



# What is BRT - when will it be full BRT?

Karl Kottenhoff,  
tekn. Dr.

FoKoll - Public Transport Group  
Transport & Logistics

# We made a prestudy 2008

- Describe BRT for Swedish planners
- Meet Swedish planners
- Listen to their views
- **Is BRT for Sweden?**

# Three regional workshops

- West Sweden: Gothenburgh (April)
- South Sweden: Lund (June)
- East/central Sweden: Stockholm (Sept)

10.15	Utmaningar för framtidens kollektivtrafik <i>Ø</i> Hur locka fler resenärer? <i>(kort restid och hög turistik)</i>
10.25	Vad är BRT? <i>(definitioner och jämförelser med stombuss, spårvagn, spårbuss, tunnelbana)</i>
10.55	Exempel i världen
11.15	<b>Diskussion</b> om för och nackdelar med BRT
11.45	BRT-liknande lösningar i Sverige
12.00	Lunch
13.00	Är separata körbana nödvändiga för Sverige? <i>Redovisning av förbilder från Bogotá, TEOR Rouen, BusWay Nantes och andra franska exempel (föreläsare bl a Thomas Johansson, rsta)</i>
13.30	Banstyrda gummihjulsfordon för minskat ytbehov. <i>(Sven-Allan Bjerkemo, Bjerkemo konsult)</i>
13.50	Prioriterad busstrafik i Malmö Ø exemplet Bergsgatan <i>(Mattias Schiöth Skånerafiken)</i>
14.00	<b>Diskussion</b>
14.30	Fika
15.00	Kristianstads länken prioriterad busstrafik i könslig stadsmiljö <i>(Joel Hansson, Trivector)</i>
15.20	Lundalänken Ø engavs för kollektivtrafiken <i>(Håkan Lockby, Lunds kommun)</i>
15.40	<b>Slutdiskussion</b> med rekommendationer om fortsatt arbete

Now, to the question:

**What is BRT -  
When will it be full BRT?**

# ”Think rail - run buses”

- City buses = Street cars/ trams
- Trunk lines/ BHLS = Light Rail Transit (LRT)
- Bus Rapid Transit (BRT) = Metro



# Separate track - separate busway



*Berlin*



*Lund*

# Tracks - but not full BRT



*Padova  
Italien*



*BRT!*

# American categorisation of BRT

- *Quickway*



Bogota, Colombia

- *Light Rail Lite*



Eugene, USA

# BRT features in various cities

	Beijing	Bogota	Brisbane	Changzhou	Chongqing	Dalian	Hangzhou	Jakarta	Kunming	Seoul	Xiamen
Segregated busways or bus-only roadways	✓	✓	✓	✓	✓	✓	⚡	✓	✓	✓	✓
High capacity BRT buses	✓	✓	✗	✓	✗	✓	✓	✗	⚡	✗	
Network of routes and corridors	✗	✓	✓	✓	✗	✓	⚡	✓	✓	✓	✓
Enhanced station environment (more than just a bus shelter)	✗	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓
High city centre peak period operational speed (>20km/hr)	✓	✓	✗	✗	✓	✓	✗	✗	✗	✗	
Majority of bus passenger demand in the corridor met by BRT buses	✗	✓	✓	✗	✗	✗	✗	✗	✓	✓	
Net time saving for bus passengers in corridor	⚡	✓	✓	⚡	✗	⚡	✗	✗	✓	✓	
Overtaking lanes at more than half of all stations	✗	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗
Actual peak ridership over 10,000 passengers per hour per direction	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓	
Passenger volume greater than a mixed traffic lane (~3000 pphpd)	✓	✓	✓	✓	✗	✓	✗	✓	✓	✓	
Pre-board fare collection and fare verification	✓	✓	✗	✓	✗	✓	✓	✓	✗	✗	✓
At-level boarding and alighting	✓	✓	✗	✓	✗	✓	✓	✓	✗	✗	
Includes BRT-only tunnels or bridges	✗	✓	✓	✗	✗	✗	✗	✗	✗	✗	✓
Buses operating both inside and outside the busway corridor	✗	✓	✓	✓	✗	✓	✓	✗	✓	✓	✓
Competitively bid operating contracts and concessions	✗	✓	✓	✗	✗		✗	✓	✓	✗	
More than one BRT bus operator	✗	✓	✓	✗	✗	✓	✗	✓	✓	✓	
No operational subsidy from government	✗	✓	✗	✗	✗	✗	✗	✗	✓	✗	
BRT buses paid for by operators rather than government budget	✗	✓	✗	✗	✗	✗	✗	✓	✓	✗	
Independently operated and managed fare collection system		✓	✗	✗	✗					✓	
Quality control oversight from an independent entity / agency		✓	✓	✗				✓			
Low-emission vehicle technology (Euro III or higher)	✓	⚡	⚡	✓	✓	✓	✓	✓	✗	✓	
Automated fare collection and fare verification system	✓	✓	✗	✓	⚡	✓	✓	✓	✓	✓	✓
Weather protection on station platforms	✗	✓	✓	✓	✓	⚡	✓	✓	✓	⚡	✓
System control centre	✓	✓	✓	✓	✓		✗	✗	⚡	✓	
Real-time next bus information displays	✓	✓	✓	✓	⚡	✗	✓	✗	✗	✗	
Distinctive marketing identity for system	✗	✓	✓	✓	✓	✓	✓	✓	⚡	✗	✓
Distinctive BRT buses	✓	✓	✗	✓	✓	✓	✓	✓	✓	✗	
High-quality passenger information at stations	✓	✓	✓	✓	⚡	✓	✓	✓	✗	✓	
High-quality passenger information on buses	✓	⚡	✗	✓	✓	✓	✗	✓	✓	✗	
Bicycle parking at stations	✗	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗
Segregated bike lanes along main corridor (s)	✓	⚡	✓	✓	✗	✗	✓		✓	✗	✗
BRT authority responsible for planning and control of the system	✓	✓	✗	✗				✓	✗	✗	

Source:  
<http://www.chinabrt.org/en/cities/comparison.aspx>

What is needed for "BRT"?

# Requirements

Not accepted

May be  
accepted

Desired level

# Requirement areas



- **Spatial planning**
- **City environment**
- **Route layout/ design**
- **Separation**
- **Station spacing**
- **Average speed**
- **% running/stop time**
- **Passenger boarding**
- **Frequency**
- **On-time performance**
- **Vehicles**
- **Propulsion/ drive systems**
- **Ride comfort**
- **Information on stations**
- **ITS**
- **Identity**

## Route layout

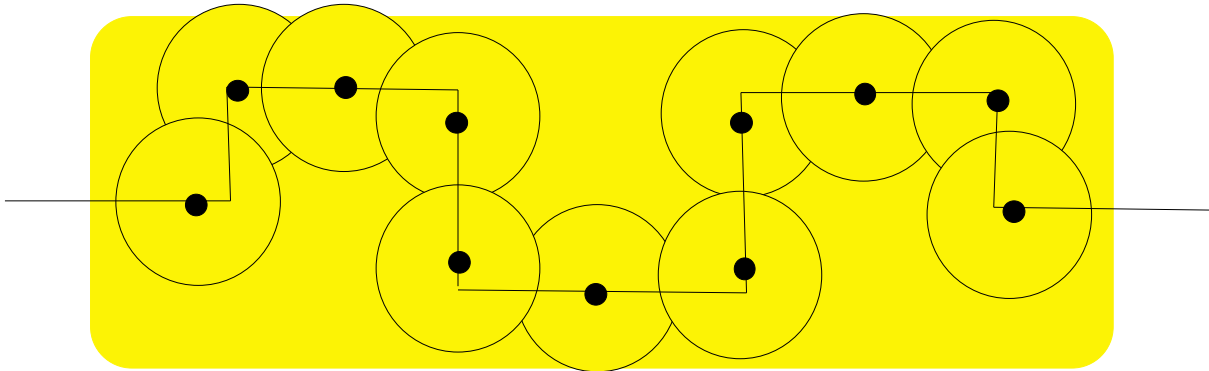
**Straight lines between areas. In the middle of living areas. Birds' way.**

**Short cuts. Straight through roundabouts  
Soft curves instead of sharp bends**

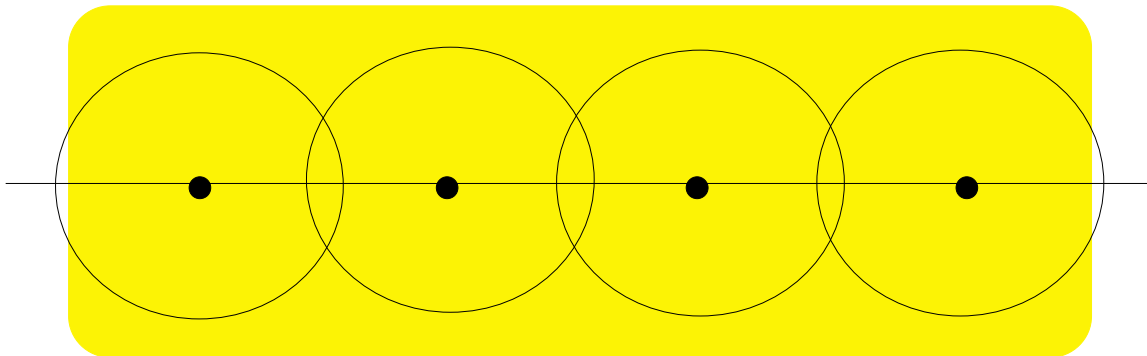
**Always on existing car roads, running around city blocks**



# Whick of these can be a BRT ?

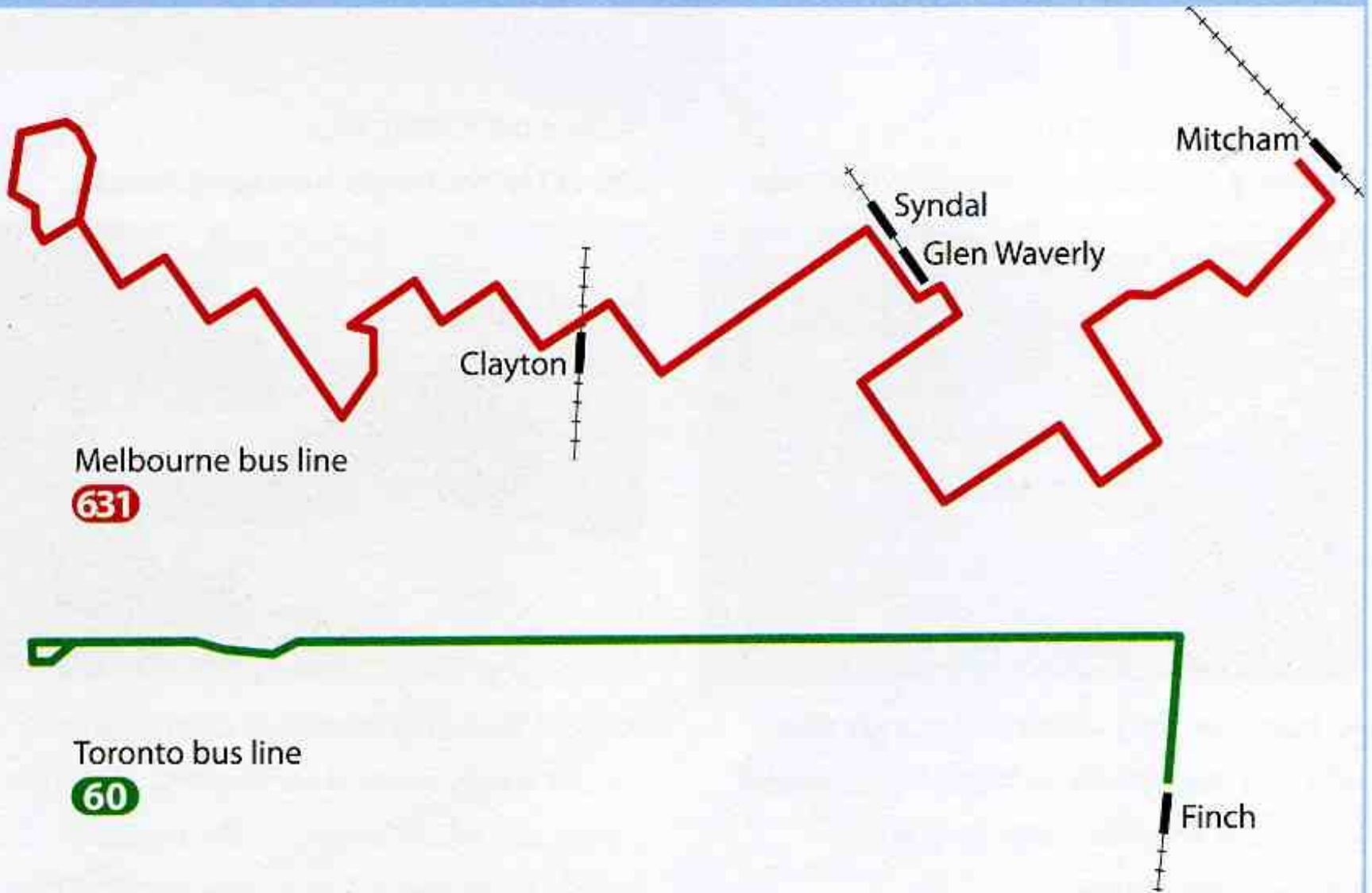


Stadsbusstrafik med korta hCEllplats- och gCEngavstCEnd



Tunnelbana med lCEnga stations- och gCEngavstCEnd

## The difference between failure and success



Let the buses in!



## Spatial Planning

**Coordinated planning**

**Some coordination with BRT**

**Planning of buildings and city-structure is made first, without PT in mind**



New LRT in  
Stockholm

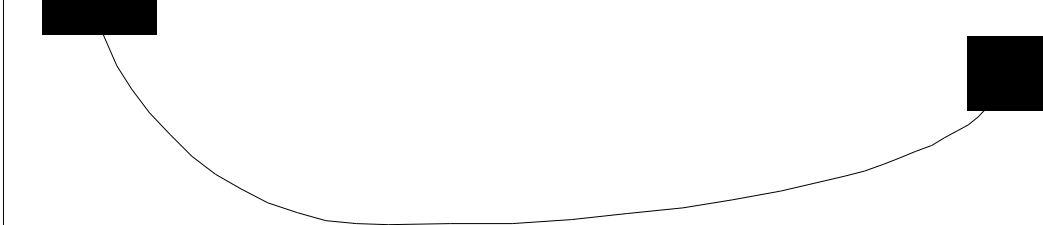
# Station Spacing

500-800 m

400-500 m  
1000-1500 m

< 400 m  
> 1500 m

Travel time



Spacing

## Average Speed

Inner city: > 25km/h  
Suburb : > 30 km/h

Innerstad: 18-24 km/h  
Förort: 22-29 km/h

Innerstad: < 18km/h  
Förort: < 22 km/h



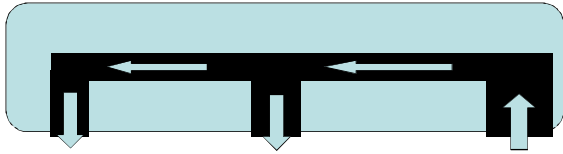
Suidtangent

## Passenger boarding

Station with ticket control

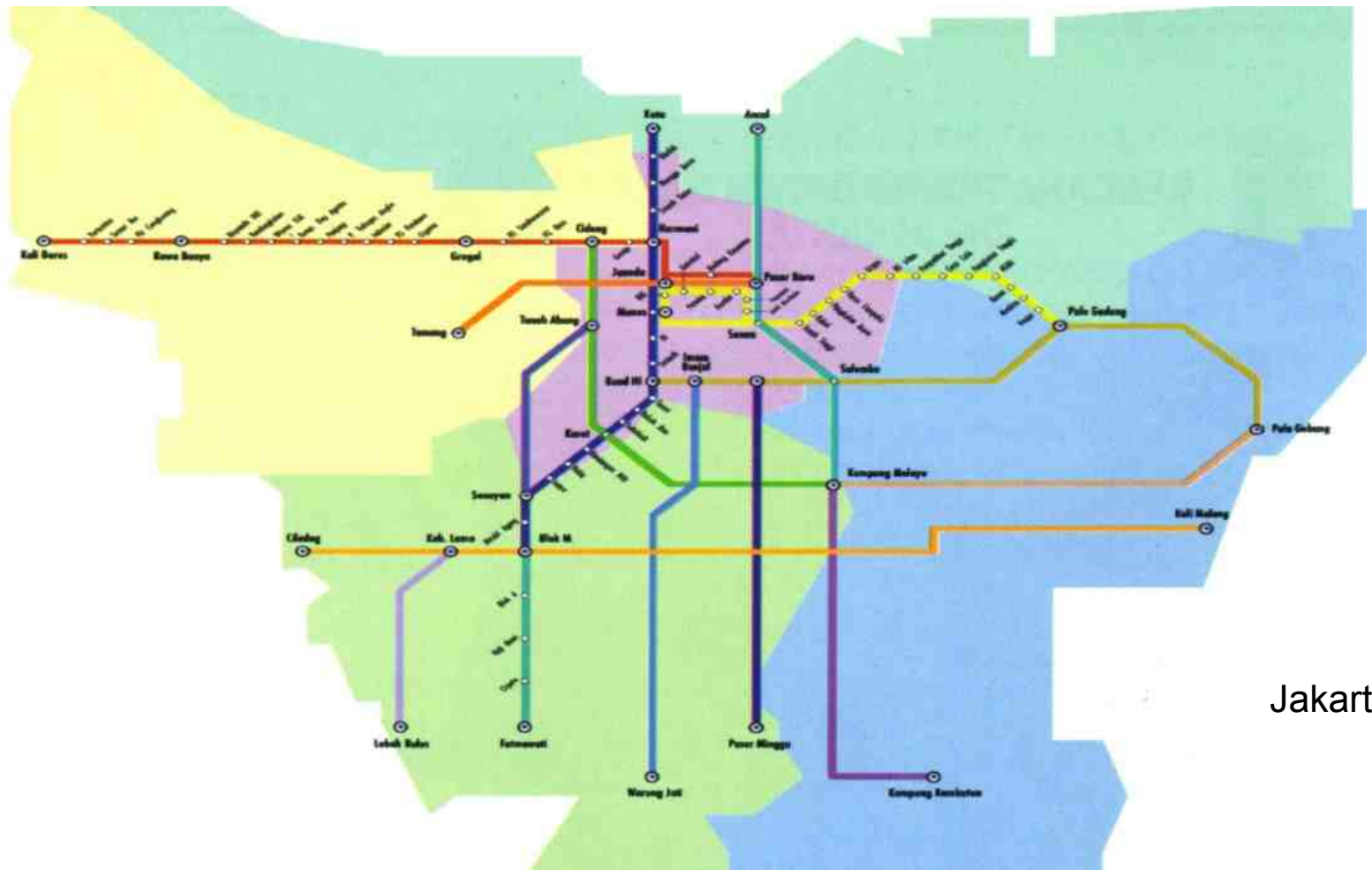
Boarding through all doors

Passenger circulation



Jakarta

# ”Metro map”



## Signal Priority

Full priority: no waiting

Priority where most needed

No priority



## Running ways

**Busways, bus-tunnels and  
crossovers all over**

**Bus lanes where most needed**

**Mostly mixed traffic**



# Vehicles

Special BRT-vehicles, new design  
doors at both sides

The latest low-floor buses many  
wide doors

Ordinary buses



# Doors at both sides?

Island stations can be cheaper,  
safer and need less space



# High floor?

## Pros

- A bigger area inside
- Difficult to enter without a ticket

## Cons

- Special arrangement
- Vehicles cannot be used at ord. stops
- Conflict with city environment

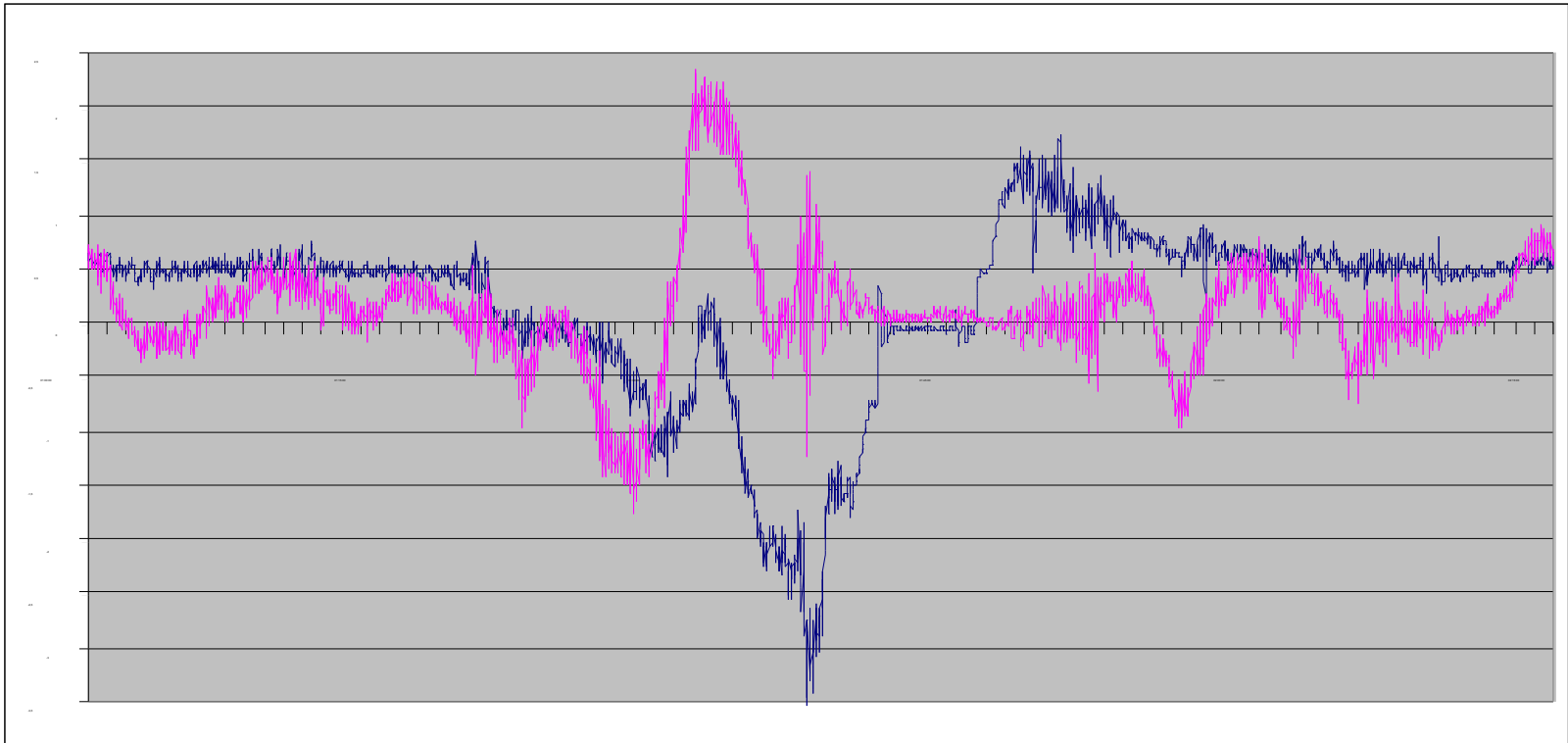


## Ride comfort

Smooth road, cambered curves, acceleration limits ( $< 2\text{m/s}^2$ ), smooth suspension

Straight and smooth roads, acc.limits

Uneven curvy road with holes and bumps





## Segregation

**Segregated ROWs  
Segregated "paid pass. area"**

**Some segregated ROWs  
Some protected calm areas**

**Buses and stops in  
noisy car traffic**



# Segregated bus-ROWs and passenger areas



## City design

**Redesign of the city center for buses and pedestrians, squares, furniture etc.**

**Some upgrading and re-design  
reduction of car traffic**

**No upgrading or re-design**



# *Identity*

Like "Transmi Ilenio", "TransJakarta",  
"MBus" och "Fastrack"

Like "stombussar"  
och "Transitway"

No special identity



# Is there need for a BRT-standard?

- Yes, needed
- Increases quality
- Metros are similar
- PT customers will understand the "product" BRT

- No, not needed
- Bus services can be adjusted to local needs
- You can pick the raisins out of the cake
- Full BRT is too heavy