



FAKULTÄT FÜR
INFORMATIK

Simulation Project 2018

Milestone 7 - experiment



Modeling - thought to get you started


"Perfection is achieved, not when there is nothing more 

are add, but when there is nothing left to take away. "

- Antoine de Saint-Exupery

Jakobstraße - bird's eye view



- North endpoint: Listemann road (in Fig left above.)

- South end: Before Ernst-Reuter-Allee (in figure right-below.)

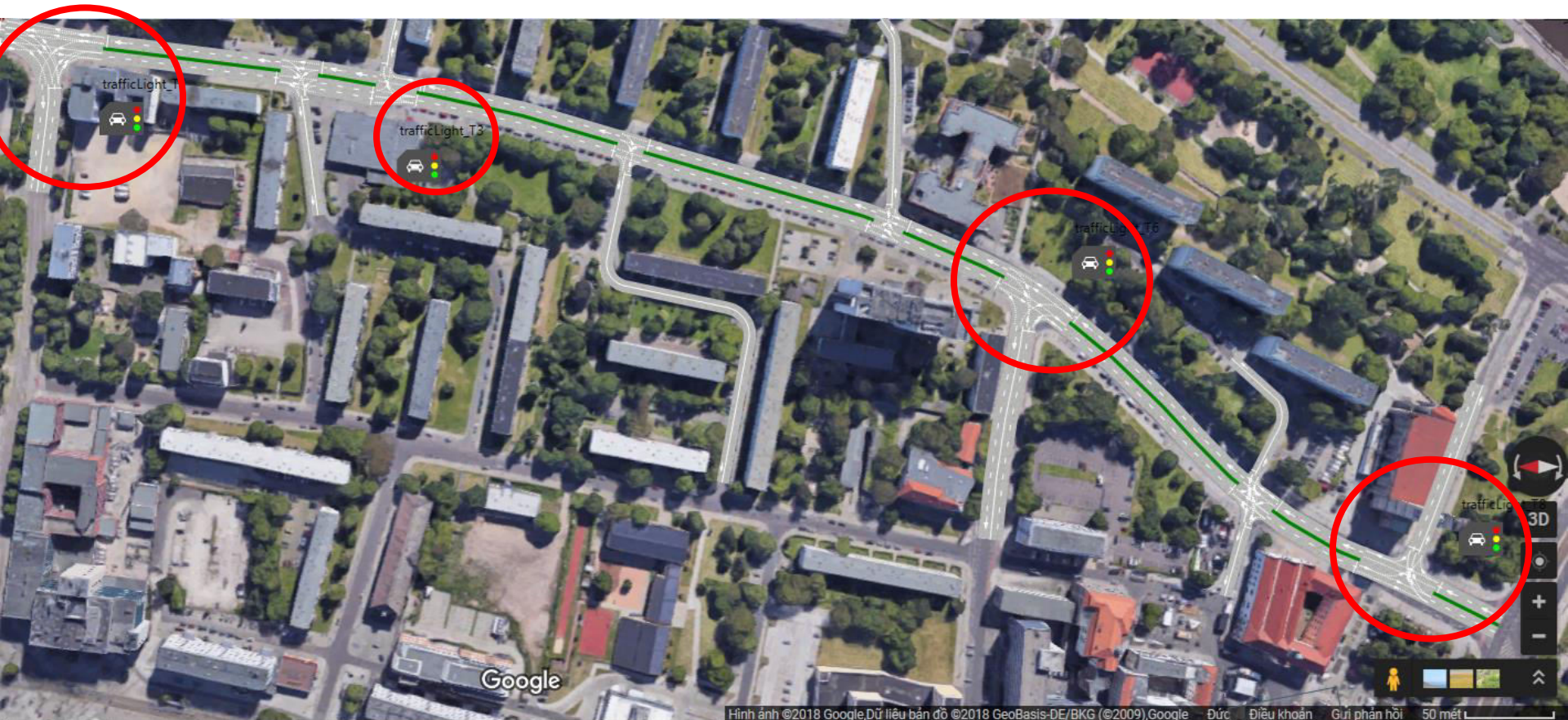
Jakobstraße - Static base model



- 3 junctions
- 4 lights (addition pedestrian crossing mill road)

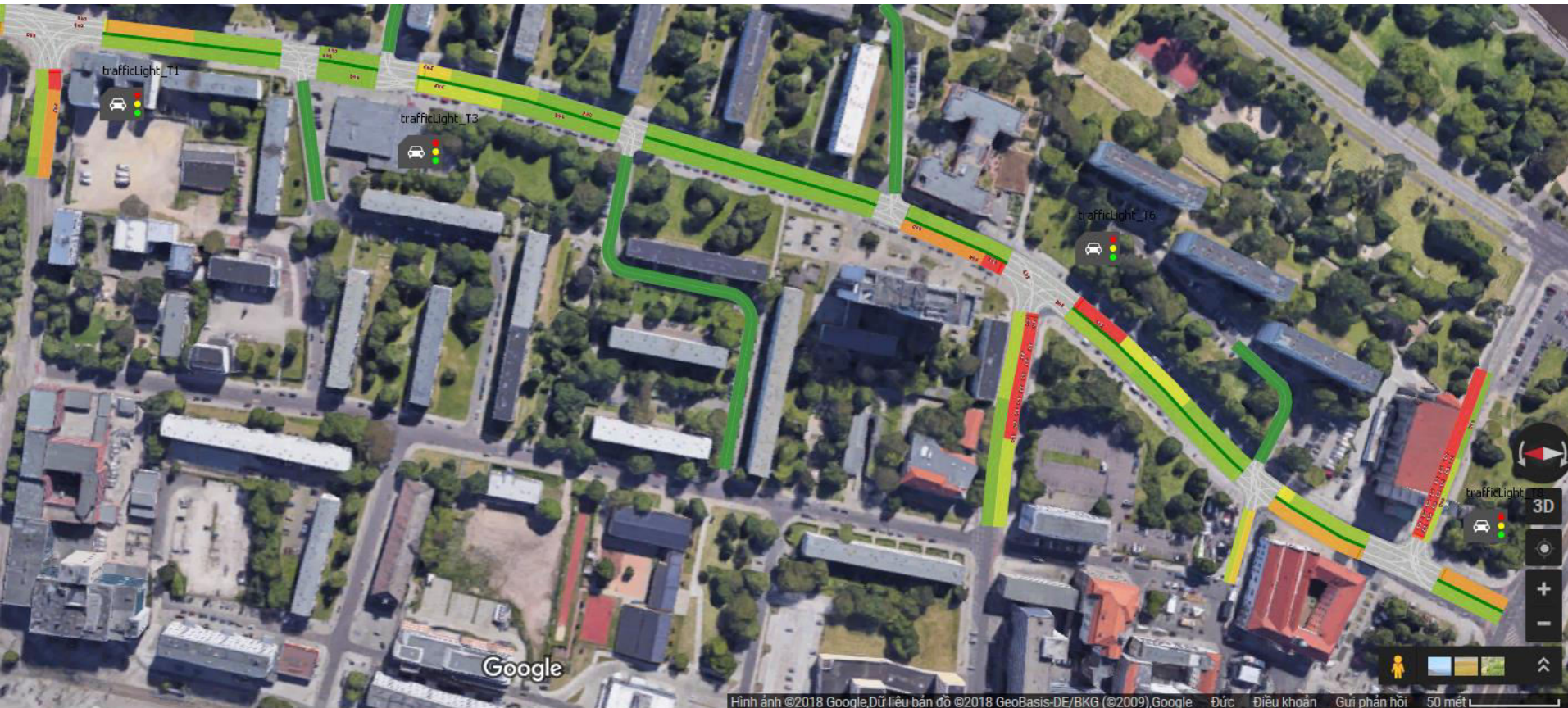


Jakobstraße - Static base model



- 3 junctions
- 4 lights (addition pedestrian crossing mill road)

Jakobstraße - Dynamic base model



- Car inflow based on traffic count data
- In addition, measurement of transit times & queues




Experiments - Assumptions & Limitations

assumptions:

- Fixed traffic signal cycles
- Highway Code is respected
- Only passenger car units

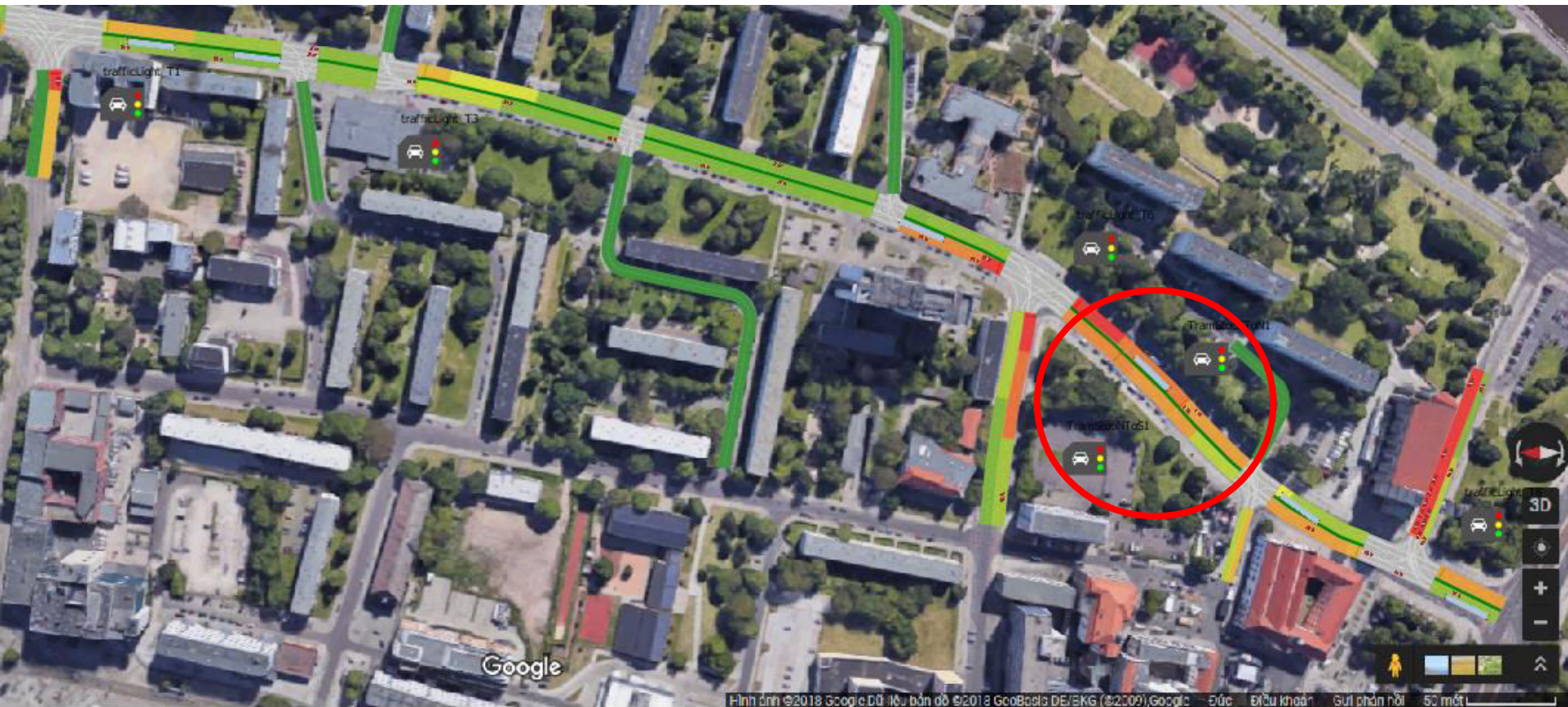
Limitations:

- Tram on 
Road (simulation "Grooved")
- Wait at
Stops: 25s



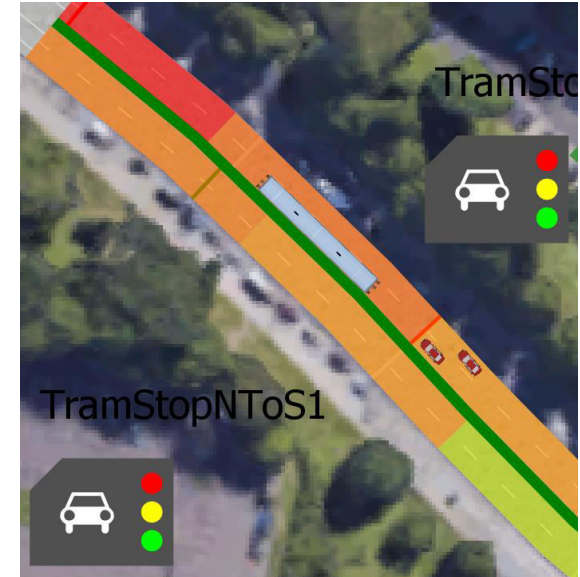
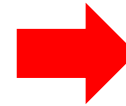
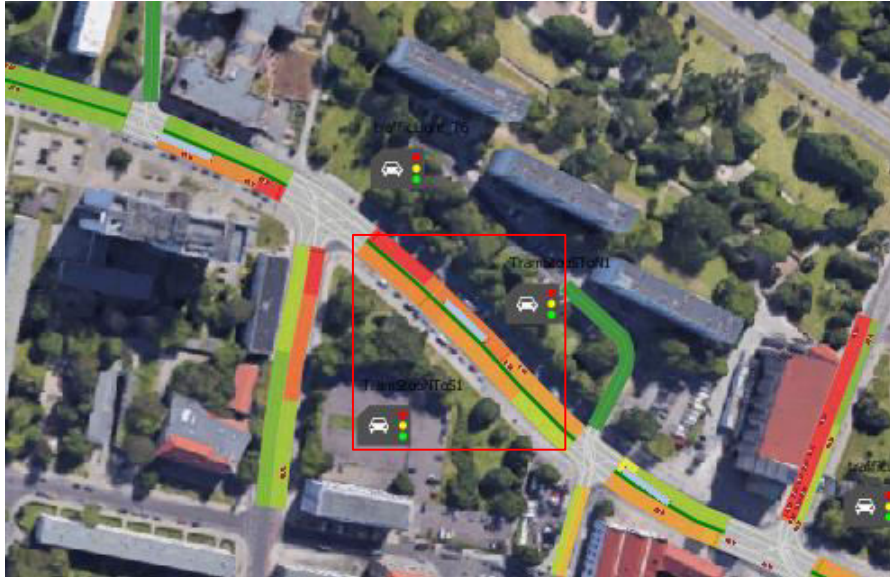
(Author Felix O, cc-by-sa-2.0
[WikiCommons](#))



Experiment 1 - stop Julius-Bremer-Straße



- Background: distance to existing stations
- Expectation: No undue impact on traffic flow

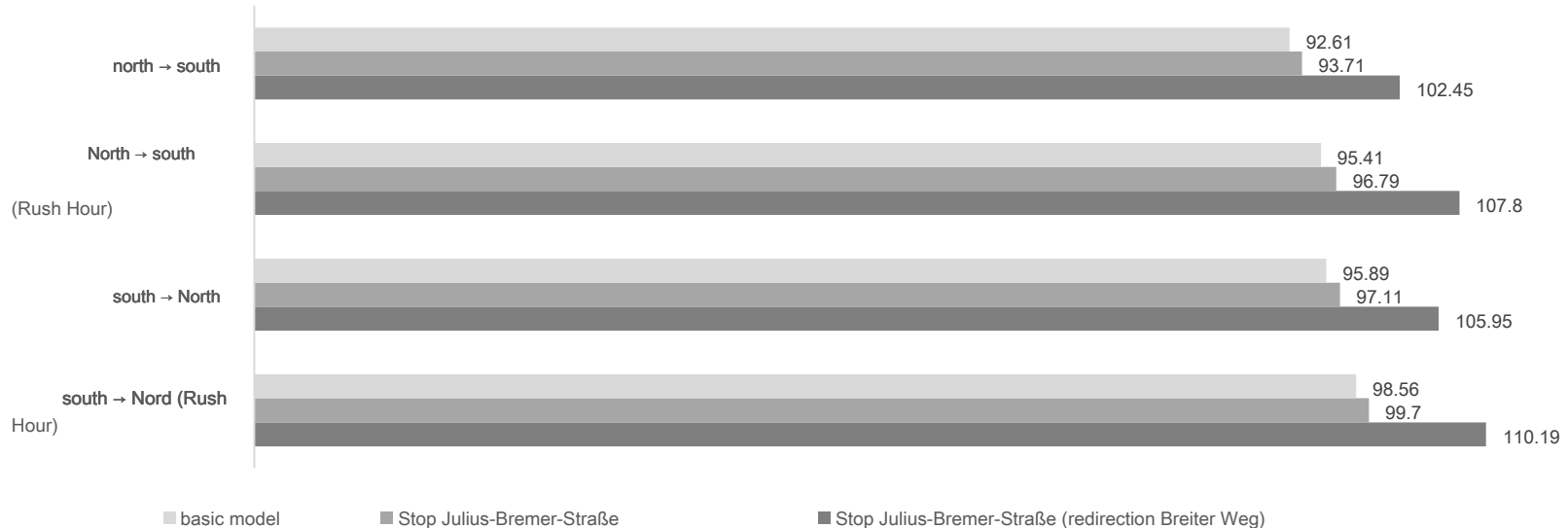
Experiment 1 - stop Julius-Bremer-Straße




- Users tram simulate indirectly 
 - Stop "dynamic light" for all lanes
- Simulation normal situation (6 lanes per hour & direction) 
- Simulation Wide diversion path (36 tracks per
Hour & direction - in addition lines M1, M2, M5, M9, M10)

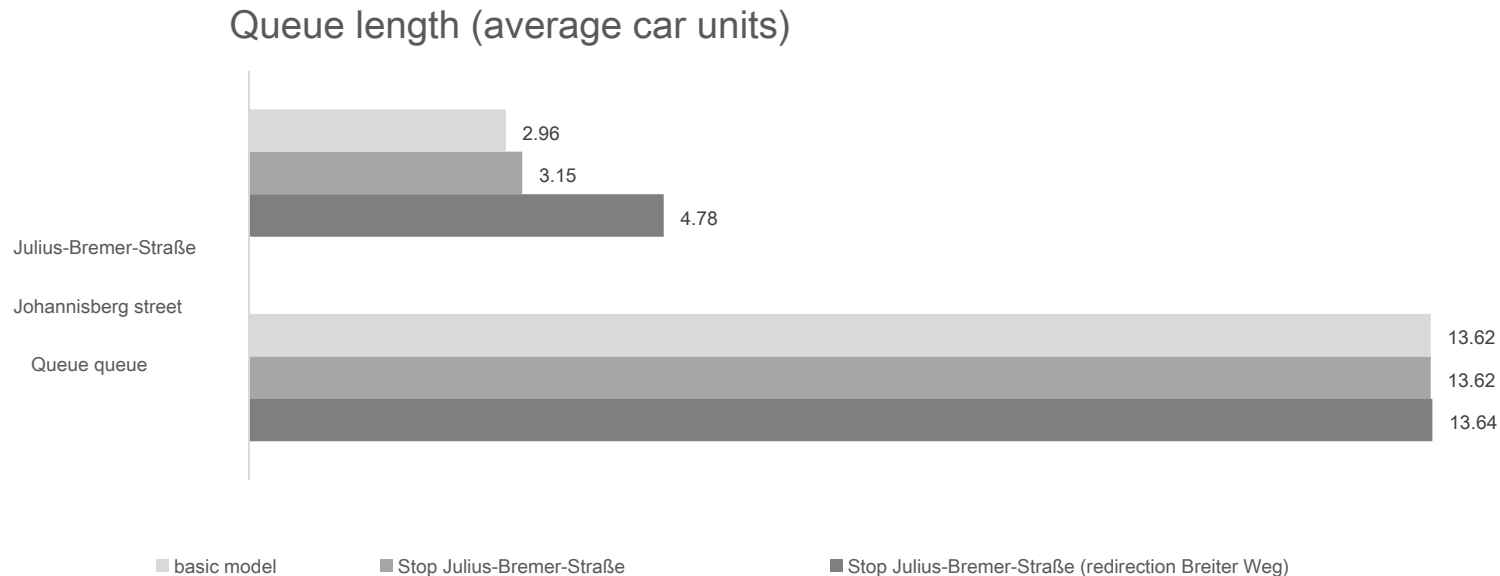
Result 1a - stop Julius-Bremer-Straße

Transit times (average seconds)




- 1 hour simulation run normal traffic, then 1 "Rush Hour" / 1h Rush Hour 
- 1,000 simulation runs for each variant
- 0.5% significance level

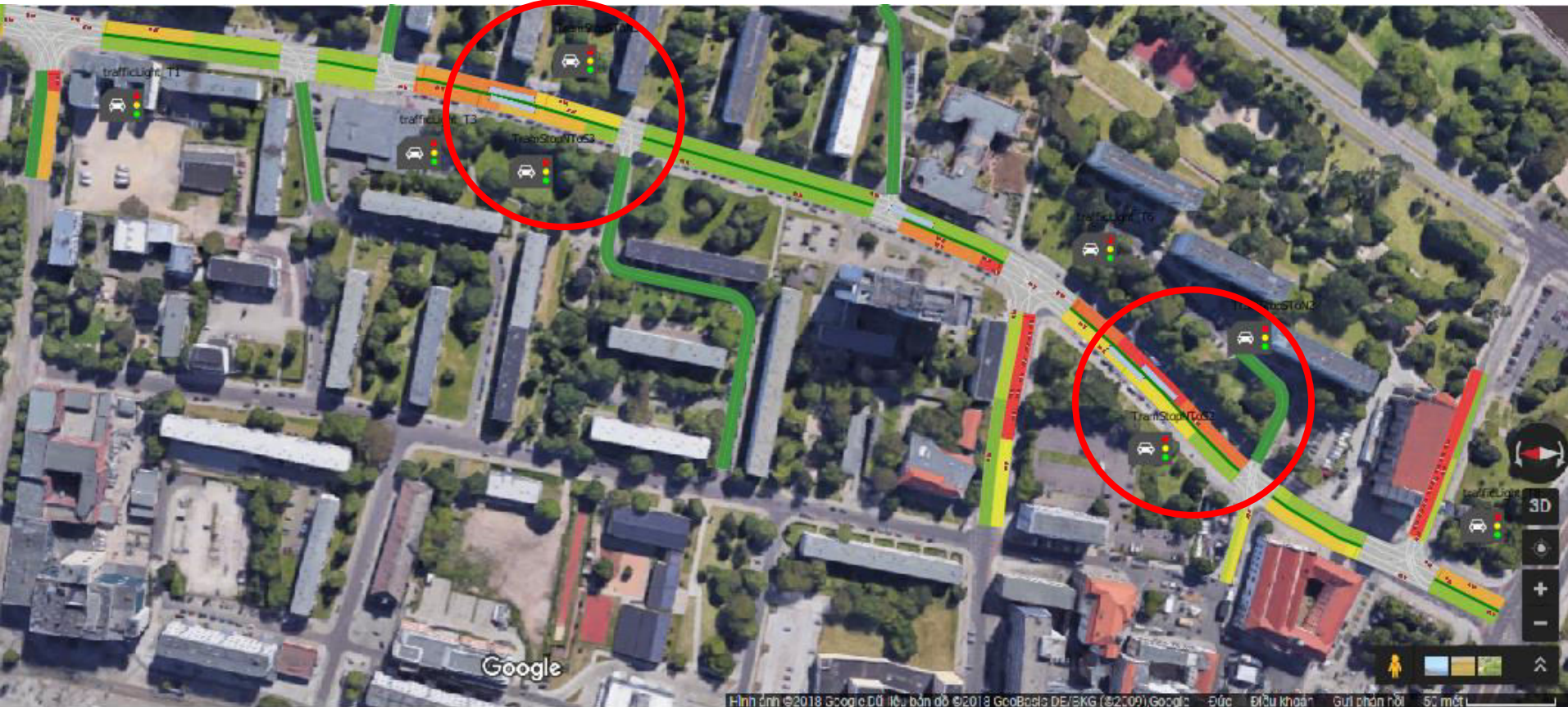
Result 1b - stop Julius-Bremer-Straße



Summary Results:

- Increase transit time normally <2%; Redirection <20%
- Increase queues normally <7%; Divert > 50%
 - Earnings expectations Compliant 

Experiment 2 - 2 stops

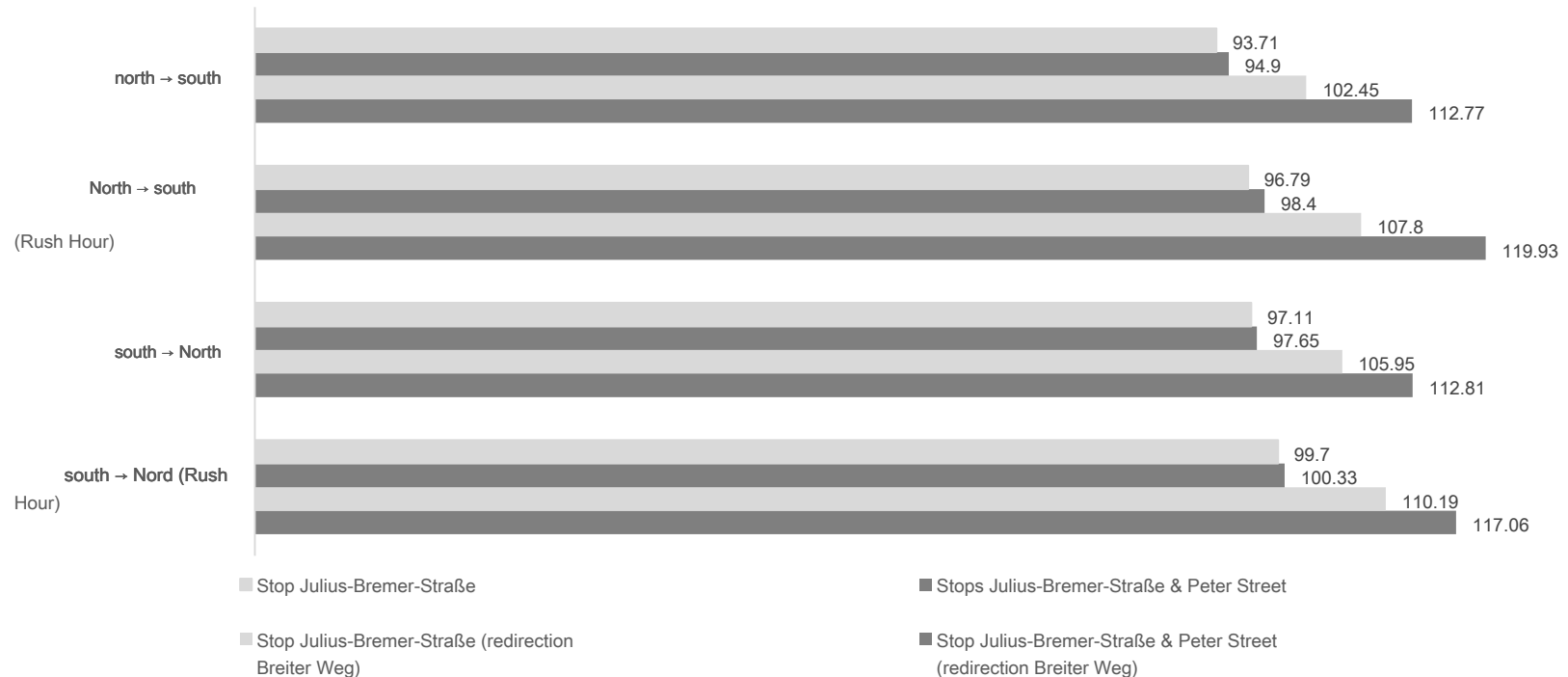


- Background: More even distribution stops
- Expectation: Higher index values than single stop



Result 2 - comparison with the first experiment

Lead times (average seconds)



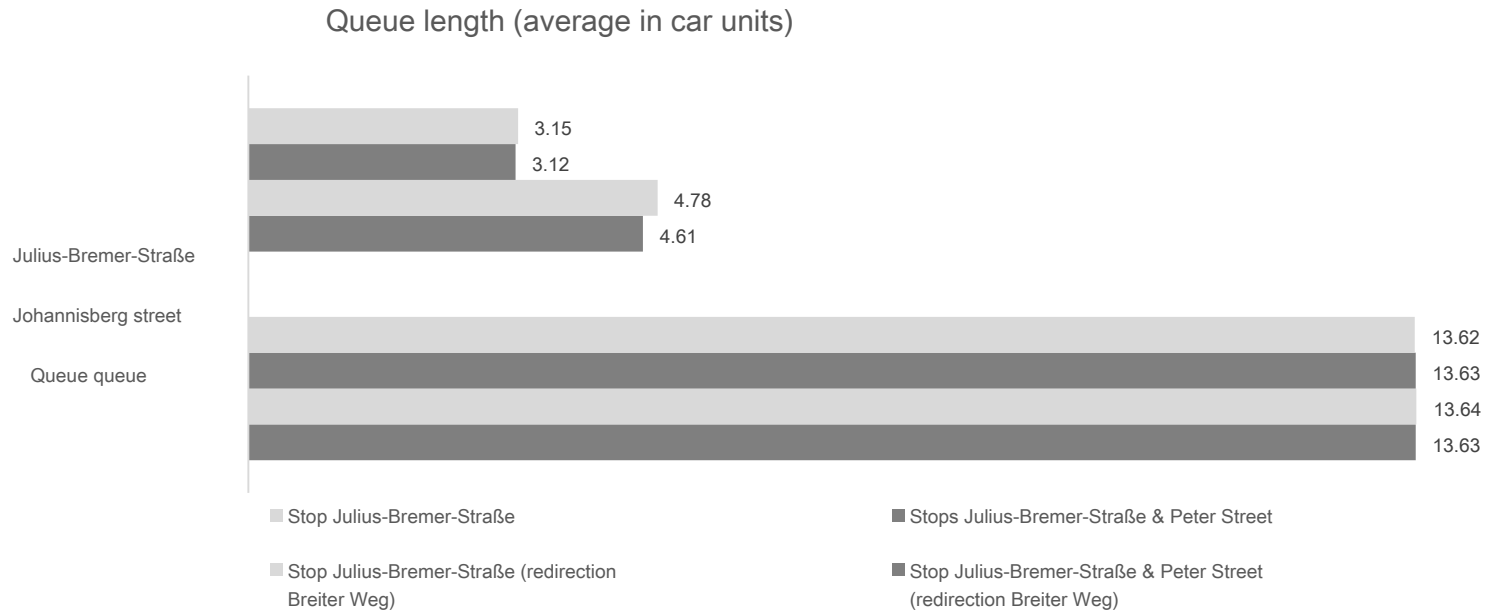
- Boundary conditions as in the first experiment




- Balance against its result
- Only additional stop



Result 2b - 2 stops, interpretation



Summary Results:

- Increase transit time low 
- Decrease average queue length (!)
 - Result in terms of key figures better than expected

Experiment 3 - "left turn" Listemann road

Background:

So far, only straight ahead in South

North direction

- Testing alternative lines 


expectation:

KPI values between results

of Experiments 1 & 2

Implementation:

Add "Abbiegefunktion" 

- Result: expectations with regard Compliant KPI values
 - Technical feasibility check track guide 



Experiment 4 - Exclusive tram route

Background:

examining alternative

line execution



expectation:

Significant adverse effects on

traffic flow

Implementation:

Restriction of normal

Traffic on single lane



- Result: expectation Compliant, above all regarding transit time.

JacobStraße : Model Validation

Run

Iteration: 1

SimResult1
{1000}

SimResult2
{1000}

SimResult3
{1000}

SimResult4
{1000}

SimResult5
{1000}

SimResult6
{1000}

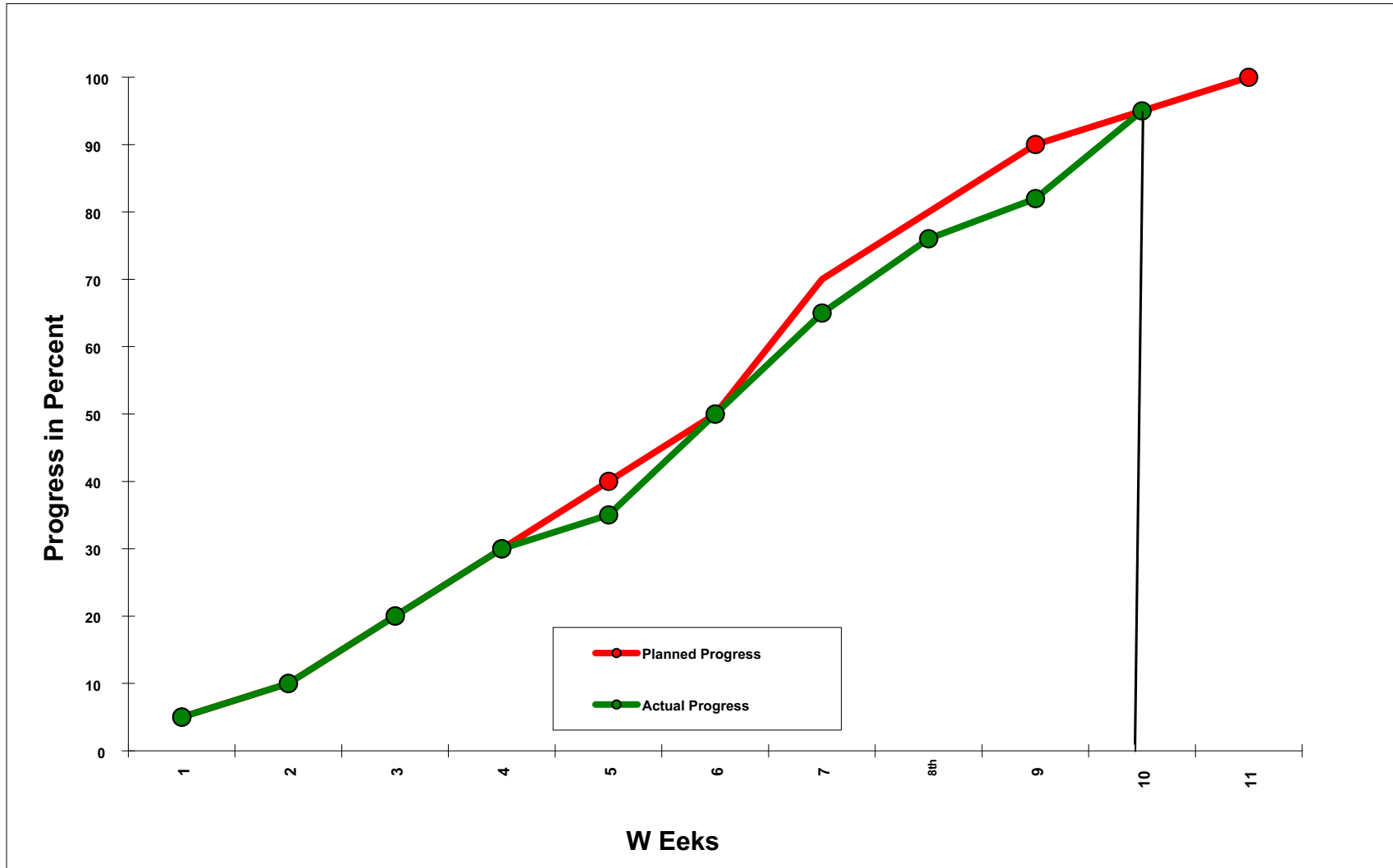
123.628 <= Time taken going South <= 132.206

298.573 <= Time taken going South in rush hour <= 325.32

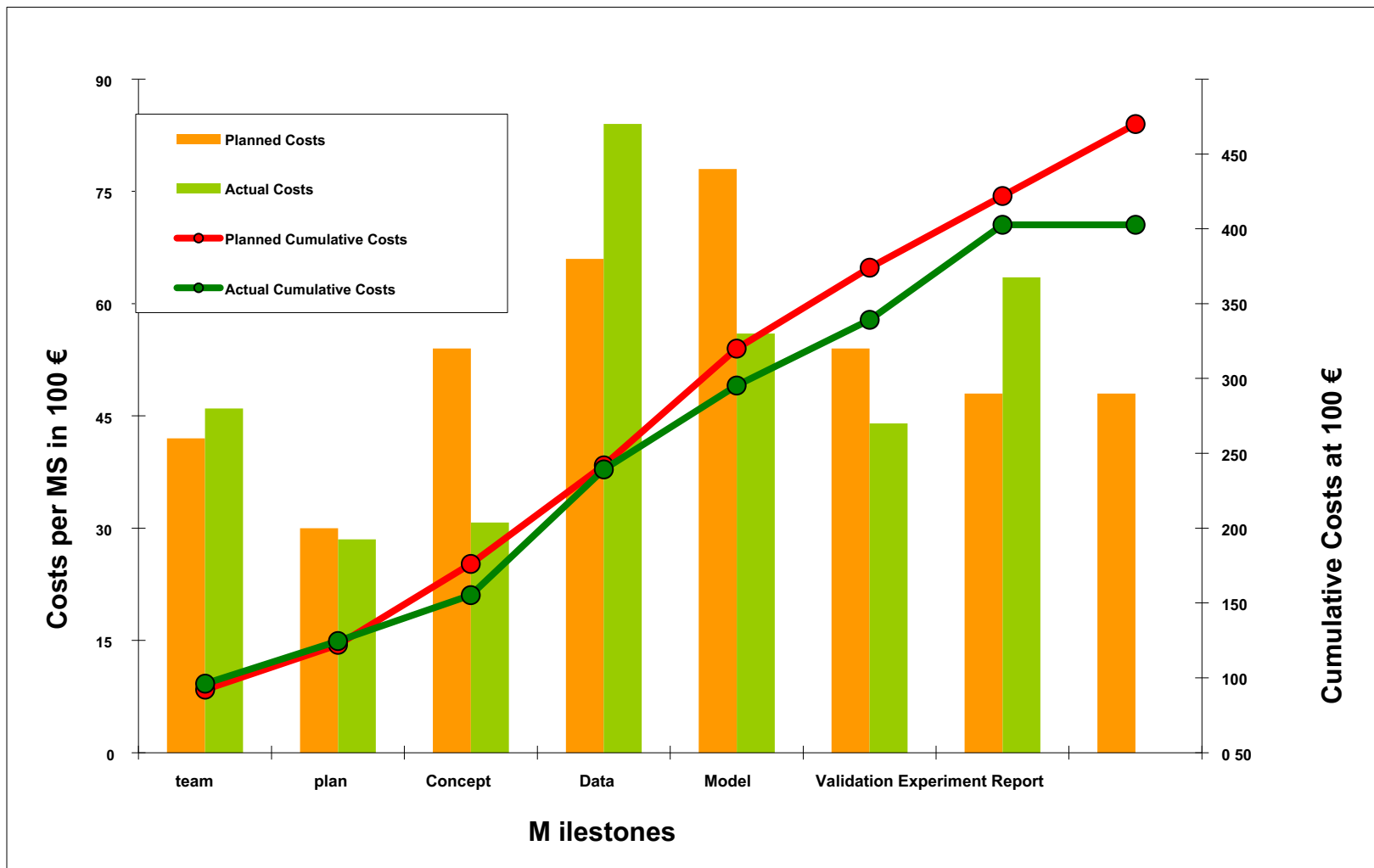
112.041 <= Time taken going North <= 114.966

148.351 <= Time taken going North in rush hour <= 162.389

Project progress: 95%



Project budget - consumption so far 35,275 €



Lessons (re) Learned

Problem:

Limits of standard



Tools achieved quickly

(Ex. Tram stop)

Solution:

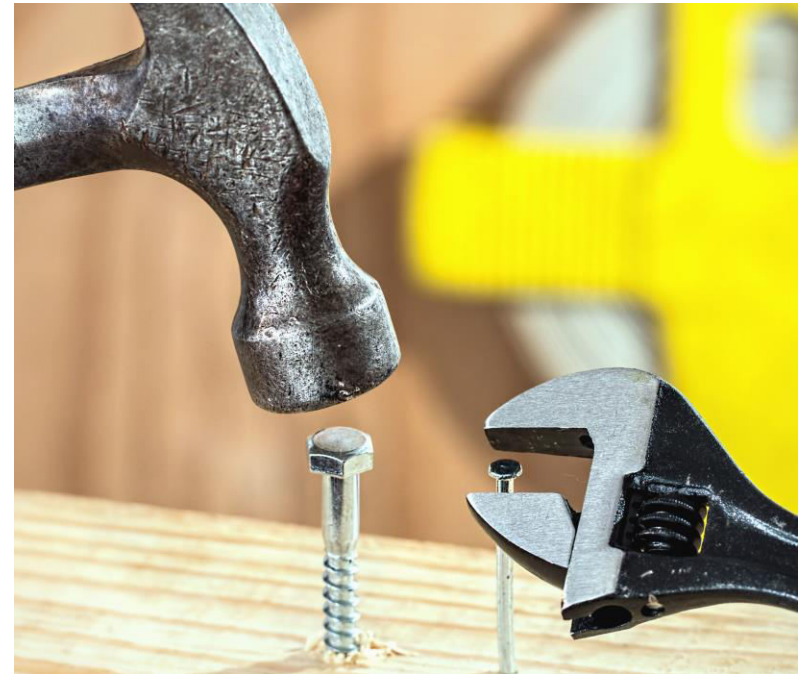
Reasoned, thoughtful



Misappropriation of existing
possibilities

(Eg. Use of traffic lights as

Stops replacement in the model)



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Thank you for your attention!



Ask?