

Title of the article in the Slovak language

Upgrading of the railway line Vienna/Stadlau – Bratislava in Austria as part of the Baltic-Adriatic Corridor

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Abstract

Here insert the Slovak translation. (Note: The Slovak translation of the title and abstract can be provided by the Organizer.)

For the text of the abstract shall be applied Century Gothic, 8 pt for common text. The abstract is indented from both margins of the page (right and also left) at 1 cm.

For the title Abstract shall be applied Century Gothic, 12 pt., bold. Under the title Abstract leave out 1 row 6 pt. Between the address and the title Abstract leave out 1 row 18 pt. The text of the abstract justify to the block.

Abstract

From the fall of the Iron Curtain and the formation of the European Union up until today, the numbers of commuters travelling between Slovakia and Austria, namely between the two capital cities have increased significantly. The Ostbahn (Eastern Railway Line) in Austria has therefore become an important link connecting these two cities (Vienna and Bratislava). As this railway connection is also part of the Baltic Adriatic corridor of the Trans European Transport Network it has become a focus point for the EU funding. As the approximately 40 km long railway line currently runs in a single track, the focus of this project is to reinstall the double tracked line, which has once existed in the 19th century, and to overall upgrade the railway tracks and stations along the line to improve safety, economic efficiency and environmental quality by electrifying the entire line.

1. Project Background

The railway line Vienna-Stadlau to Bratislava, including stops at Marchegg (A) and Devínska Nová Ves (SK), lies within the Baltic-Adriatic Corridor (from Poland to Italy) which is part of the Trans European Transport Network (TEN-T) of the European Union. The approximately 40km long railway line from Vienna to the International Border of Austria/Slovakia, near the town of Marchegg, was established and put into operation in the 19th century and had been upgraded to a double tracked line by the end of that century.

In the first half of the 20th century the railway line had lost its initial significance which lead to the gradual dismantling of that second railway track. However, at the latest from the founding of the **central European region "Centrope"** in the year 2003, the railway line between Vienna and Bratislava via Marchegg has once again gained importance.

The following graphic shows an overview of the Baltic-Adriatic Corridor with an additional blown up section of the here defined corridor Wien-Marchegg-Bratislava.

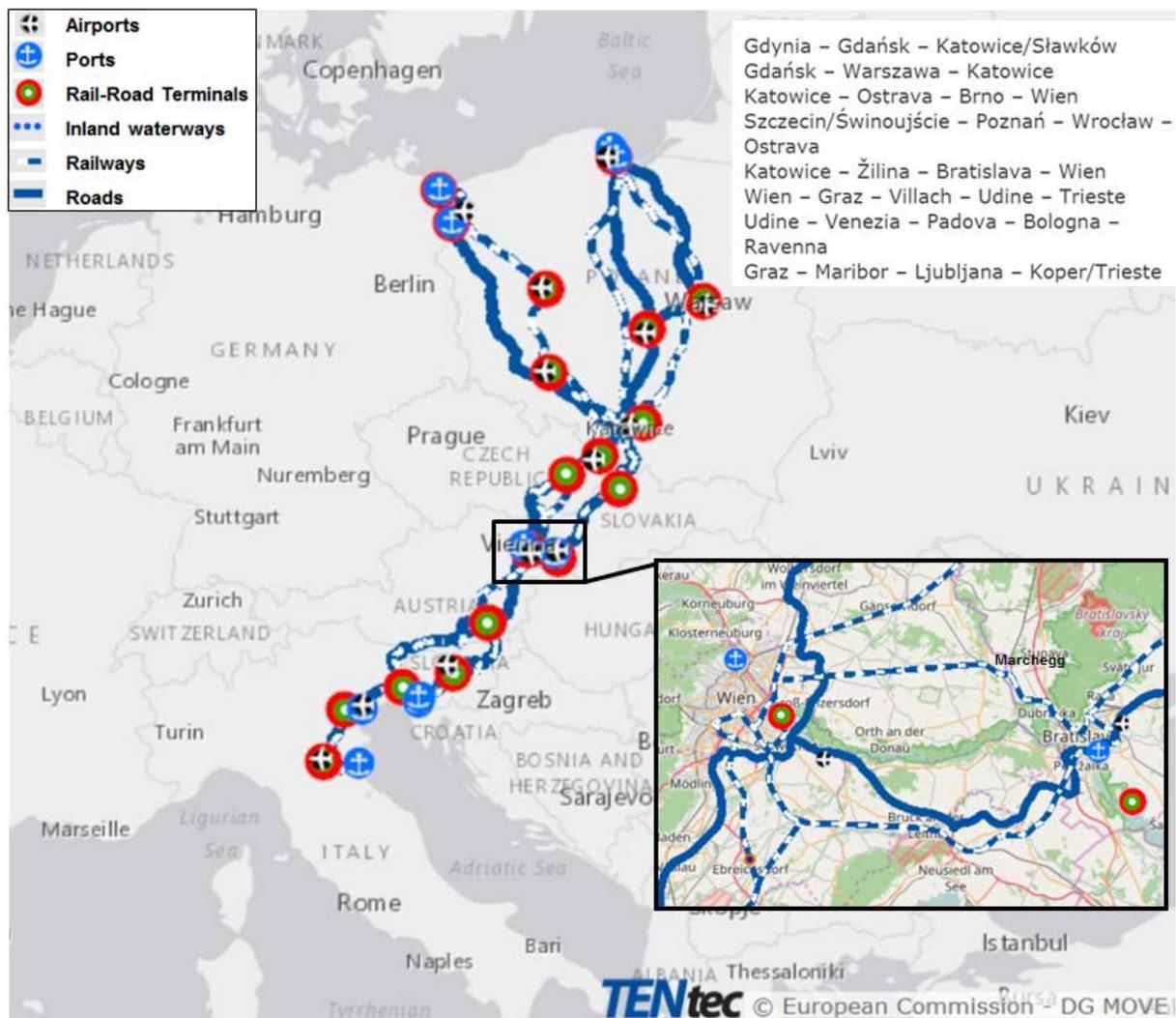


Figure 1: Baltic-Adriatic Corridor and Section between Vienna and Bratislava [1]

2. Project Description and Construction Stages

The planning for the new double tracked reconstruction/upgrade and the electrification of the railway line from Vienna to the national border near Marchegg started in 2008. After undertaking the Environmental Impact Assessment (EIA) process a Building Approval was reached in 2015. Construction works then were initiated in 2016 commencing from Vienna gradually moving eastward towards the international border of Austria and Slovakia and finally to Bratislava (which is not part of this project).

In December 2018 a first approximately 5km long double tracked section was put into operation (Modul 1a). In a further step (Modul 1b) the electrification of the entire railway section and the selective re-installment of the double tracked line will take place. To increase the safety for travellers/commuters it is also planned to dismantle, reduce and/or install technical safety measures at all existing railway crossings.

The first approximate 8 km of the track is located within the province of Vienna. Main construction works that will take place within this boundary are as follows:

- Dismantling of 2 railway crossings
- Construction of 3 underpasses, 2 technical service buildings, 2 control buildings and 2 parallel railway tracks

The majority of the project is located within the province of Lower Austria approximately between railway line km 8,1 and 37,9. Main construction works that will take place within this boundary are as follows:

- Dismantling of 21 railway crossings
- Construction of 20 road under-/overpasses, 3 railway bridges, 4 technical service buildings, 9 control buildings, 1 substation, construction of parallel railway tracks in some sections

In a final step (Modul 2) all the remaining single track sections will be upgraded to a double tracked line.

The following diagram shows the above mentioned three modules or construction/planning steps (Modul 1a, Modul 1b and Modul 2) in detail [2]:

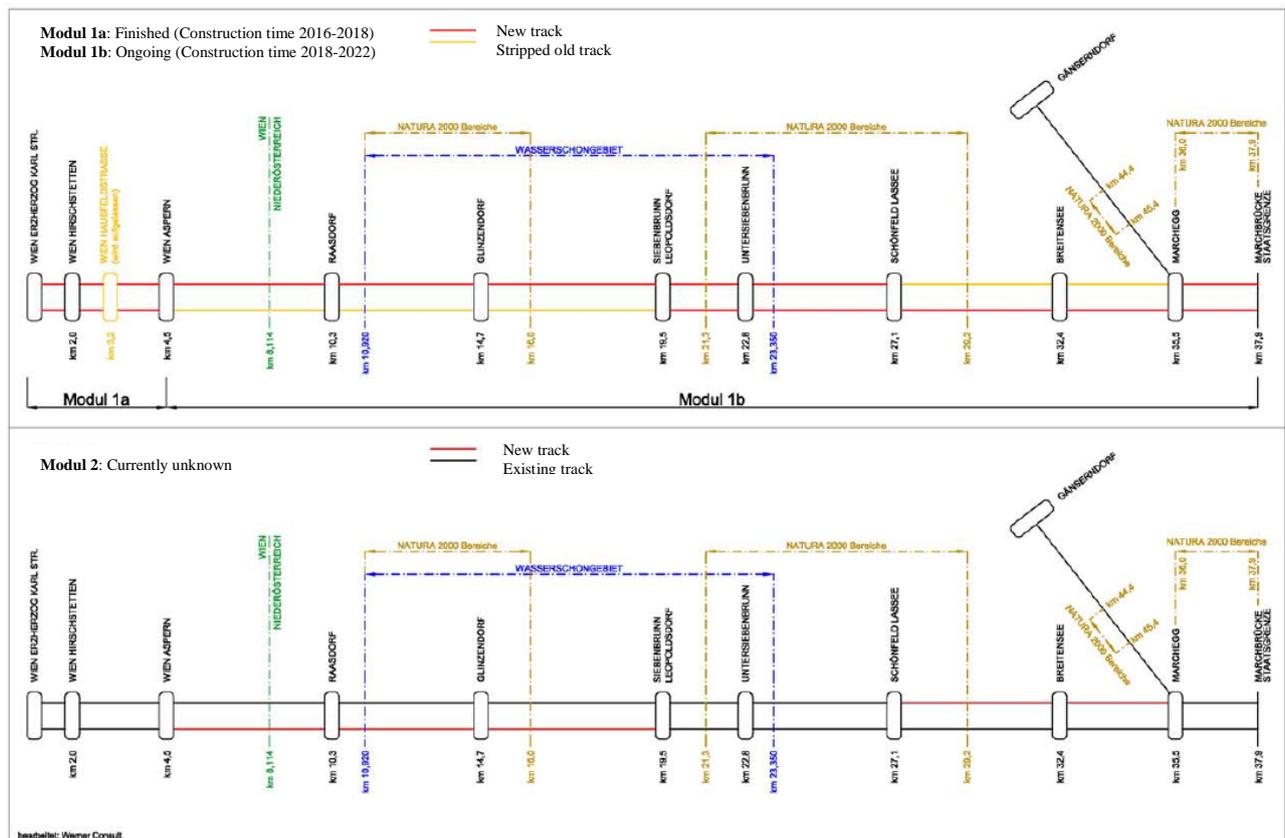


Figure 2: Project Stages Overview [2]

- **Modul 1a** – double tracked construction in the first section in Vienna between km 0,740 (Project Start Km) to approx. Km 5,693. This section has been upgraded between 2016 and 2018 and is finished.
- **Modul 1b** – Selective double tracked construction started in 2018 and is estimated to be finalized in 2022. These include the sections Siebenbrunn-Leopoldsdorf to Schönfeld-Lassee and the section from Marchegg railway station to the national border. The module also includes the construction of the railway stations Raasdorf, Siebenbrunn-Leopoldsdorf, Schönfeld-Lassee and Marchegg as well as the railway stop Untersiebenbrunn. The railway stops Glinzendorf and Breitensee, NÖ will be partly constructed in this module and partly in Modul 2.
- **Modul 2** – Finalisation of construction of railway stops Glinzendorf and Breitensee, NÖ and complete construction of the double tracked line as well as some railway crossing adjustments and connecting the track switches with the newly constructed tracks.

3. Project Goals

The main goals for this project are to increase the overall safety, to improve the environmental and technical quality and to increase economic efficiency. These overall goals are described in further detail as follows:

- **Reduction of commuting time** by i.a. increasing the maximum velocity up to 200km/h between Vienna and Bratislava to an approx. travel time of 45min according to the 2025+ goals.
- To provide the necessary **line capacity** for the Baltic-Adriatic-Corridor. A calculation for the current line capacity was done in 2008, which resulted in 110% utilized capacity during operation time. The goal is to reach a design capacity of 80%.
- Reduction of CO2 emissions by **electrifying the railway** line and decreasing the cost for operating the railway. Currently most of the line is operated using diesel engines.
- Providing **traveler friendly measures** by upgrading or renewing the existing stations – e.g. providing Park&Ride facilities, setting up travel information counters, modern signage for travelers, wheelchair accessibility...
- Improving **economic efficiency** by reducing management roles (remote controlling from Company Management Centre (BFZ) in Vienna).
- **Increasing safety** by reducing railway level crossings and providing access to the platforms without having to cross the railway tracks (especially in Raasdorf, Siebenbrunn-Leopoldsdorf and Schönfeld-Lasse). The focus here especially is, to increase the safety in and around railway stations and at the crossings of the double tracked line sections.
- Facilitating the **connection** to the **inner city public transport** system

3. Project Challenges

The main technical challenges concerning the upgrade of the railway line are for one the very **small gradient** [Photo 2], due to a very flat surface in the project area, and the often shallow depth of the groundwater table. Challenging is also the **construction** of the railway line **during constant operation** [Photo 1&4], of the railway, which is necessary due to the high number of commuters that travel between Bratislava and Vienna every day.

The **coordination with ASFINAG** (the Autobahn and high way financing stock cooperation) concerning various construction projects that were taking place concurrently in terms of space and time, such as the S1 and junction S1, was

another major challenge for this project [Photo 3]. As was the coordination with the Lower Austrian State Roads Administration concerning the dismantling of all state roads - railway crossings.



Photo 1: Construction during railway operation (diversion of track for constant operation)



Photo 2: Almost flat gradient - challenge for stormwater management



Photo 4: Construction works station Vienna Aspern North



Photo 3: Underpass Stadlauer Straße

4. Conclusion

The implementation of the fully completed electrification and selectively double tracked railway line is scheduled for the end of 2022. At this point in time it is not certain when the double tracked railway line will be completely installed and go into operation. However, due to the increase in commuters between Slovakia and Austria, the new technologies, the stricter environmental standards in recent years and the focus of the EU on infrastructure projects such as this one, it is inevitable that the overall project will be completed sooner rather than later and that yet again the "twin cities" will be interconnected using state of the art technology and hereby providing faster, safer and cleaner travel and commuters infrastructure.

Literature

- [1] Mobility and Transport: TENtec Interactive Map Viewer, <http://ec.europa.eu/transport/infrastructure/tentec/tentec-portal/map/maps.html?corridor=1&layer=8,9>
- [2] Reitermayr, Walter, Pavel: Spezifikation PEF013: Stadtlau-Marchegg, Ausbau und Elektrifizierung. ÖBB-Infrastruktur AG / GB AIE, 2012

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F. BACHL, ÖBB | B. KOHL u. J. PAAR, ILF – 19.03.2019



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UPGRADING OF THE RAILWAY LINE VIENNA - BRATISLAVA



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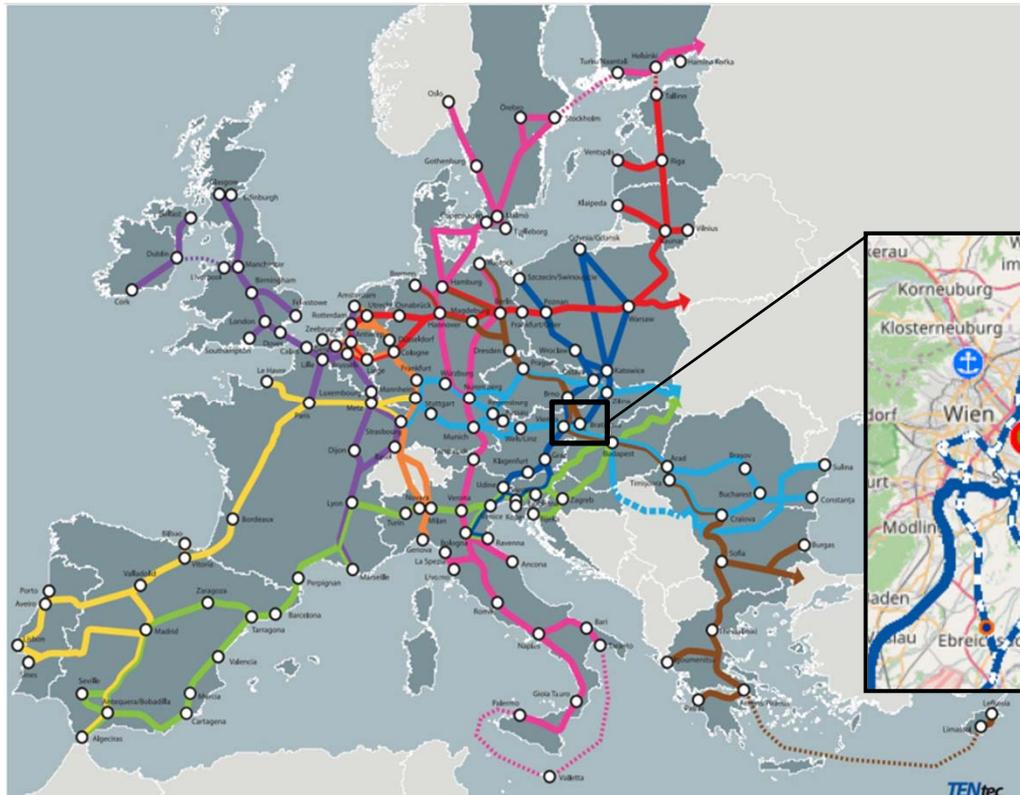


OUTLINE

- Trans European Transport Network
- Project Overview & History
- Project Goals
- Strategical Considerations
- Facts and Figures
- Construction Work Details
- Construction Stages & Examples

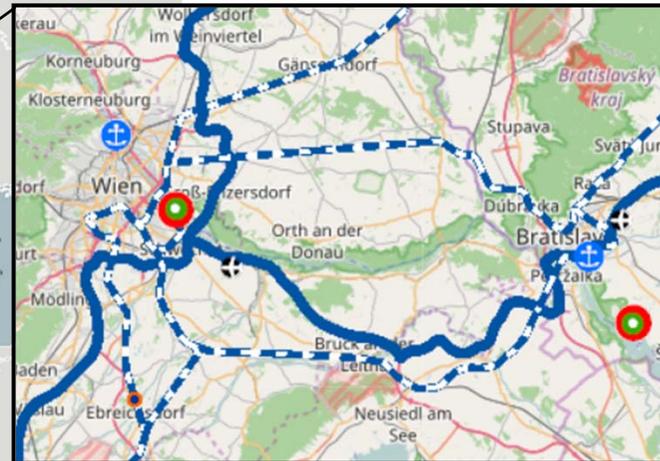
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Trans European Transport Network (TEN-T) – Baltic Adriatic Corridor



4 TEN-T (Trans European Transport Network) Corridors:

- BALTIC - ADRIATIC
- SCANDINAVIAN – MEDITERRANEAN
- RHINE - DANUBE
- ORIENT / EAST-MED



- Airports
- Ports
- Rail-Road Terminals
- Inland waterways
- Railways
- Roads

Source: <http://ec.europa.eu/transport/infrastructure/tentec/tentec-portal/map/maps.html?corridor=1&layer=8,9>

Source: https://ec.europa.eu/transport/themes/infrastructure_en

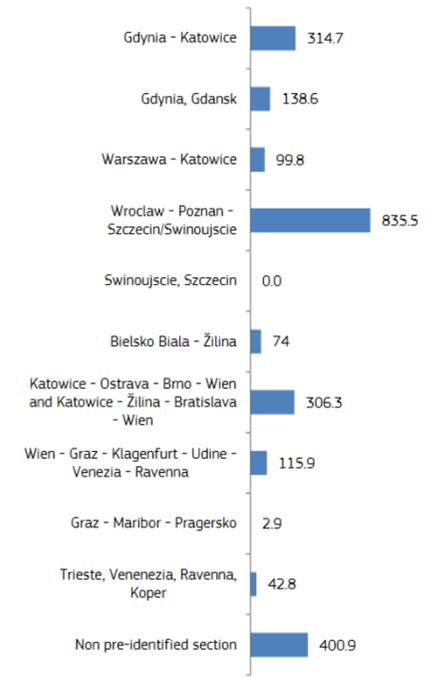
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Connection Europe Facility (CEF) Funding of the Baltic-Adriatic Corridor



- 1800 km long corridor from Poland, through Czech Republic, Slovakia, Austria to Italy and Slovenia
- Connecting core Baltic ports in Poland with core ports of the Adriatic Sea in Italy and Slovenia
- Including around 4600km of rail network and 3,600km of road networks, 13 urban nodes and airports, 10 ports and 24 rail-road terminals
- CEF funding concentrates on railway Actions (€1.9 billion)

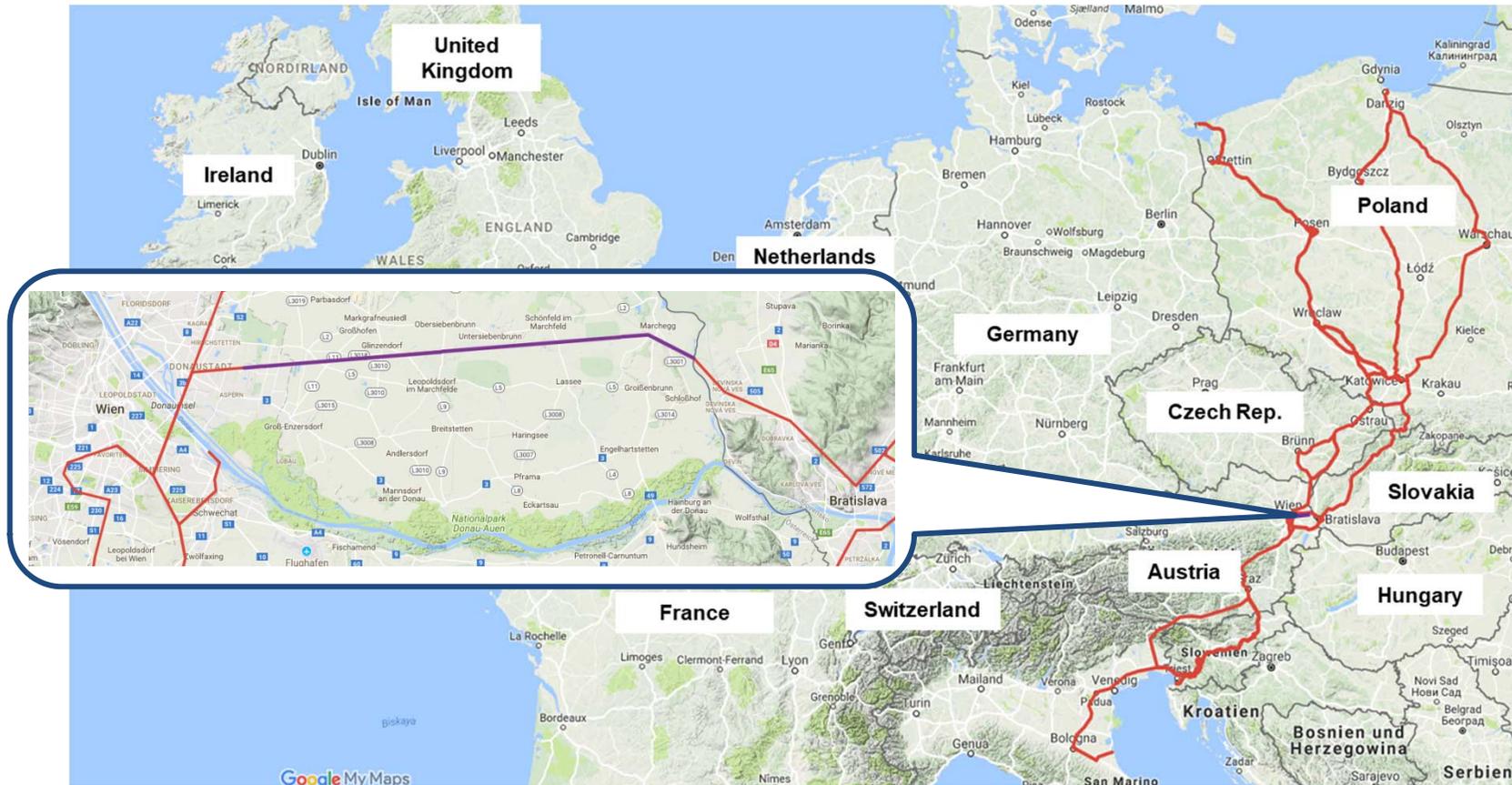
Corridor funding (€ million) per section



Source:
https://ec.europa.eu/inea/sites/inea/files/201803_corridor_report_baltic_adriatic_withcover_0.pdf

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Project Overview



UPGRADING OF THE RAILWAY LINE VIENNA – BRATISLAVA

Project History



- **From 1848:** Operation of the single track railway line between Marchegg and Bratislava by the Hungarian State Railways
- **From 1870:** Operation of the double track line from Vienna to Marchegg by the Privileged Austro-Hungarian State Railway Company
- **Between 1933-1936:** Demolition of the second track between Vienna and Marchegg
- **2008:** Start of upgrading project by ÖBB Infra
- **2014:** Positive finalization of EIA and launching of building permission by the Austrian Ministry of Transport, Innovation and Technology



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Project Goals

- **Reduction of commuting time** between Vienna and Bratislava to approx. 45min
- Providing the necessary **line capacity** for the Baltic-Adriatic-Corridor
- Eventually increasing the speed to 200km/h
- Reduction of CO2 emissions by **electrifying the railway** line and reducing cost for the railway operation
- Providing **traveler friendly measures** by upgrading or renewing the existing stations – eg providing Park&Ride facilities, setting up travel information counters, modern signage for travelers, wheelchair accessibility...
- Improving **economic efficiency** by implementing the line in the Operation Remote Control Centre in Vienna
- **Increasing safety** by reducing railway level crossings and providing access to the platforms without having to cross the tracks
- Facilitating **connection to the inner city public transport system**



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Statistics - commuters

- Out of 868,322 commuters (2011) in Slovakia, 127,149 (approx. 15%) are cross-border commuters⁽¹⁾
- In 2011 approx. 50% of commuters from Bratislava were cross-border commuters to Austria, most of which commuting to Vienna⁽¹⁾
- Due to cheaper apartments in Bratislava (compared to Vienna), there are also more Viennese now living in Bratislava to commute back to Vienna⁽²⁾
- There also is an increased trend for Bratislavans moving to Austrian villages on the outskirts of Bratislava due to comparatively lower rents

Table 1: The basic data on commuting in Slovakia in 2001 and 2011

	2001		2011	
Commuters to other municipality in Slovakia	748,942	94.03%	741,173	85.36%
Cross-border commuters	47,542	5.97%	127,149	14.64%
Out-commuters in Slovakia	796,484	100.00%	868,322	100.00%

Source: Data from the Statistical Office of the Slovak Republic (ŠÚ SR 2003, 2014a)

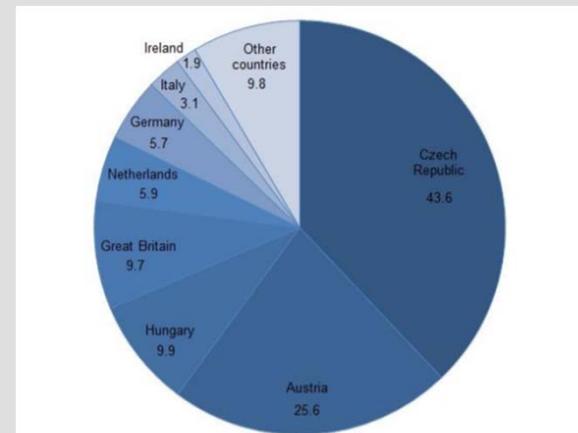
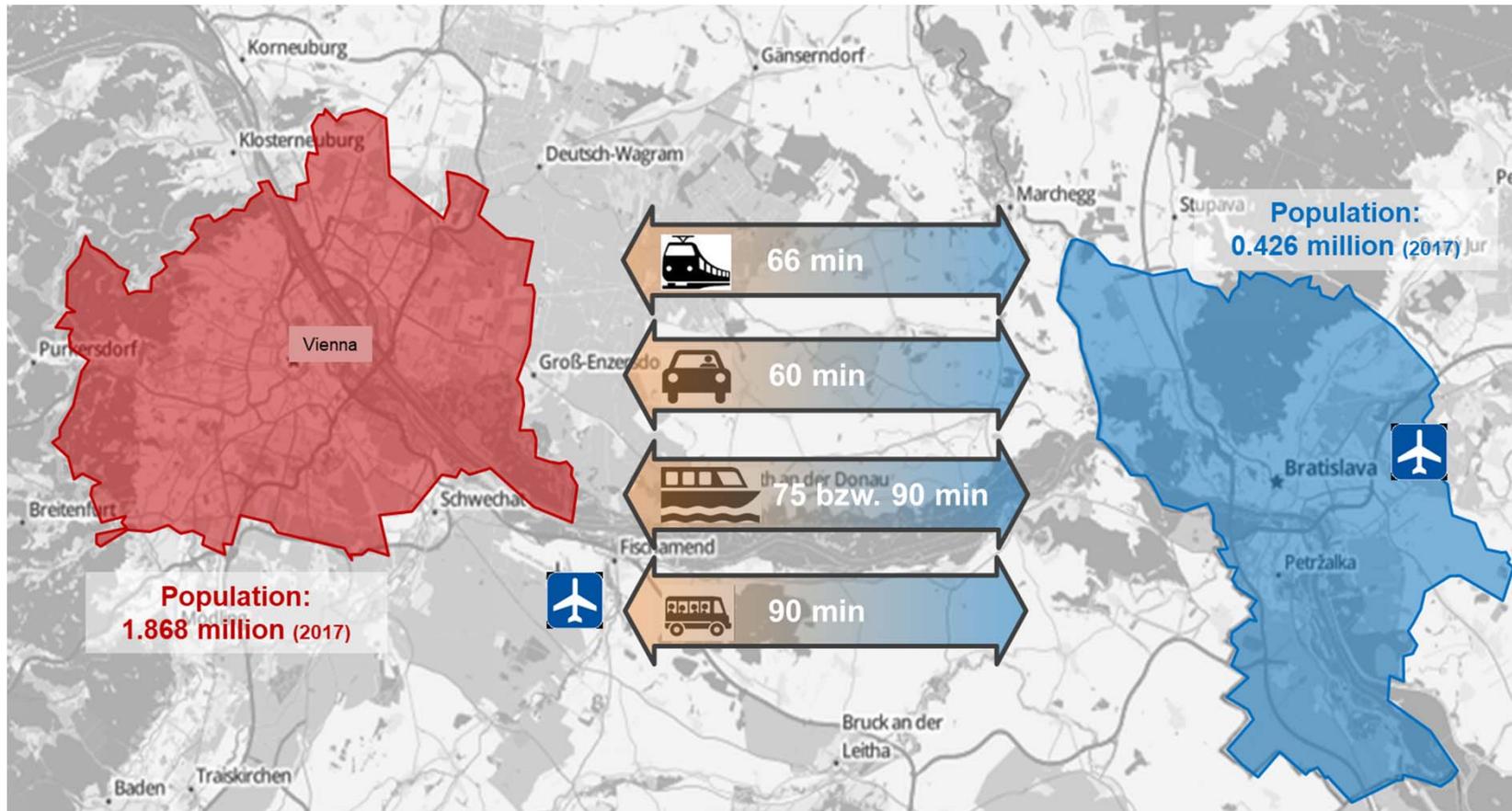


Figure 1. Cross-border commuting in Slovakia in 2011 (in %)

Source (1): Michniak, Daniel; *Main Trends in Commuting in Slovakia*; Institute of Geography of the Slovak Academy of Sciences, Bratislava, Slovakia; *European Journal of Geography* Volume 7, Number 2:6-20, June 2016; Association of European Geographers https://www.researchgate.net/publication/308625324_Main_trends_in_commuting_in_Slovakia
 Source (2): Tacconi, Matteo; *European commuters, Would you cross border to get to work?*; <https://visegradinsight.eu/european-commuters17072014/>; 17 July 2014

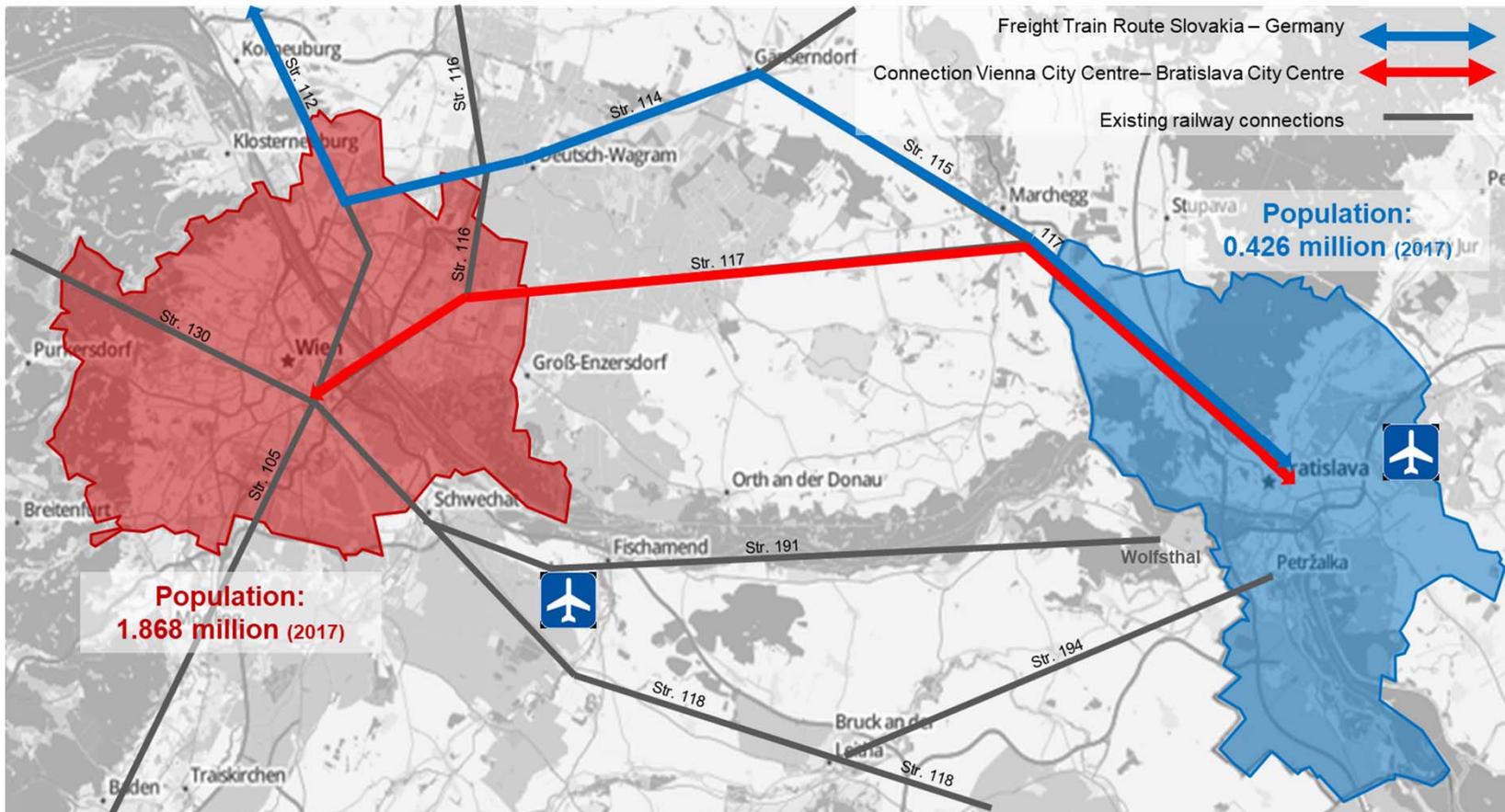
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Strategical Considerations



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Strategical Considerations



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Facts & Figures



Vienna Main Station – Bratislava Main Station	Current Situation	Future Situation
Distance: Vienna Main Station – Bratislava Main Station	65 km	65 km
Travel Time	66 min	40 min
Longest streight railwayline section in Austria	27 km	27 km
Railroad Crossings (level Crossings)	23 (barrier crossings) 1 (no barrier crossing)	none
Engine Type	Diesel Engine	Electric Engine
Positive Changes	-	Increase railwayline capacity
Velocity	max 120km/h	max 160km/h – later max 200 km/h

UPGRADING OF THE RAILWAY LINE VIENNA – BRATISLAVA

Construction Work Details (1) - Numbers



Vienna:

Dismantling of:

- 2 railway crossings

Construction of:

- 3 underpasses
- 2 technical service building
- 2 control building
- 2 parallel railway tracks

Lower Austria:

Dismantling of

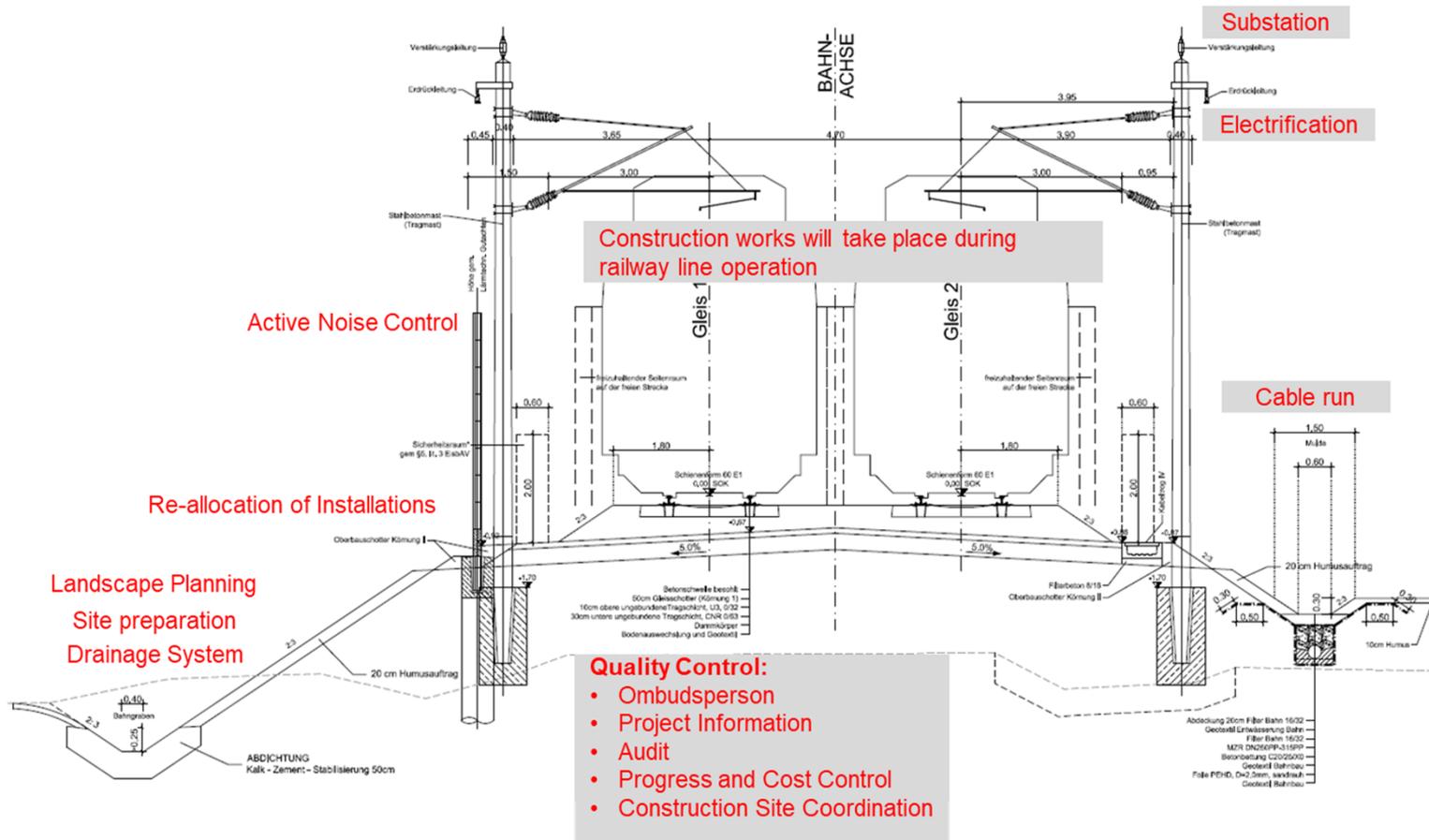
- 21 railway crossings

Construction of:

- 20 road under-/overpasses
- 3 railway bridges
- 4 technical service buildings
- 9 control buildings
- 1 substation
- parallel railway track in some sections (permitted speed 160km/h – future permitted speed 200km/h)

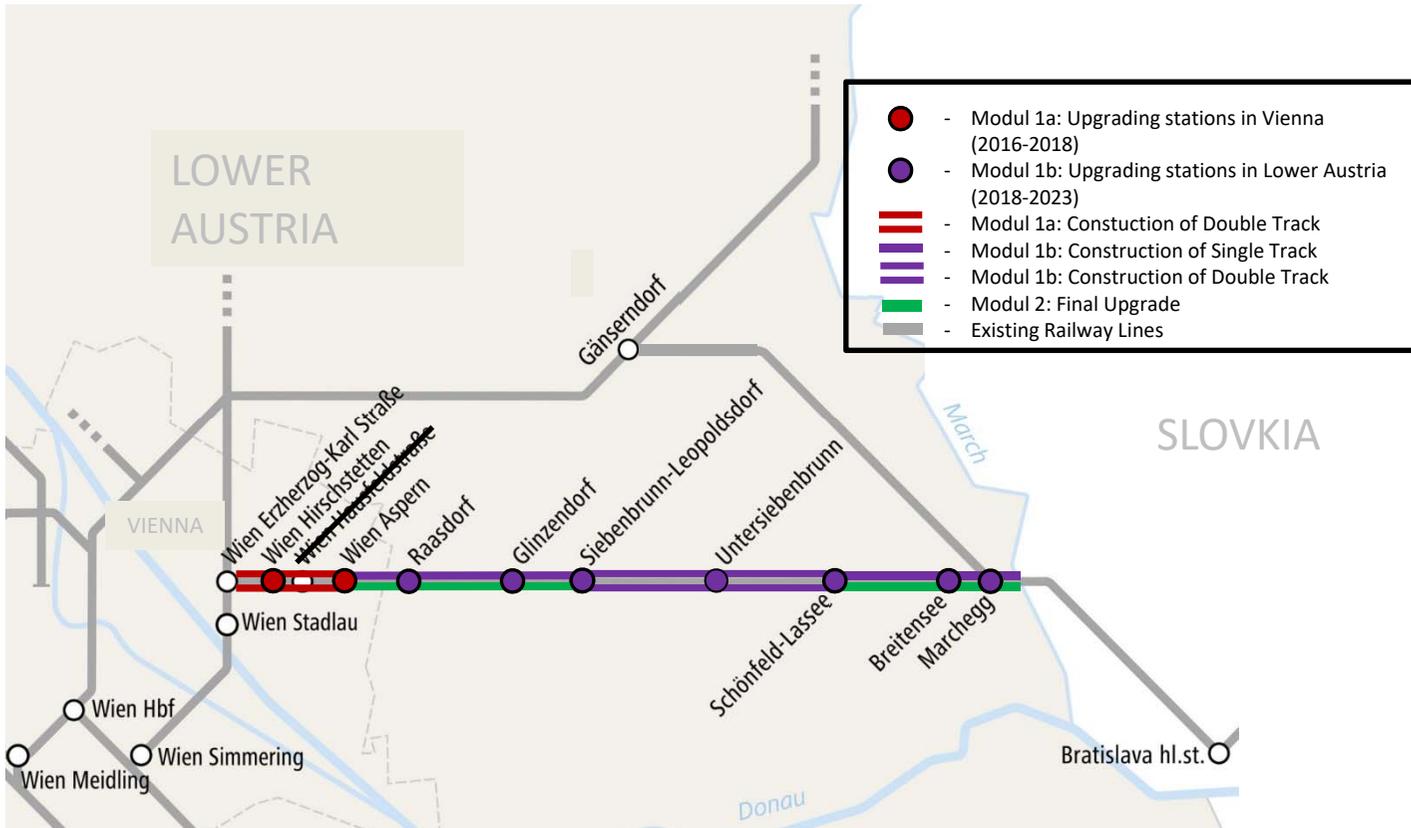
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Construction Work Details (2) - Profile



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Construction Stages (1) - Overview



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Construction Stages (2) – Modules 1a, 1b and 2



1st phase of the underpath construction at Station Raasdorf (Lower Austria) ⁽¹⁾



Station Aspern after completion ⁽³⁾

Source: (1) Luftbildservice Redl (2) Photo by ILF (3) Photo by ÖBB



Sub-construction works near Schafflerhofer-Street ⁽²⁾



Station Aspern during construction ⁽²⁾

Modul 1a – Double tracked construction between Km 0,740 to approx. Km 5,693 and construction of railway stops Hirschstetten and Aspern. (2016-2018)

Modul 1b – Construction of prioritised double tracked sections and railway stations (2018 – 2023).

- Including:
- Section Siebenbrunn-Leopoldsdorf to Schönfeld-Lasse
- Section Marchegg Railway Station to the national border
- Railway stations Raasdorf, Siebenbrunn-Leopoldsdorf, Schönfeld-Lasse and Marchegg
- Railway Stop Untersiebenbrunn.
- Partly construction of railway stops Glinzendorf and Breitensee

Modul 2 – Finalisation of railway stops Glinzendorf and Breitensee and complete construction **of the double tracked line**

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Construction Stages (3) – Challenges



- **Low gradient** and shallow depth of groundwater table – challenging in terms of stormwater management
- **Construction during constant operation** of the railway
- **Coordination with ASFINAG** (the Austrian Highway Operation) due to projects running in parallel



Source: Photos by ILF

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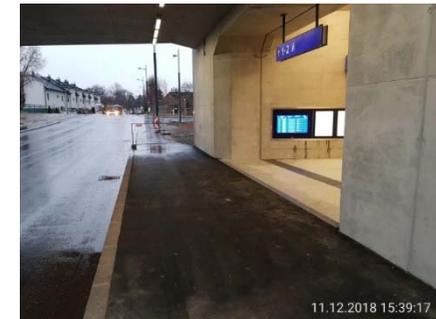
Construction Stages (4) – Modul 1a Station Hirschstetten



During construction (March 2018)



Completed (December 2018)

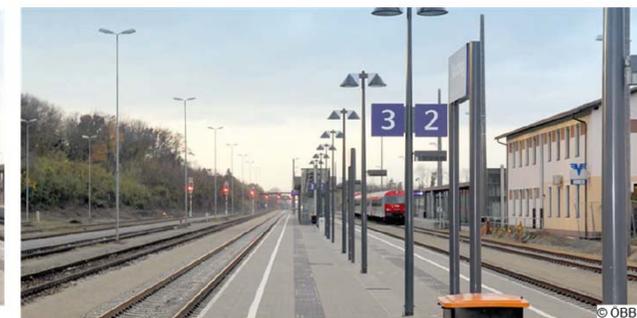


Source: Photos by ILF

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Construction Stages (5) – Module 1b Upgrade Station Marchegg

- Dismantling / relocating of existing tracks
- New platforms including an island platform
- Level-free access through pedestrian tunnel to island platform
- Original freight tracks tied back into the railway line
- Two new infiltration basins for stormwater management



Source: Photos by ÖBB

THANK YOU FOR YOUR ATTENTION!



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