

The Glattalbahn Transport for a vibrant network city





The Glattal's location between the city of Zurich and the international airport combined with superb accessibility make it the preferred location for many national and international businesses.

A new backbone for a dynamic region

Increasing Demand for Mobility

The Middle Glattal area, located between Zurich and its international airport, has been experiencing rapid growth for many years. The area's formerly separate villages have grown together into a functionally connected network city.

But growth has also had a downside. New development at the periphery of the "old" Glattal villages created relatively dense residential, employment and retail centres built with little relationship to each other and lacking any clear organizing structure. Transport demand grew steadily while the transport infrastructure, particularly the roadway network, reached its capacity limit. The result was increasing congestion delaying both private vehicles as well as roadway-based public transport.

Glattal municipalities seize the initiative

In 1990, the mayors of the Glattal municipalities recognized the need for coordinated action and began developing a concept for the Glattalbahn. Their goal was to connect the Middle Glattal's developed areas with an efficient public transport system combining the best qualities of an S-Bahn and a local bus system.

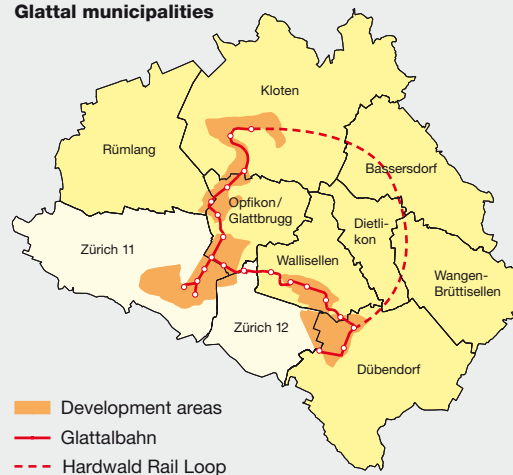
Support from the Canton

The Canton of Zurich enthusiastically supported the Glattalbahn plan since it was consistent with the Canton's strategic housing and transport policy objectives. These policies encourage provision of balanced public and private transport infrastructure designed to promote high quality of life in densely settled areas. In 1995, the Glattalbahn was incorporated into the Canton's Master Plan. In 1998, the government gave the VBG Verkehrsbetriebe Glattal AG responsibility for implementing the Glattalbahn. In 2003, the citizens of the Canton of Zurich approved funding for the Glattalbahn in a public referendum.

The Glattal: home to three of eleven Cantonal development centres

The Canton of Zurich's 1995 Master Plan designated eleven "development areas". These areas include existing or future areas targeted for urban development of significance at the cantonal level. The Master Plan targets sustainable development of these areas, paying particular attention to the landscape, the environment and quality of life. Three of the Canton's development areas are located in the Glattal. The Glattalbahn is a central prerequisite for their sustainable development. It connects these development areas and neighbourhoods into a functionally integrated "Network City Glattal", while at the same time seamlessly linking them to the higher level transport networks of regional trains, long distance trains and air transport.

Glattal municipalities



A basis for sustainable development

Milestones

- 1990** Initial ideas discussed in Glattal communities
- 1992** Alignment studies
- 1995** Alignment incorporated into Cantonal Master Plan
- 1996** System decision
- 1998** VBG given responsibility for project
- 1999** Completion of preliminary study
Application for the infrastructure concession
- 2001** Infrastructure concession awarded by Swiss Federal Council
Completion of construction planning
- 2002** Application for the construction permit
- 2003** Canton of Zurich voters approve project financing
- 2004** Construction permit approved by the Federal Office of Transport
Groundbreaking for first stage of construction
- 2006** Groundbreaking for second stage of construction
- Dec. 2006** First stage enters service
- 2008** Groundbreaking for third stage of construction
- Dec. 2008** Second stage enters service
- Dec. 2010** Third stage enters service

Improving quality of life

The Glattal municipalities and the Canton of Zurich want to encourage optimal economic development of the Middle Glattal. Two key elements of this effort are using spatial planning to improve quality of life, and providing a balanced supply of public and private transport infrastructure.

Transport concept

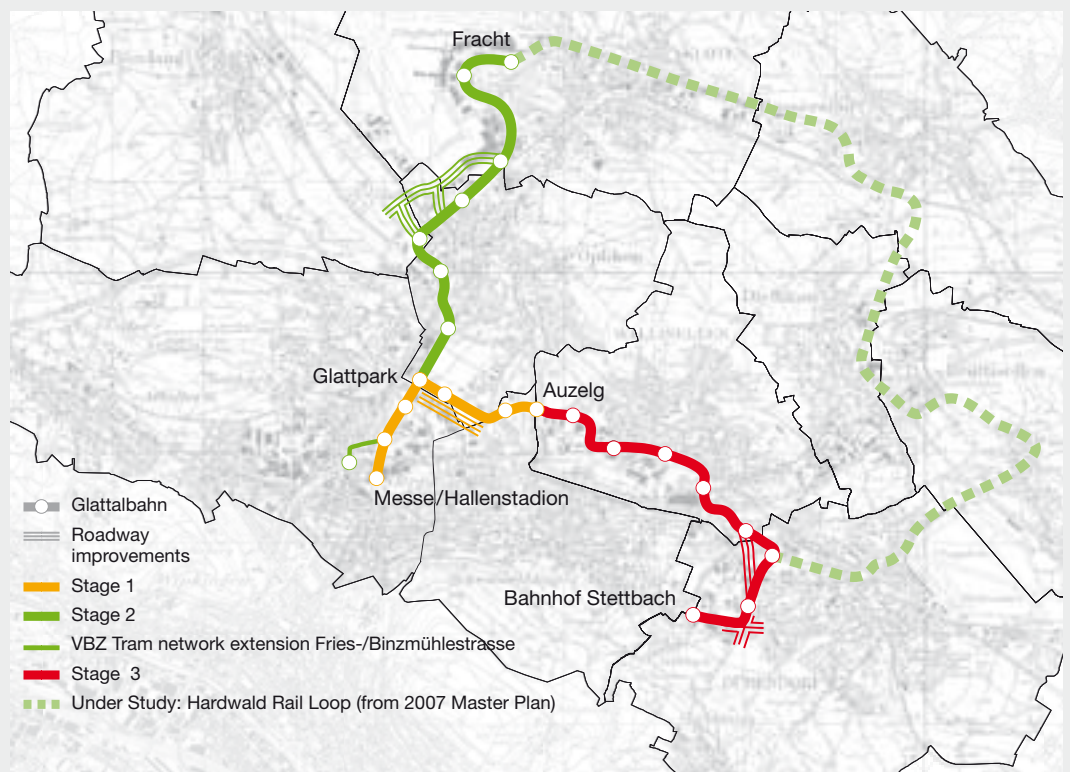
The GlattalBahn is the key element and organizing principle for the area's overall transport strategy. The project includes optimizing the roadway network and creating effective pedestrian and bicycle connections. These elements

will be completed together creating a truly multimodal system.

Demand-based staging plan

The 12.7 kilometres GlattalBahn project consists of three stages, with each stage being placed into service following a two year cycle. This staging plan was developed based on current public transport demand and development timing for adjoining projects.

The GlattalBahn staging plan





Collaborative planning process

Designing the Glattalbahn meant optimizing and coordinating complex technical, political, legal and procedural processes. To be successful, all those participating in the planning and impacted by the project needed to consciously cooperate. The following four guiding principles were used to help design the highest possible quality project:

■ **Integrated transport project**

The Glattalbahn consciously combines multi-modal transport systems into an integrated whole. Complementary projects (e.g. the new Glattparkstrasse, the new Birchstrasse, the new Leutschenbach–Bahnhof Oerlikon Ost tram extension) are all part of the overall project. The Glattalbahn is designed to serve the majority of new transport demand so that roadway system performance can be maintained. Finally, the project provides connections for pedestrians and bicycles as well as fully accessible routes for disabled persons.

■ **Façade to façade planning**

Glattalbahn planners considered the rail line an integral part of the urban fabric and surrounding landscape. Therefore, the project’s planning perimeter stretches from façade to façade, and the project considers more than just the minimum railway infrastructure. This approach highlights the project’s commitment to using the rail line to shape the urban environment.

■ **Continuous design**

The stations and infrastructure share a consistent design based on a distinctive modern architecture. Individual infrastructure elements contribute significantly to overall appearance and appreciation of the surrounding environment. The Glattalbahn’s design highlights relationships between spaces and their functions. Connections, access routes and paths are clearly apparent. Special measures are introduced at stations and in their surrounding areas to call attention to the rail line.

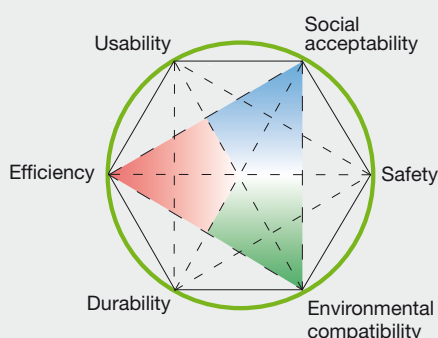
■ **Master planning for workable solutions**

The Glattalbahn is not simply an additional transport mode, but is designed to help stimulate urban development and provide an organizing structure for its service area. In locations with high development potential, planners worked closely with all stakeholders developing specific master plans to guide future growth.

Balancing quality objectives

The Glattalbahn was developed using a systematic and methodical process designed to balance six key quality goals. These quality goals are based on the classic sustainability triangle with its goals of social, economic and environmental compatibility, to which was added safety, durability and usability, thus creating a quality hexagon. The process evaluated whether the quality objectives were in harmony. If the shapes of the quality objectives formed a circle, then the overall Glattalbahn design was considered balanced.

Value systems



Implementation by the VBG, the local public transport company

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A project ideally suited to regional planning policy

The Glattalbahn will improve life quality in an intensively used, dynamic settlement zone. This objective corresponds exactly with federal and regional planning policy and therefore has received financial support from both levels of government.

Responsible project implementation and management

The Glattalbahn's clients are the federal government, through the UVEK (Federal Department of the Environment, Transport, Energy and Communications) and the Canton of Zurich, through the Canton's Economic Development Department. The federal government is represented by the Federal Office of Transport (BAV). The region's public transport coordinating agency, the Zürcher Verkehrsverbund (ZVV), represents the Canton and is responsible for administering the contracted tasks. The VBG – the company providing public transport service in the Glattal – is responsible for design and implementation of the Glattalbahn project.

The local communities, property owners and other transport operators as well as representatives of adjoining properties were all closely involved in the Glattalbahn planning and design. Project planning, management and construction contracts are all awarded in open competition.

Costs and funding

The Glattalbahn, including its complementary transport measures, cost approximately 650 million Swiss francs (1 April 2001 value). The majority of investment came from the Canton of Zurich. The federal government supported the second and third stages with funding from the Federal Infrastructure Fund. The local communities and other third parties also made substantial contributions to the investment.

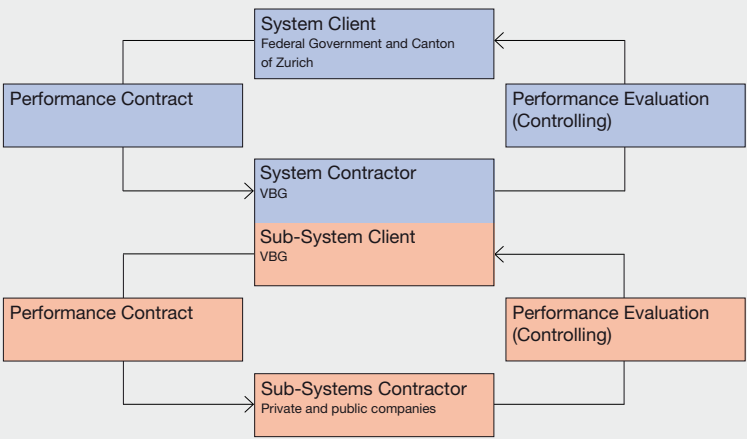
The vehicles, the maintenance facilities and operating expenses are funded by the VBG.

Investment overview

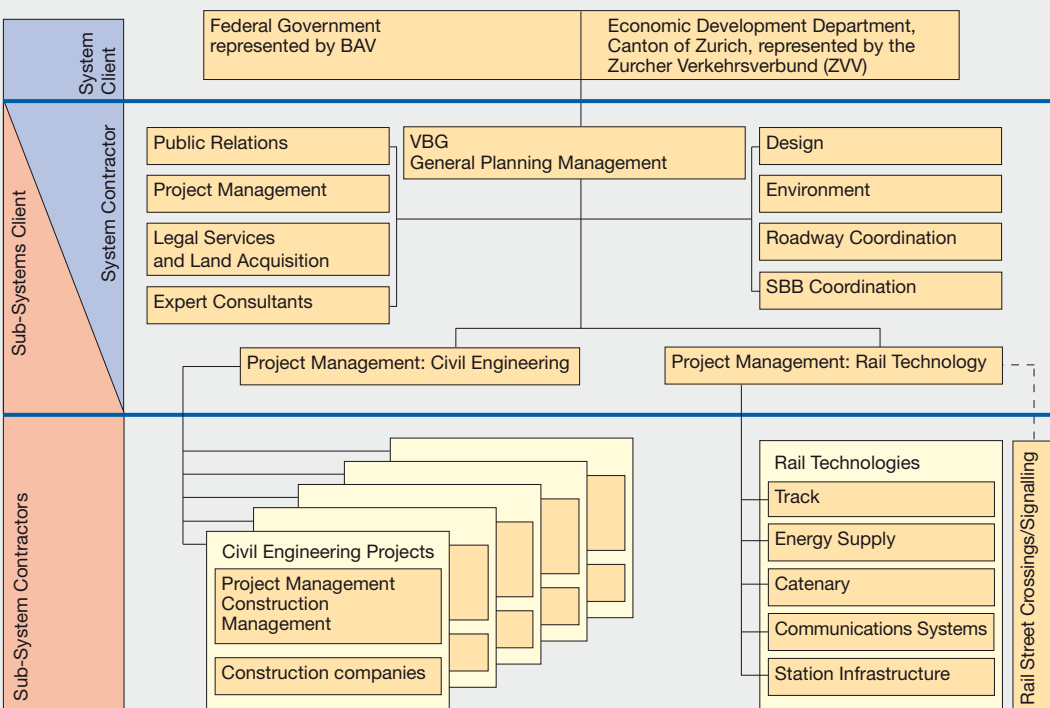
Project Element	Cost (million CHF)	Stage 1	Stage 2	Stage 3
Glattalbahn Rail Line	537	100	200	237
Tram Extension: Leutschenbach– Bhf. Oerlikon Ost (VBZ)	18		18	
Public Transport Subtotal	555	100	218	237
Roadway adjustments	97			
Total Cost	652			



Organization Model

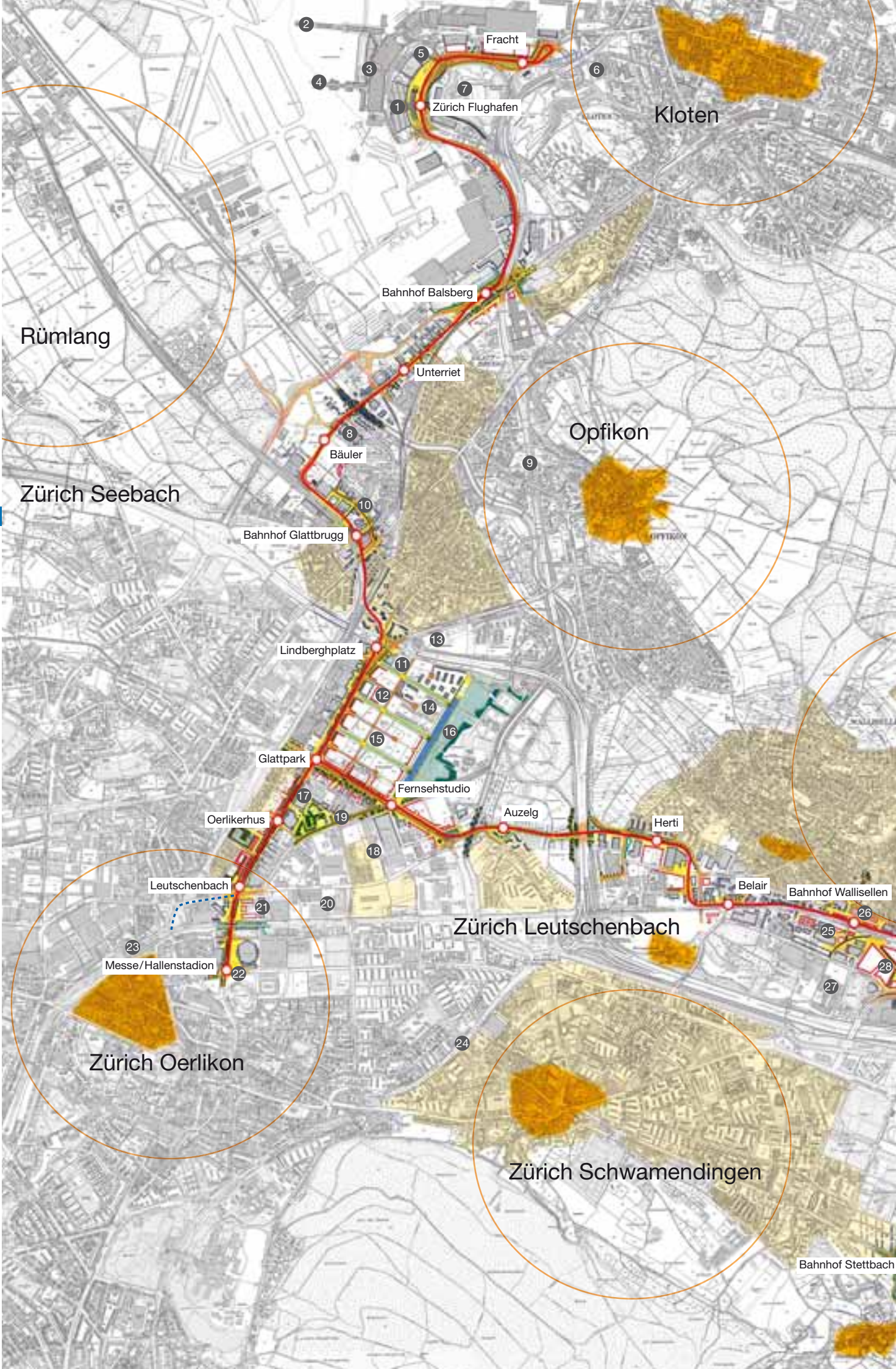


Organization Diagram: Implementation of the third stage



Switzerland's fourth largest "city"

The Middle Glattal has grown into one of Switzerland's largest population centres. The area is often called "Glattal City" or "network city Glattal". Today, with approximately 150,000 inhabitants and 125,000 jobs, the Middle Glattal would be Switzerland's fourth largest city.



Kloten

Rümlang

Opfikon

Zürich Seebach

Zürich Leutschenbach

Zürich Oerlikon

Zürich Schwamendingen

Bahnhof Stettbach

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Fracht

Zürich Flughafen

Bahnhof Balsberg

Unterriet

Bäuler

Bahnhof Glattbrugg

Lindberghplatz

Glattpark

Fernsehstudio

Oerikerhus

Auzelg

Herti

Leutschenbach

Messe/Hallenstadion

Belair

Bahnhof Wallisellen



- Glattalbahn
- - - - VBZ Tram Extension: Fries-/Binzmühlestrasse
- Existing buildings
- Areas planned for new development
- Greenway connections
- Parks and open space
- New or improved tree planting
- New or improved public spaces and squares
- + New transport nodes: places of identity and orientation
- Historic village centres
- Residential areas near the Glattalbahn

Selected Development Projects around the Glattalbahn

- | | |
|--|---|
| 1 Airport Multimodal Ground Transport Centre | 19 Leutschen Park and Leutschenbach Street |
| 2 Airport Terminal A | 20 Steiner Development Area |
| 3 Airside Center | 21 Sunrise Towers/CS Towers |
| 4 Airport Terminal B | 22 Congress Centre, Indoor Arena, Theatre 11 |
| 5 Radisson Blu Hotel, Zurich Airport | 23 Oerlikon Railway Station, pedestrian underpass |
| 6 3tops Office Building | 24 Schwamendingen Freeway Roof Project |
| 7 The Circle at Zurich Airport | 25 Integra Development Area |
| 8 UBS Investment Bank | 26 MITTIM |
| 9 Airport Freeway Roof Project | 27 Swing |
| 10 Hotelplan | 28 Richti Development Area |
| 11 Lightcube/Kraft Foods | 29 Glattzentrum Shopping Centre |
| 12 Baxter Healthcare SA | 30 Zwicky Development Area |
| 13 Böschen-, Fallwiesen Area Plan | 31 Giessen Area |
| 14 Glattpark Residential | 32 AMAG |
| 15 New Glattpark Neighborhood | 33 Hochbord Master Plan |
| 16 Opfikerpark Recreation Area | 34 Helsana |
| 17 Leonardo Office Building | 35 Stettbach Public Transport Node |
| 18 Studios Swiss Television | |

Unifying the network city

“Pearls on a necklace” unifying the network city

The Glattalbahn connects the Middle Glattal’s emerging development centres like pearls on a necklace. This means the rail line can be operated efficiently and helps create an environmentally sustainable mobility system.

High quality development in the former periphery

The Glattalbahn does not pass through the old Glattal village centres, but rather, it passes through the former settlement edges, areas formerly characterized by transportation facilities such as highways and rail lines. The Glattalbahn is changing the character of these fringe areas. As a continuous “Pearls on a necklace” the Glattalbahn’s unified design and infrastructure brings new qualities to the public realm. The Glattalbahn becomes a driving force helping transform formerly underutilized areas into new high quality places to live and work.

A street level rail system

Whenever possible, the Glattalbahn runs on the street level. It uses tunnels or aerial structures only when there is no surface space available. Running at street level means that stations are easy for passengers to identify and reach. Stations, access routes and low floor Cobra trams have been designed especially to serve the needs of mobility impaired users.

Private and public investment

Many new buildings have been built along the Glattalbahn since project planning began. Many more are planned or under construction. Recent studies estimate that the Glattalbahn will leverage private investment of almost nine billion Swiss francs in the period 2001–2015. Therefore the ratio of private to public investment is on the order of 16:1 (based on the core Glattalbahn project cost of 550 million Swiss francs).

Efficient transport system

The Glattalbahn runs on an exclusive right of way. It only encounters roadway traffic at intersections. The Glattalbahn uses modern traffic control systems and selected roadway improvements to ensure that it does not interfere with roadway traffic, helping ensure that the capacity of the existing transport systems remains equal to or better than before beginning the Glattalbahn project (this was a basic condition of the project).





Rail track construction adjacent to family garden area

Track construction adjacent to the Wallisellen SBB Station

Rail track construction in Duebendorf

Building a stream culvert at the Stettbach transport node

Professional project management and construction challenges

Considering the needs of all stakeholders

The Glattalbahn is a central element in the Agglomeration Glattal/Middle Glattal's urban development. Since the Middle Glattal was already densely developed and extensively used, it was necessary to fully consider the needs of all stakeholders at all stages of the project from planning to construction. Designing and building such a complex project in a densely settled area places high demands on project managers and planners.

The main task in the Glattalbahn project is to coordinate the civil engineering (structures, track, bridges, etc.) with the railway and transport engineering. However, it was also necessary to plan improvements to adjoining facilities including reorganizing utility lines, adjusting roadways, creating bicycle and pedestrian connections, and coordinating with the SBB on railway facilities.

Construction under operations

The project's ambitious schedule combined with the limited working space available along the new tramway line placed high demands on the planners, engineers and construction companies. Many of the construction sites were located directly on heavily used streets and squares. Much of the route passed through densely developed residential and commercial areas.

A team of transport specialists continuously monitored construction impacts and developed mitigation measures. These included measures designed to protect access, ensure that public

transport can operate reliably and prevent diversion of traffic through residential areas. During construction of the third stage, goals and measures were summarized in a tailor-made Transport Plan.

On sections near the SBB's mainline tracks it was necessary to take special consideration of railway operations, much work could only be done at night when trains were not operating. Even in sections where the Glattalbahn was built in relatively open areas, extensive special measures, such as building stabilization or remediation of contaminated sites, were often necessary.

Almost 2.5 kilometres of special structures

The Glattalbahn operates over approximately two and a half kilometres of special structures. These include the Balsberg viaduct, the Glattzentrum viaduct and the Margarethen tunnel (approximately 400 meters).

In addition, the Glattalbahn station passenger facilities and catenary support were specially designed with a distinctive modern architecture. The Glattalbahn's tracks were constructed with a special foundation to reduce noise and vibration. Finally, as part of the project's continuous design concept, most of the track is placed on a green track bed.

Performance / Cost / Timing

A large number of interested parties and stakeholders is characteristic for major projects like the Glattalbahn. The role of project management is to ensure that all aspects of the project are completed with the highest quality while meeting schedule and budget constraints. A key project management success factor is placing a strong emphasis on construction planning and staging. For the Glattalbahn project it was possible to transfer lessons learned from early stages into the design of the later stages, further improving efficiency and project quality.

Attractive direct connections

Glattalbahn Station: Fernsehstudio



Artist's renderings of the Wallisellen, Ringstrasse and Stettbach Glattalbahn stations



Comfortable, direct connections in the northern Zurich area/Middle Glattal

The Glattalbahn significantly improves public transport in the Middle Glattal.

In three development stages, the Glattalbahn creates new attractive direct links between the Glattal communities, the airport and downtown Zurich. Directly linking the Glattalbahn with Zurich's city tram network creates transport synergy closely connecting established city districts with newly emerging Glattal centres in the former periphery. Originally separate functions such as housing, employment and services are thereby transformed into a continuous urban corridor.

First stage

The first stage of the Glattalbahn entered operation in late 2006. It consisted of a new section of track between Messe/Hallenstadion, and Auzelg. It was operated as an extension of the VBZ tram line 11. This line provides a transferless tram ride connecting Zurich's city centre, Zurich Oerlikon, the housing and workplaces in Leutschenbach and Auzelg as well as the new Opfiker Glattpark neighborhood.

Second stage

The second stage of the Glattalbahn entered operation in late 2008. It consists of new track running from the terminus at Zurich Airport cargo hub to Zurich Airport Multimodal Ground Transport Centre, the Balsberg SBB station, the Glattbrugg SBB station and connecting with the first stage at the Glattpark station. The new Glattalbahn line 10 operates on this route continuing from Glattpark to Leutschenbach,

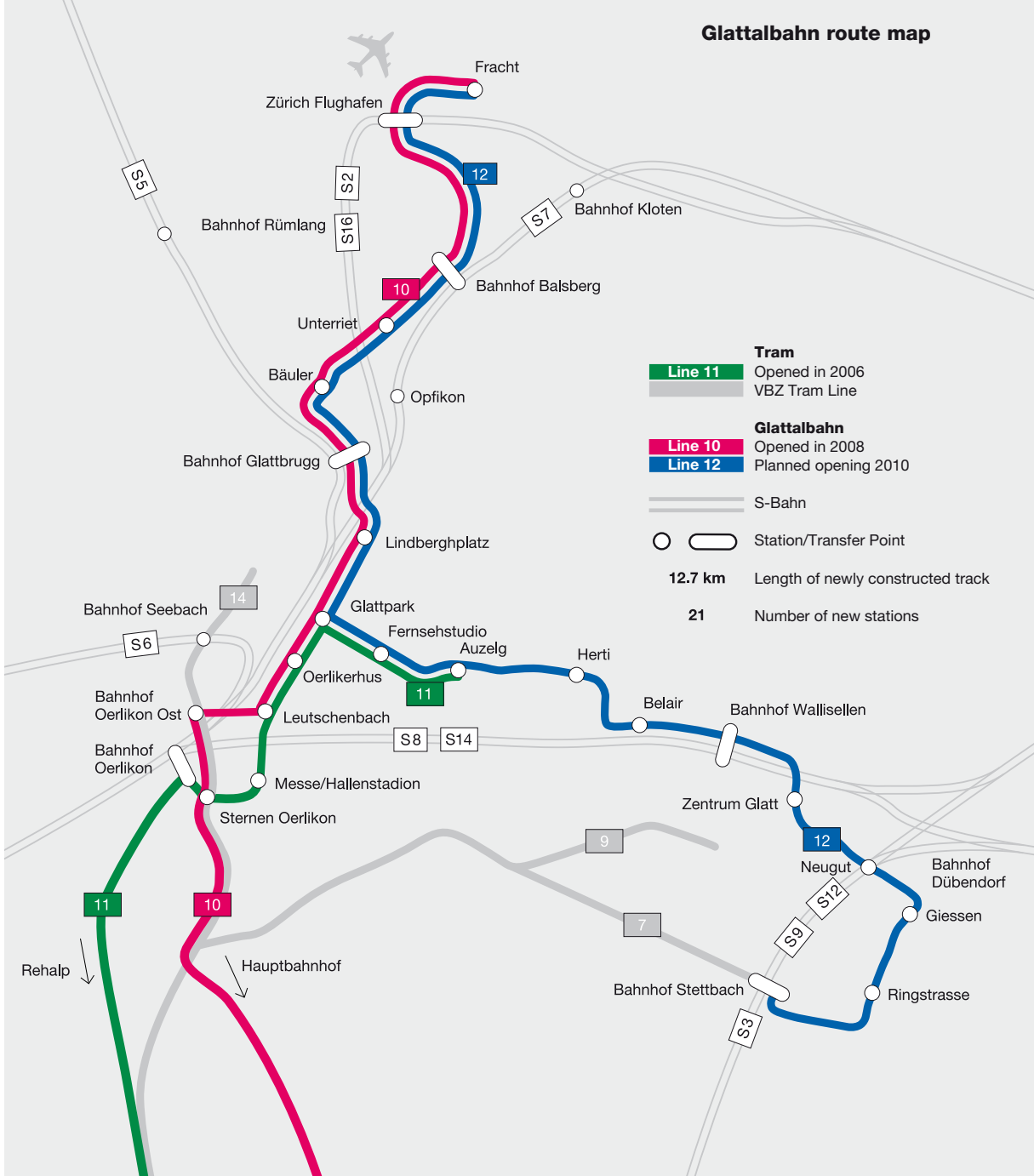
and then uses a new tram line connection to the Oerlikon East SBB station and onward to Zurich's central train station.

Third stage

The third stage of the Glattalbahn is projected to enter operation in late 2010. This line will provide a tangential connection along the northern border of Zurich. The new segment runs from Auzelg via the SBB station at Wallisellen and the Duebendorf commercial area to the Zurich Stettbach SBB station. The new Glattalbahn line 12 will be operated on this route. It will provide a direct connection between the housing and employment in Wallisellen and western Dübendorf to Zurich Airport. It will also provide direct access from the Middle Glattal to large shopping centres. Finally, the Glattalbahn will make the large event and recreation facilities including the Congress Centre, Hallenstadion and Theater 11 easily accessible from all directions.

Seamless integration with the regional transport network

The Glattalbahn is perfectly integrated with the regional public transport network. It provides direct connections to the airport and to mainline railway nodes at the airport and in Zurich Oerlikon. The Glattalbahn stops at six regional railway (S-Bahn) stations providing easy connections to practically the entire Zürcher S-Bahn service area. Finally, connecting bus service from VBG and neighbouring bus operators guarantees a high level of local accessibility.





Technical details as an expression of design:
Station, Catenary, Bridge Railing

Facts and Figures

Service Frequency

The Glattalbahn service consists initially of two lines: Glattalbahn lines 10 and 12. Additionally the Glattalbahn first stage is used by an extension of VBZ tram line 11.

Service Frequency Overview

Glattalbahn line 10:

7.5 minutes during peak periods

15 min during non-peak periods

Glattalbahn line 12:

15 min service all day

Capacity

The Glattalbahn significantly increases transport capacity in the Glattal. The new trams provide space for some 240 Passengers. During peak periods this equals the following capacities per hour per direction:

Line 10: 1920 persons/h

Line 11: 1920 persons/h

Line 12: 960 persons/h

On the Glattalbahn sections where lines 10 and 11 both operate there is transport capacity for 3840 riders per hour and direction. This corresponds the capacity of a two-lane highway during peak periods.

Vehicles

Glattalbahn lines 10 and 12 use modern low floor Cobra trams exclusively. These trams are painted in the VBG colours. Glattalbahn line 11 also uses Cobra and Mirage trams but these are operated by the VBZ and painted in the VBZ colours.

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