

- Line map of the new W to SE LightRail Transit



## ➤ LIGHT RAIL SIMULATION EDMONTON

The City of Edmonton is planning a new Light Rail (LRT) line to run through the centre of Edmonton, the capital city of the Canadian province of Alberta, from southeast to west. It will cross the only existing LRT line in Downtown. TTK is analysing the operational performance of the new line with OpenTrack, a microscopic rail simulation model.

Edmonton was the first city in North America with less than 1 million inhabitants to implement a modern rail based transport system. The first line was opened in 1978 with a length of 7 km, followed by several extensions resulting in its current length of 20 km (from Century Park in the south to Clareview in the north). Further extensions to this line are in their planning stages.

The new southeast to west LRT line will be 27 km long, connecting the West Edmonton Mall, the second biggest of its kind in North America, with Mill Woods in the southeast. No connection to the existing line is planned. In contrast to the current system the new LRT line will be running on the surface and in the street, more like a modern tramway than a railway, even though it has its own segregated right of way on the whole length: Crossings with all other street running transport will be signalised, but there will be no mechanical barriers. Only on two short elevated sections the new line will leave the street.

The North Saskatchewan River valley is crossed on a bridge and the northern steep river bank negotiated using a tunnel. The intention is that the new LRT line shall actively contribute to urban improvements in the city centre and its surroundings.

TTK estimated the future run time and its variability for the whole line as well as for a shortened option with a length of only 13 km. All stochastic influences such as driver performance, dwell times, stops at intersections and other impacts of street running have been taken into account. The influence of pedestrians crossing was a special topic in a sensitivity analysis.

This micro simulation, where the position of each LRV is calculated separately during the whole simulation time, describes the behaviour of the future LRT system in a realistic way. It even allows the analysis of operations during perturbations. Scenarios with delays up to 15 min,

a line closure in the centre of Downtown and single track operation on a defined section have been simulated and discussed. The results led to recommendations for further planning.

The evaluation of the run time permitted the estimation of the number of required light rail vehicles (LRV), which is key information for the dimensioning of the operations and maintenance facility (OMF). The movement inside the OMF itself, including sanding and washing, as well as maintenance and stabling, are now objects of further modelling work. The start-up in the morning and the return of the LRV in the evening are studied in detail because bottleneck effects could occur during these periods. Several variants will be compared to result in a tailor made OMF layout.

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All planning resources for the LRT system are joined in the ConnectEd consortium with AECOM and Hatch Mott MacDonald as leading consultants.

## FLAG

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# INFORM

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## 10 YEARS TTK BRANCH OFFICE LYON

### PARTICIPATION OF THE PUBLIC AS THE NEW BUILDING BLOCK IN PUBLIC TRANSPORT PLANNING

The close proximity to France as well as the French interest in the tramtrain system from the beginning brought TTK also projects across the border. The range of topics increased over time to become a wide portfolio.

Hence 10 years ago a branch office was opened in Lyon. From rather humble beginnings the French branch has come to strive and is now vying with TTK in Germany for the higher percentage in turnover.

The further promotion of tramway as a means of public transport is fortunate not only in France and Canada but also in Germany. The city of Ulm shows that even discus-

sions of many years can lead to a positive outcome as is the extension of the tram network. In the long run it always pays to be very frank with the public and allow room for public participation in the planning process, something that nowadays has to come natural to planners in this field.

It has become a tradition to compile slightly differing topics fitted to the individual markets and developments in our clients' countries. Feel free to also ask us for the German and/or French version of this newsletter.

Enjoy your reading!

## ▶ ULM'S TRAM NETWORK TO BE EXTENDED

With the elongation of line 1 to Boefingen in 2009 the city of Ulm took a first step towards the extension of its tram network. Quickened by the success of this measure plans have progressed to considerably extend the network by three further lines within the coming years.

TTK is responsible for the infrastructure of line 2 and at present is drawing up all paperwork for the approval of plans. Moreover, a dynamic operational simulation is carried out to test the robustness of the timetable and to minimise conflicts with motorised individual transport already at this early stage of planning. Due to the considerable extension of the network Ulm must also restructure and extend the existing depot. TTK here can draw on substantial experience from similar tramway infrastructure and maintenance projects.

slope of 53 ‰ max. Along the line 6 stops are planned with the terminal in Kuhberg serving as interchange station to city and regional bus services.

Although planning for the insertion of the stops has to consider the individual urban surroundings a unified colour and furniture concept is to allow a higher level of recognition and quality for the tramway. Besides, planning will follow the city's guidelines for PRM accessibility.

### OPERATIONAL SIMULATION LINE 2

Operations on the new line 2 were simulated with the software package Open Track identifying a robust line 2 travelling time during peak hours.

Main simulation phases are the following:

1. Mapping of the planned infrastructure and identification of an ideal, uninhibited travelling time;
2. Calibration of the model based upon data from current operations on the section where in future lines 1 and 2 will overlap;
3. Integration of the expected further impacts of mixed operations with busses and motorised individual transport, of crossings, of disruptions caused at driveways, of cars searching for parking lots, and of cycle and pedestrian traffic.

Based upon the model's results the necessary number of vehicles for line 2 during peak hours was calculated to be used in the tendering process.

### RESTRUCTURING AND EXTENSION OF DEPOT

The depot for busses and trams in Bauhofer Strasse at present does not have enough capacity to maintain and stable the additional tram vehicles.

TTK has formed an interdisciplinary team to plan a new depot for 20 vehicles and to determine the measures for the restructuring of the existing maintenance facilities. In consequence bus stabling as well as track alignment and catenaries have to be adapted, too.

All planning phases and the operational simulation run in parallel with the shared aim of allowing the start of operations on the new lines before the end of 2018.

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## ●●●●● ONE PROJECT MANIFOLD TASKS

### INFRASTRUCTURE LINE 2

Line 2 leads directly from Kuhberg school campus to the university and science city on to Science Park II. The new section for which TTK is responsible has a length of 2.5 km and overcomes a difference of level of 76 m meaning a

- Public participation throughout (Source: SWU)



## LATEST NEWS

+++ **Opening Depot Saarbahn Sep 3rd, 2012 + depot and maintenance for 22 vehicles + construction cost 25 m Euros + construction time 2 years** +++ After two years of construction from now on all vehicles of the operator are serviced and stabled in the new depot. From the first idea to execution: one-stop planning carried out by TTK and Werkgemeinschaft Karlsruhe.

+++ **„Tram South-East“ Karlsruhe in operation from Sep 8th, 2012 + 2.2 km length + 5 stops + 30 m Euros construction cost + construction time 19 months** +++ The sun shone brightly on the fair held for the inauguration of the new south-eastern tramline in Karlsruhe which was planned by TTK. Thousands of citizens took “test rides” the day before the line was officially opened a month ahead of planning.

+++ **Light Rail simulation Edmonton** +++ TTK set up an Open-Track model for the new Light Rail line to be built in Edmonton, Canada. Travelling times, their variability and the ensuing number of vehicles required were determined and various incident scenarios studied. Several alternatives for a depot set-up were simulated as well.

● Inauguration Tram South-East



● Opening Depot Saarbahn



## ➤ 2002-2012 • 10 YEARS OF TTK LYON

After 5 years of consulting work in France in 2002 TTK opened an office in Lyon. With the foundation of this affiliated office TTK's French activities took a boost in particular in the South East of France.

Among the most notable projects number the following: Tramtrain studies for Lille and the future tramtrain to the airport Notre-Dame-des-Landes in Nantes; preliminary design tramway Strasbourg and Bus Rapid Transit in St. Nazaire, Aix-en-Provence and Angers; various cases of network restructuring in particular related to tendering processes of public transport services in Bayonne, Tours or Orléans; high speed rail lines “railway Aquitaine 2020” (low-cost alternative to the existing plans based upon a synchronised timetable); ...

In particular in south-eastern France TTK led many studies which in the meantime have become systems in operation or are just in the process of being built: feasibility study and technical assistance for the Rhône Express Tram to the airport Lyon St. Exupéry; feasibility study for the tramtrain in western Lyon and in Lyon Trévoux; conceptual planning of multimodal public transport (horizon 2025) for greater St. Etienne and greater Annecy; strategic network development concept for Montpellier (horizon 2020), ...

Due to our permanent aim to always provide the best possible German as well as French know-how to our

clients the establishment of an affiliated office in Lyon soon won over the foundation of an independent branch. So now teams from Lyon and the seat in Karlsruhe work closely together and meet up regularly, either in the framework of projects tackled together or during the bimonthly 3-day visits of the Lyon colleagues in Karlsruhe.

The Lyon office opened in 2002 with just 2 colleagues and 10 years later, at the end of 2012, the team has grown to 5 people, all of whom gathered preliminary experience at the seat in Karlsruhe. Together with the PTV France team in Lyon the office there houses a staff of about 10 in an easy-going and fruitful atmosphere.

A closer proximity to our clients, the wish of our French colleagues to work in their motherland again and our express decision to strategically position ourselves as a mixed German and French company were the criteria that 10 years led us to put our feelers out in Lyon: also in future we will do our very best to ensure the success of this decision!

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