mobility hubs project.

2. Assessment of the Rail Baltica corridor and regional stations
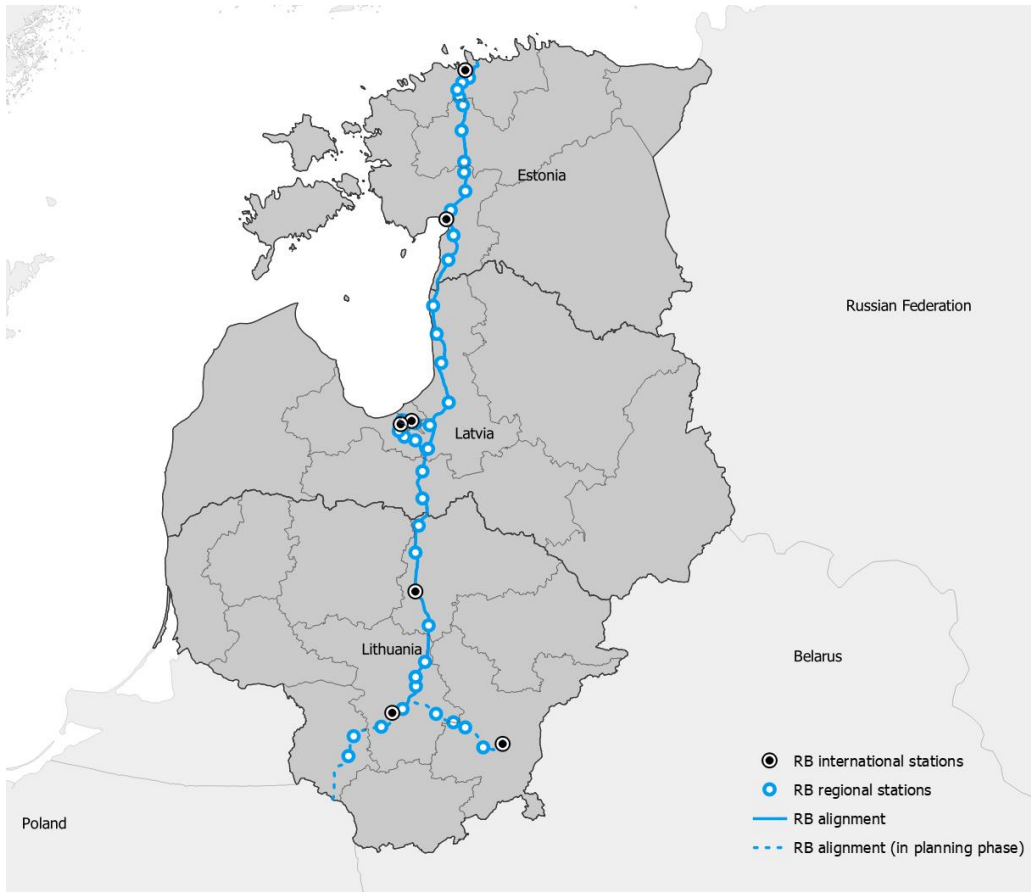
FIGURE 3: RAIL BALTICA STATIONS (SOURCE: GIS DATA, RB)

For this study, nine Rail Baltica (RB) regional station locations have been selected in agreement with the Client. Each location is analysed with respect to two main dimensions:

Broader socio-economic impacts, which focuses on identifying the potential impacts of Rail Baltica regional stations and how services may impact and affect specific regional socio-economic characteristics and the existing services, with specific focus on:

- ♣ Population relocation
- ♣ Integration with local and regional freight logistics
- ♣ Digital connectivity
- ♣ Regional cohesion
- ♣ Firms clustering

Mobility and relevant transport connections, with focuses on analysing existing public transport services, facilities located near RB regional stations, and identifying required local mobility connections, which could better integrate future railway stations into the regional context:

- ♣ Public transport and its facilities
- ♣ New mobility services
- ♣ Bike infrastructure and passenger drop off facilities
- ♣ Short distance mobility
- ♣ Regional mobility system optimization

2.1 Critical analysis of selected examples of RB regional stations

ASSAKU REGIONAL PASSENGER STATION

Assaku falls within Rae municipality, in the region of Harjumaa, Estonia. The Assaku district has an estimated population of 460 inhabitants. The regional station is situated in a rural area approximately 600 meters south-east from the town of Assaku which is the nearest urbanized area consisting of primarily low-density housing and some industrial land uses.

FIGURE 4 ASSAKU STATION AND REGIONAL SORROUNDINGS

ASSAKU REGIONAL STATION	
STATION ID	0S060
LOCATION	Greenfield
POPULATION IN 3 KM RADIUS [6]	8.200
NEAREST LARGE URBAN AREA	Tallinn- 8.5 km
NEAREST AIRPORT	Tallinn International Airport, 5km
RELEVANT ROAD CONNECTIONS	Station adjacent to Järveküla- Jüri local road and Estonian National Road 2 Tallinn-Tartu-Võru- Luhamaa which follows the alignment of European route E263

RELEVANT BENCHMARKING FOR THIS STATION TYPE[7]	- Espoon Keskus Station; - Assen Station; - Abcoude Station; - Landskrona Station;

The figure below, presents a comprehensive review of the principal land uses around Assaku Station.

TABLE 2 ASSAKU MAIN REGIONAL CHARACTERISTICS
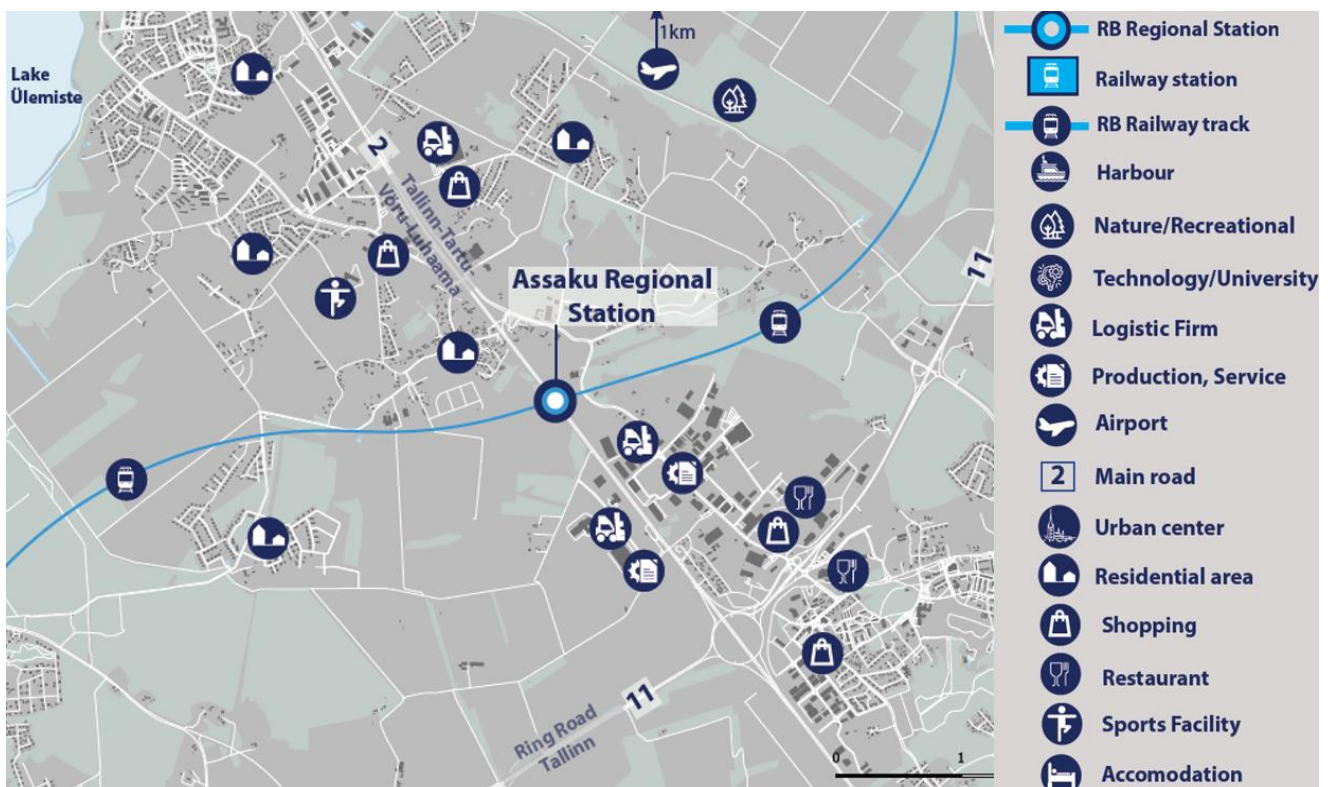
FIGURE 5 LAND USE AT ASSAKU REGIONAL RAILWAY STATION AND SURROUNDINGS (SOURCE: AUTHORS)

ECONOMIC IMPACTS AND REGIONAL COHESION

[6] Population of nearest urban area. Rail Baltica GIS data

[7] The reference of an international suitable to a station type best practise. Detailed benchmarking study is described within the inception report from 01.11.2021 Reference to a best international practise corresponds to RB regional railway station types, as well as general regional and urban characteristics. A detailed benchmarking study is described in the inception report dated 11/01/2021.

Population Relocation

The population of Rae municipality has seen average increase of approximately 1 000 inhabitants per year, and the employment opportunities are described by a job density of 1 000 to 2 200 jobs per km. The planned Assaku station is surrounded by several housing areas, which can be considered already suburb, including Assaku, Lehmja Jüri, Järveküla, Uuesalu, Peetri, Karla and Rae.

The area surrounding the planned location for Assaku regional station provides future opportunities for urban development, as currently housing and commercial density is low. High density mixed land uses around the station and surrounding areas may increase the attractiveness of the area to people studying or working in Tallinn, consolidating a suburban location with sustainable transport options.

There are also seen opportunities for scaling up investments in health, education (including university campuses), or other social service land uses to be located within the surroundings of the station, given its privileged location near Tallinn, Tallinn airport and other industrial and productivity centres.

Regional Cohesion

Harjumaa county is home to nearly half of the Estonian population and over 70 % of its inhabitants are of working age. GDP in Harjumaa has seen healthy growth in the last few decades. In terms of regional cohesion, however, it is important that development, both in terms of industry/economic activity and housing, is also focused outside of Tallinn to ensure that there is competitiveness and economic and social convergence.

Figure 6 below shows regional population and employment statistics in a radius of 1 km, 3km, and 10 km around the Assaku Regional Station. These maps show the potential for attracting both people and commercial and industrial activity from the nearby Tallinn Metropolitan Area.
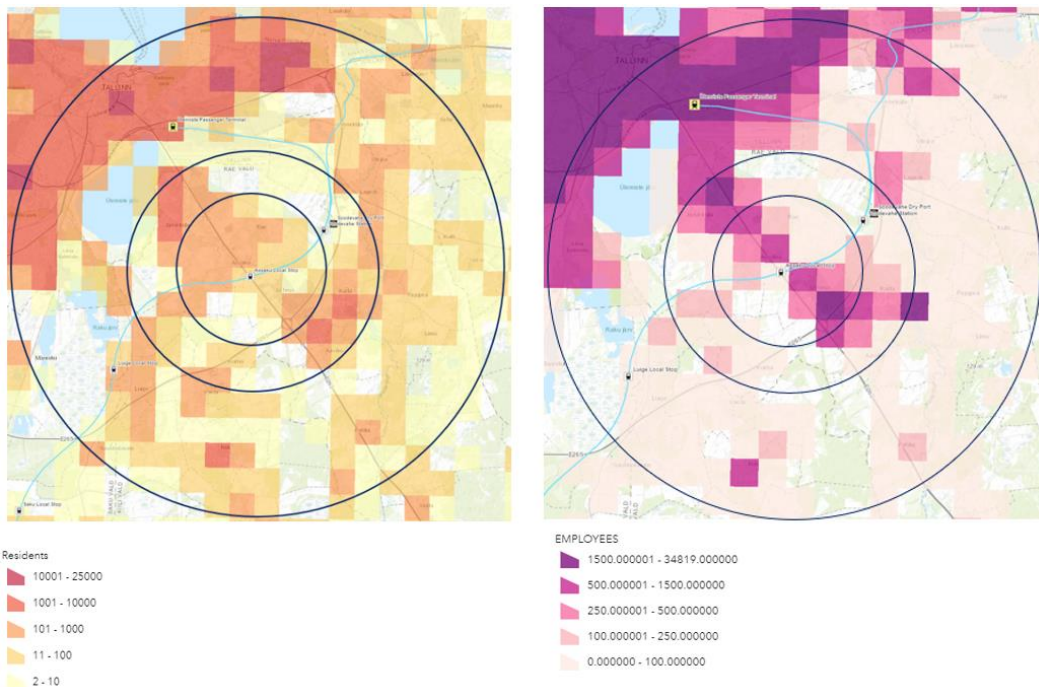
FIGURE 6 OVERVIEW OF POPULATION AND EMPLOYMENT STATISTICS IN ASSAKU (SOUCE: RB GIS)

In terms of general well- being, according to the OECD, Northern Estonia, which includes Harjumaa County, is placed in the top 20% of OECD regions for jobs, service access, education and environment. In this respect, Assaku station has a potential as a driver for regional development.

In fact, its proximity to Tallinn presents an exceptional opportunity for industrial, commercial, and housing development that could support the activities of a large city such as Tallinn. Developing these productive

land uses in proximity of Tallinn will ensure additional housing stock and commercial activity that could generate social and economic cohesion.

Integration with local and regional freight logistics network

Assaku is located in a rural/suburban area with little opportunities regarding production or agriculture. The areas to the north and south-east of the station have several logistic centres and storages, which are used for regional product distributions. Approximately one km along E263 highway (in the direction towards Tallinn) some logistic storages and other industrial sites are located:

- Baltic Sea Solution OÜ – specializing in manufacturing and international trading of fire suppression systems and wide spectrum chemical products;
- Smarten Logistics – a storage for various goods;
- SFS – big service office for washing machine repairs and their storage;

The areas around Assaku called Peldiküla and Lehmaja and it is characterised by availability of many small logistic storages, auto sell areas, and some food storages:

- BaltFreight OÜ- freight trucking facilities, delivery of dangerous goods and temperature sensitive products within 24 hours in Estonia;
- Rimi Eesti Food AS- small logistic centre for food storage;
- DPD Eesti AS –smart lockers for private users/ companies;
- Via express logistic – storages for private customers, and deliver their orders;

Depending on these companies' services and products, railway services could support distribution in the region. Moreover, Rae Municipality has ongoing construction projects to develop new logistics land uses, which will run under SEB and Omniva (national post and logistic service). The centre is planned to support Omniva to sort packages and letters more efficiently.

The logistic centre will cover 13,000 m2, with a 70,000 m2 plot allowing future expansion. These planned land uses potentially to be integrated with a railway network i.e., trains could be used for delivering packages to small villages or to Tallinn along the railway corridor.

Assaku Regional station might have a strong potential to become a valuable logistics point that could support local and regional freight activities.

Firms Clustering

The density of industry and commercial services in the Assaku region is relatively low, which shows the potential for expansion and consolidation utilizing the Rail Baltica Railway as a trigger for development.

The area surrounding the station shows a concentration of logistic companies, as well as automobile dealerships. The mainland uses clustered around the future Assaku Regional station area are:

- Food storage for regional and country wide distributions;
- Heavy containers for metal materials;
- Automobile dealers; and,
- Agricultural heavy machinery.

The potential success for firm clustering and industrial consolidation will, in part, be a result of good planning and setting up the optimal incentives to attract both firms and talent to the region. There are opportunities to set up an industrial part or similar projects around the station.

Digital Connectivity

An important network access point could be available at Assaku station to provide access to 5G connections for the nearby community and to allow cargo carriers to reliable connect to network services, as well enhance the signal along the track for deploying digital connectivity to the trains and other ITS applications.

For Assaku station, such digital connectivity could be an opportunity to implement a scalable telecommunications network in Assaku to consider the needs of freight transport for digital connections, possible housing and business development projects in the region.

MOBILITY AND RELEVANT TRANSPORT CONNECTIONS

Public Transport Facilities

The public transport network in the Rae Municipality is quite developed and connects all villages located within the municipality, including Assaku area. There is an important potential to build a municipal multimodal transport mobility network, where road transport, P+R parking, tram, bus traffic (local and regional), light traffic, etc. will meet. Hence, Assaku station could be developed as a local multimodal hub.

Despite its suburban location, the future Assaku regional station could be served by an existing number of regional bus routes, primarily running between Tallinn and Lehmja (along highway E263). There are two main bus routes (No. 120 and No. 138), with a frequency of 6-20 departures/day. There are about six public transport bus routes (R1, R7, 162, 132, 132A, R9) operated by the companies HansaBuss AS and AS GoBus serving Assaku.

Exact bus routes and frequency could be later adjusted to future railway expansion plans to create an attractive public transport network with the potential to bring the urbanized areas closer to the station. For an efficient integration of Assaku station into a local mobility network, it is recommended additionally introduce a study that could be directed to organization/reorganization of the existing (and where required – new) public transport service.

Short Distance Mobility

Given that the Assaku regional station is a greenfield station there is limited opportunities to provide a critical analysis of any planned infrastructure.

However, from a spatial analysis, it is important to consider the development of grid of streets around the station to support sustainable mobility options and increase access to different land uses. Such urban development would promote walking, biking and the use of new or alternative modes as an option for short distance mobility. The front area creates a good quality pedestrian experience with green space and illuminations, which support the convenience and optimal experience in terms of road safety. In addition, crossings and intersections around the station need to prioritize walking and biking, as well as facilitating a safe passage for pedestrians wishing to cross the railway track and Highway No. 2/ E263.

Furthermore, the future Assaku regional station is expected to be approximately 600 m from the closest urban area, which is considered suitable walking or biking distance. Adequate sidewalks need to be planned near the station with a strong focus on connecting the most high-density areas (housing and commercial) to the station. It is essential to provide adequate multi-use (bike/pedestrian) sidewalks with sufficient illumination, surface, and width that is highly functional, also under winter conditions. To increase accessibility, sidewalks could be as free of level changes as possible, with correct markings for people with impaired accessibilities. The population trend in Rae municipality shows a clear increase that should be taken into consideration in the planning for the sidewalks network.

Similarly, promoting the wide use of bicycles requires a focus on infrastructure functionality and safety. As Assaku station is located within 1 km from both Assaku and 3km from Jüri, Järveküla and Rae, there is a good opportunity to increase bicycle usage. In addition to illumination and an inviting environment, bicycle racks of high quality as well as sheltered parking options[8] are important elements at the station next to station entrance and also around the station with direct connection between the parking area and the bike lanes could be provided.

---

[8] International practise of bicycle parking size and type- Please refer to the Annex 1

Designated bike lanes along the National highway No.2/E263 would be preferable; however, the alternative of using open natural fields (not closely located to the highway) for developing bike routes could be considered. An alternative bicycle connection could be allocated along the road 330.

Sustainable New Mobility Services

Given the station location, a connection of on-demand mobility could in the future be implemented between the station and main destinations in both Assaku and Lehmja, creating a smooth door-to-door passenger journey. Along with the growing number of inhabitants in Rae municipality, the demand for new mobility services is likely to increase. Therefore, it is recommended to review these possible options to provide passengers a mix of both on- demand and scheduled connections.

Shared Light Electric Vehicles (LEVs) is a relatively new mobility service which has gained increased popularity particularly in urban areas. As Assaku station is located less than a kilometre from the nearest neighbourhood, and considering the potential urban growth around the station, the option of offering space for and promoting the use of e-scooters and e-bikes as a light mobility service could be an attractive last-mile choice for both visitors looking for a fast and affordable way to reach the town centre, but also for regular train commuters. Hand in hand with increased popularity of shared LEVs comes the trend of utilizing personal LEVs. Facilities that offer safe, affordable, and convenient accommodation of personal LEVs in direct access to the station will therefore become a key factor to promote this sustainable mode of transport.

Regional Mobility System Optimization

Assaku station is accessible via National Road 2/E263, which might make it possible to consider this station as an alternative to passengers from the southern side of Tallinn boarding in the city centre. Both local residential areas and villages would benefit from having access to the station via adjacent local roads that complement any planned access via National Road 2/E263.

Bike Parking and Passenger Drop-off Facilities

P+R, K+R, and B+R facilities can potentially attract regional passengers connecting to/from locations south of Tallinn, and who would prefer to avoid boarding/alighting at the central station.

Furthermore, adequate drop-off/pick-up areas should be provided in direct connection to the station but not in front of the main entrance, as this area should be kept free for people walking, biking, and in favour of vulnerable road users. Minimum 1 accessible parking space with level-free access to the sidewalk and elevator needs to be provided. For a better bicycle connection, it is recommended to provide a B+R access supported by high quality bicycle lanes connecting to local neighbourhoods and villages (within 5km) and, if desired, cycle superhighway infrastructure to support access via longer distances.

Superhighways, which are adjacent to this type of regional railway stations, are mainly understood as direct and high-speed long-distance bicycle route connections with a high road surface and the absence of traffic lights. The goal of introducing this mode of transport is to provide an alternative to cars, fast and flexible private transport to connect work, study and residential areas as well as public transportation hubs (stations) making it easy to combine a commute with public transport.

Following best international practice, which could be applied to the Assaku station, cycle superhighways have typical features:

- A preferred width of a cycle path should be 2.00 meters (the minimum is 1.50 meters) completely separated from other modes of transport;
- Priority for cyclists on side roads with speed tables to slow down vehicles;
- Clear signage and information along bicycle routes to make wayfinding to PT station, as well as at a railway station area easier for commuters;
- The whole highway network should be visually visible (coloured) and have more than 10 km length one way and more;
- Signalised crossing points;

- Bicycle superhighways are operated and maintained in a permanent and safe manner, incl. winter maintenance service;
- To promote using a bicycle for long distances a proper charging infrastructure at a railway station could be introduced;
- Clearway orders to prevent parking in the cycle lane;
- Introduced a sufficient number of parking facilities at a railway station (open or closed);
- Associated improvements at access points e.g. improved ramps/steps, or bollards/barriers to stop vehicle access;
- The whole bicycle network should have a sufficient lighting system;

Additionally a railway station could propose a clothes drying rooms, lockers, showers, repair shops and other on- side facilities.

RECOMMENDATIONS

SECTOR	HIGH LEVEL RECOMMENDATIONS
Population relocation	- Development of integrated land use plan around the station that clearly plans uses, provides incentives for projects including residential housing, educational and commercial; - Developing housing area and commercial activity close to the station; - Based on close location of the statin to rural area it is recommended to potentially develop working spaces (offices) and business centers at or close to the station;
Regional cohesion	- Maximize the utilization of the rural/greenfield station to establish a strong passenger hub, which will also propose transport connectivity to other small villages (for example Uuesalu, Pildiküla, Jüri, Rae, Karla, etc.); - Consider the consolidation of a specialized industrial park taking advantage of the land availability around Assaku station. To identify required railway infrastructure and types of tracks connection with potential industrial park it would require to hold a detailed study which will involve the Municipality, and stakeholders to identify the potential demand of freight transport and logistic service to be allocated around Assaku;
Regional freight logistics	- Developing urban logistic services at the station. This could be presented by smart parcel boxes installed at platforms or within the station building; - Consider the development of a railway corridor-wide strategic freight logistics plan that includes Assaku station as a potential important distribution centre, as well as synergies with Soodevahe station (East of Assaku). Based on the obtained information, it is recommended to develop an infrastructure plan and required railway connection types;
Firm clustering	- Prioritize commercial and industrial land use planning. Consider development of a technology or industrial park within a 1-3 km of station along the north-west corridor towards Tallinn; - Development of cooperation with industrial enterprises to attract railway transport in this sector;
Digital connectivity	- Provide 5G network access point to connect nearby communities and businesses;

SECTOR	HIGH LEVEL RECOMMENDATIONS
	▪ Provide transmission grid support/ renewable generation support via railway substations to e.g. bus/car charging facilities ▪ Development of a local strategic digital connectivity plan to understand connectivity needs beyond the railway station;
Public transport & facilities	▪ Development of a public transport integration and infrastructure plan to identify bus and rail reorganization needs to bridge gaps in physical connectivity; ▪ Establish covered bus station in front of the railway entrance with direct and prioritised pedestrian connectivity. Bus station must provide places for PRM, show operational time (preferably in real time) and the provide information on the whole PT network and interchange points; ▪ Potentially develop an underpass to connect Põrguvälja with future roads to the southwest of the tracks and ensure public transport connectivity for both sides; ▪ Establish a taxi station for 6 cars with ranks, providing operational and tariffs information ; ▪ Potentially assign On- demand service, especially at night-time;
Short distance & new mobility	▪ Developing a station with a design that enables any passenger to access the station comfortably. It is recommended that all infrastructure leading to the boarding areas are at level with a minimal number of steps or barriers installed. Moreover, the whole station design should be barrier free oriented and provide special services to PRM; ▪ As part of a connected and direct bike infrastructure network of multi-use paths, develop protected multi-use (walk/bike) path between station, central Assaku, and Lehmja southeast of the station; ▪ Design parking and charging spaces for e-scooters and e-bikes. EV charging facilities will depend on local energy type availability, possible connection to the station. Benchmarking is presented in the Annex 3; ;
Regional mobility	▪ Ensure planning bus services to/from the east side of Harjumaa county to the railway station; ▪ Investigate the possibility to implement MaaS services that include on demand regional transport that could connect adjacent rural users to the station; ▪ Development of a transit plan to adapt existing bus services and introduce new bus services;
Bike, Kiss, and Park + Ride	▪ Provide bike parking station (preferably covered) at the station close to railway platforms and station building; ▪ Allocation of sufficient P+R where number of parking slots could be determined based on a demand using a wide catchment area (3-5 km); ▪ Based on demand outcomes introduce Shared LEV with respective charging infrastructure; ▪ Establishing drop off and pick up zones (K+R) (2 zones) with clear parking rules (not more than 15- 30 min.)

RAPLA REGIONAL PASSENGER STATION

Rapla regional station will be located approximately 2.5 km from Rapla City centre in the district of Sulupere. Rapla is located near several important national and international transport modal points such as the ports of Paldiski and Pärnu. Nearly 40 percent of Rapla municipality inhabitants live in the city centre. Rapla offers a mix of housing, workplaces, shopping, and other services. The county is a popular living environment with a rich and active cultural scene attracting people from the capital.

FIGURE 7 RAPLA STATION AND REGIONAL SORROUNDINGS (SOURCE: AUTHORS)

RAPLA REGIONAL STATION	
STATION ID	0S170
LOCATION	New/ Greenfield
POPULATION IN 3 KM RADIUS [9]	6.300
NEAREST LARGE URBAN AREA	Tallinn, 55 km
NEAREST AIRPORT	Tallinn International Airport, 57 km
RELEVANT ROAD CONNECTIONS	Proposed station is located in a rural area about 2 km south of Road 141 Rapla-Varbola, 1 km north of Road 28 Rapla- Märjamaa, and 20 km east of National Highway No. 4/European Road E67.
RELEVANT BENCHMARKING FOR THIS STATION TYPE	▪ Mäntsälä Station; ▪ Parkano Station; ▪ Leinelä Station;

TABLE 3 – RAPLA REGION MAIN CHARACTERISTICS AROUND THE REGIONAL STATION

---

[9] Population of nearest urban area. Source; RIS GIS data

Figure 8 below, presents a comprehensive review of some of the principal land uses around Rapla Station.

FIGURE 8 – LAND USE AT RAPLA REGIONAL STATION AND SURROUNDINGS (SOURCE: AUTHORS)

ECONOMIC IMPACTS AND REGIONAL COHESION

Population Relocation

Population statistics show that Rapla County has seen population decline in the past ten years. Furthermore, estimates also show that population will continue declining through 2045. However, estimates also show a strong increase in population in the Tallinn-Harju region. Such trends partly mean the opportunities and needs for the development of industrial and commercial activities and provision of housing and social services such as healthcare.

The figure below shows regional population and employment statistics in a radius of 1 km, 3km, and 10 km around the Rapla Regional Station. These maps show the potential for attracting and consolidating commercial and industrial activity that has settled along the Highway 15 corridor.

It also could create potentials for freight logistics opportunities in trades between the Pärnu region and Tallinn. Furthermore, the placement of the station also provides an opportunity for consolidating and increasing population density in the region between Rapla and the station, providing a potential for TOD.
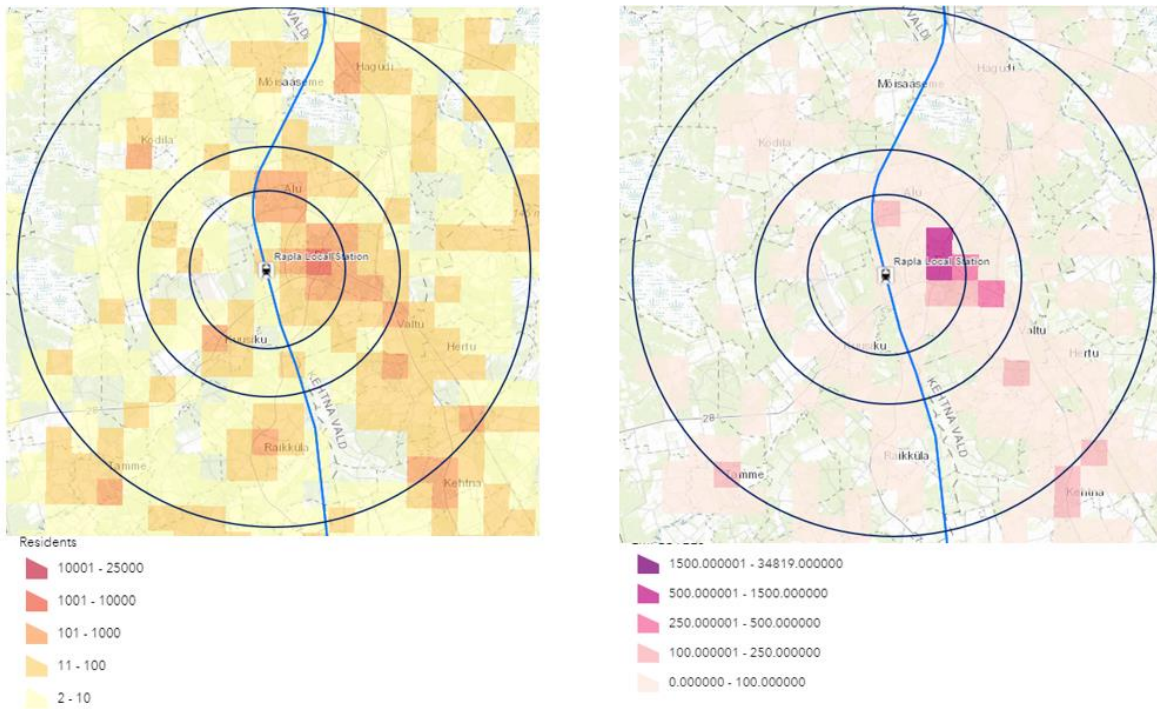
FIGURE 9 OVERVIEW OF POPULATION AND EMPLOYMENT STATISTICS IN RAPLA (SOUCE: RB GIS)

Regional Cohesion

Rapla County has made strides in the last decade in terms of advancing towards increased growth and economic development. Part of the success in the economic development of Rapla County is its proximity to the Tallinn-Harju region and other high development and growth areas in northern Estonia.

One of the most notable advantages of Rapla is the proximity job markets both in Tallinn-Harju to the north and Pärnu in the south. It means that future railway station could have an important transportation role for serving commuters.

Additionally, Pärnu city has important social and entertainment activities such as the Basketball sports industry and active tourism services being a popular summer resort. Rapla offers such activities as skydiving. Therefore developing a regional tourism and sport activities in both cities could attract residence living along the railway corridor to travel both Rapla and Pärnu.

Integration with Local and regional freight logistics network

Due to is strategic location, modern infrastructure Estonia plays one of the important roles in Europe of providing rail freight logistic chains and services for Nordic, Baltic and northwest Russian Federation regions. As other Baltic countries Estonia has a strong access to North Sea Baltic TEN-T Corridor, future Rapla station being located between important railway connection Tallinn – Pärnu, could potentially enhance the economic corridor providing additional freight activities to Baltic States and east European countries. Railway service in this case could be provided for distributing small regional manufacturing products: for example, for some plastic materials being transported within the country, as well as building materials.

Moreover, attention to possible railway freight logistic services could be given to Märjamaa Treff Logistics & Industrial Park is situated at the 65 km mark on the Tallinn – Pärnu – Ikla highway in Rapla County. This industrial park will feature two fuelling stations and storage and production buildings, with a total of 70,000

sqm of land under construction. Currently the focus is only on road transportation, however multimodal connections could be created for an expanded logistics chain, depending on goods being allocated at the logistic park.

While analysing Rapla station surroundings and its region (as it is shown under "firms clustering" part below), it was noticed that there are numbers of manufacturing (local small production) companies, which provide not only regional and national, but also international services. Water and road transport (partly rail) constitute the chain for freight logistics. Railway freight logistic service is mainly concentrated in Muuga.

The Rail Baltica Rapla passenger station shall be directed to allocate more passenger- oriented logistic services. Within the region and the city of Rapla, there are a few large post & logistics delivery companies:

- DPD (delivering and distribution) centre. The company also uses an automated system for private small packages deliverables located at the north part of Rapla city.
- National post services organised by Omniva (which also allocates packet station kiosks in the city)
- Rapla Postkontor Omniva (who has only one office in the city and provides a drop- off and pick- up post service for private users, or small private companies)

A strong cooperation with these companies will bring to rail results in mutual benefits by allocating their services within the railway building. Fast railway service between Tallinn and Pärnu for the delivery of small private packages is another potential benefit.

Since the station could play an important role in connecting passengers between these two cities, and possibly on a daily basis, delivering urban logistics services to the station would create represent a significant new revenue stream potential and for travellers, and provide them with flexible services on their way home.

Depending on station size, and land availability, logistics services could be presented by:
- An official post office with relevant information centre;
- Small smart boxes being opened using digital door opener solutions;

Firms Clustering

Rapla county traditionally allocates several SMEs. Nowadays, there are also many large international corporations like Lallemand (Canada), OI Production (USA), Lindström (Sweden), etc. which have set up their production units there. Most companies operate in the manufacture of timber products, furniture, metals, plastics, and building materials. The county focuses on smaller, environmentally friendly businesses, including clean and green food production. The abundance and variety of big and small enterprises is the main strength of the economic life in the region.

Rapla county is already location for several industrial as well as cultural clusters, including:

- Manufacturing, with approximately 50 enterprises10, with the biggest one Rapla Metall OÜ and other forest and wood companies, as well as small furniture producers, metal and car workshops, sewing, handicraft, furbishing, property mediation;
- Local small production companies (32 companies / farms and animal products processing companies);
- Education, including schools and separate educational private courses. Within the next years, there planned be a new, modern Rapla State High School, which could serve 360 students;
- Culture and tourism, with companies that provide for local tourism, offering local green attractions;

Rapla has a very attractive business environment, and it is a popular living place in Estonia. However, the main issue is a lack of labour force. Therefore, the Estonian government is supporting through EU funds

---

10 https://www.dnb.com/business-directory/company-information.manufacturing.ee.na.rapla_vald.html

companies in their digitalization and automatization processes. In the future, it is seen that Rapla will remain an attractive county for private businesses and developing logistics services.

Digital Connectivity

A larger network access point could be available at Rapla station to provide access to 5G connections for the nearby community of Rapla. An extension of the main fibre could be created, as the station is planned to be situated just outside of the current town. The extension could be planned to go through the town perhaps under Viljandi street, as the town land use is dense around it. Providing an access point at the station or making use of so-called neutral hosts could also enable convenient internet access to minor local settlements (within 40 km) that lack internet access today due to low population density.

For Rapla station, such digital connectivity could be seen to:

- Improve the attractiveness of the region as a place to live, where good digital connections facilitate the combination of remote working at home and working in Tallinn. As RB future railway services will reduce travel time between Rapla and Tallinn, Rapla could become an attractive location for living, especially if people want to combine both working remotely from home and at the office;
- Enable various businesses to utilize the region to locate their business, with good digital connections enabling the business to utilize modern technologies and large amounts of data transfer;
- Utilize the railway as a backbone to enable highspeed internet access to local community entities such as schools, hospitals/medical facilities, and local administration

MOBILITY AND RELEVANT TRANSPORT CONNECTIONS

Public Transport Service and Facilities

Since the proposed regional railway station in Rapla is still a greenfield area, there is no public transport network serving the area. Nevertheless, the consultant analysed the attached areas to Rapla, to have a better overview on possible connection of existing routes to future railway station.

The neighbouring areas like Lemmiku, Kinkuvärava, Järvakandi, and Haapsalu are connected by a few bus routes, which run though Rapla. Their operational routes pass along Road 28 at the south from the proposed station location. Rapla is also a mid-stop for bus connections:

- Eidapere - Lelle tee - Kehtna - Kaerepere – Rapla (national bus route Nr 40, operated by SEBE Aktsiaselts);
- Pärnu - Tootsi - Vändra - Lelle – Rapla (national bus route Nr 333, operated by SEBE Aktsiaselts);
- Vändra - Järvakandi - Rapla - Kohila – Tallinn (national bus route Nr 335, operated by SEBE Aktsiaselts);
- Haapsalu - Risti - Märjamaa - Rapla - Türi - Paide – Tartu (national bus route Nr 153, operated by MK Reis-X Osaühing);
- Rapla - Türi - Paide - Põltsamaa – Tartu (national bus route Nr 304, operated by ARILIX OÜ);

The local bus network is served mainly by small buses, offering more than 10 routes within the city, and out to close located suburban areas. Next to the planned regional railway station there are three bus routes (2; 23; 37) which could be in the future integrated with the railway service.

Besides public buses, there are also commuter train services which stop at the existing Rapla Jaam station (E23, R21, R22, RE22, RE23). The existing station provides a covered bike station as well as car parking (including stations for PRM). There is also a railway building and a small cafe.

The consultant sees that the existing public transport network could be extended to cover the new RB regional station; furthermore, planning concerning the RB station could:

- Establish proper road access to the station;
- Allocate a public transport station close to the railway building (if possible, directly in front of the entrance);
- Considering future station facilities and furniture to include: digital operational screens, ticket and price information corner, ticket machines, clear signage of the station, open public seats, etc. ;
- Considering re-organization of the existing public transport stations along Route Nr.28, which are located close to the proposed railway station and currently poorly organised (following the google maps data there is no proper sheltered station with no safe and proper organised pedestrian access. Moreover, at the station there is no information on bus operations and possible routes connections);
- Develop the railway station as a regional and suburban hub for bus connections;

Short Distance Mobility

Currently, there are no short distance mobility services that exist within the studied area. A clear bicycle network and parking stations within Rapla city from online available resources were not identified. Moreover, within the city urban area, there is no organisation of bicycle flows, no intersections or traffic lights for bicycles, and no dedicated driving area for bicycles (also visually) along walking areas.

For the future RB railway station, bicycle connections could be a last-mile solution since the distance from the town main area is only 2,5 km. For the few trips being longer, e-bikes would be a good option. Creating a safe and fast bicycle connection to the Rapla city could promote sustainability in the region and improve attractiveness and efficiency of railway station operations.

To establish bicycling as a transportation mode at the railway station, the consultant proposes to potentially establish:

- Direct bike lanes separated from the existing Road 28;
- Alone the bike path, clear signs of the route shall be installed and intersections within the city should prioritize bike;
- Establish a covered bike parking area, to promote traveller's daily use of bikes to the railway station;
- Review of the possibility to allocate bicycle charging infrastructure at the railway station as a phased implementation;
- Promote bicycle use by offering special railway tickets;

Additionally, the railway station area shall promote walking and pedestrian priorities. Due to the station's distance to the city centre of about 2,5 km (using a direct green field access) it could prove challenging to establish pedestrian connections to incentivize walking. However, in case of city growth, walking accessibility might be possible to set at the later stages, where a focus could be on:

- Providing adequate multi-use sidewalks, illumination, and signalling to guide pedestrians safely from the station to surrounding roads with public transport connections to Rapla centre;
- Investigate the possibility to put safe pedestrian access next to the existing river (avoiding the existing highway). In this case, the area could also be used for free walking time around the station;
- Providing sidewalks as free from level changes as possible, and with correct markings for people with impaired accessibility;

Sustainable New Mobility Services

Under this section, possible on-demand services are considered, which are quite often used for rural areas in order to fulfil existing gaps with public transport operation. At Rapla station, such services could both serve Rapla central area, as well as Rapla Airfield. Depending on the demand (most probably at weekends), different mobility services could be allocation at the stations: shared e-bikes, carsharing . Here, it is important to coordinate drop-off parking dedicated to carsharing both at the railway station and the airfield.

Allocation of on-demand mobility, such as those supported on a MaaS platform, could in the future be implemented between the station and main living and central destinations in Rapla, creating a smooth door-to-door passenger journey. A small commuter bus which could run between the station and the villages located around Rapla, could be connected to such a MaaS platform. Moreover, following international experiences, on- demand could provide special service to PRM and elderly travellers who would need to visit hospitals, go shopping, and use other functions in the society.

To increase the attractiveness of the station and promote modal shift towards sustainable modes of transport, facilities that offer safe, affordable, and convenient accommodation of personal LEVs is a key factor. Travelers must be ensured that bringing their LEVs to the train station can be as convenient as taking the car, but also risk-free in terms of having their LEV vandalized or stolen. Hence, sufficient sheltered and unsheltered parking spaces, as well as LEV storage compartments could be provided with direct access to the station.

Additionally, micro shared mobility solutions could be supported. The option of in particular e-bikes could be an attractive last-mile choice for visitors looking for a fast and affordable way to reach Rapla town centre. By providing LEV sharing at the station and on strategic destinations in Rapla, the usage of the private cars could be reduced.

Regional Mobility System Optimization

Under this section, special attention is given to review the existing regional mobility systems which could integrate a railway station into urban life, as well as provide sufficient connectivity to closely located villages. No documents or regional development plans which could be analysed were found.

Therefore, below the consultant provides a description of the main elements which shall be considered under this section:

- The location of the station is in an unurbanized area far from large towns; if future growth plans are not being developed in parallel with the planning of the station, then utilization of the station will be minimal. Local urban planners could consider a sufficient justification to focus future TOD in this area to leverage new railway corridor access;

- The station is located near the Rapla-Märjamaa Road 28. However, the new railway station accessibility shall require new and better road connections. The catchment size of this station would have to be large to justify its use in this way;

- Local residential areas would benefit from the access to the station via adjacent local roads. They will give a better option for bus connections though the rural areas and therefore create better coverage of the living areas;

Bike Parking and Passenger Drop-off facilities

Allocation of both P+R and B+R parking options at a regional railway station provides travellers better flexibility to personal mobility. As it is typical for rural areas, where poor coverage of public transport is common, private cars are currently the primary solution to get to a railway station.

Therefore, it is seen that in RB Rapla stations these parking facilities could consider:

- B+R access should be supported with high quality bicycle lanes connecting to local neighbourhoods (within around 5 km radius) and, if desired, cycling superhighway infrastructure to support access via longer distances could be proposed. Availability of such infrastructure will promote a need of proving secure parking, as well as charging infrastructure at the station for e-bikes

- P+R at this location could consider that the total demand is likely to be relatively small; the total number of spaces for P+R purposes could be however determined also considering a larger catchment area and future residential development and relocation
- To encourage multimodal commuter traffic and shared vehicle services, sufficient long term and short-term parking possibilities could be provided. A seamless connection between Rapla Station and the existing Rapla commuter train towards Tallinn is essential[11]. In the planning of the parking, the priority could be given to: 1-2 accessible parking, drop-off/pick-up, taxi, shared EV and then other. The connections from the parking area to the station should be facilitated with illuminated sidewalks, free from level changes.

RECOMMENDATIONS

SECTOR	HIGH LEVEL RECOMMENDATIONS
Population relocation	- Developing a long-term integrated land use plan around the station that clearly plans uses, provides incentives to building housing and commercial/industrial uses; - Ensure there is a development plan that connects the regional station with downtown Rapla and the nearby the airfield prioritizing public transport, cycling and shared use vehicles;

---

[11] Currently, 1520 railway passenger services serve Tallinn – Viljandi

SECTOR	HIGH LEVEL RECOMMENDATIONS
	▪ Developing housing strategic plan that integrates with land use and provides affordable housing for local populations and incentivises regional movement from other regions in northern Estonia;
Regional cohesion	▪ Maximize the utilization of the greenfield station to establish a strong passenger hub but also a strong institutional hub where community centres, hospitals and other government institutions could place offices and service centres; ▪ Developing a TOD concept and commercial development; ▪ To connect the existing 1520mm rail station served by Tallinn – Viljandi route to the RB Rapla station in order to provide comfortable interchanges between both rail routes.
Regional freight logistics	▪ Consider the development of a corridor-wide strategic freight logistics plan, where Rapla Station could potentially play a role of distributing small regional manufacturing products; ▪ Consider the creation of a legal, tax and regulatory framework that incentivises companies to locate within the area of the station;
Firm clustering	▪ Establishment of possible freight railway supply to Logistics & Industrial Park due to the strategic positioning of Rapla station between Tallinn and Pärnu; ▪ Consider the development of a freight/industrial/trade special zone to attract firms and talent;
Digital connectivity	▪ Improve the attractiveness of the region as a place to live, where good digital connections facilitate the combination of remote working at home and working in Tallinn and potentially in Pärnu, including surrounding regions; ▪ Potential to utilize the railway as a backbone to offer high speed internet access to local community entities such as schools, medical facilities and local administration ▪ Due to the station's location, the "Dig Once" concept could be implemented as a part of a digital connectivity strategy to enable internet access in the region
Public transport & facilities	▪ Development of a PT integration and infrastructure plan to identify bus and rail reorganization needs and infrastructure construction needed to bridge gaps in physical connectivity; ▪ Allocation of a proper organised taxi station closely located to the railway building; ▪ Station design and accessibility should be highly organised for various groups of passengers with reduced mobility. Public stations and rail platforms should offer a quick assess for all;
Short distance & new mobility	▪ Designing the station with focus on accessibility for all types of passenger. It is recommended that all infrastructure leading to the boarding areas are at level with a minimal number of steps or barriers installed; ▪ As part of a connected and direct bike infrastructure network of multi-use paths, develop protected multi-use (walk/bike) path between station and the surrounding communities; ▪ Design parking spaces for e-bikes;
Regional mobility	▪ Ensure there is access connecting roads that lead to the station and from both station sides; ▪ Potentially design a grid of streets to connect future medium-density land uses;
Bike, Kiss, and Park + Ride	▪ Provide covered bike parking next to the station (number of slots will depend on demand); ▪ Allocation of sufficient P+R. The number of parking slots could be determined based on a calculation using a catchment area that does not overlap with access from the North[12]; ▪ Introduce Shared EV (e-bikes),. charging infrastructure. Examples are presented in the Annex 3; ▪ Introduce K+R in front of the station building with clear parking rules (not more than 30 min.)

[12] Kindly refer to the provided international best cases in the Annex4.1

TOOTSI REGIONAL PASSENGER STATION

Tootsi local station is situated in a rural area approximately 1.5 km south-east of the town of Tootsi, which is the closest populated area with a population density of only 7 people/ sqm. The location of the station is in south-west Estonia approximately 100 km south of Tallinn city centre.
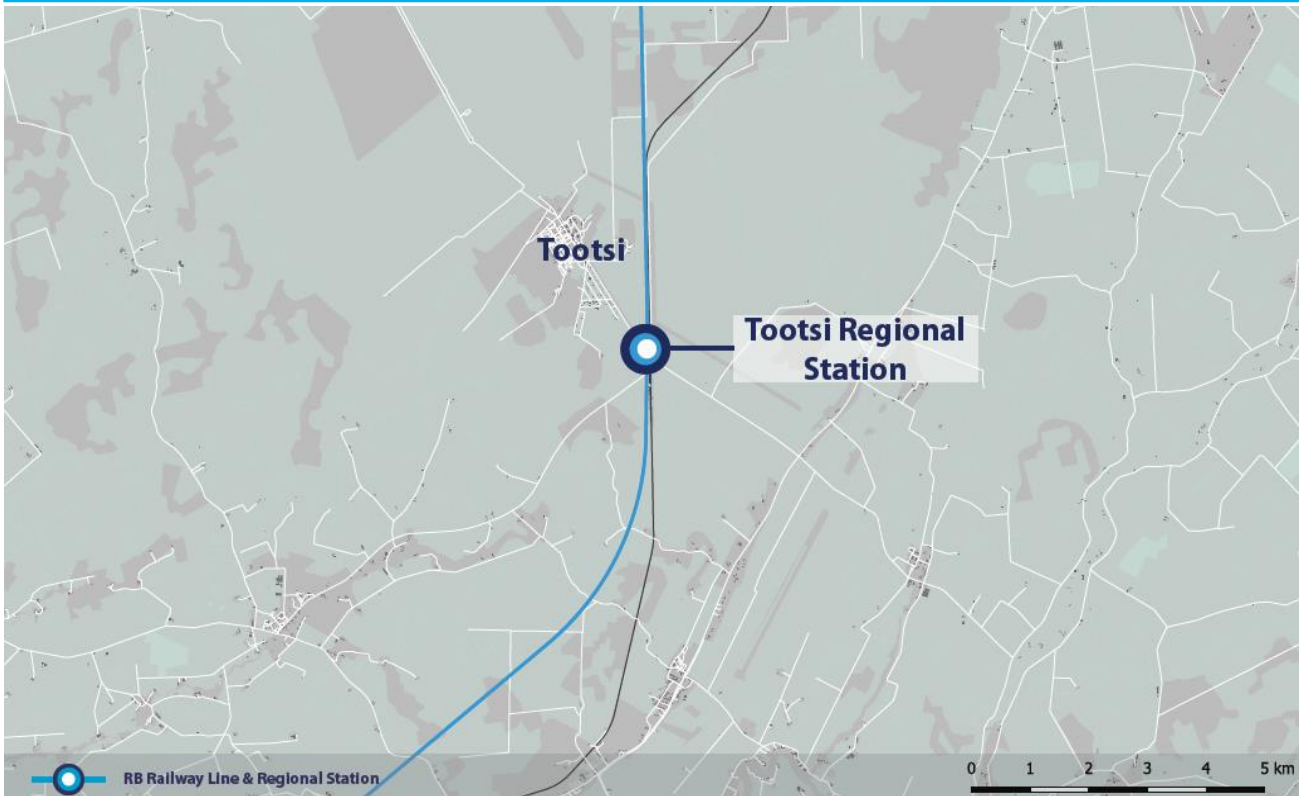
FIGURE 10 TOOTSI STATION AND REGIONAL OVERVIEW (SOURCE: AUTHORS)

	TOOTSI REGIONAL STATION
STATION ID	OS210
LOCATION	Greenfield
POPULATION IN 3 KM RADIUS [13]	800
NEAREST LARGE URBAN AREA	Pärnu, approximately 35 km
NEAREST AIRPORT	Pärnu International Airport, 36 km
RELEVANT ROAD CONNECTIONS	Proposed station is located just north of the intersection between Road 271 Tootsi-Piistaoja and Road 270 Suigu-Tootsi. A local road runs parallel with the railway track. Along Road 271, in direct connection with the station, is Tootsi Raudteejaam bus stop.
RELEVANT BENCHMARKING FOR THIS STATION TYPE	▪ Kemi railway station; ▪ Winterberg railway station; ▪ Rottenbach railway station;

TABLE 4 TOOTSI REGION MAIN CHARACTERISTICS AROUND THE REGIONAL STATION

---

[13] Source: RB GIS data

The Figure 11 below, presents a comprehensive review of some of the principal land uses at Tootsi Station.
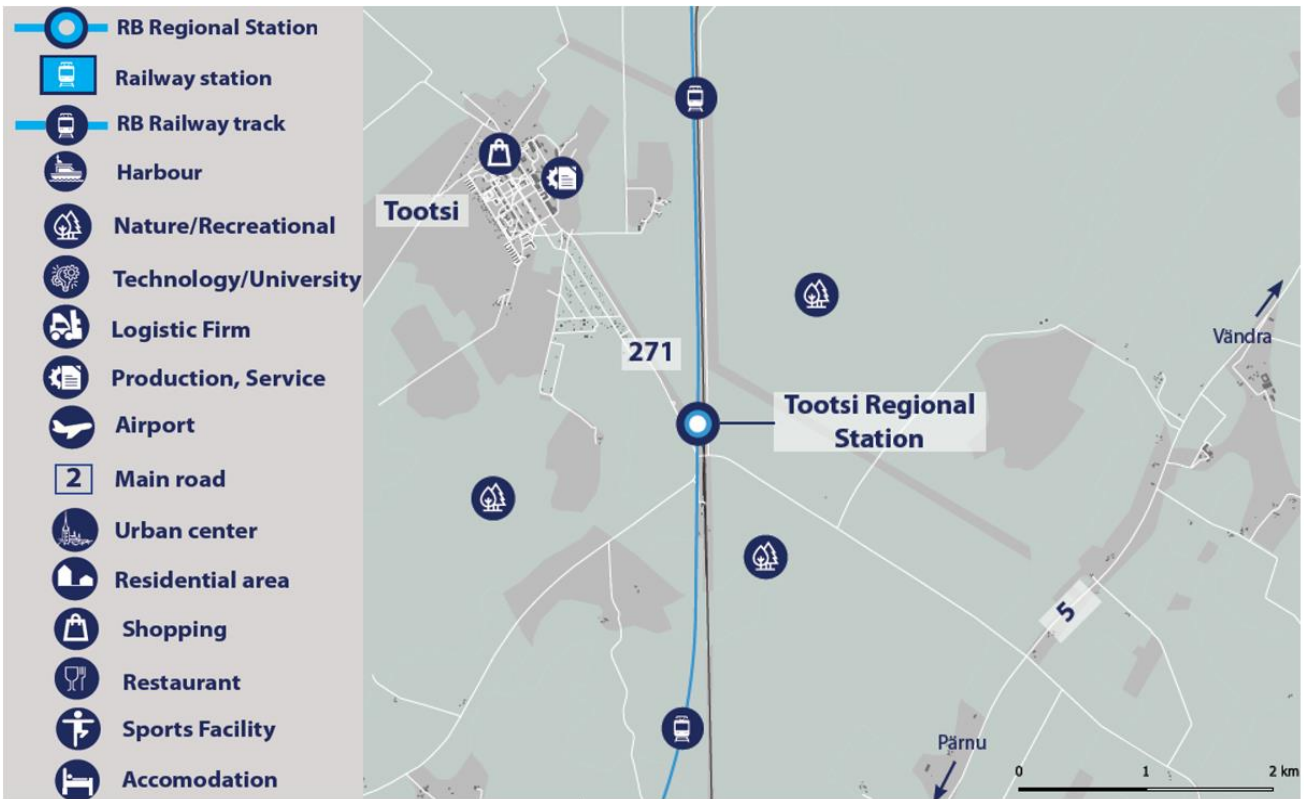
FIGURE 11 – LAND USE AT TOOTSI REGIONAL STATION AND SURROUNDINGS (SOURCE: AUTHORS)

ECONOMIC IMPACTS AND REGIONAL COHESION

Population Relocation

The Tootsi small village has fewer than 100 inhabitants. Although currently characterized by low population density, the village presents an important opportunity for growth and for provision of services that could attract travellers and town dwellers.

To spur regional growth, a sufficient public transport network connecting Tootsi station with the city and other villages in the region must be introduced. In fact, a convenient, well-integrated transportation services which offer access to key services and employment sites, i.e. Tootsi, Tori, and Jõesuu could attract potential new inhabitants to settle in the area. Furthermore, the new railway station has the potential to offer shorter travel times for commuters who wish to work in larger cities but reside in the countryside, but also for tourists who would like to enjoy the rich nature of the region.

FIGURE 12 OVERVIEW OF POPULATION AND EMPLOYMENT STATISTICS IN TOOTSI (SOUCE: RB GIS)

Regional Cohesion

Currently, the town of Tootsi is isolated and accessible only by motorized vehicles, with limited public transit services. There is a huge opportunity to spark economic and social development around Tootsi by: a) prioritizing investment in industrial activities as well as outdoor activities (the area has important natural reserves and protected areas, such as Soomaa Rahvuspark) b) by providing high quality access to such services or industries and by increasing housing development and improving the quality of housing in the town.

Integration with Local and Regional Freight Logistics Network

Tootsi has a very small city area accessed only by cars. There are no logistic services, including basic post and delivering services. In the North part of the town along the Road Nr. 5 Pärnu- Rakvere- Sömeru, there are three small agriculture and fishing centres for food distribution (parallel to the proposed railway connections, about 3 km from the infrastructure). There are no Municipality plans to develop the region with strong focus on freight logistic sector.

For better urban logistics in Tootsi and its surroundings, it is recommended to attach to the railway building some urban logistics services, which will provide residents opportunities to pick up and drop off parcels.

Firms Clustering

Within the city, no strong firm clusters exist. In the radius of 20 km there are only small villages, the closest production and manufacturing firms being in Pärnu (33 km).

Digital Connectivity

To support good digital connections and achieving the goal of 5G connectivity along transport corridor by 2025, the railway corridor could house a main fibre connection along the length of the railway with multiple access points near local communities. A larger network access point could be available at Tootsi station to provide access to 5G connections for the nearby community of Tootsi and other nearby settlements up to 40 km from the access point An extension of the main fibre could be planned to go through the town perhaps under Road 271, as the town is built quite dense around it, yet very little housing is far from the road.

Due to its rural location and low population density, the inhabitants in and nearby Tootsi might face difficulties in terms of 5G deployment as individual telecommunication companies would face a high cost-to-customer ratio to provide its services to just a few users per node. Hence, the concept of neutral hosts could be an option for this area, provided the business model of third-party hosts is accepted by local telcos.

Tootsi is located within a very short (15-20 min) train journey from Pärnu, providing good opportunities for people to live outside the densest town area and still rely on train travel on their daily journeys. Tootsi can be seen as an attractive location for living, especially in mixed remote/office work conditions.

MOBILITY AND RELEVANT TRANSPORT CONNECTIONS

Public Transport Services and Facilities

The future railway station area has a rural location. Currently, a commuter bus station located just south of the new Rail Baltica station offers 1- 2 daily departures to Pärnu. Moreover, there is a regional bus running from the mentioned bus station to Rakvere and to areas in north-eastern Estonia. Operational frequency is limited. The bus station is poorly organised and does not have proper station facilities or operational conditions of local and regional buses.

This bus station is close (480 m) to the proposed location and could later be integrated with railway services. The focus of public transport should not be to create new routes, but to bring existing routes to the railway station and offer sufficient and reliable bus feeder services.

Short Distance Mobility

Due to the station's rural location with barely any nearby development, the distance of 1,5 km is considered too long for daily commuting by walking. However, the distance is perfect for biking and other short distance mobilities such as private scooters. In fact, even though Tootsi village is small, it has a school and younger people are expected to use the station. Bicycle is an ideal transport mode from Tootsi village to the regional railway station. The only existing road from Tootsi to the station Tootsi- Piistaoja is fairly narrow for deployment of both sidewalks and bike lanes on both sides of the road. In this case, a shared two-way cycle lane is recommended.

A bicycle parking station at the railway could be covered. This will provide better conditions for daily travellers and their comfort. The design shall be very simple and protect private bicycles from bad weather. Moreover, a future bicycle parking area could be allocated close to the main entrance, so long as it does not interfere with pedestrian zones. A direct connection from the bike parking area to the bike lanes serving Tootsi shall be introduced.

In addition to illumination and an inviting environment, bicycle racks of high quality are an important element at the station. Likewise, special racks for private scooters (including mopeds and motorcycles) is important here. Infrastructure that supports short distance mobility will be necessary and can, in the long run, increase the use of active modes. Well-established infrastructure can, in part, minimize depopulation of more rural areas, e.g. avoiding that the younger generation moves from the area, when they start secondary or tertiary education, etc. Similarly, future railway service shall be used as a main commuter and transport mode bringing residents to workplaces in Pärnu.

Sustainable New Mobility Services

Due to a critically low population in this area and currently no growth in the population, the demand for new mobility services is relatively low. Despite that, the new station will be an asset for the area and more people will probably move to the area, although it is not expected to have an impact in the short term. Considering the area's low population density, the expected travel demand would probably not justify the implementation of LEV sharing. Furthermore, since the area has a low level of income, shared mobility services could be too expensive for regular use. Moreover, the allocation of a sharing station would need to be not only at the railway station but also within Tootsi village.

Regional Mobility System Optimization

The station is in a greenfield area far from larger towns, with Pärnu being the closest at roughly 35 km away. The village of Tootsi is part of the smallest county in the country, with a low population density, which in combination with the station's rural location, suggests that if future growth plans are not being developed in parallel with the planning of the station, the utilization of the station will be scarce. Local urban planners could therefore consider a sufficient justification to focus future TOD in this area to leverage the new railway corridor access.

The station is located at the intersection between Road 271 Tootsi-Piistaoja and Road 270 Suigu-Tootsi, where the latter is also served by regional bus services. To enhance the regional mobility system, improved railway station access is required in the form of new and better road connections, in particular to National Road 5.

Today the regional bus services offered primarily focus on commuter journey between Tootsi and Pärnu, but an increased frequency and expansion of offered routes could improve a regional mobility. Moreover, existing regional bus services could be extended to include nearby villages and communities such as Tori, Jõesuu, and Suigu, as well allowing commuting via Tootsi towards north, e.g. Rapla/Assaku/Tallinn, especially if to consider remote work conditions. The catchment size of this station would, however, must be large enough to justify its use in this way.

Bike Parking and Passenger Drop-off Facilities

Residents in Tootsi, as well as in closely located villages, typically use private cars. To encourage commuters to utilize the station, sufficient long-term and short-term parking possibilities must be provided in direct connection to the station. As Tootsi Station will be developed in a greenfield area, an optimal location of parking areas and drop-off/pick-up areas could be chosen based on local and regional travel patterns. A seamless connection between Tootsi, Tootsi Station and Pärnu is essential to attract more commuters.

RECOMMENDATIONS

SECTOR	HIGH LEVEL RECOMMENDATIONS
Population relocation	▪ Introducing an integrated land use plan around the station that clearly defines land use and its future development, and provides incentives for the development of the regional area; ▪ Introducing strong and high-speed railway connections to economic important cities, could attract people to move to Tootsi. Moreover, due to potential development of support services for commercial, industrial and small agricultural activities could create more working places;
Regional cohesion	▪ Maximize the utilization of the greenfield station within the land uses permitted to establish potential agricultural/small industrial service mainly with a regional delivering focus; ▪ Potentials for Tootsi and the regional station to be part of attractive regional green tourism;
Regional freight logistics	▪ Tootsi might play a supporting role for Pärnu intermodal terminal. However, it is strongly recommended to develop a strategic freight demand study, which should give more information on establishing a freight service; ▪ Consider development of a small urban logistic station at railway for citizens. For this RB need to create a suitable cooperation framework with logistic companies, since their presence is quite limited in Tootsi; ;
Firm clustering	▪ Establishing small urban logistic service and relevant to this sector firms cooperation;
Digital connectivity	▪ Improve the attractiveness of the region as a place to live, where sufficient digital connections facilitate the combination of remote working at home and working in Tallinn and Pärnu; ▪ Due to the station's greenfield location, utilizing the "Dig Once" concept to provide shared digital infrastructure could reduce investment costs and spur regional cohesion/information accessibility. ▪ Potential to adapt Neutral Hosts to enable convenient internet access throughout the region. Promoting the Neutral Host model could be a great opportunity to provide internet access in areas with low population density and a high cost-to-customer ratio for regular telco providers.
Public transport & facilities	▪ Development of a public transport integration and infrastructure plan to identify required bus service. All stations must have barrier free design and provide a free access for PRM; ▪ Introduce bus stations (both for regional and national connections) being close located to the railway station building with a safe and direct pedestrian access. The stations should provide a sufficient information on bus operation and potential interchanges; ▪ Provide frequent regional bus service between station and surrounding land uses and place bus stop attached to the rail boarding area; ▪ Introducing a taxi station which will have a rank and will provide operational and tariffs data;
Short distance & new mobility	▪ Developing a station with a design that enables any passenger, not matter their physical (or other) abilities to access the station comfortably It is recommended that all infrastructure leading to the boarding areas are at level and minimal steps or barriers are installed; ▪ Develop protected multi-use (walk/bike) paths between station and the town of Tootsi and also from the station to the Mõrdama hoiuala nature Preserve in Viluvere; ▪ Development of parking spaces for e-bikes for day use (and also overnight use);
Regional mobility	▪ Integrate existing bus services, which run at the roads Nr.271 and Nr.270, with railway service; ▪ Possibly provide additional long-distance trains to Tallin and Riga. Other directions to be established once a demand study will be carried out; ▪ Integrate commuter bus service running between Tootsi and Pärnu at a railway station;
Bike, Kiss, and Park + Ride	▪ Provide a sufficient bike parking slots next to the station (this is based on the demand); ▪ For drop off and pick up, one or two parking station in front of the railway building could be introduced (1 slot close to the railway station entrance);

SKULTE REGIONAL PASSENGER STATION

Skulte is located in Limbaži municipality. The planned Rail Baltica regional railway station is currently a greenfield located approximately 5 km from the nearest urbanized area - Skulte town - and north-east of the existing Skulte station. The surrounding area is primarily made of forests and agriculture land. Due to its coastal location, one of the main focuses in the region is shipment services and fishery products. Today, Skulte is the northernmost endpoint of the 1520 mm Riga suburban rail network. The existing rail services runs along the coast via Saulkrasti and Carnikava.
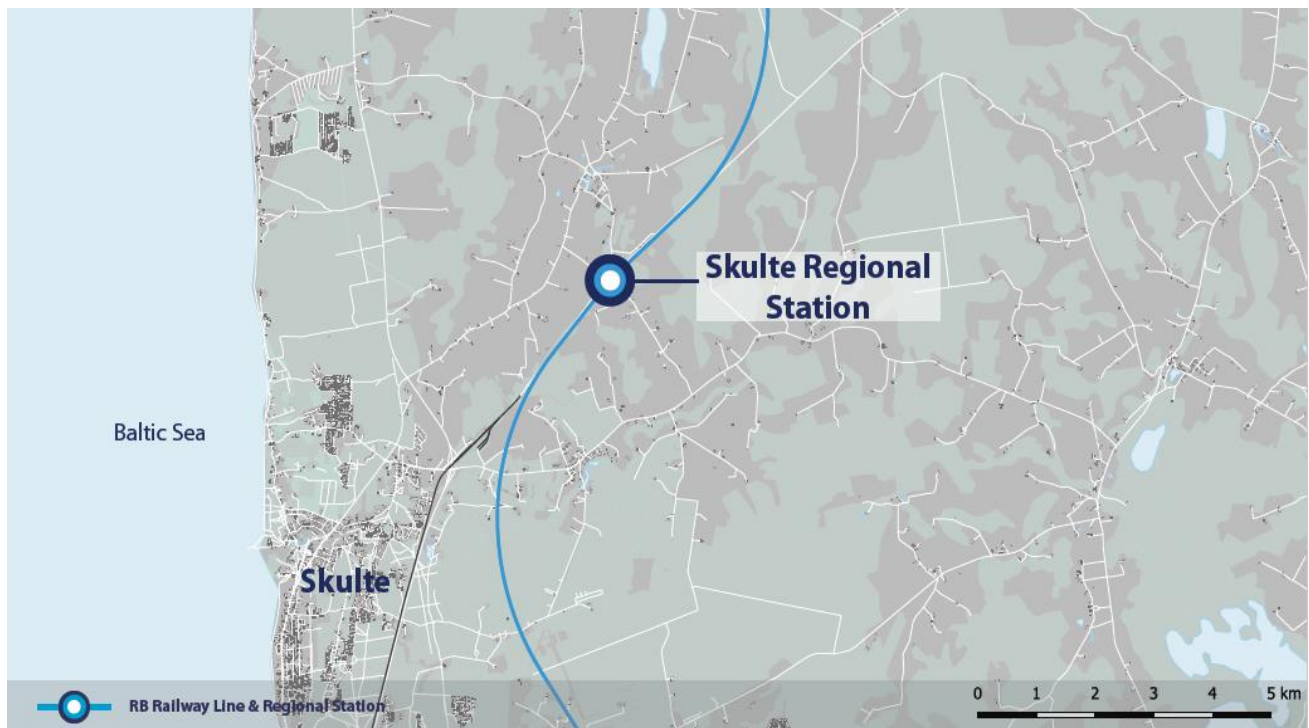
FIGURE 13 SKULTE STATION AND REGIONAL SORROUNDINGS (SOURCE: AUTHORS)

SKULTE REGIONAL STATION	
STATION ID	OS330
LOCATION	New/Greenfield
POPULATION IN 3 KM RADIUS [14]	800
NEAREST LARGE URBAN AREA	Riga City Center, approximately 69 km
NEAREST AIRPORT	Riga International Airport, approximately 79 km
RELEVANT ROAD CONNECTIONS	The station could have access to the Highway P53. The distance is approx. 1 km to the East. The Saulkrasti Bypass running from Lilaste to Skulte and is used for important cargo transfer
RELEVANT BENCHMARKING FOR THIS STATION TYPE	▪ Toijala Station; ▪ Riihimäki Station; ▪ Winterberg railway station; ▪ Mikkeli railway station;

TABLE 5 – SKULTE REGION MAIN CHARACTERISTICS AROUND THE REGIONAL STATION

The figure below, presents a comprehensive review of some of the principal land uses around Skulte Station.

---

[14] Source: RB GIS

The existing rail services run along the coast via Saulkrasti and Carnikava. Current travel time to Riga Central station is approx. 1:10 hours. With Rail Baltica a shorter travel time (33 min. 34 sec.) will be possible. The future RB plan is to extend the existing 1520 mm to the new 1435 mm station, which is located northeast of the existing station[15].
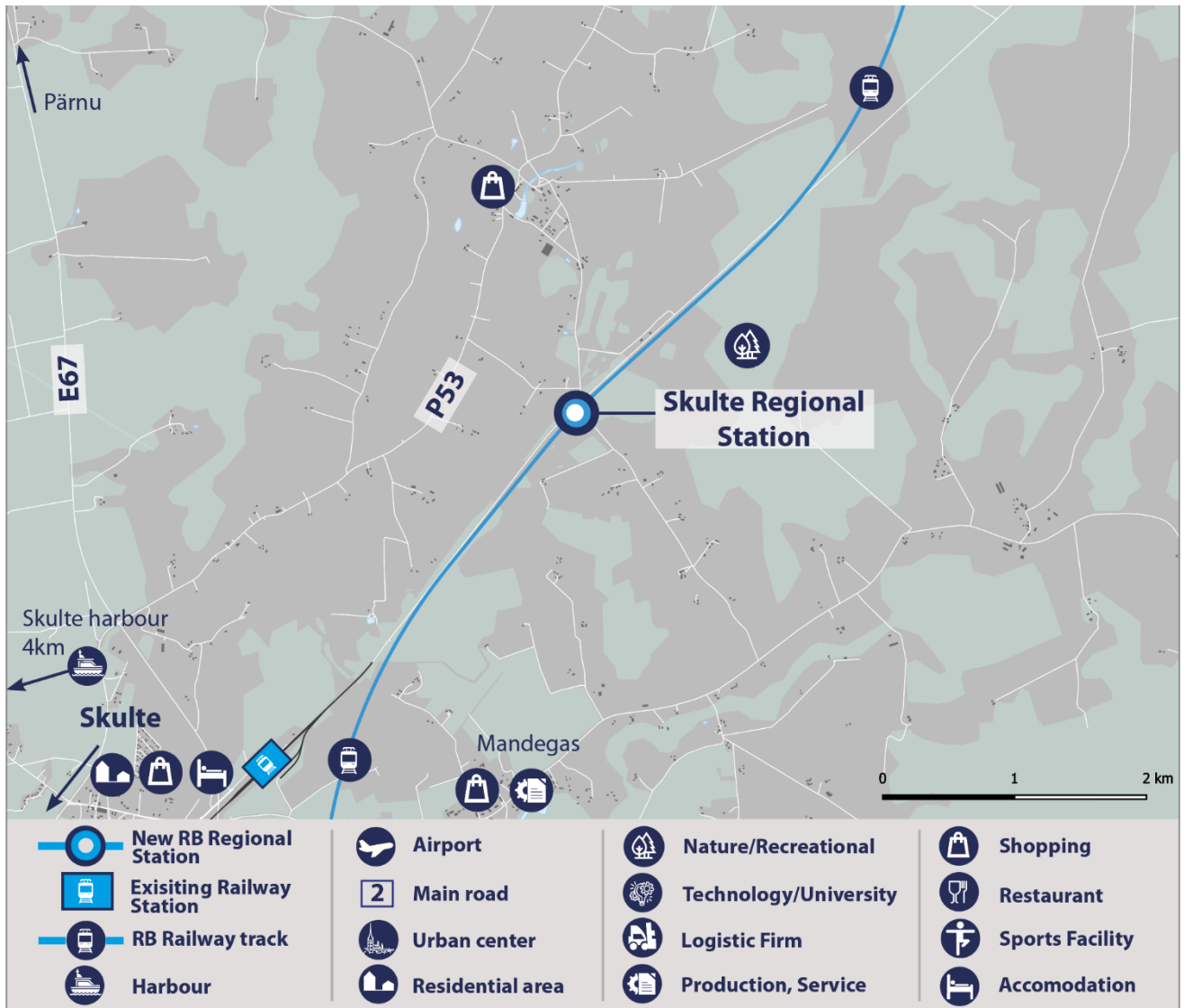
FIGURE 14 LAND USES AT SKULTE REGIONAL STATION AND ITS SURROUNDINGS (SOURCE: AUTHORS)

The future station could be attractive for passenger traveling from the north of Riga interchanging to local public transport to and from other destinations in Riga.

ECONIMIC IMPACT AND REGIONAL COHESION

Population Relocation

---

[15] https://www.railbaltica.org/the-contract-has-been-signed-for-the-construction-design-and-author-supervision-of-rail-baltica-infrastructure-maintenance-point-construction-projects-in-latvia/

In Latvia, 68% of its 2.2 million population live in urban areas. 32% of the population live in the capital city Riga, which has around 700,000 inhabitants. Other urban areas are significantly smaller—second largest city Daugavpils has only slightly under 100,000 inhabitants. Thus, one of the key territorial development challenges in Latvia is its mono-centric settlement structure, which also leads to concentration of economic activity around the capital city with considerable regional disparities. Part of Latvia's urban areas challenges relate to their size.

The planned location for the RB Skulte regional station is a greenfield area with relatively low population density. Although Skulte and neighbouring Mandegas together house approximately only 2 600 inhabitants16, the towns together with neighbouring villages (such as Saulītes) present an important opportunity for growth and for provision of services that could attract travellers and town dwellers. In addition, the relatively short distance between Skulte and city of Saulkrasti, famous for its beaches and sunsets, could boost regional tourism and potentially also population growth, if fast and easy connections between the proposed station and the city are provided.

FIGURE 15 OVERVIEW OF POPULATION AND EMPLOYMENT STATISTICS IN SKULTE (SOUCE: RB RAIL GIS)

For potential growth of the region's population and its settlement, the proximity of Skulte to Riga plays the greatest role here. The Limbaži and Saulkrasti Municipalities are already among the most attractive areas for living near Riga. The introduction of future high-speed rail links from Skulte to Riga will provide passengers better access to jobs, and presently existing rural areas will have greater opportunities for redevelopment into urban areas.

Regional Cohesion

Skulte regional station is located in Limbaži County. Although the town is located within the Riga planning region, there is still a marked difference in income, employment, and generally in regional cohesion and wellbeing. In terms of GDP per capita, Riga is the region that has the highest GDP per capita in Latvia, and signs of lowered development for other counties.

---

16 https://en.wikipedia.org/wiki/Skulte_Parish

Skulte is closely located to Riga, and therefore might have strong opportunities for establishing touristic offers for residents, considering close access to the public beach and forests from the future regional station. Visitors could come to Skulte for a weekend to have some bicycle tours.

In order to develop this sector the consultant strongly recommends to set a communication and cooperation between the Rail Baltica and the municipality.

Integration with local and regional freight logistics network

Transit in Skulte is one of the strongest developed sectors. The main freight flows travel through the industrial and logistics area of the existing port. The quality and level of transport and logistics services in Skulte is led by large international transport and forwarding companies. The logistics network in Skulte is provided by various existing transportation services from the Skulte port and its surrounding area:

- By truck transport (with its biggest share of freight transport) by using the main road VIA BALTICA (Riga – Tallinn);
- By shipping routes along the Gulf of Riga;

Near the existing main railway, via Baltica highway and the port terminal, there is an industrial park of approximately 45ha. This site is mainly for logistics companies to allocate their warehouses and production sites. Closer to the Skulte port is the Skulte Terminal hosting the infrastructure for reloading cargo and other relevant service developments of the Port of Skulte. Potentially railway service could be utilised for cargo goods transported over European rail network (to Poland, Germany, Netherlands).

The proposed new Skulte regional railway station is located approximately 4km away from the logistic port area. Behind the existing railway station, there is a small terminal for allocation of liquid products and possible storages of agriculture products. There are no plans on how the area will be reorganised. Potentially it could be assigned for a small logistic center or warehouses. However, such developments need to be aligned with the local Municipality.

Based on the existing logistic and industrial services in the area a start-up service which will improve logistic connections could be developed close to the regional railway station. Innovations with a focus on traceability, last-mile delivery, robotics as well as automation, to be used for example for e- commerce services, are in priorities. Additionally some fulfilment centers with service like inventory management, stock keeping, packing, and shipping, as well as handling returns, could be located.

This could also be useful for private users, who lives not only in Skulte , but also in villages like Mandegas, Ziemeļblāzma and Dūči, the consultant sees a potential of allocating strong urban logistics services, like post offices, service for international deliverables organised by, for example, DHL, DPD, etc.

In this context, railway transport could be a part of an urban logistics chain, which could include parcels transportation in the region and along the corridor.

Firms Clustering

Skulte region has a high concentration of logistics and cargo firms mainly providing services for:
- Logistics and transportation;
- Ship repair and maintenance
- Manufacturing;
- Agriculture (including regional products);
- Tourism and Education;

The service delivered by these firms could be potentially integrated with railway transportation, for example: providing regional and international multimodal logistic chain connecting high speed infrastructure, delivering private and commercial parcels along the RB corridor, creating attractive railway touristic services which could include offers integrated visits of Skulte seaside and Riga city.

Based on the existing access to the port Skulte, the maritime service and its core elements are one of the dominant clusters in the region, where potential integration of connections between port and railway could play an important role in the development of national economy.

Additionally, located within 7 km commercial and more business economic activities in the area of Saulkrasti, could be connected to the railway station. It could provide additional safe and fast commuting services for visitors coming Riga and other cities along the corridor.

Digital Connectivity

Due to Skulte station's greenfield location, it could be beneficial to provide a network access point at or nearby the station to provide 5G connectivity to rail passengers but also enable high speed internet to local communities, businesses and industrial areas nearby. An extension of the main fibre with access points could be created towards the coastline, as the station is planned to be located a few kilometres outside of the current population structure. The extension could be planned to follow the more densely populated coastline, as the rail is planned to go through a somewhat looser formation of population, and most employee counts are located at the coast. Instead, the model of Neutral Hosts could be a suitable solution for the more sparsely populated areas provided that local telcos are open to this kind of collaboration with third-party infrastructure providers.

MOBILITY AND RELEVANT TRANSPORT CONNECTIONS

Public Transport and its Facilities

The existing railway station is not connected by any kind of public transport modes. Access is only possible via private cars. From this station, railway transport runs every three hours to Riga, which provides residents good opportunities for their daily travels to Riga for work purposes (traveling time from Skulte to Riga is 33 min. 34 sec.).

The proposed location of the new Rail Baltica railway station is approximately 4 km north of Skulte, near Salzemnieki village. Due to its greenfield location, there is also no public transport access, as well as no public transport serving nearby areas. The attached villages are Salzemnieki, Saulītes and Skultes muiža. Without sufficient public transport connections, there is a risk that commuters will continue using their private vehicles, leading to traffic at the station.

At the distance of approximately 5 km from the proposed station location, there is one urban bus station which leads to the town central and living areas. Bus stops in the area do not usually have shelters and service operational information, and they are directly located along roads, sometimes without any appropriate markings. Since small rural areas are divided by the Highway A1, general accessibility to the future railway station is extremely poor. Buses between villages run only a few times per day with a limited number of stops.

The current assigned location of the RB railway station could be only efficiently connected by public transport using the existing Road P 53 or the more rural road leading from the Saulītes village to the Skulte town border. This road shall be however completely reconstructed providing a better and safer quality for public transport operation.

Since buses will potentially cross the villages of Salzemnieki, Mandegas, Skultes muiža and Dūči, there shall be at least one or two stops within each of these locations. The existing regular bus service which runs between Riga and Skulte (every two or three hours) shall be introduced at the future railway station as well. The RB railway station shall become a local bus hub, which will offer rural bus transport connections with frequent operational time at least at peak hours.

Furthermore, Limbazi – Riga bus services could be replaced/coordinated/supplemented by Bus + Train as this solution will heavily shorten the travel time even with interchange in Skulte. Similarly, also P+R solution in Skulte for Limbazi – Riga journeys must be considered. Moreover, the bus connection Skulte-Limbazi will as well facilitate the connection towards North, including destinations such as Salacgriva, Parnu, and Tallinn.

Short Distance Mobility

Due to the station's location approximately 6 km from the nearest urban district of Skulte, traveling by bicycle would be more attractive than moving by foot. Pedestrian access at the railway station shall be prioritized and could potentially be introduced to the closest village Salzemnieki (500 m) and Skultes muiža

(1,5 km). The pedestrian infrastructure however shall be completely constructed and be separated from the car traffic.

Future bicycle infrastructure, including multi-use sidewalks/bicycle paths, illumination, and signage must be provided for Non-Motorised Transport (NMT) to compete with private cars. However, simpler bicycle infrastructure (lanes and priorities at road intersections) with improved bicycle access shall be considered for distanced less than 2 km. To provide a bicycle connection to Skulte town, a future NMT network shall include LEV infrastructure, which could make daily trips more attractive.

At Skulte RB railway station, it is recommended to introduce bicycle racks and covered bicycle parking station. The existing main road connections are relatively narrow for supporting biking. Therefore, either an upgrade of the current road or a designated cycle line through recreational parks and green lands would improve the attractivity for bike mode.

For a bicycle connection, attention shall be given to integrating the future network with the existing Eurovelo 10 route which runs 9 km away from the future station. Moreover, additional touristic bicycle network routes could be extended from the railway station to the Baltic seaside (potentially 6 km with direct access through the greenfield). Since bicycle lanes will cross the national Road E 67 and P53, safe bicycle road crossings (or over/underpasses) shall be constructed.

Sustainable New Mobility Services

The railway station location distanced of 6 km from Skulte is suitable for last-mile journeys made with shared bicycles or cars. MaaS and on-demand transport would be an upgrade and potentially connecting the station with the urban area. Different shared light electric vehicles would attract people who arrive by train on a day visit or weekend. Shared offers could also be used to drive the public beach sides, as well as for short trips through the forest.

Since Skulte already offers a car rental service, it could potentially be also allocated at the railway station area.

Regional Mobility System Optimization

The station is in a suburban area relatively far from any large town, which suggests that if future growth plans are not being developed in parallel with the planning of the station, utilization of the station will be lower than potential. However, due to a future HS services the station area could be potentially attractive for considering a sufficient justification to focus future Transport Oriented Development (TOD) to leverage the new railway corridor access.

Future regional mobility system should have clear sustainable goals and services should be fully digitized where possible.

The station is located approximately one km from Highway 53 and six km from E67. To enhance the regional mobility system, improved railway station access is required in the form of new and better road connections. Local residential areas and villages would benefit from access to the station via adjacent local roads, which would offer better options for bus connections through the rural areas and, as a result, increase the coverage of the living areas and possibly also expand them.

Bike Parking and Passenger Drop-off Facilities

The experience of unregulated car parking at the existing Skulte railway station in the future shall be avoided. The RB railway station shall include a medium size car parking[17] with clear assigned zone as this will encourage commuters to utilize the station. Sufficient long term and short-term parking possibilities could be provided in direct connection to the station.

---

[17] For details of international benchmarking please refer to the Annex 1

As Skulte RB railway station will be developed in a greenfield area, an optimal location for parking and drop-off/pick-up areas could be chosen based on regional travel patterns. Convenient access to the station from Highway A1/E67, Skulte, and Road P9 to the east is essential to increase the catchment areas and attract more commuters.

To make railway transportation more attractive, a special P+R conditions for commuters could be introduced. This could be: reduced prices for P+R and railway tickets, special offer for charging use at regional railway stations, offers to combine P+R and tariffs for taking public transportation, etc.

Under the Annex 2 presented international examples of P+R size and base for railway regional stations.

RECOMMENDATIONS

SECTOR	HIGH LEVEL RECOMMENDATIONS
Population relocation	▪ Developing integrated land use plan around the station that that clearly plans land uses, provides incentives to develop the land uses most interested in this region; ▪ Given the nature aspect of the surroundings of this station, low-population density developments may develop to support commercial, industrial, and productive agricultural activities; ▪ The available land area at regional station could be used for developing a start- up or business city, which will attract more residents to travel or to relocate to Skulte;
Regional cohesion	▪ Maximize the utilization of the greenfield station within the land uses permitted to establish areas which will potentially serve transportation of regional agricultural products; ▪ Develop a small industrial side at the station connected to existing multimodal logistic services and the Skulte port; ▪ There is a potential for Skulte regional station to be part of an important tourist area given the natural reserves and the nature around the area. Therefore, it is recommended to allocate touristic information at the railway station, which will also promote bicycle routes for example to the Skulte Beach and forest; ▪ Integration of passenger and logistics catchment areas of Saulkrasti and Zvejniekciems;
Regional freight logistics	▪ Establishment of freight railway supply to the existing industrial side at the Skulte Port and existing in the area warehouses; ▪ Develop stronger railway connection to the Skulte LNG Terminal and enhance its logistic service; ▪ Create a strong transport integration service within the industrial area, which will also stimulate development of additional warehouses, production sites, etc.; ▪ Possibility to integrate the Skulte port and its service into Rail Baltica ecosystem;
Firm clustering	▪ Due to a regional focus, Skulte dominant firm clusters are Industry-, Agriculture driven; However, potential clusters development should be prioritized in existing cluster opportunities in service of broader economic development goals. There is a potential to develop business cluster providing more areas for offices and administrative buildings. ;
Digital connectivity	▪ Improve the attractiveness of the region as a place to live, where good digital connections facilitate the combination of remote working at home in close located big cities (Riga, Jūrmala, Jelgava). ▪ Due to the station's greenfield location, there is an opportunity to utilize the concept of "Dig Once" to deploy shared digital and energy infrastructure; ▪ In areas with low population density, the Neutral Host model could be an option to promote equal access to internet throughout the region;
Public transport & facilities	▪ Development of a wide public transport offer which will serve not only Skulte, but close located villages (Mandegas, Ziemeļblāzma, Dūči, Salzemnieki, etc.) ; ▪ Railway interchange development vis-à-vis the 1520mm Riga-Skulte line; ▪ Weather protected public transport station should be located in front of the railway building entrance and have priorities for pedestrians traffic. The station should provide spaces for PRM and enough sitting places. Operational information on buses and rail to be digitally integrated and shown. Information on network and interchange points to be also allocated at the public transport station; ▪ Interchange station including both Rail Baltica Corridor as well existing Skulte – Saulkrasti – Riga line; ▪ It is recommended to review PT operation using the existing Road P 53 and the more rural road leading from the Saulītes village to the Skulte town border; ▪ Establish a taxi station with a proper taxi rank and information on operations and tariffs;
Short distance & new mobility	▪ Developing a station with a design that enables any passenger, not matter their physical (or other) abilities to access the station comfortably. It is recommended that all infrastructure leading to the boarding areas are at level and minimal steps or barriers are installed; ▪ Development of parking spaces for e-bikes; ▪ Design potential places for a charging infrastructure (both for cars and bikes);
Regional mobility	▪ Provide long distance regional train stops at the station, for buses traveling on north-south and east-west directions; ▪ Consider the development of a network of multi-use paths that connect the whole region and provide access to socio economic and recreational activities;

SECTOR	HIGH LEVEL RECOMMENDATIONS
Bike, Kiss/ and Park + Ride	- Provide covered bike parking next to the station entrance (number of parking spaces will be based on the demand); - Allocation of sufficient P+R t places for at least 30 vehicles; - Introduce bicycle shared system and allocate required facilities (for LEV) and charging infrastructure (benchmarking is presented in the annex 3);

ZASULAUKS REGIONAL PASSENGER STATION

Zasulauks regional passenger station is located 3.5 km west of Riga city centre across the Daugava river. The station is located between two international railway stations of approximately 4.5 km west of Riga- Pasažieru railway station and 5 km north-east of Riga Airport. The new Rail Baltica platforms are located south of the existing 1520 mm tracks.

FIGURE 16 – ZASULAUKS STATION AND REGIONAL SORROUNDINGS (SOURCE: AUTHOR)

ZASULAUKS REGIONAL STATION	
STATION ID	OS445
LOCATION	New/Urban environment
POPULATION WITHIN 3 KM RADIUS [18]	158 000
NEAREST LARGE URBAN AREA	Riga City Center, approximately 6 km
NEAREST AIRPORT	Riga International Airport, approximately 6 km
RELEVANT ROAD CONNECTIONS	Lielirbes iela with an access to highway A10 approx. 2 km away from the station
RELEVANT BENCHMARKING FOR THIS STATION TYPE	▪ Leinelä Station; ▪ Jyväskylä railway station ; ▪ Espoon Keskus Station ;

TABLE 6 ZASULAKS REGION MAIN CHARACTERISTICS AROUND THE REGIONAL STATION

---

[18] Source: RB GIS data

Figure 17 below, presents a comprehensive review of some of the principal land uses around Zasulauks Station.
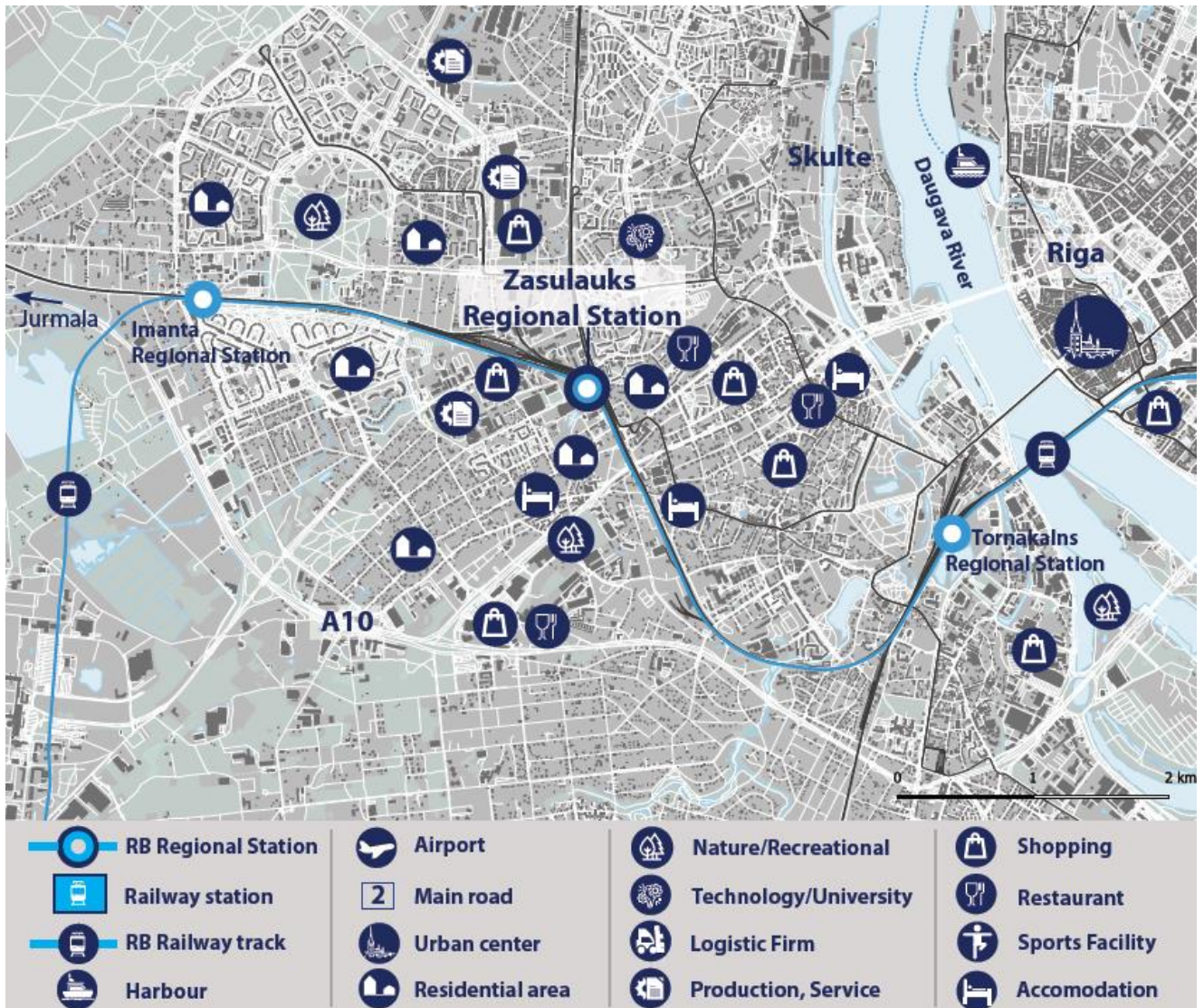
FIGURE 17 LAND USES WITHIN ZASULAUKS REGIONAL STATION'S SURROUNDINGS (SOURCE: AUTHORS)

ECONOMIC IMPACT AND REGIONAL COHESION

Population Relocation

The area surrounding the proposed location of the RB station mainly consists of old industrial buildings as well as low-density housing, but there are also local shops, a fitness centre, and a cafe within walking distance from the proposed station location. Several workplaces are also located south of the tracks, and the closest hospital is about 2 km south-east.

Moreover, Zasulauks station could play an important urban role since it is close to the major Pauls Stradiņš Clinical University Hospital while being located between RB Riga Central station and the RB Riga Airport station.

Zasulauks RB station features a great potential to provide services to the communities around the station but also brings opportunities for commuters who travel to Riga by becoming an important urban mobility hub, which will be strongly connected with surroundings and Riga central area. Furthermore, Zasulauks

station area features an important potential for developing a TOD community which will increase hosing stock and commercial activity.

The City of Riga is home to more than 30 percent of the population of Latvia. Although population growth in the country has seen a sharp decline since the decade of 1980, Riga City Suburbs have seen a steep increase in population in the last few decades. The movements of people from both outside of the Riga Planning area and from the central Riga City region depend on different factors including job availability and industry consolidation as well as land availability and price
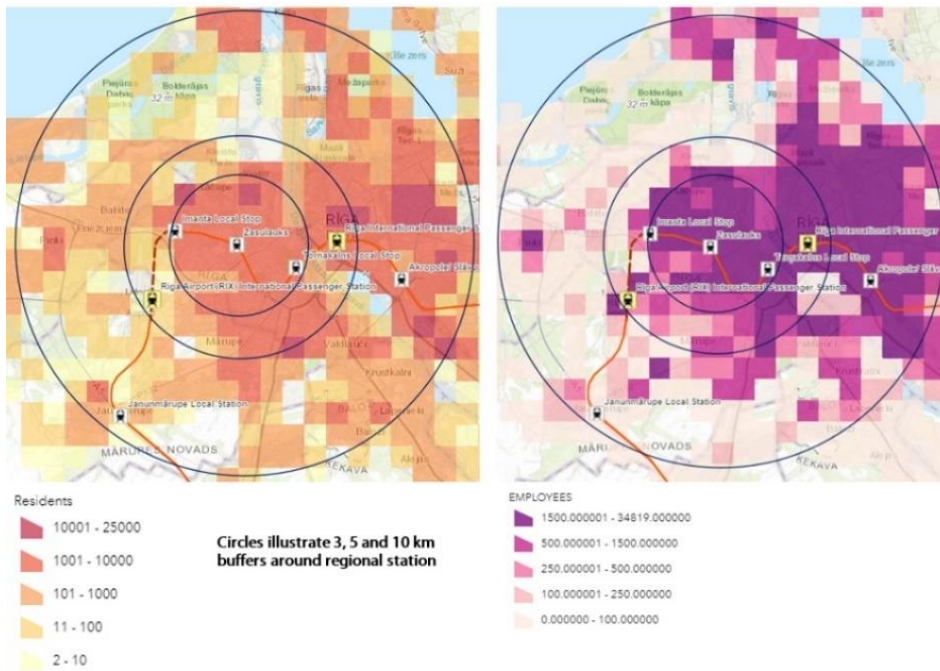

FIGURE 18 OVERVIEW OF POPULATION & EMPLOYMENT STATISTICS IN ZASULAUKS (SOUCE: RB GIS)

Regional Cohesion

Zasulauks RB station will be located a few kilometres west of Riga just across the Daugava River A new Rail Baltica bridge, equipped with bicycle lane connecting both parts of the river, will be constructed next to already existing railway bridge, which will enhance station access but also promote sustainable mobility. The population density and employment activity for this Riga suburb are high, and the station will be in a strategic position not only to potentially connect people with employment, but also for possible set up of small urban freight logistics or distribution centres (potential location will depend on land availability and the approved size of the distribution center, from international prospective this to be located 200m- 500m from the regional station) to serve close located sub- and urban districts area (Šampēteris, Pleskodāle, Zolitūde, Torņakalns, Dzirciems, Imanta).

The existing railway station building should be reorganised keeping its historical idea and design. The station building could be potentially extended and in the future propose shared working spaces for business or start- ups. The whole railway station area should be organised in a way of creating social interaction and business friendly spaces. Beside the focus of this area should be directed on green transportation and innovations.

The existing depo at the west side (200 m. from the railway), which might be removed to the east part of the river, could be used for developing commercial services, or for building offices. This area should not be used for any industrial activities.

Integration with Local and Regional Freight Logistics Network

Riga is an important centre for multimodal transport and logistics services offering air, road, maritime and railway connections that make the city a natural hub for Latvia and put it in a good position to be a central hub of the Baltic States.

The main economic sectors in the city are trade, transport & logistics services. Therefore, Riga has several modern facilities for freight logistics, which play an important trade role not only at a national, but also at an international scale.

The most important manufacturing city area was identified by the city strategic development plan and located at the Granīta Street(Latgale region)(16,3 km from the Zasulauks RB station) based on its strategic location in the south-eastern part of the city next to the railway and main road infrastructure. Moreover, the Freeport of Riga remains an international logistics and a trade hub, connected with both Zasulauks and the Latgale regions by road transport. Transit cargo from the Latvian regions and abroad could arrive at the port of Riga on the left bank of the River Daugava through the entrances of Stage III and IV of the planned Northern corridors; however, the Eastern main road and potential stage I of the Northern corridor could be used on the left bank of the River Daugava. Enterprises operating in the city will transport their port-related cargo mainly through the city circle that is conveniently connected to the Freeport of Riga. Following the proposal by the Riga Sustainable Development Strategy until 2030 the manufacturing and logistics services shall remain at the Port area with its logistic networks and transport communications using Road A6, E22 (along the river).

Zasulauks RB station is located within Riga's urban living area and currently provides only passenger service. This shall remain and any freight services and facilities should not be allocated within the area. The existing small urban logistic services nearby the station provided by private (DPD, BEWE RIX, SIA / Beweship, addPack Transport, TNT, etc.) companies. The future possible mobility hub at Zasulauks shall allocate urban logistics services with electric Last Mile Delivery using Mobile Smart Cargo Boxes. Such service will support optimisation of a multimodal simulation transport city framework for urban freight transportation of e-commerce deliveries. Attached to it, transport modes could be not only cargo bicycles, but also urban buses and commuter trains.

Depending on the transport mode, special infrastructure shall be introduced (car parking for at least 30 autos with charging facilities (depending on demand. The benchmarking in presented in the annex 3), direct assesses, reloading areas potentially within the railway station building or preferably in well organised separated zone (distanced in 200m. -500 m.). This service could be later integrated by railway transportation with the Pieriga region where key specifications of service types are air transport and postal and courier activities.

Railway communication at the Riga Loop is more relevant for passenger traffic. Freight transport, which is also not relevant for the Zasulauks station, should not be developed at this loop connection. Potentially, Riga loop creates reliable passenger access to the railway, especially from small villages in Salaspils.

Freight traffic should be concerned at harbour area and terminal. It created high potentials to develop logistic terminals at the west side of the city, which might be potentially reached over the Riga loop.

Firms Clustering

Since Riga city is strongly providing transport and logistics services, there are several private companies providing freight logistic networks, transportation services, production and manufacturing in Riga:

- Warehousing (for small private parcels);
- Support activities for transportation and logistics service - private operators "Baltijas ekspresis" in Ventspils, "Liepajas tranzita ekspresis" in Ventspils and "Baltijas tranzita serviss";
- Woodworking (not directly impact on the railway station service);
- Public administration and defence;
- Education;
- Health – near Zasulauks station is located one of the famous Pauls Stradiņš Clinical University Hospital, which offers number of working places for Riga residents. It means that the future

redeveloped into potential mobility hub station could be used by number of commuters coming to this district for work and study reasons;

Some of them create direct potentials for Rail Baltica cooperation especially for urban logistic services. Education and small business companies could be potential users of established shared working spaces and offices at the Zasulauks station.

Digital Connectivity

As the Zasulauks station is in the urban area of Riga, the area might have sufficient digital connections that citizens and businesses are able to utilize. Hence, the "Dig Once" concept cannot be deployed which in turn reduces the importance of the Rail Baltica as a driver to improve the digital connectivity in the neighbourhood. However, If the railway line is used as a backbone, extensions of the main fibre with access points could be created towards the city districts nearby, as the station is planned to be in the middle of the current city structure. There is also a possibility for the railway, by allowing other entities to connect to the already existing sub stations, to act as an emergency transmission grid or local renewable energy generation resource for e.g. charging facilities for public transport fleets or cars.

MOBILITY AND RELEVANT TRANSPORT CONNECTIONS

Public Transport and its Facilities

Riga is characterised by a high number of public transportation modes (rail, buses, trolley bus, tram etc.) and the 46.5% of work-related trips are made by using public transport[19]. The Zasulauks RB station is directly located in a living area and will provide a commuter services to residents in Zasulauks, Šampēteris and Āgenskalns suburban areas.

Following Riga development strategy until 2025, public transport organised in Zasulauks has a high accessibility. Due to its urban location and direct connections to living areas, Zasulauks RB station will be served by several bus lines i.e. No. 22 (Riga-Lidosta), No. 32 (Riga-Abrenes lela), No. 46 (covering districts north-east to south-east), and 56 (north-south including Riga port). In addition to local bus traffic, the station is also served by light rail route No. 2 (Riga-Tapesu lela) and cable car route 12 bound for north-west Riga.

Analysing the public transport routes the consultant could conclude that no additional routes or network shall be introduced. Due to the station's urban location and proximity to the country's capital, there is a great opportunity to benefit from already existing public transport services serving the area and the region. Routes and departure frequency could be adjusted in line with future expansion plans to create an attractive public transport network with the potential to make the station area thrive.

The backbone of transport access shall remain to railway service, where buses, trolley bus, trams will be feeders at the district. Moreover, to increase railway service attractiveness, the Zasulauks RB station could be organised as a public transport local hub.

A fundamental step in developing a public transportation hub is to understand and map the unique mobility needs of the community/region. Focus should be on providing more efficient and affordable transportation to all types of passengers, but it is also important to consider how the potential hub could be shaped to maximize stakeholder alignment/investments, generate sufficient return on investment, and improve the overall quality of life in nearby neighbourhoods. Attention should be given to establishing great better bus connectivity from Zasulauks to nearby districts and potentially to suburban where rail connections are limited (for example Mārupe, Krustkalni), as well as assure fast transfer within the railway station. Allocation of both public and suburban buses could be established in front of the railway station, where a tram station is introduced, to support multimodality mobility choices. In front of the station a taxi stop should be assigned (at least for 6 cars). This could be reorganised with better parking rules and operations being allocated on side for passengers.

Eateries, shopping, and other commercial establishments would help to create a vibrant station environment. Additionally, safe access between west and east side of the station (direct pedestrian road) to

---

[19] Factsheet - Riga, Latvia, 2018

be provided. In the future, the railway area should be completely redesigned to offer safe and fast NMT access at both sides of the station. Clear pedestrian intersections should be introduced with high standards. According to Rail Baltica, extensive negotiations with municipality and NGOs has resulted in the agreement of a pedestrian tunnel as the preferred choice. If a tunnel is introduced, it is of high importance that it is well lit, open, safe and accessed for all types of users. Moreover, the future tunnel could partly serve as shopping area creating arts or outlets (depending on approved final design). Potentially the tunnel space could locate one-time or annual art competitions to engage the local community in shaping the tunnel into a unique landmark attracting visitors to the area.

Short Distance Mobility

Upgrading and expanding the transport network are opportunities to redesign urban developments and the areas close to the station. Zasulauks RB station can offer great opportunity to create the best framework for urban development based on the TOD principles. Promoting walking as an option for short distance mobility is a key component in TOB. It is essential to provide adequate multi-use sidewalks (i.e. infrastructure supporting multiple recreation and transportation opportunities such as walking, biking and wheelchair usage), illumination, and green space installations that together create a good quality pedestrian experience, where convenience and safety are central. The less than five-minute walk to public facilities, shops and other attractions principle could be considered. An overpass in connection to the station is currently provided for pedestrians to cross the tracks, but the passage lacks sufficient lighting and safe, quality pedestrian infrastructure.

Similarly, promoting bicycling requires focus on convenience and safety. The station's urban location provides great opportunities to increase bicycle usage as the distance between the station and potential destinations in around the city, which is relatively short. Following the Riga strategic development plan, pedestrian and cyclist access and infrastructure have a high priority in transport hierarchical system. Currently, the bicycle network in Riga has 68 km, however mainly in central city areas. Within the next years (until 2030) it is planned to expand the network and build at public transport interchange stations for better bicycle access. The proposed future bicycle network also covers the area surrounding the regional railway station. Hence, it is important to integrate the bicycle network and routes with the railway station and other services to support a strong last mile connectivity.

Sustainable New Mobility Services

Since the station has an urban location there is a great opportunity to implement new mobility services. Despite being a low-density population area, the area surrounding the station offers shopping districts, a regional hospital, as well as a university, which is only 5 km away from the station location. Fast rail connections could create opportunities for stronger development of housing areas and attractions especially for students. It also mean that new sharing services could have demand generated among the young people using the area.

Therefore, the option to allocate shared services of e-scooters and e-bikes as a light mobility modes could be an attractive option for last-mile choice, also for visitors looking for a fast and affordable way to travel around. As already mentioned, Zasulauks could be developed as a small transport hub where LEVs could also be shared at strategic locations in and around the station, as well as at the main destinations surrounding it, the use of a private car could be reduced in favour of sustainable transport.

To increase the attractiveness of the station and promote modal shift towards sustainable modes of transport, facilities that offer safe, affordable, and convenient accommodation of personal LEVs is a key factor. Furthermore, travellers could be ensured that bringing their bicycles to the train station can be as convenient as taking the car, but also risk free in terms of having their bicycles vandalized or stolen. Hence, sufficient sheltered and unsheltered parking spaces, as well as LEV storage compartments could be provided in direct access to the station entrance.

Regional Mobility System Optimization

The location of the station in a suburban/light industrial area suggests that, if future growth plans are not being developed in parallel with the planning of the station, then utilization of the station will be under

optimal. Local urban planners could consider if there is sufficient justification to focus future TOD in this area to leverage the new railway corridor access.

The station is located within reasonable access to A10 and Lielirbes iela, which might make it possible to consider this station as an alternative to passengers from the western side of Riga boarding in the city centre. Furthermore, safe access ramps and connector roads must be planned for this location to ensure that high speed traffic along the motorway is not impeded by the enter/exit activity at the station. Local residential areas and villages would benefit from access to the station via adjacent local roads that complement any planned access from major roadways.

Bike Parking and Passenger Drop-off Facilities

B+R access should be supported with high quality bicycle lanes connecting to neighbourhoods (within 5km) and, if desired, cycle superhighway infrastructure to support access via longer distances. If such infrastructure is envisioned, then it could be also possible to provide secure parking as well as charging infrastructure at the station for e-bikes. Following Riga strategic development plan 2030 B+R stations should be made with an opportunity to leave bicycles safe for the night.

P+R at this location would make sense as it will likely attract regional passengers connecting to/from locations west of Riga who would prefer to avoid boarding/alighting at the central station. However, the total demand for this purpose is likely to be small and, therefore, total number of spaces for P+R purposes could be determined based on a calculation using a catchment area that does not overlap with access from the north. Current car parking in front of the station should not be allowed. Clearly rules for car driving and parking within railway area shall be changed.

RECOMMENDATIONS

SECTION	HIGH LEVEL RECOMMENDATIONS
Population relocation	- Developing integrated land use plan around the station that that clearly plans uses, provides incentives to building housing and commercial/industrial uses; - Developing housing strategic plan that integrates with land use and provides affordable housing for local populations and incentivises regional movement from nearby regions in Latvia; - Integrate the station design into Zasulauks park to the south of the tracks; - Create strong social interaction places and potentially develop business area with offices and shared working places;
Regional cohesion	- Maximize the utilization of the station area to establish a strong passenger transport hub but also a strong institutional hub where community centres, hospitals and other government institutions could place offices and service centres ; - Developing a TOD concept and commercial development; - Create attractive commercial activities for visitors coming from other small districts or villages;;
Regional freight logistics	- Take advantage of location to potentially consolidate regional distribution centre outside of Riga central areas; - Utilize current industrial locations at the future station to potentially develop a small business area. No freight logistic to be handled at Zasulauks; - Develop small urban logistic center for parcel service at the future railway station; - A cooperation with air service to enhance multimodal logistic could be reviewed. Potential terminal location should be reviewed at the west side close to the harbour;
Firm clustering	- Future potential is seen in developing industrial clusters, which could also be served by railway transportation (fast train courier services); - Cooperation focus should be small logistic and education, business sector companies;
Digital connectivity	- Utilization of potential digital networks to be built in connection with Rail Baltica to improve regional connectivity with fixed network technologies (main fibre connections) to improve space efficiency in the urban area rail corridor; - Development of a digital connectivity strategic plan to understand the potential to maximize digital connectivity in the Riga metropolitan area; - Potential to provide emergency transmission grid and function as a local renewable energy resource by allowing third-party operators to connect to the railway substations
Public transport & facilities	- Strongly improve connections of commuter services to residents in Zasulauks, Šampēteris and Āgenskalns suburban areas; - Update the city a public transport plan and integrate infrastructure planning considering a railway station area and reorganised railway service; - Organising of several taxi stations (at least for 6 vehicles) with ranks and clearly introduced operational rules and tariffs; - Ensure a good connectivity between city urban transport and potentially introduced regional buses at the railway station; - Potentially develop at the station a regional public transport hub as a main transfer point for passengers arriving to Riga from other parts of the Country and region; - The entire design of Zasulauks should be based on a barrier-free concept, and the station should offer additional assisting services for PRM; - Since the railway station will be closely located to the airport, beside rail connections it is proposed to enhance urban transport service to the airport;
Short distance & new mobility	- Developing a station with a design that enables any passenger, not matter their physical (or other) abilities to access the station comfortably (introduce free steps solutions); - As part of a connected and direct bike infrastructure network of multi-use paths, develop protected multi-use (walk/bike) path between station and immediate main arteries - Integrate planning by the Riga city bicycle routes with the railways station and provide direct access to the building; - Design parking and charging spaces for e-scooters and e-bikes; - Ensure there is good connectivity (above rails) between both sides of the station, especially given the complex intertwined nature of the rail system at Zasulauks ;

SECTION	HIGH LEVEL RECOMMENDATIONS
Regional mobility	▪ Ensure good and frequent complementary to railway transportation services connections both regional and suburban directly to the Zasulauks station; ▪ Development of a transit plan to adapt existing bus services and potentially provide new bus services to the station; ▪ Plan potential new bus lines that could connect the northeast and southeast parts of Latvia (in and outside of Riga Planning area) and provide access to the station;
Bike, Kiss, and Park + Ride	▪ Provide covered bike parking (double system) next to the station or covered parking either at station building or in adjacent building. This will In order to promote bicycle transport as an efficient commuter; ▪ Allocation of sufficient P+R the number of parking slots (at least for 30 vehicles) could be determined based on demand study to be carried out; ▪ Introduce Shared Light Electric Vehicles with respective charging infrastructure (international experience is presented in the annex 3); ▪ Introduce K+R stations in front of the station building with clear parking rules (15-30 min.)

BAUSKA REGIONAL PASSENGER STATION

Bauska is a town in Bauska Municipality in the Zemgale region of southern Latvia. The city is located 66 km from the Latvian capital Riga and 20 km from the Lithuanian border on the European route E67. The future station is proposed to be located about 5 km east of Bauska town, in between Mūsa river and Mēmele river. The station is a greenfield and has a distance of approximately 2 km to the nearest housing district Mūsa. There are currently no other establishments in the direct vicinity of the proposed station location. The area has rich nature resources and famous tourists destination in Latvia
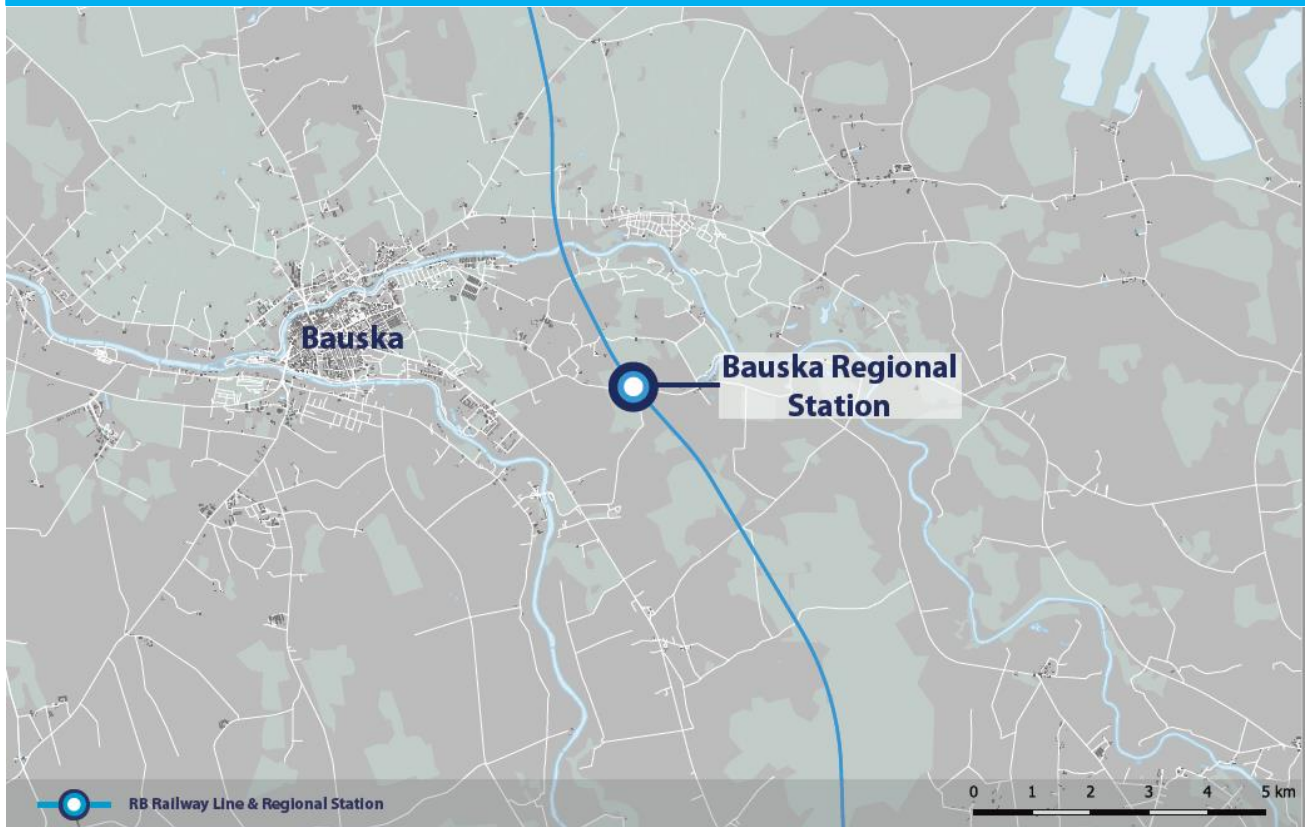

FIGURE 19 – BAUSKA STATION AND REGIONAL SORROUNDINGS (SOURCE AUTHORS)

BAUSKA REGIONAL STATION	
STATION ID	0S570
LOCATION	Greenfield
POPULATION IN 3 KM RADIUS[20]	1 200
NEAREST LARGE URBAN AREA	Riga City Center: 72 km, Riga Airport: 81 km
NEAREST AIRPORT	Tallinn International Airport, 57 km
RELEVANT ROAD CONNECTIONS	Bauska station is approximately 2 km east of Highway A2/E67
RELEVANT BENCHMARKING FOR THIS STATION TYPE	▪ Mikkeli railway station; ▪ Toijala Station; ▪ Riihimäki Station;

TABLE 7 – BAUSKA REGION MAIN CHARACTERISTICS AROUND THE REGIONAL STATION

---

[20] Source: RB GIS data

Figure 20 below, presents a comprehensive review of some of the principal land uses around Bauska Station.
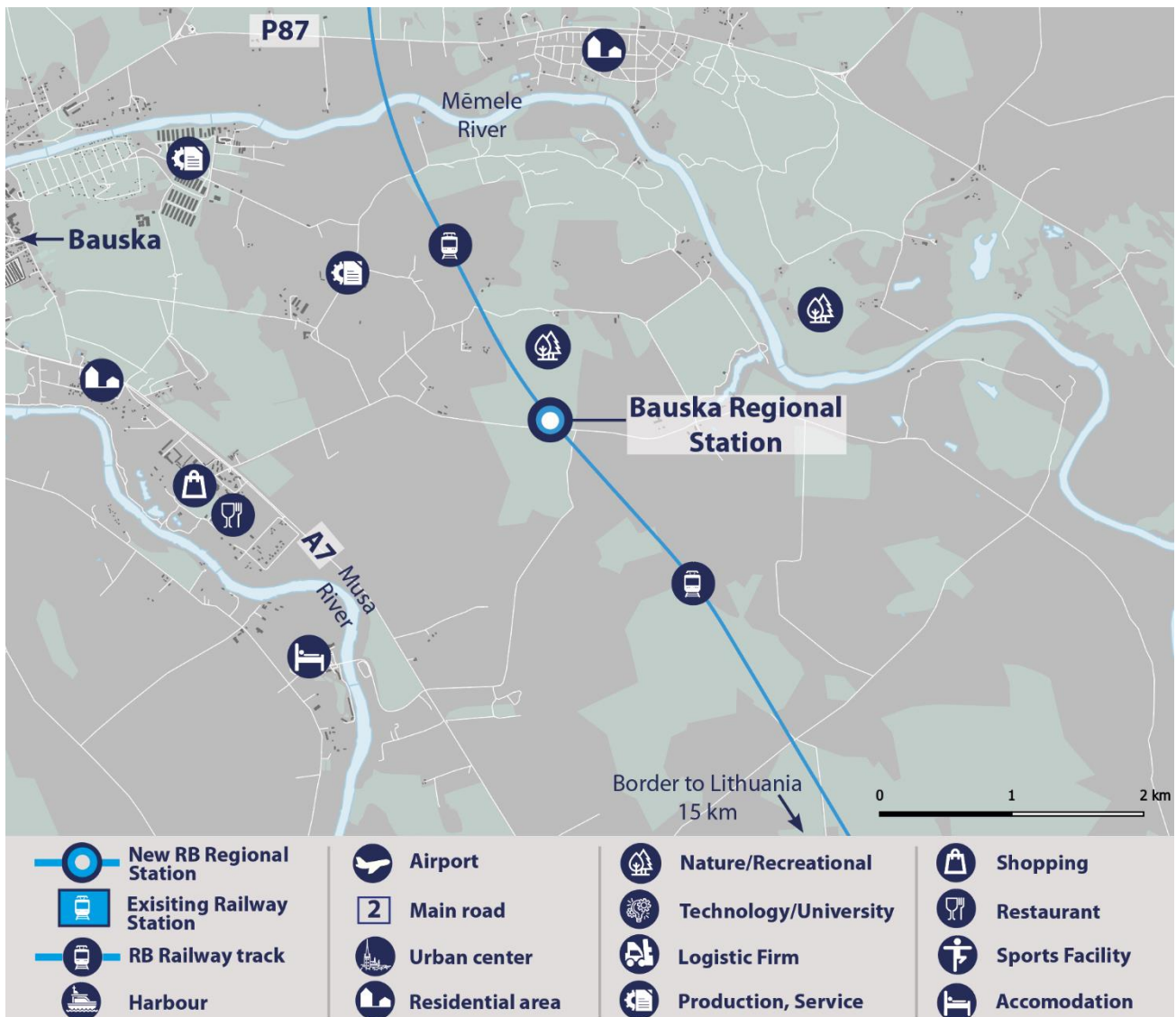

FIGURE 20 LAND USES WITHIN BAUSKA REGIONAL STATION'S SURROUNDINGS (SOURCE: AUTHORS)

ECONOMIC DEVELOPMENT AND REGIONAL COHESION

Population Relocation

Bauska Town is a regional importance centre whose merging with the adjacent villages has already begun. The new agglomeration of Bauska is in progress, Bauska Town is growing, and its role and significance as a development centre is also increasing.

Bauska County's Strategy of Sustainable Development for 2012-2030 is a long-term planning document. The strategy determines the vision of the county's development, long-term development priorities, and strategic objectives. The implementation of the strategy is closely related with the implementation of the county's development program (DP), which determines the activities for a seven-year period and an investment plan for at three years period. DP is an instrument for implementation of the strategic objectives and priorities determined in the strategy section that includes an action plan and an investment plan.
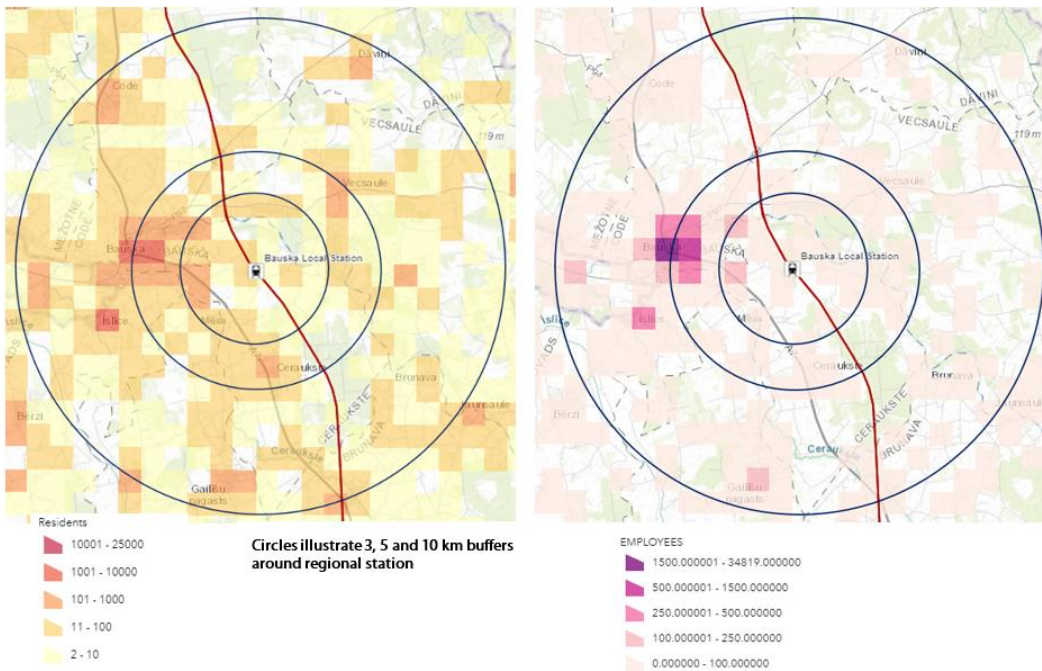
Residents
- 10001 - 25000
- 1001 - 10000
- 101 - 1000
- 11 - 100
- 2 - 10

Circles illustrate 3, 5 and 10 km buffers around regional station

EMPLOYEES
- 1500.000001 - 34819.000000
- 500.000001 - 1500.000000
- 250.000001 - 500.000000
- 100.000001 - 250.000000
- 0.000000 - 100.000000

FIGURE 21 OVERVIEW OF POPULATION AND EMPLOYMENT STATISTICS IN BAUSKA (SOUCE: RB RAIL GIS)

Regional Cohesion

According to analyses by the OECD, Latvia still features gaps in productivity and development when comparing large metropolitan areas and rural areas away from metropolitan areas. However, at the European scale most of Latvian urban areas are comparatively small, thus many of them lack critical mass of resources necessary for growth. As a result, cooperation between urban areas and complementarity of their roles is crucial. Specialisations of these municipalities should be strengthened, and functional links with rural areas should be further developed, as currently their positive impact on the development of their surrounding areas is limited. In fact, most urban areas face a challenge of population decrease, except around the capital city. There is insufficient connectivity between national and regional development centres and rural areas.

The Bauska regional station is located within the Riga planning region. In terms of GDP per capita, Riga is the region that has the highest GDP per capita, while Latgale region in the eastern part of the country features the lowest rates of GDP per capita. Although the country as a whole has experienced positive growth in terms of social and economic development between 2000 and 2019, Latvia still features important disparities among regions today.

Integration with Local and Regional Freight Logistics Network

The main transport mode for freight logistic is provided by road transport (trucks) which uses the existing logistics network and connections with the international and inter-city traffic route Russia – Daugavpils – Aizkraukle – Bauska – Eleja – Dobele - Liepaja. Typical connections run through the regional motorways P103 Dobele – Bauska (crossing Bauska Town), P87 Aizkraukle -Bauska (crossing Bauska Town, Code and Vecsaule Parishes), P88 Bauska – Linde (crossing Bauska Town, Code and Dāviņi Parishes), P89 Ķekava – Skaistkalne (crossing Dāviņi and Vecsaule Parishes). In the future, there is a logistic area planned to serve agriculture productions, eco productions, warehouses, and logistics services.

This area will be designated as an industrial zone and will be located between the future railway station and the national Road A7 (as it is shown at the figure below), which has direct connections to Berlin and Helsinki. This means that rail transport could be integrated into the future logistics network (only about 5 km from the passenger station). Potentially, the attached area to Industrial Park could be converted into a railway terminal and serve international cargo transportation.
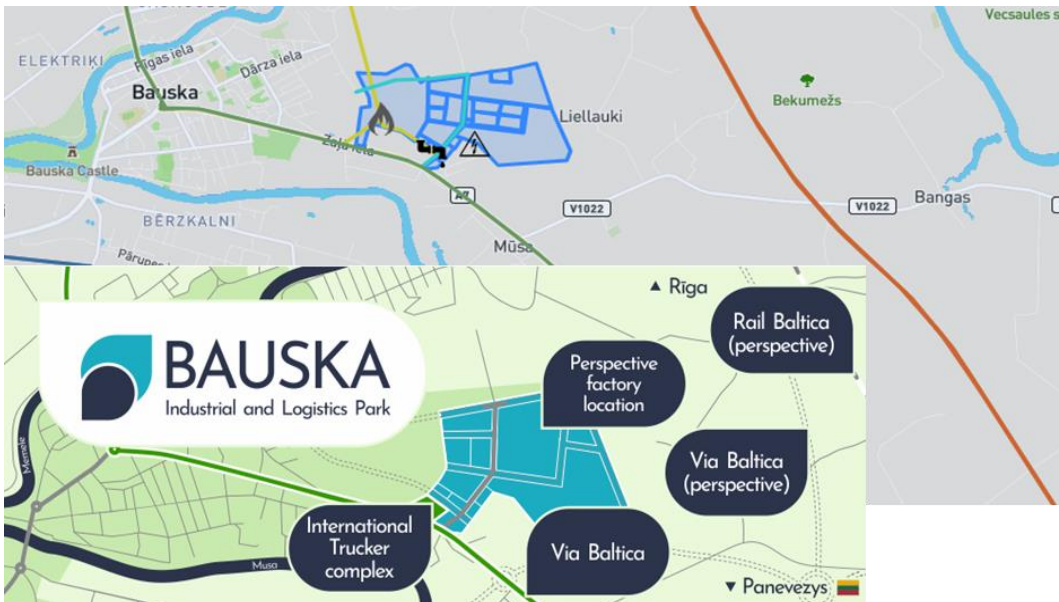
FIGURE 22 BAUSKA LOGISTIC AND WAREHOUSE SERVICES[21] (SOURCE: INVESTBAUSKA.EU)

Currently the total area for these services is about 115 ha, 86ha for industry and business purposes. It is expected that the industrial and logistics park area will offer (partly relevant for railway transportation):

- Processing manufacturing (food processing, beverages production, woodworking, printing and reproduction of recorded media, machinery and equipment repair and installation, fabricated metal product manufacturing, furniture manufacturing);
- Wholesale and retail trade; repair of motor vehicles and motorcycles;
- Agricultural production with specialization in plant propagation
- Construction, including design;
- Transport services and storage;

Future potential physical connectivity to the Industrial park should be done based on the final design of the Bauska park. However, currently available materials show that the access could be organised over the main HS line. It is important to note that frequent freight rail transportation might have an impact on passenger services.

To insure strong freight railway transportation it is important first to establish a clear understanding of a railway transport role at the national and international levels. Rail transportation should obtain priorities for cargo especially to Central European countries.

Firms Clustering

Bauska is a historically important centre at the junction of Memele and Musa rivers, which over the centuries has evolved as an important centre for trade between Latvia and Lithuania. The area is well known for its developed agriculture, industry and shipping services. There is about 80% of land used for agriculture business, and around 13% for a forestry. Therefore Agriculture, i.e. livestock farming and crop farming, is the main field of entrepreneurship in Bauska.

In Bauska, more than 97 enterprises are successfully operating for several years. Most of them are operating in the county as micro- enterprises with the number of employees up to 10. In accordance with the data of Lursoft Ltd., the largest companies of the Bauska County with annual turnover exceeding 1.5 million Latvian lats are Lielzeltiņi Ltd., Uzvara – lauks Ltd., Cooperative Company of Agricultural Services Saimnieks-V, Korn Ltd., Kvēle Ltd., PS Līdums Ltd., Bauska's alus Ltd., Bauskas tirgotājs Ltd., Abra Trade Ltd. and Latvian-Swedish Firm Bērzkalni.

---

[21] Source: https://www.investbauska.eu/#map

From the analysis of the operating firms in the area, the following clusters could be identified:

- Agriculture and Productions ("Bauskas alus" is well-known for brewery, and as a producer of the non-alcoholic malt beverages "Veselība" and "Porteris". Aviculture company Lielzeltiņi Ltd. provides approx. 30% of the poultry meat produced in Latvia and approx. 65% of the production are sold in a cut form. Kronis Ltd. is a fruit and vegetable processing company
- Transportation and logistics
- Electric and hardware manufactories ("Vizulo" LTD manufactures outdoor and indoor lighting and spotlight; "Kvēle" LTD deals with the design, construction and operation of electrical installations and power supply facilities)
- Tourism and culture (local companies promotes tours to 57 national importance cultural and historic monuments)
- Education (19 general education institutions, 7 preschool, 6 vocational institutions)

Digital Connectivity

Due to the station's greenfield location, it would be possible to implement the "Dig Once" strategy to provide shared transport, digital and energy infrastructure at the station and along the railway track.
The area surrounding the station is characterized by low population density, which could cause issues in terms of 5G deployment due to high cost-to-customer ratio for telecom operators who simply do not see the benefits in investing in infrastructure and maintenance to serve only a few users per node. Hence, the Neutral Host model could potentially be adapted to deploy fast and convenient 5G internet access to local communities, schools, hospitals and other local entities.

Furthermore, the logistics centre planned for Bauska can take advantage of improving digital connections. Bauska RB station will enable the area to be comprehensively connected to the fibre network, from which it will be necessary to implement 5G access points to the area. The extension of the network connection to the needs of the logistics centre could take place from the Rail Baltica corridor along the A7 road. The extension could also be planned to go directly to Bauska town

Being less than 20 km from the Lithuanian border, Bauska RB station also creates opportunities in terms of deploying high bandwidth cross-border networks (terabit/s), which could bring significant economies of scale to the region. .

MOBILITY AND RELEVANT TRANSPORT CONNECTIONS

Public Transport Services and Facilities

With future development of the Bauska RB station, Bauska will be at a short ride to Riga central (48 min.) and the Riga international airport (35 min.). Furthermore, Rail Baltica regional trains are planned to provide direct connections towards North and South, including cross-border regional connections, e.g. to Panevezys and Kaunas in Lithuania.

Due to its current rural location, the proposed area for a regional station is not served by public transport. The closest bus stop is in Bekas, and it operates three times per day with Route Nr. 6374 running between Bauska town and Tunkuni. Bauska also offers a very strong network of regional bus (partly national) connections which includes more than 36 routes. International bus connections mainly depart from Riga with a mid-stop in Bauska to: –Bonn, Freiburg, Stuttgart, and Prague.

To increase the station's catchment area, the connecting public transport network should be expanded. The future railway station shall allocate city, regional, and some national bus services. All existing suburban, regional and international connections shall be allocated at the RB station, to become a multimodality transfer hub. Public transport stations within Bauska city have clear stop signs, weather protection waiting area, though the information on bus operations is missing at each city stop.

Short Distance Mobility

Bauska RB station is planned to be located at a rural location 2 km from Bauska featuring a minimal amount of development in its surroundings. Such distance is too long for daily commuting walking, whilst can be covered by bicycle and other short distance mobilities such as private scooters.

However, for this station the road leading to Bauska village from the station is gravel. For daily bike commuting the majority will find this inconvenient, therefore, attention should be given not only to introduce bike lanes to Bauska and the closely located villages.

Also to develop a safe and high-quality road connectivity will prove essential. Following the Bauska sustainable development plan, a convenient access both physically (roads, transport) and virtually (Internet and other modern technologies since exchange of information does not always require physical presence) are a priority for the development of the Bauska County.

It is recommended to establish a strong connection of bicycles to the railway station and introduce number of bike racks, as well as racks for private scooters directly at the railway station. In the planning of the outlet of the station area, should also make sure that both pedestrian infrastructure and bicycle infrastructure including multi-use sidewalks/bicycle paths, illumination, and signage must be provided to make the non-motorized modes compete with the usage of private car.

Since Bauska and attached to the railway station area has access to natural resources, building attractive routes for example next to the Mēmele River could bring added values both to the city and station.

Sustainable New Mobility Services

Even though many of the new mobility services do not require the same infrastructure as private short distance mobility, since it is shared among many users and is flexible in use and demand, the potential for new services such as MaaS is low around this station. Considering the area's very low population density, the expected travel demand would not justify the implementation of LEV sharing. To increase the attractiveness of the station and promote modal shift towards sustainable modes of transport, facilities that offer safe, affordable and convenient accommodation of personal LEVs and bicycles is key. Travelers should be ensured that bringing their bicycle or LEV to the train station can be as convenient as taking the car, but also risk free in terms of having their property vandalized or stolen. Hence, sufficient sheltered and unsheltered parking spaces, as well as LEV storage compartments should be provided in direct access to the station.

Regional Mobility System Optimization

The location of the station in a rural area far from any large town suggests that, if future growth plans are not being developed in parallel with the planning of the station, then utilization of the station will be minimal. Local urban planners should consider if there is sufficient justification to focus future TOD in this area to leverage the new railway corridor access. The station is nearby A7 and P87 but requires new connections to make access possible. The catchment size of this station would have to be large to justify its use in this way. Local residential areas and villages (e.g. Bauska) would benefit from access to the station via adjacent local roads. Bauska station will be located not far from the Lithuanian border, which in combination with EU's support of free movement within its borders, raises the issue of cross-border mobility. Cross-border mobility is not only concerned with workers commuting between two countries on a daily basis, but it also include e.g. students participating in exchange/educational programs, people visiting friends and relatives, as well as holiday-goers. Studies have shown that young, highly educated Europeans are particularly keen on moving between member states for a shorter period of time. Hence, facilitating solutions for convenient cross-border mobility could increase the pool of potential workers in the region. An example of such mobility initiatives could be cross-border mobility programs such as the EU Erasmus program, but also free of charge language support classes organized by local authorities in the receiver country to minimize linguistic barriers.[22]

Bike Parking and Passenger Drop-off Facilities

Park and Ride access should be supported with high quality bicycle lanes connecting to local neighbourhoods and villages (within 5km) and, if desired, cycle superhighway infrastructure to support

---

[22] https://www.epsu.org/sites/default/files/article/files/EPSU-Report-Migration-Health-Workers-Summary_Recommandations-EN.pdf

access via longer distances. If such infrastructure is envisioned, then it could also be possible to provide secure parking as well as charging infrastructure at the station for e-bikes.

P+R at this location would be minimal as there are few regional passengers connecting to/from nearby locations; however, the total demand for this purpose is likely to be small and, therefore, the total number of spaces for P+R purposes should be determined based on a calculation using a large catchment area. To encourage commuters to utilize the station, sufficient long term and short-term parking possibilities must be provided in direct connection to the station. As Bauska Station will be developed in a greenfield area, an optimal location for parking and drop-off/pick-up areas could be chosen based on regional travel patterns. Convenient access to the station from Highway A2/E67, Mūsa, and Bauska is essential to attract more commuters.

RECOMMENDATIONS

SECTOR	HIGH LEVEL RECOMMENDATIONS
Population relocation	▪ Bauska could be one of the attractive city in Latvia for future population relocation. Therefore it is recommended to develop an integrated land use plan around the station that clearly provides incentives building housing and commercial/industrial areas; ▪ Developing housing strategic plan that integrates with land use and provides affordable housing for local populations and incentivises regional movement from nearby regions in Latvia;
Regional cohesion	▪ Maximize the utilization of the greenfield station to establish a strong passenger and institutional hub where possibly community centres, hospitals and other institutions could place offices and service centres; ▪ Develop attractive tourism (green and agriculture) offers which could make station area more attractive for various group of users (also allocate hotels and relevant commercial service);
Regional freight logistics	▪ Due to its strategic location, consider development of a railway corridor-wide strategic freight logistics plan that includes Bauska Station as a potential important distribution centre not only for regional purposes, but also for international especially to Lithuania;
Firm clustering	▪ Establishment of possible freight railway supply to the planned warehouse due to the strategic positioning of Bauska station between Riga and the border with Lithuania; ▪ Develop agriculture cluster and provide railway service for long- distance transportation;
Digital connectivity	▪ Provide network access point to provide access to 5G connections for the nearby community and businesses (up to 40 km away), especially for future logistics services; ▪ Deploy "Dig Once" strategy to provide shared digital infrastructure/energy infrastructure in the region; ▪ Potential to adapt Neutral Hosts model to increase 5G connectivity in areas around the station with low population density to strengthen regional cohesion and information accessibility; ▪ Potential to set up high speed cross-border network between Bauska and the Lithuanian border paving way for significant economic of scale ;
Public transport & facilities	▪ Introduce PT routes to serve the Bauska city and attached suburban regions. Potentially review opportunities of building tram connections; ▪ Public transport stop should be located in front of the station entrance with prioritised pedestrian flow, Moreover, the station should be weather protected, provide place for PRM and allocate digital information on transport operation and travel timing; ▪ The whole station area should consider barrier free design and concept; ▪ Development of a regional transport integration and infrastructure plan to relocate regional bus network to the railway station; ▪ Introduce separate regional and city bus stops closely located to the railway station building. Each of the bus stop has to provide operational times and served station, as well as information on tariffs. Additionally it is recommended to allocate a sales office at railway for all kind of transportation modes ;
Short distance & new mobility	▪ Developing a station with a design that enables any passenger groups free access the station comfortably; ▪ As part of a connected and direct bike infrastructure network of multi-use paths, develop protected multi-use (walk/bike) path between station and the town of Bauska to the west of the station; ▪ Develop city and regional wide bicycle network being used for commuter and tourists purposes;
Regional mobility	▪ Ensure good and frequent public transportation services connect directly to the Bauska's station from Bauska town and connecting other towns west along the Lielupe River; ▪ Development of a transit plan to adapt existing bus services or provide new services to the station;
Bike, Kiss, and Park + Ride	▪ Provide bike parking station with a sufficient number of parking slots (double system is recommended). The future should preferably be located directly at the railway station building; ▪ Allocate K+R in front of the station building with clear parking rules (not more than 30 min.

KAIŠIADORYS REGIONAL PASSENGER STATION

Kaišiadorys is the capital of Kaunas county, the second-largest region in Lithuania after Vilnius. The regional station is located in the metropolitan area with a semi-central location in Kaišiadory city. While the northern side of the city is mainly consisting of detached housing districts, the southern side contains the heart of the city including a mix of housing, commercial areas, workplaces and restaurants.
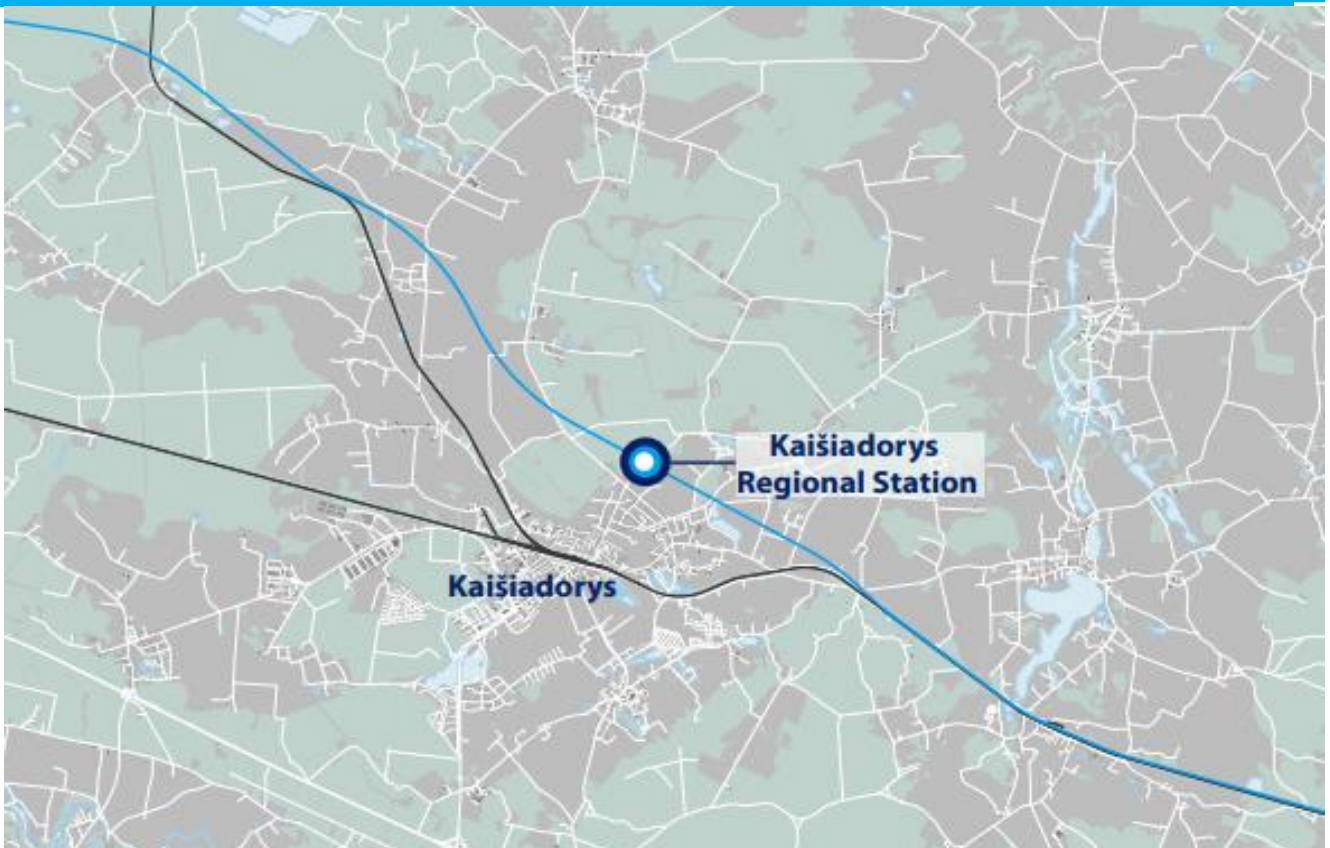
FIGURE 23 LOCATION OF THE KAIŠIADORYS REGIONAL PASSENGER RAILWAY STATION (SOURCE: GIS)

Kaišiadorys RB station is intended as regional train station and interchange to 1520 mm services from/to Jonava, Kėdainiai, Šiauliai, Klaipeda. In the current model this station serves as passing loop and regional train stop. This should be reconsidered depending on final decision about implementing Kaišiadorys bypass. Depending on final decision about overtaking facilities at Kaunas triangle and on implementation of Kaišiadorys bypass optional loop lines dedicated for freight trains shall be foreseen.

KAIŠIADORYS REGIONAL STATION	
STATION ID	OS710
LOCATION	Suburban
POPULATION IN 3 KM RADIUS[23]	4 000

---

[23] Source: RIS GIS data

NEAREST LARGE URBAN AREA	Kaišiadorys, 0-2 km (depending on final location)
NEAREST AIRPORT	Kaunas International Airport, 45 km, Vilnius International Airport, 70 km
RELEVANT ROAD CONNECTIONS	Kaišiadorys is on the A1 (E85) highway, which connects Lithuania's three largest cities. The A1 also directly connects with the Via Baltica highway, which links Eastern Europe with Western Europe and Scandinavia.
RELEVANT BENCHMARKING FOR THIS STATION TYPE	▪ Hoshakuji Station; ▪ Jyväskylä railway station; ▪ Korneuburg Railway Station;

TABLE 8 KAIŠIADORYS REGION MAIN CHARACTERISTICS AROUND THE REGIONAL STATION

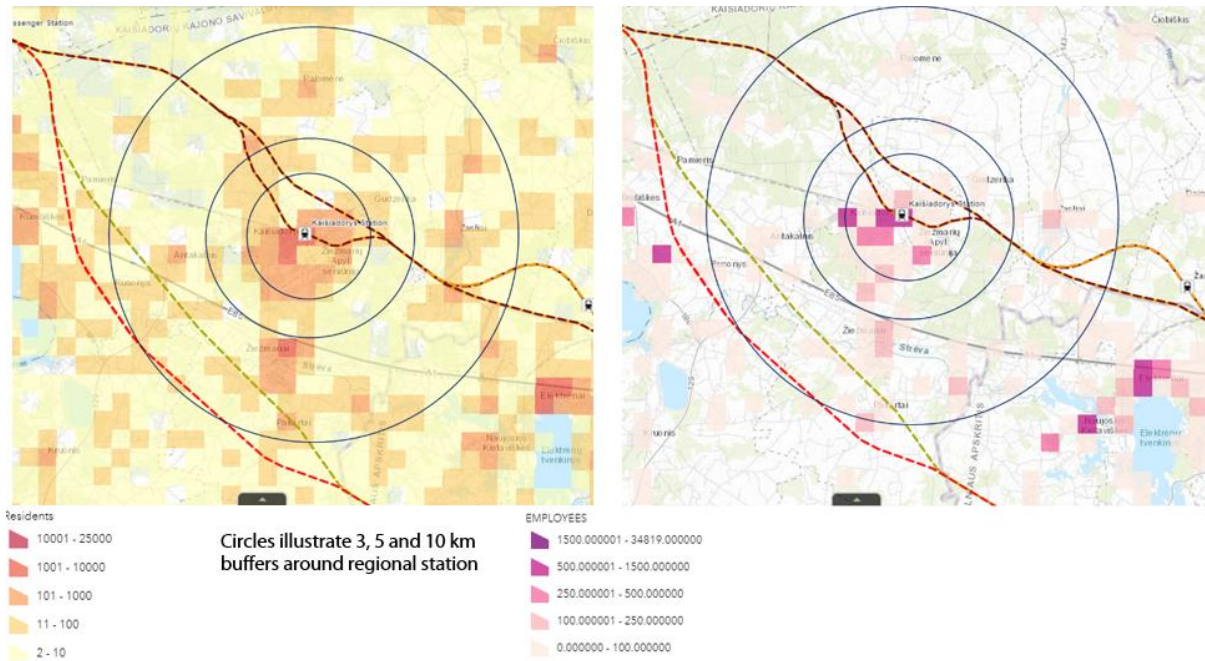The figure below, presents a comprehensive review of the principal land uses around Kaišiadorys.

FIGURE 24 – LAND USES WITHIN KAIŠIADORYS REGIONAL STATION'S SURROUNDINGS (SOURCE: AUTHORS)

ECONOMIC IMPACT AND REGIONAL COHESION

Population Relocation

The town of Kaišiadorys is positioned in a strategic region between Kaunas and Vilnius. Such characteristic makes the location for the future Rail Baltica Regional Station critical, not only for the potential for economic development, but also for the potential that it is presented by this opportunity to further develop this region into a productive centre with job opportunities and social development potential. The city of Kaišiadorys has seen itself expanding in terms of development and population growth.

Kaišiadory strategic location provides a strong potential for people from large cities to potentially consider relocating in this area[24].

Residents

	10001 - 25000
	1001 - 10000
	101 - 1000
	11 - 100
	2 - 10

Circles illustrate 3, 5 and 10 km buffers around regional station

EMPLOYEES

	1500.000001 - 34819.000000
	500.000001 - 1500.000000
	250.000001 - 500.000000
	100.000001 - 250.000000
	0.000000 - 100.000000

FIGURE 25 OVERVIEW OF POPULATION AND EMPLOYMENT STATISTICS IN KAIŠIADORYS (SOUCE: RB RAIL GIS)

Regional Cohesion

Kaišiadorys is located in the Kaunas county and the second-largest region in Lithuania after Vilnius. Kaunas is an important centre of Lithuanian economic, academic, and cultural life. Due to Kaunas rich cultural life and festivals being arrange every year the city was named European Capital of Culture for 2021[25] by the European Commission, and stays an attractive destination (both work, study and as a destination for free time) for citizens coming from Kaišiadorys.

The Kaunas county, including Kaišiadorys is strongly oriented on industrial developments and trade primarily within the food and beverage industries, textile and light industries, chemical industry, pharmaceuticals, and metal industry. Railway between Kaunas and Vilnius, where biggest railway hubs are, Kaišiadorys plays a crucial role of a between stop and provides valuable freight and passenger transportations.

Integration with Local and Regional Freight Logistics Network

Kaišiadorys is a small city strongly oriented on providing logistic transportation services. The main transport modes used for regional logistic links are road and rail. Moreover, through a strong rail and road connections to Riga, Kaunas, and Vilnius this network is expanded to provide shipping and air transportations. Klaipėda Seaport is accessible from Kaišiadorys in two and a half hours by road. Well-

---

[24] Kaunas, including Kaišiadorys, Vilnius and Klaipėda regions, account for 70% of Lithuania's GDP and are home to the majority of the country's industries and service centers, although only accommodating 60% of the country's population.

accessed rail infrastructure in the city offers great connections from Kaišiadorys to Kaunas, which is one of the key rail distribution hubs in the Baltic States.

At and around the city there are no multimodal logistic centres (warehouses). Currently there is a small industrial areas accessed by road transport only and assigned to private companies which provide limited service of food storages. Kaišiadorys city plans to extend an industrial zone, which should be located between the railway tracks, and Vatyuto Didziojo street. This obviously could create potentials for developing multimodal logistic centers (3PL) and a better access to regional logistic networks. Freight transport could be transported by rail directly to Riga and Kaunas.

Firms Clustering

The focus of the most efficient economic sector in the city is food and wood processing. In this sector, the six biggest companies employ 10% of the total working population and provide mainly manufacturing service:

- Kaišiadorių Paukštynas and Dovainonių Paukštynas (Livestock)
- Nematekas and Žiežmarių Mėsa (food processing)
- Gudobelė (bakery for regional and local distribution)
- Clemence Richard (manufacture of wood furniture)
- Desė (fish processing)
- Roda (doors manufacturing);

In this respect, the region around Kaišiadorys station could have a consolidated manufacturing and logistics services given the strategic location between Kaunas and Vilnius.

Moreover, the city has technology schools where the focus is to provide knowledge which will be important for regional developments and relevant economic sectors: 33% are studying either engineering or manufacturing (421 students). The city is also a popular destination for rural tourism.

Digital Connectivity

A larger network access point should be available at Kaišiadorys station to provide access to 5G connections for the passengers and neighbouring districts, especially the housing districts located east of the proposed station. As the station has a suburban location rather than a rural/greenfield location, the areas surrounding the station might already have sufficient digital connections that citizens and business are able to utilize. However, the railway line could still constitute a main fibre connectivity backbone offering the possibility for local communities, businesses, and industrial areas who could gain access to high-speed networks through local fibre extensions via access points. Furthermore, the railway substations could potentially be utilized as emergency transmission grids and sources of local renewable energy generators for example various types of charging facilities.

MOBILITY AND RELEVANT TRANSPORT CONNECTIONS

Public Transport and its Facilities

The future passenger railway station is planned to be located close to the city living district on the north in parallel to the 1801 route. Kaišiadorys station is currently not served by public transport. Moreover, there is no sufficient road access to the future station.

Kaišiadorys city is easily accessible by train though the existing railway connection (railway station is located at the city central area) from both Kaunas and Vilnius, as well as long distance buses from Riga. It is considered one of the busiest railway stations in Lithuania with frequent and fast suburban services to Kaunas and Vilnius, as well as intercity services to Klaipėda and Šeštokai.

The existing station also facilitates an important freight transport corridor between Vilnius and Kaunas, Riga, Kaliningrad and Siauliai, as well as Klaipėda. Potentially this station could be kept for future railway freight service development.

According to regional services planned for Rail Baltica, Kaisiadorys will have fast direct connections to cities Kaunas, Vilnius, Panevezys and Marijampole. The future passenger railway station should provide a sufficient public transport access, preferably over the shortest to the city road connection.

The existing rail suburban services to Kaunas and Vilnius, as well as intercity services to Siauliai and Klaipeda could be extended and improved with more frequent services. Additionally a regional bus service to connect nearby villages (like Miežonys, Stasiūnai, Kriaučiškės, Gudzenka, Kalniškės, Vilkiškės, etc.), could be introduced.

Future railway station area improvements shall be a local transportation hub. New bus station could serve both international (as between stop) and regional connections.

Short Distance Mobility

Since the city is relatively small, it will be important to keep promoting walking as one of the main options for short distance mobility, which relies heavily on pedestrian convenience and experienced level of safety. Due to the proposed location outside of the city, NMT could be challenging. In order to promote it a proper, separate from car traffic infrastructure should be introduced. Network to the urban living area, pedestrian sidewalks to and around the station should be designed. The lack of allocated areas dedicated to non-motorized travellers will contribute to unsafe pedestrian movement and therefore should be highly designed using international benchmarking to increase pedestrian safety.

Main pedestrian infrastructure could be improved through:

- Better pedestrian access with clear designed crossings at and around the station;
- Establish general pedestrian priorities, especially to and at the station;
- Improved illumination and green space installations and safe access from the main access roadside;

The station's urban location offers a great opportunity to increase bicycle usage as the distance between the station and potential destinations in the city and surrounding area is relatively short. Currently there is no bicycle infrastructure in the city, and therefore, bicycles are forced to share the road with motorized traffic. To promote bicycle usage, a network of bicycle lanes to be introduced, and bicycle parking allocated at strategic areas including the station.

Sustainable New Mobility Services

As Kaišiadorys station is located close to urban area, offering e-bikes sharing as a light mobility service might be an attractive last-mile choice for travellers looking for a fast and affordable way to move around. By providing LEV sharing at the station and on strategic locations around the city such as the Curia of the Diocese of Kaišiadorys and other tourist attractions, usage of private car could be reduced in favour of sustainable transport.

Regional Mobility System Optimization

The location of the station outside of the central city area currently suggests a lower station utilization compared to locations in central areas. However, based on the international practise such suburban locations could be a base for developing TOD, redeveloping attached living area plans in the area to leverage the new railway corridor access.

The station is located within reasonable access to A1 and Road 142, which might make it possible to consider this station an alternative to passengers from the eastern side of Kaunas boarding in the city centre. However, the size of the catchment area of this station should be clearly identified and include other located living areas beside Kaišiadorys. Overall, Kaišiadorys could provide P+R services (for international benchmarking please refer to the Annex 2) to users of A1 motorway to avoid congested entrances to Kaunas and Vilnius.

Furthermore, improved safety for access ramps and connector roads must be planned for this location to ensure that high speed traffic along the motorways is not impeded by the enter/exit activity at the station.

Local residential areas and villages would benefit from access to the station via adjacent local roads that complement any planned access from major roadways.

Bike Parking and Passenger Drop-off Facilities

Park-and-Ride at this location would be higher than other locations as there are likely more regional passengers connecting to/from nearby locations, eastern Kaunas, as well as the local town itself. However, the total demand for this purpose is likely to be small and, therefore, total number of spaces for P+R purposes should be determined based on a calculation using a large catchment area. Alternatively, due to its downtown location, planners may wish to avoid attracting regional car traffic to this location and not provide P+R services.

Bike-and-Ride access should be supported with high quality bicycle lanes connecting the city with local neighbourhoods and villages (within 5km) and, if desired, cycle superhighway infrastructure to support access via longer distances. If such infrastructure is envisioned, then it could be also possible to provide secure parking as well as charging infrastructure at the station for e-bikes.

RECOMMENDATIONS

SECTION	HIGH LEVEL RECOMMENDATIONS
Population relocation	▪ Consider building a new regional stop along the RB corridor, however, also consider the option to upgrade the existing Kaišiadorys station given its proximity to the town; ▪ Develop integrated land use plan around the station that that clearly plans uses, provides incentives to building housing and commercial uses; ▪ Develop housing strategic plan that integrates with land use and provides affordable housing for local populations and incentivises regional movement given the strategic location of the station between Kaunas and Vilnius;
Regional cohesion	▪ Maximize the utilization of the greenfield station while leveraging the current station to establish a strong passenger hub. Depends on a city development plan the area around the station could also be a future strong institutional hub where community centres, service offices, hospitals and other institutions could be placed; ▪ Develop a TOD concept and commercial development around the station;
Regional freight logistics	▪ Given the privileged location, consider the development of special zone to create an important freight logistics distribution centre. A focus could be on reorganising the existing railway station;
Firm clustering	▪ Establishment of possible freight railway supply from Kaišiadorys to Industrial logistic services in Kaunas and Vilnius;
Digital connectivity	▪ Improve the attractiveness of the region as a place to live, where good digital connections facilitate the combination of remote working at home and working in Kaunas and Vilnius; ▪ Develop a digital connectivity plan for the region that takes into consideration potential infrastructure sharing with the regional station and developing industries; ▪ Potential to utilize railway infrastructure (sub stations) as emergency transmission grids for local communities or businesses
Public transport & facilities	▪ Fully develop a public transport planning with required infrastructure planning; ▪ Public transport stop should be located in front of the station entrance with prioritised pedestrian flow, Moreover, the station should be weather protected, provide place for PRM and allocate digital information on transport operation and travel timing; ▪ The whole station area should consider barrier free design and concept; ▪ Introduce regional bus service to connect nearby villages (Miežonys, Stasiūnai, Kriaučiškės, Gudzenka, Kalniškės, Vilkiškės); ▪ Allocate a taxi station preferably in front of the railway station building and provide passenger information (operational time, tariffs);
Short distance & new mobility	▪ As part of a connected and direct bike infrastructure network of multi-use paths, develop protected multi-use (walk/bike) path between station (planned outside of town) to the centre of Kaišiadorys; ▪ Design parking and charging spaces for e-bikes;
Regional mobility	▪ Ensure good and frequent public transportation services connect directly between the suburban station, existing station, downtown Kaišiadorys as well as connecting other towns in the region; ▪ Development of a transit plan to adapt existing bus services or provide new services to the station; ▪ Ensuring synergies with existing 1520mm services;
Bike, Kiss, and Park + Ride	▪ Provide sufficient P+R slots. The number of parking slots should be determined based on a calculation using wide catchment area. It is recommended to provide weather protected parking; ▪ Introduce Shared Light Electric Vehicles with respective parking and charging infrastructure;

MARIJAMPOLĖ REGIONAL PASSENGER STATION

Marijampolė is the capital of the county with the same name, located approximately 50 km from Kaunas in south-west Lithuania, bordering both Poland and the Russian region of Kaliningrad. The regional station is situated close to the central area of Marijampolė. The majority of the population of Marijampolė works in light industry enterprises, including construction, transport, trade and other similar businesses.
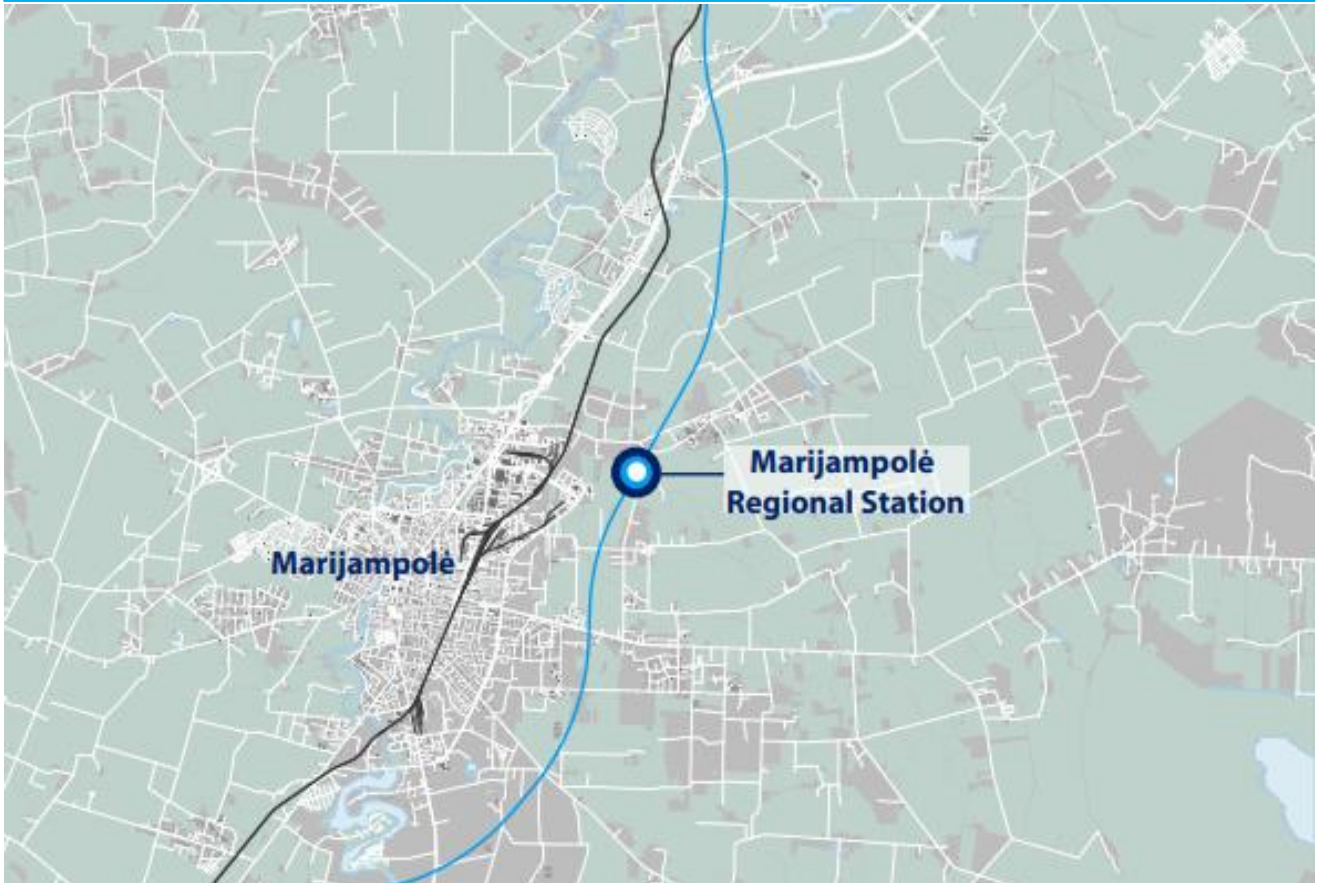

FIGURE 26 LOCATION OF THE MARIJAMPOLĖ REGIONAL PASSENGER RAILWAY STATION (SOURCE: AUTHORS)

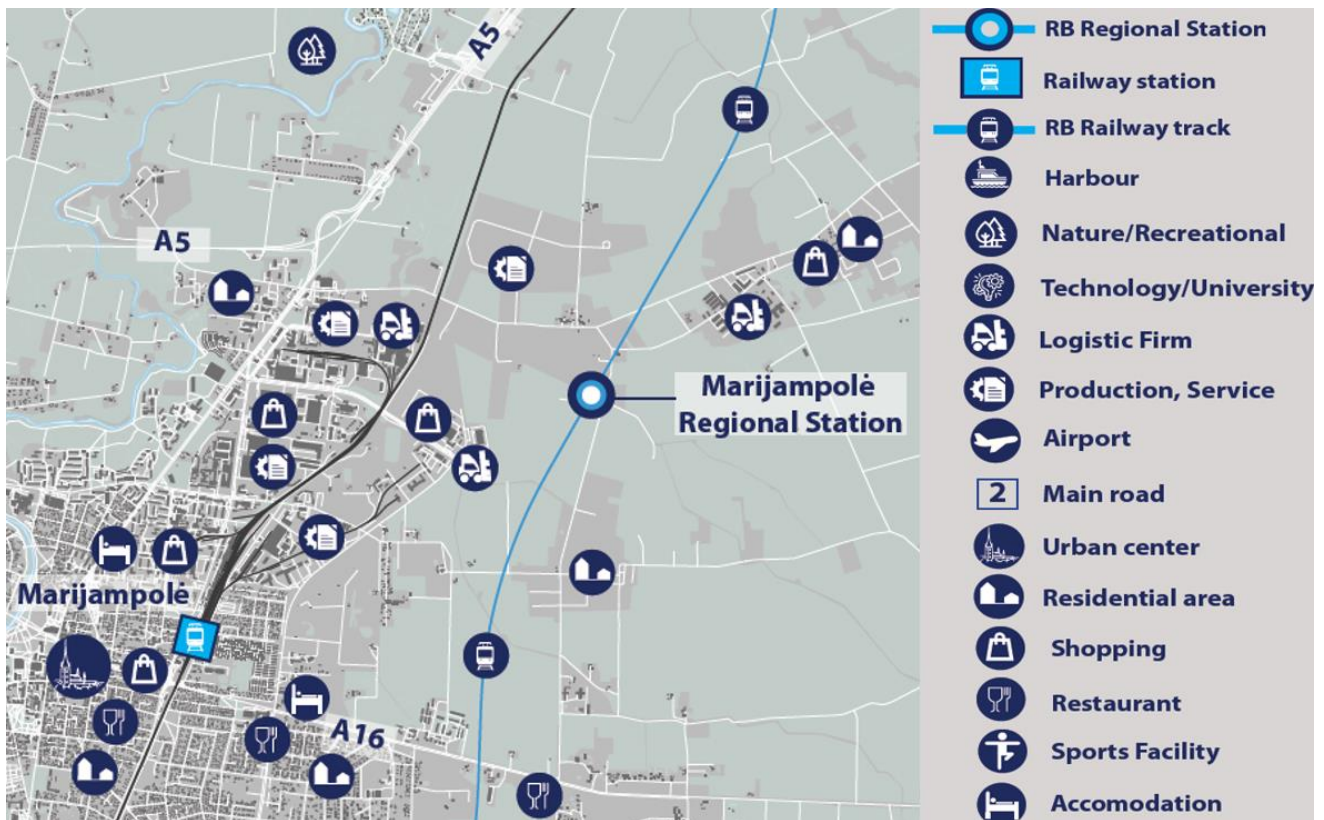| MARIJAMPOLĖ REGIONAL STATION	
STATION ID	OS870
LOCATION	Suburban
POPULATION IN 1,25 KM RADIUS[26]	20.000
NEAREST LARGE URBAN AREA	Marijampolė, 0-2 km (depending on final location)
NEAREST AIRPORT	Kaunas International Airport, 75 km

---

[26] RIS GIS Data

RELEVANT ROAD CONNECTIONS	The city is located at the crossroads of two highways where the railway track is intersected by Road A16 and at the east western part with the international E28 road which is also connecting Kaliningrad to Minsk.
RELEVANT BENCHMARKING FOR THIS STATION TYPE	▪ Bromölla Station; ▪ Landskrona Station; ▪ Vordingborg Station;

TABLE 9 MARIJAMPOLĖ REGION MAIN CHARACTERISTICS AROUND THE REGIONAL STATION

The figure below, presents a comprehensive review of the principal land uses around Marijampolė.

FIGURE 27 LAND USES WITHIN MARIJAMPOLĖ REGIONAL STATION'S SURROUNDINGS (SOURCE: AUTHORS)

ECONOMIC IMPACT AND REGIONAL COHESION

Population Relocation

Marijampolė municipality and the whole region aim to focus on higher value-added jobs. The public and private sectors are looking for rational solutions that can provide the location and all the necessary services for resettlement of existing companies into the region, for the creation of new companies and the attraction of foreign direct investment.

Marijampolė is a Free Economic Zone (or Baltic FEZ) which makes the city on of the more attractive places in Lithuania for local production and industrial business development. Hence, providing convenient rail access to the city and between the city and neighbouring areas in the region could attract workers to reallocate to Marijampolė and villages nearby.

Moreover, the city has a strong educational system with state institutions that could attract students from within the region if convenient access to the railway and a well-integrated public transport network is provided.
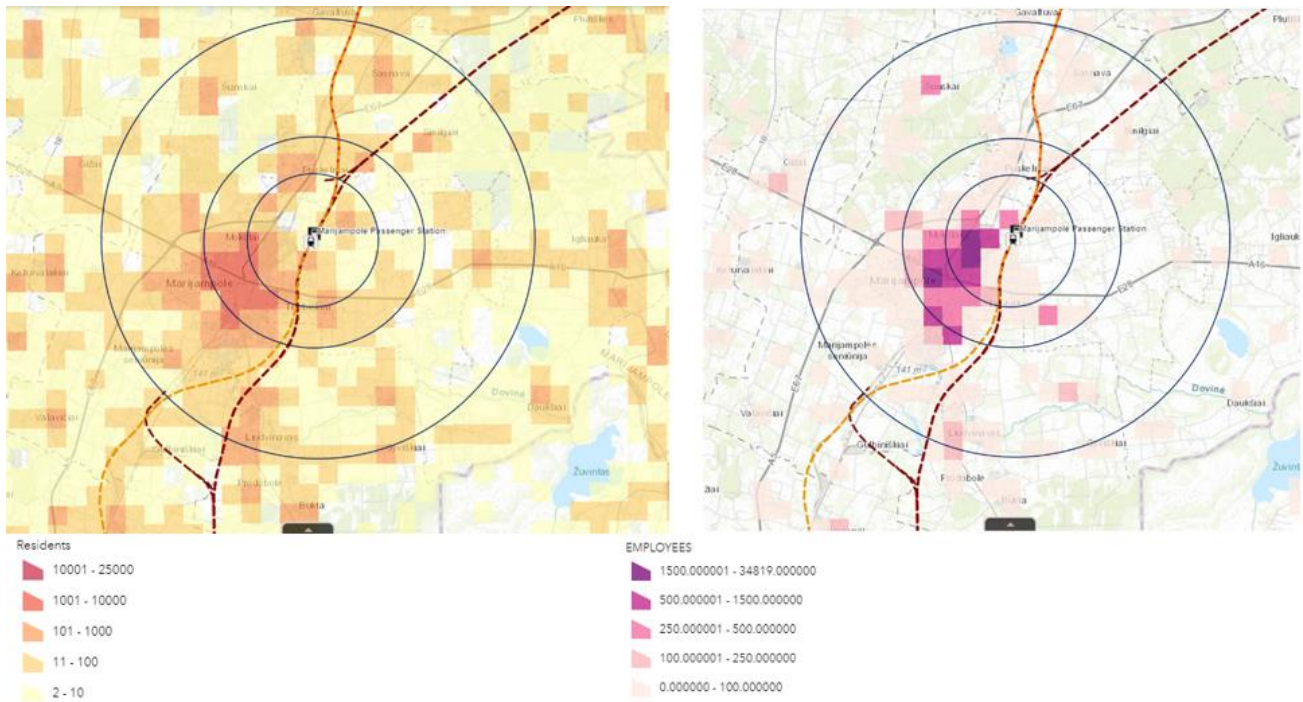

FIGURE 28 POPULATION AND EMPLOYMENT STATISTIC IN MARIJAMPOLĖ AND THE REGION (SOURCE: GIS)

The city provides for the region boosting business developments and additional working places. A range of EU projects aimed at smarting up the city of Marijampolė making it even more attractive. The renovation Poesia Park has been recognized as the best project to have been implemented in southern Lithuania in the years 2007-2013 under the measure entitled 'Development of regional economic growth centres'[27], and has a great impact on social development and cohesion.

Regional Cohesion

Marijampolė is the capital of the county with the same name, located approximately 50 km from Kaunas in south-west Lithuania bordering both Poland and the Russian region of Kaliningrad. Despite being home to just over 5% of the country's population, the region has well-developed commerce and transport sectors. These sectors are the supportive one to hold international transit commercial activities. Furthermore, the Via Baltica route, which is one of Lithuania's main transit routes, linking the Baltic States with western Europe, runs through the region, creating opportunities for potential economic growth and business development primarily along the section leading to the Polish border in Marijampolė. To create a business-friendly environment, a free economic zone has been set up in the municipality of Marijampolė.

Marijampolė is one of five Lithuanian counties with a GDP per capita below 80% of the national average. In an attempt to even out the regional distribution of GDP, nine public industrial parks have been established throughout these regions with the aim of diverting some of the industrial activities from larger regions such as Vilnius, Kaunas by providing tax incentives and prepared physical infrastructure. Marijampolė Industrial Park emerged as a result of this initiative.

---

[27] https://what-europe-does-for-me.eu/en/portal/1/LT024

Marijampolė and region itself is a light industry oriented and provide logistic transport, and trade services. It is also the one of the largest second-hand car markets in Europe[28].. Developing this area and using a railway service for distributing cars to Poland and Russian over 1,520 mm-broad gauge, could bring valuable economic benefits to the region.

Integration with Local and Regional Freight Logistics Network

Marijampolė is a Free Economic Zone (or Baltic FEZ) with a special economic zone located between European route E67 and Rail Baltica lanes. The city is one of the attractive places in Lithuania for local productions and industrial business development. The dominant industrial sectors in the city and region include small light industry, food producing, wood processing, and metal processing.

One of the important logistic transportation modes is currently railway, which provides the city with efficient freight transport communications with Poland, Latvia and Estonia. Therefore, Marijampolė municipality is also investing in establishing a stronger position for providing national and international freight transportation services with potential establishment of logistic centres for cargo services.

The main logistic and industrial areas in Marijampolė are concentrated at the north side of the city; Rail Baltica already plans to develop a freight railway stop less than one km north of the regional railway passenger station. Moreover, Marijampolė is one of the cities in Lithuania which provides urban logistic services and delivering private packages by local trains. The future renovated regional railway station could expand this service and provide even international deliverables in Baltic states (in cooperation with Litrail, who is currently providing urban logistics in the country).

Firms Clustering

At the beginning of 2020, Marijampolė county had 4,493 active economic operators. These were mainly small and medium-sized enterprises[29]. Most of the inhabitants of the city are engaged in light industry enterprises, including construction, transportation, trades and other similar businesses. Today, Marijampolė city has registered companies in the next sectors: services sector (84.8%), followed by industry (7.6 %), construction (4.6 %) and agriculture (3.0 %).

The industrial sector in Marijampolė and its municipality is dominated by industrial activities, i.e. the manufacturing of food products, textile products and clothing, woodworking and manufacturing of wood products, and metal products. Goods transport is the dominating field in the service sector of the municipality. In order to attract other international business to this sector and increase the attractiveness of the market, the city has signed agreements of cooperation with Kokkola (Finland) Bergisch Gladbach (Germany), Suwalki and Piotrkow Trybunalskie (Poland), Kvam municipality of Hordaland (Norway), Viborg (Denmark), and Cherniachovsk (Russia).

In general, valuable market firms are clustered as:

- Manufacturing companies: (Furniture: 25 companies, Wood: 51 companies)
- Logistic and freight trucking services (50 small and medium private enterprises)
- Food production (more than 51 companies)
- Education (7 pre-school institutions, 5 nursey-schools, 2 primary schools, 12 lower secondary schools, 7 secondary schools, 2 gymnasiums, adult education centre)
- Tourism (local focus on green tourism for national and international visitors)

It is expected that the city continues its development in the industrial sector, which could be obviously strongly supported by railway (both for international and national connections).

Digital Connectivity

Depending on the final location of Marijampolė station, the distance to the city center and already existing digital infrastructure is not certain. Assuming the station would be located in a suburban area, a larger network access point should be available at Marijampolė station to provide access to 5G connections for

---

[28] Wikipedia
[29] Source: EURES

the passengers and neighbouring districts. The existence of high-quality network connections is essential, especially for companies specializing in high value-added services, which can effectively utilize e.g. communication with video connections and high data transfer speeds.

Providing an access point at Marijampolė station would enable the possibility of deploying high-speed internet connectivity as far as 40 km from the station, which could be beneficial for not only local communities but also the production centres and logistics firms located in the station's vicinity. As mentioned earlier, it would also be possible to utilize the railway substations as emergency transmission grids.

MOBILITY AND RELEVANT TRANSPORT CONNECTIONS

Public Transport and its facilities

Marijampolė is currently accessible by railway (Kaunas- Šeštokai- Alytus line) and it is located at the crossroads of two national and internationally important highways, leading to Nordic Europe and to Kaliningrad and Minsk, which gives a strong opportunity for regional as well as international road transport connections.

According to planned RB regional services, Marijampole will be directly connected by regional services to Kaunas, Vilnius, Panevezys, Suwalki, Elk, Bialystok and even up to Latvia. The services are planned as fast regional rail according to modern standard.

The public transportation in the city consists of bus services only. The main urban and suburban bus routes serve the railway station and have quite complex routes covering regional villages with the highest density. The public transport network includes more than 7 city bus routes and 27 suburban routes[30].

The existing Marijampolė passenger railway station is of medium size and has a mix of historical and modern building design created by imitating the early modern stylistics. The station is quite developed compared to other Lithuanian regional railway stations offers services and facilities such as:

- Ticket sales for local and international trains
- A parcel transport point with its logistic service
- WC facilities, also for PRM
- Public open space with number of seats in front of the station
- Direct connection to the regional bus station
- Car parking zone
- A small coffee shop
- Direct city bus and taxi stops

There are about four urban bus routes serving the railway station bringing passengers to the industrial and living areas of the city. Moreover, in the south side of the railway building a regional bus stop is located, providing a strong transit with railway services. This bus station serves ECOLINES offering wide national and international connections.

The planned regional railway station should be located in suburban area with a potential direct access over the urban road (2626). Currently the area is a greenfield and cannot be served by any transport modes. There is currently no road access.

General planning and service allocation in the future should be well planned and attached to the railway station. However, attention should be given on a proper bus and rail transport service integration. The station area should be properly designed to provide passengers convenient transfer between railway and bus stations.

---

[30] https://www.marijampole.lt/transportas/eismo-tvarkarasciai/363

Future bus stations should be well organised (including important passenger information on service operation, network and tariffs) with a direct access to the railway station entrance. The access to all PT stations should be pedestrian-centric to improve pedestrian safety while transferring. Pedestrian crossings at main roads and intersections where required to be introduced.

Future PT stations should be preferably weather protected and provide a sufficient number of seats and market waiting area for passengers. The operational planning could be tailored to railway schedule and consider local/regional travel patterns and peak travel periods.

Furthermore, the existing regional bus service could be allocated at the new regional railway station.

To allocate an alternative fast car transportation, it is recommended to allocate a taxi station with clearer parking rules and a designated parking zone close to the building.
Moreover, in the future, it could also be utilized as a shared station between taxis and K+R.

Short Distance Mobility

Since the station located close to a metropolitan area, the station could prioritize pedestrians and therefore promote walking as one of the main options for short distance mobility to close located living area, which heavily relies on pedestrian convenience and high levels of safety. In this case a detailed design of possible pedestrian connection separated from car traffic should be introduced.

Currently the pedestrian access to the future regional station is poorly organised and partly not possible at all. The future central building zone could be organised in a way of providing an open walking area, which could allocate public spaces including green zones and shared public seats. Additionally, crossings and intersections around the station could be redesigned to prioritize walking, as well as biking, facilitating a safe passage for pedestrians wishing to cross the railway track and close located urban roads.

Similarly to the improved pedestrian infrastructure, promoting bicycling requires focus on convenience and safety. Currently there is no bicycle infrastructure or planned routes existing in the city. However, the consultant finds it crucial to develop bicycle infrastructure in the future, especially for a city of the bikeable size of Marijampolė. Future network and routes could serve not only flexible urban connections, but also nearby villages, as well as offering special tourist routes to the city parks (Pašešupio Parkas, Degučių parkas, Peace Park, etc.) and connections to more open nature resources (along Sesupe river and biggest Marijampolės nudistų paplūdimys open park area). In addition to illumination and an inviting environment, bicycle racks of high quality are an important element at the station. It is recommended to establish a covered bicycle parking with an option of longer parking options.

Sustainable New Mobility Services

Due to the station close urban location and not too far distance from Vilnius and Kaunas, there is a great opportunity for establishing on-demand mobility offering fast access to destinations to city outskirts. This service could be established for a smooth door-to-door passenger journey to benefit from already existing public transport services serving the area and the region. Assigning on-demand, for example at a very early morning or late evening time, could create a better experience for travellers while traveling for work purposes during public transport limited operational times.

Shared LEVs, as a relatively new mobility service in Marijampolė could provide additional value of positive travel options. This service could be potentially used not only by residents, but also by tourists and business visitors. By providing LEV sharing on strategic locations at and around the station and main destinations surrounding it, the use of private car could be reduced in favour of sustainable transport.

Thanks to its urban location, offering e-bikes as a light mobility service could be an attractive last-mile choice for visitors looking for a fast and affordable way to travel around.

To increase the attractiveness of the station and promote modal shift towards sustainable modes of transport, facilities that offer safe, affordable and convenient accommodation of personal LEVs is an advantage. It means that sufficient sheltered and unsheltered parking spaces, as well as LEV storage compartments should be provided in direct access to the station.

Regional Mobility System Optimization

The location of the station is in suburban. Therefore utilization of the station area might be challenging. However, the location might have a potential of completely developing and creating a strong TOD concept, which could have access to the new railway corridor.

Moreover, the station has potentially a quick access to A16 and A5, which might make it possible to consider this station as an alternative to passengers from the southern side of Kaunas boarding in the city centre.

Furthermore, improved safety for access ramps and connector roads must be planned for this location to ensure that high speed traffic along the motorways is not impeded by the enter/exit activity at the station. Local residential areas and villages would benefit from access to the station via adjacent local roads that complement any planned access from major roadways.

Bike Parking and Passenger Drop-off Facilities

Creating a sufficient B+R, as well as P+R are crucial elements of station accessibility. Now, there are no Bike-and-Ride zones or facilities planned at the station.
Future private car parking should have clearly identified rules and does not allow parking in front of the station (beside K+R station).

While establishing P+R, it is likely that regional passengers (nearby rural locations, eastern Kaunas, as well as the local city itself) will use this service for better connectivity with the railway station. However, the total demand for this purpose is likely to be small and, therefore, total number of spaces for P+R purposes should be determined based on a calculation using a large catchment area. Alternatively, due to its downtown location, city planners may wish to avoid attracting regional car traffic to this location and provide limited P+R services.

Bike-and-Ride access should be supported with high quality bicycle lanes connecting to the city and local neighbourhoods and villages (within 5km) and, if desired, cycle superhighway infrastructure to support access via longer distances. If such infrastructure is envisioned, then it could be also possible to provide secure parking as well as charging infrastructure at the station for e-bikes.

RECOMMENDATIONS

SECTOR	HIGH LEVEL RECOMMENDATIONS
Population relocation	▪ Develop integrated land use plan around the station that clearly plans uses, provides incentives to building housing and commercial/industrial uses and provide seamless connection to the urban areas of Marijampolė; ▪ Develop housing strategic plan that integrates with land use and provides affordable housing for local populations and incentivises regional movement from other regions in southern Lithuania;
Regional cohesion	▪ Maximize the utilization of the greenfield station to establish a strong passenger hub by establish well-integrated connections with the existing railway station and bus terminal ▪ Develop a TOD concept and commercial development;
Regional freight logistics	▪ Consider the development of a National corridor-wide strategic freight logistics plan that includes Marijampole Station as a potential important distribution centre in southern Lithuania; ▪ Bridging the gap between future Rail Baltica Marijampole regional station and existing Marijampole railway station to facilitate synergies with existing regional 1435mm line;
Firm clustering	▪ Establishment of possible freight railway supply to Logistics & Industrial Park due to the strategic positioning of Marijampole station, that connects the Baltic Nations with the rest of Europe;
Digital connectivity	▪ Provide network access point to provide/improve access to 4G/5G connections for the nearby community and businesses; ▪ Develop a digital connectivity plan for the region that takes into consideration potential infrastructure sharing with the regional station and developing industries; ▪ Depending on the final location of the station, the "Dig Once" strategy could be adapted to provide shared digital infrastructure in the region
Public transport & facilities	▪ Development of a public transport integration and infrastructure plan to identify bus and rail reorganization needs and infrastructure construction needed to bridge gaps in physical connectivity; ▪ Public transport stop should be located in front of the station entrance with prioritised pedestrian flow, Moreover, the station should be weather protected, provide place for PRM and allocate digital information on transport operation and travel timing; ▪ The whole station area should consider barrier free design and concept;
Short distance & new mobility	▪ Develop a station with a design focusing on accessibility. All infrastructure leading to the boarding areas should be at level with minimum steps or barriers installed; ▪ As part of a connected and direct bike infrastructure network of multi-use paths, develop protected multi-use (walk/bike) path between station, the already existing Marijampole station and downtown Marijampole; ▪ Design parking spaces for e-bikes;
Regional mobility	▪ Ensure good and frequent public transportation services connect directly between the greenfield station, existing railway station/bus terminal, downtown Marijampole and other towns in the southern region of Lithuania; ▪ Develop of a transit plan to adapt existing bus services or provide new services to the station;
Bike, Kiss, and Park + Ride	▪ Provide both non-covered and covered bike parking at or next to the station; ▪ Allocation of sufficient P+R. The number of parking slots should be determined based on a calculation using identified catchment area (close located villages – less than 15 km); ▪ Introduce Shared Light Electric Vehicles with respective charging infrastructure (benchmarking is presented in the annex 3);

2.2 Summary of the key recommendations for the Rail Baltica

2.2.1 Development focus to be considered for the entire RB corridor

Under the current assessment, the consultant has developed broad, at high-level recommendations that will assist Rail Baltica in developing the entire corridor, as well as regional railway stations, which will be serviced based on local needs suitable for passenger and freight traffic. The outcomes described in the chapter provide a direction and a core basis for better calibration of station functions and their focuses,

potential design needs, size of some required public facilities, as well as the benefits that individual regions derive from access to the HS network. The suggested recommendations are based on the assessment of RB station examples described in the chapter 2.1, earlier identified benchmarking lessons learned and synergies with the existing Rail Baltica mobility plans.

Considering the broader socio-economic impact on Rail Baltica, examining international experience in relation to the regional railway station development the focus should be taken to:

- Definition of role of regional stations and their broader functionalities: as is known, population density and growth for the coming years do not show positive changes in small regions. However, assuming that a number of villages and small towns gain access to the HS, this could potentially be a catalytic element for people leaving metropolitan areas. In this case, the focus of the regional station should be to provide reliable commuting services and create a good interchange between rail and public transport. In addition, commercial services such as small retail spaces, shopping areas with local products may be in high demand;

- Considering regional cohesion: promoting sustainable rail transport and removing bottlenecks in key transport infrastructures in Baltic States. All regions and metropolitans should have fast rail connections and have access to high-speed digital network. Relevant cohesion policy should support the deployment of rail-based solutions for sustainable and smart regional and local mobility;

- Regional railway station should reactivate TOD and potentials for establishing of new housing zone, as well as business areas.

To develop high accessibility to the network it is proposed to utilize the Rail Baltica alignment to set up and strengthen the national, and cross-border, backbone network and ICT infrastructure between the Baltic countries, something that must be accounted for already during the planning phase of Rail Baltica and its stations. Furthermore, service roads could be efficiently built along the track to allow for maintenance and upkeep of the access points. All three Baltic States there are already plans to provide a good access for digital connections which partly already available in big cities. Following some online available materials achieving 5G connectivity along transport corridors should be fully done by 2025.

The fact that several of the regional RB stations are located in rural/greenfield areas with limited or non-pre-existing digital infrastructure, opens up the opportunity of deploying a "Dig once" strategy to lower investment costs and accelerate digital connectivity throughout infrastructure sharing. Co-deployment of FOC/ICT though infrastructure sharing among operators and across multiple sectors of the economy i.e. telecom operators, IT providers, energy and transport infrastructure, could not only accelerate digital connectivity throughout regions along the track but also narrow the digital divide between urban and rural areas. In areas with low population density, a high cost-to-customer ratio might present an issue for deploying 5G internet access as only a few customers would be served per node. Adapting the so-called Neutral Host model could offer a solution to this issue as a third-party operator could invest in construction and maintenance of digital infrastructure while e.g. telecom operators could reduce investment costs and avoid deployment risks by operating on already existing infrastructure.

For logistic service development a greater focus should be given on creating urban freight service (e-commerce) at regional railway stations. This could be presented by full packing services at railway, which will additionally require dedicated parking spaces and a separate room, or simple smart parcel machines to be allocated at railway platforms. A service calls fast train courier could be particularly relevant for suburban areas.

For stations located near or within industrial zones, freight transportation by rail could play an attractive role for Rail Baltica. The great focus should be given on establishing possible direct rail connections to warehouses, logistic centers, ports or other relevant facilities. If direct communication is not possible, it is recommended to develop multimodal links between strategic objects. Additionally, Rail Baltica could play attention on creating cooperation framework with existing firms in the region based on the local clusters.

For stations closely located to urban areas, it is strongly proposed to separate passenger and freight traffic flows.

Generally, challenges in this sector could include the creation of new supply chain requirements and capabilities and new marketplaces with particular demands.

From mobility point of view regional stations along the corridor should provide transport services considering existing local and regional mobility plans, where appropriate integration is ensured. A contemporary station should be designed as a place of exchange between transport modes, a living and business space providing other services, and the heart of a populated sustainable suburban or rural districts.

All railway station types should provide a great access to public transportation, as well as to NMT. Public station design should include high international standards considering usage of sustainable materials and as much as possible daily light.

Stations type II and III could potentially allocate EV charging facilities. This should be prioritized also in order to support sustainability transformation in the region. The concreate facilities and infrastructure will depend on a country existing policy and available providers, and cooperation framework with them. Nevertheless, generally it is important to consider that by allowing local businesses/entities to connect to the already provided substations of the railway, the railway could act as an emergency transmission grid but also provide a source of renewable energy to electrify e.g. charging facilities for buses and cars.

While designing regional stations additional attention should be given to stations accessibility. Following international benchmarking this should include: barrier free concept (for all traveller types), allocation of special sings, fast connectivity between station facilities and various transport modes, as well as parking zones, good lightning system, etc.. As standard, regional railway stations should offer accessible WC zones for those with disabilities, as well as considering family WCs with baby changing facilities and accommodating passengers with bulky luggage.

Moreover, while developing the RB corridor a special attention could be paid to regions with high tourist resources. Here a special service, such as cycling and rail, could be developed. In this case a great attention should be paid to create safe and attractive for tourists bicycle routes which are directly connected with regional stations.

Below the consultant summarised key focuses and developments for the RB corridor, as well as main tools to be used while implementing proposed recommendations.

REGIONAL COHESION & REGIONAL DEVELOPMENTS	RB REGIONAL STATIONS FOCUS	IMPLEMENTATION TOOLS AND APPROACH
▪ Stations closely connected to urban areas and metropolitan areas should be actively developed by residential and commercial activities; ▪ Connect key regional services (for example industrial, agricultural, logistics or commercial activities) along the railway corridor; ▪ Creating cooperation framework with logistic companies, productions in industrial regions and allow rail transportation to European countries; ▪ Developing optimal synergies between regional mobility creating fast and well-designed passenger connectivity. Connect rural area to high-speed network; ▪ Expanding regional cohesion via connectivity and digitalisation;	▪ Some urban logistic services (post services) could be located at the railway station, where trains could play a role of regional transportation services; ▪ Providing multimodal transport integration and sharing transportation services; ▪ Small urban areas should be connected to the HS corridor, to make it more attractive to inhabitants (as an option via road transport) ▪ Connecting transport modes over unified digital booking solution to ensure comfortable passenger transportation; ▪ Creating perfect access for NMT; ▪ Developing high design standards for creating regional stations accessibility for various types of travellers and station visitors (young people, visitors	▪ Developing Stakeholders cooperation plan (for industrial, economic, hospitality and mobility developments) and strengthening collaboration between Baltic States. This should give an ability to implement challenging and global projects, supported by regional station services; ▪ Ensure land availability in a cooperation with municipalities; ▪ Establish digital connectivity through all Baltic states (preferably using modern connections for example 5G) especially in rural areas using sharing facilities approach; ▪ Develop a clear transport hierarchy and improve interconnectivity to stimulate economic development through freight transport. Regional stations close to economically important stations could be

▪ Developing strong regional mobility to create urban vitality where attached cities and villages are connected; ▪ Creation of attractive tourism offers for specific regions with rich natural resources, connecting the railway and NMT models;	with kids, elderly, people in a wheelchair, people with people with vision and hearing problems, etc.). ▪ Deploying a "Dig once" strategy	integrated into the corridor more closely by providing ancillary services (for example logistics centres). ▪ Strengthening of cross-border relationships between regional development centers along Rail Baltica corridor.

Additionally, it is recommended to consider some currently existing challenges for the entire RB corridor development:

- Strengthening the cohesion between the three Baltic states to support strengthening and stabilizing the region as a whole. This is to be seen as a very important precondition for sustainable economic development and will thus bring benefits also to businesses and population not directly benefiting from the daily railway services;

- Further development of Rail Baltica Regional Stations could create benefits for all the Baltic States, including small surroundings, connected settlements along (and wider) the RB corridor and offering fast cross-border communications;

- Provision of a strong link to Central Europe including small regions along the RB corridor. The whole Baltic region will benefit from improved connectivity in passenger and freight transport – from the provision of a direct land bridge to the Atlantic sea ports to the provision of night train connections for tourists visiting the Baltic states;

- Allowing interconnectivity to the 1520 mm system. This will strengthen demand on interconnection routes also to east-west;

- Strengthening the qualification of local staff. Rail Baltica will rely on qualified staff for provision of high-quality services to the public and the required technical support functions. Staff should be able to communicate across borders – this will strengthen ability to work locally in a cross-border environment and could be seen as a booster to further development also in other business areas;

2.2.2. General recommendations for RB regional railway stations

In Table 10 below, the consultant summarised high level recommendations assigned for Rail Baltica regional railway station types. Some of recommendations require additional detailed studies, especially when it comes to regional logistics and industrial improvements, digitalisation and exact mobility service, charging infrastructure, as well as organisation and size of relevant public facilities to be established at each of the Rail Baltica station.

TABLE 10 – GENERAL RECOMMENDATIONS BASED ON CRITICAL ANALYSIS BY STATION TYPE

STATION TYPOLOGY	POPULATION RELOCATION & REGIONAL COEHESION	TRANSPORT & MOBILITY	FREIGHT & LOGISTICS
TYPE II (600 PAX per day)	- Development of a railway interchange between 1520 mm and 1435 mm gauges in the respective areas/stations; - Developing land use areas with a focus on potential TOD that could attract people and businesses (corporates and start- ups) from nearby metropolitan areas (for example stations close to Tallinn, Pärnu, Riga, Kaunas and Vilnius); - Creating strong regional rail links to connect small cities and villages with metropolises, therefore proving to residents more opportunities for job; - Consider development of dense grid of streets around the station to ensure walkability and density of land uses ; - Integrate station within urban land uses – housing, commercial and parks and other public spaces ; - Ensure adequate access to both sides of the tracks with the least number of barriers to users (under and over passes and at least 2 elevators); - Accelerate digital connectivity by provide 5G access points at the station to strengthen the main fibre backbone and allow local	- Establishing bus station with a direct and barrier free access to the railway building. The station should be weather protected and provide a special spaces for a traveller in a wheelchair. Digital screens with operation data to be installed and be in a real time; - Based on benchmarking urban bus stations need to be located at least within 100 meters of rail boarding area; - Establishing a taxi station close to the railway building entrance(6 cars). The area should include a taxi rank and clear operation rules and tariffs; - Providing of medium-sized automobile parking (30 vehicles). Car parking zones have to assign lots for PRM and family parking; - Consider building a car parking station under shopping centres or shopping areas. This could be only relevant for regional stations close to metropolitan areas. Such parking could be potentially built by private sectors; - Parking needs to have an optimal price to incentivise more sustainable transport modes and to ensure revenues are used to maintain or upgrade station components. In the case where parking spaces are owned by private owners, prices are governed by government policies and regulations;	- Establishing of potential multimodal logistics services for private and business users. Potentially create small urban logistics centers with access to the railway (for example, to serve e-commerce); This applies to stations in industrial areas with existing and high potential for hospitality; ; - Establishing fast train courier services delivering parcels (e-commerce) in the region or/and in the Baltic States (especially from Poland to Kaunas, Vilnius, Riga). Facilities to be located at regional station will depend on customer requirements. Nevertheless, a room for unloading and loading of small cargo should be organized within a railway station building or close to it; - Allow private logistic companies allocate their smart boxes at railway platforms or within a building hall. This is especially relevant for stations close located to urban areas; - Developing cooperation framework with logistic companies to provide urban logistic service at railway stations and potentially establish an offer of serving logistic storages and boxes; - Promotion of efficient low-noise and low-carbon urban freight delivery using last- mile connections to railway station (for example using freight bicycles) In this case, it is necessary to allocate parking spaces for off and unloading;

	communities, business, and institutions to benefit from high-speed internet access. ▪ Developing a strong cooperation with local municipalities to create special seasonal tourism offers (also for agriculture or green tourism). The concept of attractive regional potentials to be considered; ▪ Setting a cooperation with industries to develop stronger offers of urban logistics;	▪ Minimizing conflicts between bus and rail interchange as well as taxi or shared ride-drop off zones; ▪ Establishing drop off and pick up zones (K+R) (at least 2 parking zones); ▪ Establishing comfortable spaces for bikeshare, scooter share services. This places should be station based and provide clear tariff and operational information; ▪ Developing direct, properly designed separate from car traffic bicycle routes to railway stations; ▪ Providing opportunities for third-party operators or local communities to utilize the railway substations as an emergency transmission grid or a source for local renewable electricity generation to e.g. charging facilities ▪ Allocating EV charging facilities. The recent EU directive "Fit for Fifty" recommends "15% of parking spaces of medium and large commercial properties in 2030 are fit fitted with public accessible chargers since these are the parking areas where cars are actually parked." While this directive helps to provide general guidance, it does not contemplate the specific needs and conditions of a P+R facility where driers might leave their vehicles unattended for 8-10 hours or more per day. To support such use needs, clear assessment of demand patterns should be studied, and the minimum recommendations should likely be increased to at least 30% with a mix of fast chargers (e.g. Type 3, 150kw or higher) and slower chargers (e.g. Type 2, 50kw) that should be provided and priced to properly manage the longer periods of time cars are typically parked and unattended by their owners in these locations; ▪ Developing a comprehensive multi-use path (bike/walk) network that connects urban and industrial agglomerations to the station in a direct, safe and convenient way; ▪ Establishing covered B+R parking designed with simple Bike racks. Parking zones could provide places	▪ Establish railway logistic supply chain which could consist of a network of many smaller supply urban chains; ▪ For developing freight logistic especially in industrial areas (for example Skulte, Bauska, Vangaži, Järvakandi, etc.) it is important to establish rail connection to the existing warehouses , dry ports and logistic facilities, as well as create overpassing points; ▪ All freight data should be integrated between all transport modes; ▪ Integrate close located ports and relevant logistic services into the RB ecosystem;

Best practice	Assen railway station (NL); Flintholm railway station (DK)	Espoon Keskus railway station (FI); Växjö railway station (SE)	Kemi railway station (FI)
		for freight bikes and charging facilities to e-bikes. Bike racks can be placed next to the station in order to ease the access of the cyclists to the station; ▪ Future stations should be designed in a way of providing access to all types of station visitors and travellers. The whole area design should be barrier free oriented with special facilities for PRM; ▪ Additionally, stations this type could potentially provide a special assistance services (PRM, elderly);	
TYPE III (300 PAX per day)	▪ Considering potential development of high-to-medium-density housing within 500 m from regional stations; ▪ Considering potential development of shopping and other small commercial opportunities within 500-600 m from regional stations; ▪ Depending on a station location (preferably close to urban areas) there is a possibility to create small business areas which could allocate government offices and other institutional land uses to create employment opportunities and increase population attraction; ▪ Deploy the "Dig once" strategy to accelerate digital connectivity through infrastructure sharing and narrowing down the digital divide between urban and rural areas in the region; ▪ Accelerate digital connectivity by providing 5G access points at regional stations to strengthen the main fibre backbone and allow local communities, business, and institutions to benefit from high-speed internet access; ▪ Investigate the possibility of introducing a Neutral Host model in areas with low	▪ Establishing bus station with a direct and barrier free access to the railway building. The station should be covered and provide a special space for a traveller in a wheelchair. Digital screens with operation data to be installed and be in a real time; ▪ Provide automobile parking that could potentially be converted into other land uses in future, conveniently placed next to the station (20 vehicles). Car parking zones have to assign lots for PRM and family parking; ▪ Establishing a taxi station close to the railway building (4 cars). The area should include a taxi rank and clear operation rules and tariffs; ▪ Establishing drop off and pick up zones (K+R); ▪ parking should have an optimal price to incentivise more sustainable transport modes ▪ Parking lots should not take immediate space close to the entrance of the station as priority should be given to pedestrians, bikes, public transport (bus and MaaS vehicle stops). ▪ Bus station within 50 meters of railway station platform; ▪ Establishing comfortable spaces for bikeshare, scooter share services (number of vehicles will be based on region characteristic, distance to urban areas and demand). This places should be station based and provide clear tariff and operational information;	▪ Creating a small urban logistic service at railway stations and allocate drop off and pick up facilities; ▪ Consider allocation of smart parcel boxes or machines close or at railway platforms. The area should provide clear operating rules of machines and costs;

	population density in order to attract e.g. telecom operators to provide services in areas which normally have high cost-to-customer ratio; • Investigate the opportunity of initiating EU funded "Community Wi-Fi" projects for sparsely populated areas; • Developing a strong cooperation with local municipalities to create special seasonal tourism offers (also for agriculture or green tourism). The concept of attractive regional potentials to be considered; • Setting a cooperation framework with local industries to develop offers of urban logistics;	• Developing direct, properly designed separate from car traffic bicycle routes to railway stations; • Establishing covered B+R parking designed with simple Bike racks. Parking zones could provide places for freight bikes and charging facilities to e-bikes. Bike racks can be placed next to the station in order to ease the access of the cyclists to the station; • Future stations should be designed in a way of providing access to all types of station visitors and travellers. The whole area design should be barrier free oriented with special facilities for PRM;	
Best practice	**Leinelä railway station (FI)**	**Landskrona railway station (SE)**	**Hoshakuji railway station (JAP); Ludwigsfelde railway station (DE)**
TYPE IV (150 PAX per day)	• Ensure the development of an effective street network connecting to the station • If no new streets are planned, ensure the local road has direct and adequate access to the station; • Deploy the "Dig once" strategy to accelerate digital connectivity through infrastructure sharing and narrowing down the digital divide between urban and rural areas in the region; • Accelerate digital connectivity by provide 5G access points at the station to strengthen the main fibre backbone and allow local communities, business, and institutions to benefit from high-speed internet access • Investigate the possibility of introducing a Neutral Host model in areas with low population density in order to attract e.g. telecom operators to provide services in areas which normally have high cost-to-customer ratio;	• Establishing bus station with a direct and barrier free access to the railway building. The station should be covered and provide a special space for a traveller in a wheelchair. Clear operation plan of other urban modes and network maps to be located at PT stations; • Establishing a taxi station close to the railway building (2 cars). The area should include a taxi rank and clear operation rules and tariffs; • Establish car parking zone for at least 12 vehicles. Car parking have to assign lots for PRM and family parking; • Allow space for new mobility vehicles; • Establishing drop off and pick up zones (K+R) in front of railway stations; • Developing direct, properly designed separate from car traffic bicycle routes to railway stations; • Establishing covered B+R parking designed with simple Bike racks. Parking zones could provide places for freight bikes and charging facilities to e-bikes. Bike	• To provide to residents an access to urban logistic it is proposed to allocate a small post office, which provides packing services. Moreover, a connection for freight bicycles to a railway station used for urban deliveries is highly recommended; • Establish urban logistic connection with last mile providers; • A railway station could be a place for selling local products (creating a market space). Therefore a cooperation with local farmers or small companies could create additional benefits for stations and improving its attraction;

	- Investigate the opportunity of initiating EU funded "Community Wi-Fi" projects for sparsely populated areas; - Developing housing and some commercial density within 700 m from the station; - Developing a strong cooperation with local municipalities to create special seasonal tourism offers (also for agriculture or green tourism). The concept of attractive regional potentials to be considered; - Setting a cooperation with industries to develop stronger offers of urban logistics;	- racks can be placed next to the station in order to ease the access of the cyclists to the station; - Car parking lots should not take immediate space close to the entrance of the station as priority should be given to pedestrians, bikes, public transport (bus and MaaS vehicle stops); - Future stations should be designed in a way of providing access to all types of station visitors and travellers. The whole area design should be barrier free oriented with special facilities for PRM; - Ensure at least one crossing over the tracks that is within 400 m from train boarding area (if relevant to a station location);	
Best practice	Barneveld Noord railway station (NL)	Korneuburg railway station (A)	Rottenbach railway station (DE)

3. Annex

3.1 Annex 1. Benchmarking for bicycle parking size at a regional railway station

A bicycle parking size will depend on an exact railway station size (space availability) and space availability at or close located to the building area. Form some international cases

STATION NAME	REGIONAL RAILWAY STATION TYPE[31]	B+R SIZE (NR OF PARKING SLOTS)	PARKING STATION TYPE	CITY POPULATION
Espoon Keskus Station	Type II	156	Covered with special lightning system	272 193
Kivistö Station	Type II	340	Parking houses within and next the railway station building	10 000
Mäntsälä Station	Type III-IV	≈30	Open air but weather protected parking station in front of the station entrance	20 800
Mikkeli railway station	Type II	≈ 70	Easy and not weather protected parking racks	53 000
Køge Nord Station	Type II	≈ 140	Easy and not weather protected parking racks	38 000
Winterberg railway station	Type III	≈30	Easy and not weather protected parking racks	17 710
Barneveld Noord	Type III-IV	≈ 150	Mainly presented by easy and weather protected parking racks including bicycle boxes.	35 000
Sävsjö railway station	Type IV	≈ 16	Easy and weather protected parking racks	11 677
Korneuburg railway station	Type II	≈ 150	Open and weather protected parking zone next to railway platforms	13 00

---

[31] International categorization/ Type

3.2 Annex 2. Benchmarking for car parking size at a regional railway station

STATION NAME	REGIONAL RAILWAY STATION TYPE[32]	P+R SIZE	PARKING TYPE	CHARGING FACILITIES	CITY POPULATION
Køge Nord Station	Type II	650 + potential for additional 250[33]	Free outdoor parking on both sides of the station. CCTV	n.a.	38 000
Rottenbach Railway station	Type IV	13	Free outdoor parking	EV charging provided	4 657
Vordingborg Station	Type II	140	Free outdoor parking	n.a.	18 000
Abcoude Station	Type I-II	≈ 35 + 5 K+R	Free outdoor parking	EV charging provided	8 175
Landskrona Station	Type I-II	≈ 300	Extensive car parking shared with neighbouring shopping area. Mixed short and long term parking	EV charging provided	33 308
Nordmaling Station	Type III-IV	≈ 105	Free of charge outdoor parking incl. spaces offering engine warmer. Additional 1-hour parking in connection with the station	EV charging provided	7 143
Sävsjö Station	Type II	≈ 60	Free outdoor parking	EV charging available approx. 150 m from the station	11 677
Barneveld Noord	Type II-III	430 + ≈ 8 K+R	Free outdoor parking	n.a.	35 00

---

[32] International categorization/ Type
[33] https://www.bane.dk/Presse/Temaer/KOEGE-NORD-STATION

3.3 Annex 3. EV charging infrastructure and facilities

There is no universal benchmark or suitable cases to Rail Baltica to identify a ratio of exact number of electric vehicles per public charging point. The reason for that is that electric vehicle owners' access to home charging varies considerably in cities across the globe.

The global benchmark recommendations are to plan the number of chargers based on suitable in the region ratio per EV, rather than a fixed number. The key factors affecting the ratio for a city or other major locations are EV drivers' access to home charging and the role of public charging in an EV uptake strategy. Fewer public chargers (a higher ratio of EVs per charging point) will be required if more drivers are able to charge their vehicle at their home or workplace such as, for example, in Californian or European cities. If private parking is rare, like in the Netherlands, more public chargers will be needed (a lower ratio).

Any charging facilities to be installed at a railway station will depend on two main existing types of electric vehicles:

- ♣ Battery electric vehicles (BEVs) – these are a purely electric vehicles, powered only by the battery which is charged by connecting to an external source of electricity;

- ♣ Plug-in hybrid electric vehicles (PHEVs) – these have two engines – one powered by a battery which is charged by connecting to an external source of electricity, and the other engine is fuelled by other fuel, generally petrol or diesel, from a fuel tank;

Conventional forms of petrol hybrids are not considered for electric vehicles as they are not charged by 'plugging in'. Their batteries are only charged by re- capturing energy when braking or from electricity generated by the engine.

Barriers to the deployment of the ideal electric vehicle charging network remain, such as fragmentation, inconsistent data availability and the lack of consistent standards in most markets.

The graphic below shows the benchmark ratios of EVs to public charging points for cities in leading markets. Assurance that charging infrastructure keeps up with demand needs to be done by monitoring the numbers of EVs, EV charging points and demand for charging points. Otherwise, this may limit EV uptake.
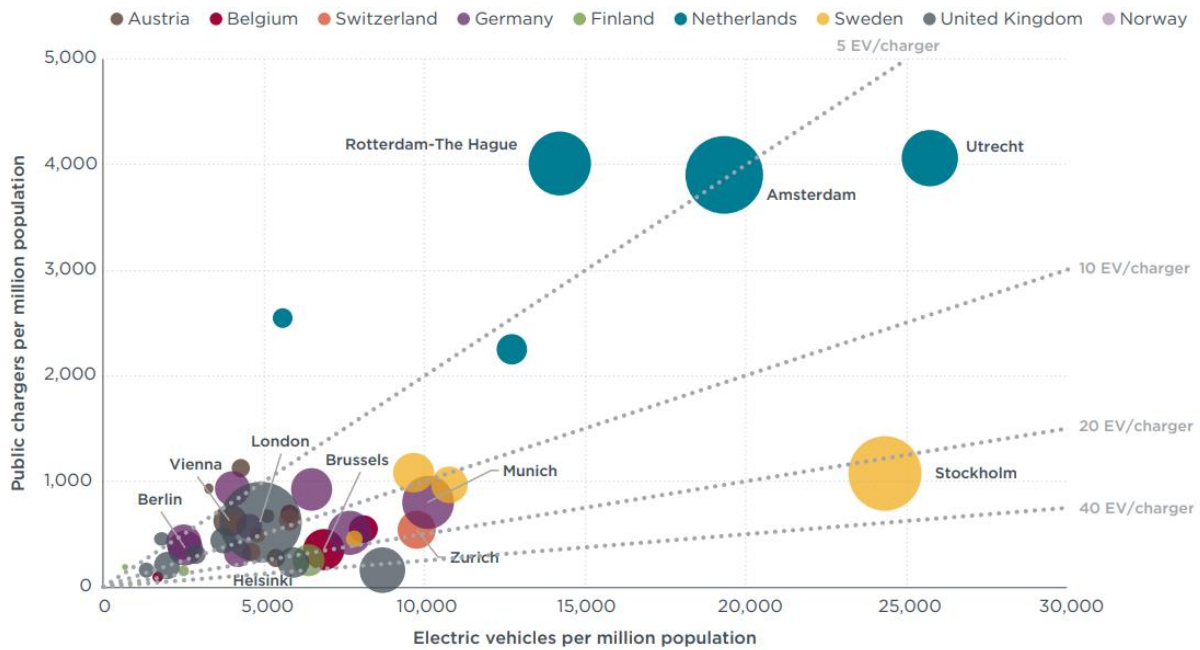
FIGURE 29 CHARGING INFRASTRUCTURE AND EVS CONCENTRATION IN MAJOR METROPOLITAN REGIONS (SOUCE: HTTPS://THEICCT.ORG/SITES/DEFAULT/FILES/PUBLICATIONS/EV-CHARGING-METRICS-AUG2020)

As it is seen the high number of public charges are in the Netherlands. This is due to a massive public investment and policy that also support chargers for PHEVs.

For public charging infrastructure, rapid chargers are usually needed for inter- city use, while slower chargers could be used for workplace and residential charging. Public organisations or commercial entities need to establish the appropriate local balance between rapid and slower charging points, informed by where, when and what types of vehicles EV drivers will be charging. In this case the studied regions of Rail Baltica could potentially review slower charging points at station types II and III. In case of establishing appropriate balance between both charging types a market analysis should be takes and which could cover:

- ♣ The types of EV that residents are driving or projected to be driving. Higher percentages of PHEVs relative to BEVs (as in the Netherlands) will require more slower chargers, and vice versa.

- ♣ Where and when they are charging. Higher percentages of EV drivers charging on route, rather than overnight, will require more fast chargers and vice versa.

- ♣ In addition, if many of those drivers have access to their own home charging fewer public chargers will be needed.

Following the European relevant policy framework, the networking capability of chargers must be considered in making decisions regarding which types to include in an EV infrastructure plan, as well as on existing policy framework in the country. Non- networked charging stations are cheaper, but they cannot communicate with central server and therefore do not allow costs to be recovered through charging for electricity. They are also typically unable to support smart charging scheme that manage peak demand, which will become increasingly useful as the market grows.

DAFI	ARTICLE 4 ELECTRICITY SUPPLY FOR TRANSPORT

The Directive of Alternative Fuel for Infrastructure requires Member States to set targets for recharging points accessible to the public, to be deployed by 2020, to ensure that electric vehicles can circulate at least in urban and suburban agglomerations. Targets should ideally foresee a minimum of one recharging point per ten electric vehicles (and for information purposes: at least every 60 km2 on TEN-T Core network).

The EU wish for a green transformation of the European car fleet and has therefore set requirements for how much CO_2 an average new car sold may emit. If the requirements are not met, car manufacturers are expected to receive billions in fines, which could lead to bankruptcies in the car industry. In practice, this means that the industry will have to sell at least 2/3 EVs. 34 In addition, the EU is currently working to further tighten the requirements for car manufacturers, making it virtually impossible to buy a new petrol or diesel car after 2025.35

1. At least 10% of the recharging points shall be publicly accessible.
2. Member States shall ensure that the equipment for slow and fast recharging points shall be available on fair, reasonable and non-discriminatory terms.
3. All publicly accessible recharging points for electric vehicles shall be equipped with intelligent metering systems as defined in Article 2(28) of Directive 2012/27/EU and respect the requirements laid down in Article 9(2) of that Directive.
4. Annex I.1 (h) and the last subparagraph of Annex I.2 of Directive 2009/72/EC shall apply to the consumption data and the metering system of the recharging point for electric vehicles.
5. Member States shall not prohibit electric vehicle users from buying electricity from any electricity supplier regardless of the Member State in which the supplier is registered. Member States shall ensure that consumers have the right to contract electricity simultaneously with several suppliers so that electricity supply for an electric vehicle can be contracted separately.
6. Member States shall ensure that any person can establish or operate publicly accessible recharging points and that distribution system operators cooperate on a non-discriminatory basis with any such person.
7. Member States shall ensure that prices charged at publicly accessible recharging points are reasonable and do not include any penalty or prohibitive fees for recharging an electric vehicle by the user not having contractual relations with the operator of the recharging point.

The Commission shall be empowered to adopt delegated acts in accordance with Article 8 concerning the updating of the technical specifications set out in Annex III.1.1, Annex III.1.2 and Annex III.1.3.

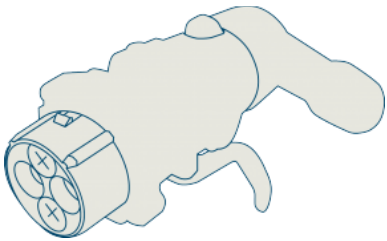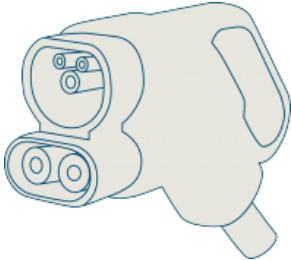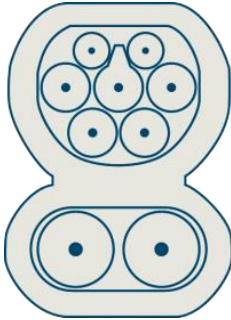EVs could be charged using either AC electricity or DC electricity:

♣ AC electricity is typically used at home or at destinations like in the city. Standard here is 11 and 22 kW, also known as normal charging or slow charging;
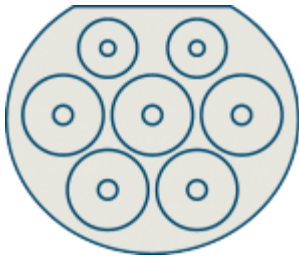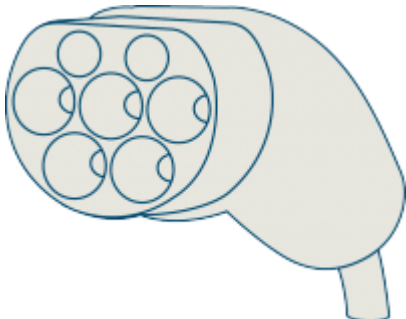
---

34 https://fdm.dk/nyheder/bilist/2020-05-saadan-paavirker-nye-co2-krav-dit-bilvalg

35 https://www.businessinsider.de/wirtschaft/mobility/kommt-das-aus-fuer-verbrenner-motoren-schon-2025-eu-kommission-werkelt-an-deutlich-strengeren-abgasregeln-b/

♣ DC electricity is normally used at dedicated fast charger installations. Standard for fast and ultra-fast variates from 20 to 25 kW, 50 to 100-, 150- and 350-kW effect;

It is recommended that DC charging stations provide tethered cables with both the CHAdeMo DC and DC CCS connector types. The most common DC charging connection in Denmark and most of Europe is CSS TYPE 2. Tesla has its own charging connector, however Tesla supplied accessory can be used to charge from a CHAdeMo or CCS Type 2 connector.

RECOMMENDED CONNECTOR	VECHICLES INLET REQUIRED	MODELS WITH SPECIFIC INLETS
 CHAdeMo DC (tethered cable)		Nissan Leaf. Nissan e-NV200. Tesla 2 and X can use a CHAdeMo connector using a Tesla-supplied accessory.
 EU DC CSS Combo TYPE 2 (tethered cable)		European electric vehicles. including BMW i3 and VW e-GOLF.

It is recommended that AC charging stations provide a Type 2 socket; the driver will be expected to provide their own supply cable that is compatible with their vehicle inlet.

RECOMMENDED SOCKET OUTLET	DRIVER SUPPLIED CABLE – CONNECTION FOR CHARGING STATION SOCKET OUTLET
 TYPE 2 or Mennekes AC socket outlet	 TYPE 2 or Mennekes AC connector

Obstacles and targets for charging are different for both short and long term. For example, the level of public understanding and knowledge on EVs and charging are likely to be lower in the short term. This means that the deployment of EVs over the next five years can advantageously prioritize targeted visibility and user-friendliness. In comparison, long-term goals for charging infrastructure may place greater emphasis on having sufficient charging capacity and availability