

# Modern system for Zurich north urban centre

Andreas Flury Managing Director, Glattal Transport Services (VBG)

Georg von Graefe Head of Marketing and Communications, Glattal Transport Services (VBG)

14th September 2004 was a historic day in the short but exciting story of the Glattalbahn Project – government member Rita Fuhrer of the Economic Affairs Directorate for Canton Zurich, moved the first stone for the construction of the new Glattalbahn.

At her side, visibly proud and moved was Dr. Andreas Flury, Managing Director of Glattal Transport Services (VBG), responsible for the project. Also present were representatives of the six local districts which will be connected to the new service and a crowd of guests. An initial 2.5 kilometre section will commence operation at the end of 2006. Completion of the 12.7 kilometre network with its 20 new stops is planned for the end of 2010.

The Glattalbahn is a new metre-gauge light rail system with its own location line to the north of Zurich City. The double track railway will connect the airport and five urban districts to the northern area of the city and Zurich City on two branch sections with three routes.

Switzerland is a railway country by tradition. True to form, Canton Zurich has repeatedly distinguished itself over recent years with pioneering projects in the sphere of rail-borne suburban transport. Zurich S-Bahn, placed in service in 1990 and continuously extended, is known throughout the world and today carries well over 300,000 passengers a day. Also painstakingly cared for and with state-of-the-art maintenance is Zurich City's tram system and the narrow gauge lines serving the urban centre such as the Forchbahn, the Uetlibergbahn, the Sihltalbahn or the Bremgarten-Dietikon-Bahn.

Nonetheless, the Glattalbahn project represents an enormous challenge for all concerned, breaking new ground in many respects. These include the following domains:

- Regional planning
- Line layout
- System selection
- Legal framework
- Project management
- Construction engineering and quality assurance
- Communication and the political decision making process

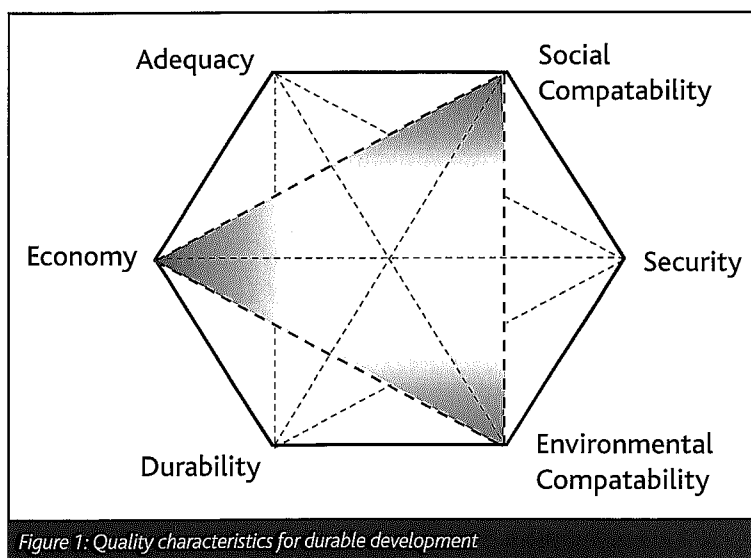
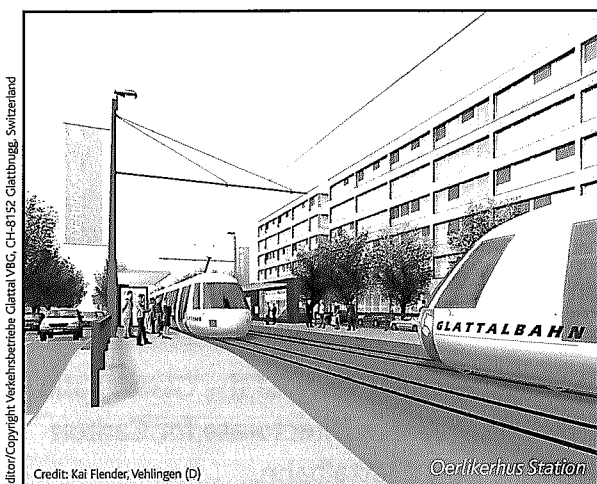


Figure 1: Quality characteristics for durable development

**Dynamic development in the Glattal**

Central Glattal is situated to the north of Zurich City, between the city and the airport at Zurich Kloten. In addition to the northern part of Zurich City, the region comprises five suburban districts. Over recent years and decades Central Glattal has undergone dynamic growth. Villages and urban districts, originally separated and self-contained, have increasingly grown together to form a functionally networked urban centre. The immediate vicinity of the Zurich metropolis, but also the excellent links with Switzerland's most important road and rail axes have rendered the area a preferred site for many nationally and internationally active enterprises.



**From urban centre to Glattalstadt**

Regional development and transport planners like to designate Central Glattal as 'Glattalstadt'. The term actually describes the development target rather than the development structure as effectively presented at the start of the Glattalbahnhof project. But the fact is, Central Glattal is on the way to becoming one of the largest coherent development areas outside classic Swiss cities such as Zurich, Basle, Geneva or Lugano. With its present 150,000 inhabitants and 125,000 jobs, 'Glattalstadt' is today Switzerland's fourth largest town. Located in Central Glattal are the largest coherent building land reserves in the whole of the Canton Zurich. Internationally known, for instance, is the 67 hectare city development zone 'glattpark', popularly described as Switzerland's largest and most expensive building site. The glattpark is situated right at the junction of the two Glattalbahnhof branch lines.

**Capacity bottlenecks in the transport infrastructure**

The dynamic development of Central Glattal also has its dark side. A heterogeneous patchwork of new, densely occupied residential, workplace and service centres has emerged at the periphery of the 'old' Glattal villages. The relation to traditional village centres was increasingly lost without the introduction of new connecting elements. Mobility requirements have grown. The distances to stations of the high capacity S-Bahn network have increased. The consequences are traffic congestion and overfilled buses at peak times and a dying-off effect for districts at the end of the working day. The original, village-style quality of life has been increasingly lost without being replaced by any new, town-style qualities.

**Local districts recognised the need to act**

In 1990 Glattal's district municipality presidents recognised the need to act. They founded the community of interests 'Glattal's Future' and formulated the objectives for a district-overlapping development policy. An important upshot of this was that the region's development potential is only meaningfully exploitable given an adequate expansion of the transport infrastructures. With a view to an enduring preservation of the quality of life, expansion of the public transport system was clearly a priority. Against this background the idea grew to network the Central Glattal urban centre with a high capacity public transport facility for medium distances. The 'Glattalbahnhof' was born – even though it was not so called, nor was it yet certain whether a railway line would in fact represent the most suitable solution.

The idea was one thing, but an even more important success factor for the Glattalbahnhof was the fact that the idea was born in the local districts themselves. For in federally organised Switzerland the process of decision making and authorisation for such a project is a complex and demanding procedure. So it was all the more important that the local districts have always supported the project with motivation and commitment.

**Support through the Canton**

The idea of the Glattalbahnhof received vigorous support from the government of Canton Zurich. It coincided to a large extent with the higher ranking development policy objectives for the Zurich North/Central Glattal urban centre. One of the central planning guidelines for the region stated that suburban development in such areas should be 'inwardly' directed and its focal point should be on public transport. The most important precondition which

Bus routes	33 bus routes
Line length	222km
Number of vehicles	79 (73% low floor)
Vehicle wagon kilometres	4.8 million km
Workforce	198 full-time positions, 12 of which with VBG
Stops	280
Passengers	14 million
Passenger kilometres	37.7 million

Figure 2: Figures for Glattal Transport Services from the year 2003

got the Glattbahn project moving was its incorporation into the 'Cantonal Recommendation Plan'. The Recommendation Plan is the coordinating instrument for the cantonal area. It reflects the development policy intentions for the next 10-15 years and defines priorities and financial feasibilities. The Recommendation Plan must be approved by the cantonal parliament – in Canton Zurich the 'Cantonal Great Council'. The Recommendation Plan is an obligatory requirement for the regional planning of the districts.

**Economically optimised line layout**

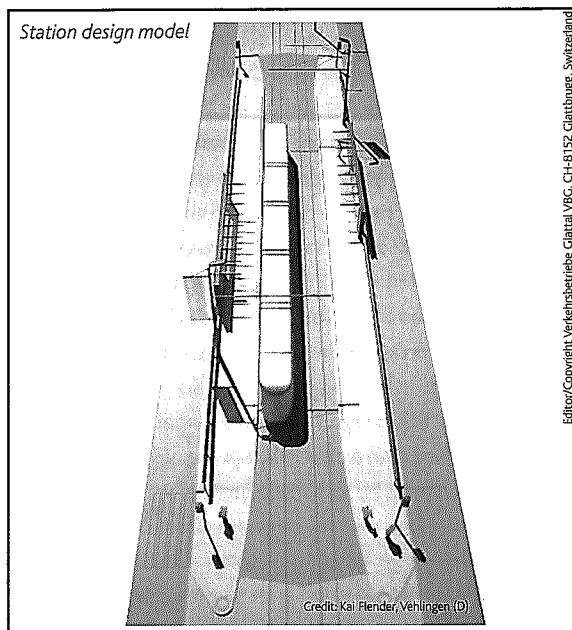
For entry of the Glattbahn into the cantonal Recommendation Plan it required a concrete line layout. In 1992, Zurich Metropolitan Transport Services (ZVV), the umbrella organisation responsible for public transport in Canton Zurich, placed the appropriate contract. The anchor points for the future Glattbahn network were set. These were the two Intercity rail stations of the Swiss Federal Railways (SBB), Zurich Oerlikon and Zurich Airport, also the stations of the Zurich S-Bahn in the Glatt districts. The requirement was for a line layout and stop network between the two rail stations which promised optimal profitability. The result was two branch lines. One is from the airport to Zurich Oerlikon. The second is conceived as a tangential connection along the northern periphery of Zurich, taking in, amongst others, the Glatt Centre, Switzerland's largest shopping centre. Three routes are planned on the railway network:

- Airport-Opfikon-Ambassador-Zurich Oerlikon
- Airport-Opfikon-Ambassador-Wallisellen-Centre-Zurich Stettbach

- The route Bahnhof Stettbach-Wallisellen-Ambassador-Zurich Oerlikon

**Best variant along the new town structures**

For many of the Glattal district inhabitants the best Glattbahn line layout variant was somewhat surprising. The Glattbahn bypassed the historic village centres and instead followed the new town development areas outside the original centres. Since some of the town development areas at the time of the evaluation



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were still presented as a 'green belt', those responsible for project communication were faced with a first important political persuasion exercise. In 1995, the Zurich Cantonal Great Council successfully adopted a total revision of the cantonal Recommendation Plan. Enshrined in this under the title 'New high capacity public transport facility for medium distances in the Glattal' was the Glattbahn.

**Narrow-gauge instead of a futuristic system**

Still the Glattalbahnhof was not a railway system. The choice of the most suitable transport system still had to be made. This task was tackled in 1996 and once more the result was surprising for many. Proving clearly the best variant was the system consisting of a metre-gauge, mixed residential and business compatible light rail with basically its own location line. Translated for the layperson this simply means a normal – although modern – narrow-gauge railway or light railway as already known in the Zurich urban centre from the Forchbahn, the Sihltalbahnhof or Bremgarten-Dietikon-Bahn. Not even a small number had expected or even desired some futuristic system such as an elevated railway or even a magnetic suspension railway to be proposed for the 'boom region' of Central Glattal. But a broad system comparison gave a clear message: the obvious benefits of the railway lay with its optimal networkability with existing transport facilities in the region (S-Bahn, Zurich City trams, buses). The stops for all these systems are situated at town and therefore at pavement level. So they offer passengers optimal accessibility plus convenience of access. Also the futuristic option offered no cost advantages. And then there was also the fact that technical risks and imponderables are estimated to be much higher with a futuristic transport system than for a conventional railway.

**Cooperative project planning process**

In 1997, all preparations for the concrete planning of the Glattalbahnhof were completed. Zurich Metropolitan Transport Services (ZVV) placed the project planning order in the hands of the VBG. The VBG had been established five years earlier as the enterprise with market responsibility for public interurban transport for the Glattal region. The enterprise operates a bus network with a length of 222km and 14 million passengers per year (figures from 2003).

The company which is in AG form belongs principally to the regional districts. Some members of the board of management of the VBG are the same members of the administration who had previously promoted the idea for the Glattalbahnhof in their own districts. In retrospect this also proves to be one of the important factors for the success of the Glattalbahnhof project. In general terms the Glattalbahnhof is the successful result of a cooperative project planning process. Local districts, cantonal bodies, third parties such as the Swiss Federal Railways, Zurich Airport together with especially affected land owners were periodically informed. Their concerns and wishes were accepted and where possible taken into account in the project engineering process.

**From railway to collective transport project**

The preliminary project for the Glattalbahnhof was ready in 1999. Proving demanding technically and from a planning aspect was the task to find sufficient space for the new seven metre wide Glattalbahnhof line within the existing transport and metropolitan structures. Wherever possible, existing road space or axes were used. Nevertheless, the Glattalbahnhof has to divert to another level – tunnels or viaducts – over a section of more than two kilometres. The object of a continuous own location line was to be able to maintain over 97 per cent of the line network. Mixed

Length of the newly laid line:	12.7 kilometres
Viaducts:	1.8 kilometres
Tunnels:	0.4 kilometres
Gauge width:	1,000mm (double line)
New stops:	20
Lines:	3
Extension stages:	3
Distance between stops:	600 metres on average
Connections:	Link with the Zurich City tram system 10 S-Bahn lines (15 in the final phase) at six S-Bahn stations Long distance trains in Zurich Airport and Zurich Oerlikon International air transport at Zurich Airport
Timetables:	7.5 (peak times)/15 cycles/min per route
Maximum operating speed:	60km/h
Average travelling speed:	22km/h
Rolling stock:	During stage one and two the service is operated with modern trams by Verkehrsbetriebe Zürich (Zürich Tram). For the third stage (when the whole Glattalbahnhof Net will be in use) there is an option to accomplish a bidding procedure. In this procedure, the interested operators will suggest the roll stock (vehicles, trains, wagons, compositions).
Investments:	600 million Swiss Francs Glattalbahnhof network 108 million Swiss Francs supplementary metropolitan and transport infrastructures

Figure 3: Glattalbahnhof key data

zones with other traffic carriers remain in the area of crossings and stops. A central stipulation in the planning process was that capacities of road networks may not be reduced. With well over 100 level road-rail crossings this imposed high demands on the control of the traffic flows. With the help of computer-assisted traffic simulation models and after several optimisation rounds, it was finally proven that the capacity of the overall transport system could be maintained. Even a slight increase in capacities was envisaged at important key points in the road network, thanks to additional intersection lanes. During the course of the project planning process it was soon clear that the Glattalbahn alone cannot cover the mobility requirements of the urban centre. So the project planning work was right from the start aligned towards a collective optimisation of the entire transport provision. The railway project had become a collective transport project which, in addition to the Glattalbahn, also included steps for supplementing the road network, development of the stations and the optimising of cycle track and footpath connections. As a whole, the project makes an important contribution to the design of the public urban area.

### Linking the Zurich City tram to the Glattalbahn

There was yet another finding in connection with the project planning work: the compatibility of the new Glattalbahn with the existing Zurich City tram system offered not only technical and operational benefits. Lines which reached way beyond the two rail systems developed new passenger potentials. Proving especially attractive was the connection possibility between Zurich City (with the main rail station) and the urban development areas in Central Glattal. This resulted in the inclusion in the package of supplementary transport infrastructure measures of a second connecting line between the Glattalbahn and tram net in Zurich Oerlikon.

### Sustainability of the central project plan

Next to technical feasibility the Glattalbahn project management placed great value from the outset on the sustainability of the project. Figure 1 shows the quality characteristics hexagon, defining this objective. Playing a decisive role in cost optimising were not only investment costs but also anticipated maintenance costs (life cycle cost principle). Operational profitability was already one of the definitive criteria for the evaluation of optimal line layout and also line planning.

Current estimates assume that the Glattalbahn will attain an operational cost coverage percentage of more than 60 per cent. The average cost coverage percentage in the overall Zurich Metropolitan Transport network is 55 per cent.

Over and above its transport facility functions, the Glattalbahn project was directed towards valorising the Central Glattal town improvement planning. Stops, building construction elements and traffic zones used by the railway

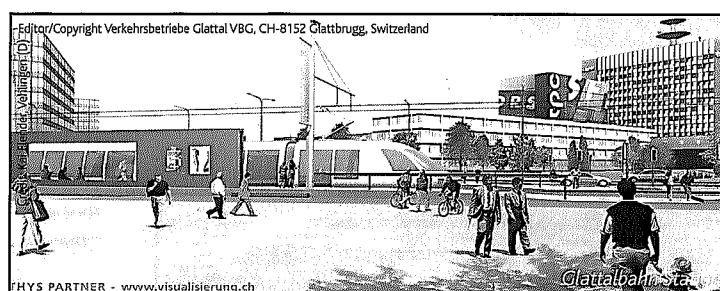
were designed according to modern, architectural stipulations. The aim was to provide decisive stimuli for town improvement planning directed towards quality of life.

### Preliminary project as a starting point

The preliminary building project of the Glattalbahn was the starting point of tackling the authorisation procedure. During this process, the project was continuously developed and optimised. In the spring of 2002, the Glattalbahn project had been displayed for public attention (a mandatory part of the authorisation procedure). This was followed by dealing with the total of 138 objections – a comparatively small number in view of the size of the project – and the acquisition of land and rights.

### Financing the Glattalbahn

Not unexpectedly, the credit grant procedure for the Glattalbahn encountered political opposition. The conservative-right Swiss People's Party SVP used the possibility of a parliamentary referendum and enforced a public referendum. The Glattalbahn project had to undergo a public acceptance test. Responsibility for Glattalbahn communication matters, like the overall project management, was with Glattal Transport Services who were not unprepared for this development. Right from the start of the project planning work the project had been accompanied by a balanced mix of communication measures in the framework of an appropriate concept.



### Open project communication policy

The communication concept was based on the three principles 'Imagination', 'Identification' and 'Dialogue'. 'Imagination' concerned providing the public with extensively concrete images of the planned tramway. Created in this connection, for instance, was a series of 3D visualisations plus a 3D animated film with a virtual Glattalbahn journey over large sections of the future location line. The aim of 'Identification' was to show different target groups publicity indicating the benefits and advantages of the project for them. 'Dialogue' signified the continuous availability of project information – also when all was not going smoothly or when temporary problems occurred. Public wishes were taken seriously. Those responsible for the project repeatedly presented themselves at a number of information events, answering questions and personally receiving constructive criticism and suggestions from the public.

Periodic opinion polls monitored the success of the communication efforts. In the approach to the Glattalbahn financing referendum, opinion polls indicated a clear majority for

<b>1990</b>	The districts Dübendorf, Wallisellen, Opfikon and Kloten discuss initial ideas for a new public transport facility in Central Glattal.
<b>1992</b>	The Zurich Metropolitan Transport Services (ZVV) places the order for determining the principles and the possible location line for the new public transport facility.
<b>1995</b>	The route for the new public transport facility is entered in the cantonal Recommendation Plan.
<b>1996</b>	The Traffic Council for the Canton Zurich decides on the choice of system: The Glattalbahn is to be realised in the form of a metregauge, metropolitan railway compatible for mixed residential and industrial areas, and hence compatible with the Zurich City tram system.
<b>1998</b>	Glattal Transport Services (VBG) take over the general project management for the Glattalbahn on behalf of the Economic Affairs Directorate for the Canton Zurich.
<b>1999</b>	The preliminary project is completed and serves as a basis for the infrastructure concession application.
<b>2001</b>	The Executive National Council grants VBG on 28th March the concession for the construction and operation of the Glattalbahn.
<b>2001</b>	The construction project is concluded.
<b>2002</b>	The cantonal government of Canton Zurich grants VBG the licence to use public roadways for the Glattalbahn.
<b>2002</b>	The Zurich Great Council decides to realise the Glattalbahn in the framework of a collective transport project together with road improvements and adaptations.
<b>2002</b>	The building project for the Glattalbahn is displayed for public attention in the local districts.
<b>2003</b>	Voters in the Canton Zurich accept the submission for the financing of the Glattalbahn and the supplementary infrastructure projects with a total of 66.6 per cent in favour.
<b>2004</b>	The Federal Transport Office grants the Verkehrsbetriebe Glattal the building authorisation for the construction of the Glattalbahn.
<b>Autumn</b>	
<b>2004</b>	Building commences on the first Glattalbahn stage between the Messe/Hallenstadion and Zurich Auzelg.
<b>End 2006</b>	The first stage of the Glattalbahn between the Messe Hallenstadion and Zurich Auzelg is placed in service.
<b>End 2008</b>	The second stage between Ambassador and Zurich Airport is placed in service.
<b>End 2010</b>	The third stage between Zurich Auzelg and Zurich Stettbach is placed in service.

Figure 4: Glattalbahn key dates

the project. However, just at this point in the run-up to the referendum, doubts were beginning to grow as to whether the dynamic development of the Central Glattal would in fact persist as forecast. The economic dull spell continued more stubbornly than expected. Zurich and its surrounds were gradually noting an excess of office and service accommodation. Alongside this was the air transport crisis with the grounding of the national Swiss airline Swissair in 2001. As a consequence, passenger figures for Zurich Airport fell from an annual 22 million to 17 million.

Nevertheless, in the referendum battle the Glattalbahn successfully maintained its positioning as a durable future investment in the quality of life for an economically important region. In addition, road and public transport users were themselves experiencing, on a daily basis, the fact that capacities of the existing transport infrastructures were approaching their limits. Finally the Glattalbahn was approved by the electorate of Canton Zurich on 9th February 2003 with a comfortable majority of over 66.6 per cent. This ensured the financing of the Glattalbahn, satisfying the conditions for concluding the project planning and authorisation procedure.

**Staged realisation**

On 27th January 2004, the Federal Transport Office granted the construction licence for the Glattalbahn; this was combined with some 750 provisions which had still to be satisfied in connection with the detailed planning. The way was now clear to prepare invitations to tender and award contracts for the construction of the first stage of the Glattalbahn.

The first stage of the Glattalbahn runs from the present tram terminus at Messe/Hallenstadion to Zurich Auzelg. The part section is some 2.5km long and will come into service at the end of 2006. First spade cut and the subsequent preparatory work took place on 14th September 2004. The construction work has been running at full speed since the beginning of the year.

According to the current timescale the two further stages of the Glattalbahn are being placed in service in a two-year cycle. By the end of 2008, the part section from Ambassador to the airport and by the end of 2010, the section Zurich Auzelg to Zurich Stettbach. In February 2005 the Zurich cantonal government had to decide whether the next stage will be realised within this time frame. Again the voice of political opposition was raised, wishing to delay the project and referring to the financial situation of the Canton and an alleged reduced development dynamic in Central Glattal. Once again it was the local districts who demonstrated their vigorous commitment to the expansion of the Glattalbahn according to plan. Continuous regional observation by the Glattal Transport Services moreover confirmed that development in Central Glattal continues unabated. On 3rd March 2005 the cantonal government released the resources for the construction of the second stage of the Glattalbahn by the end of 2008. The visionary and forward-looking Glattalbahn project continues on a course to success. It will contribute decisively to maintaining the urbanisation and quality of life in an intensively used, municipal living space and optimally support the economic potential of the region Zurich North/Central Glattal. □