

**LCC och LCA in
Swedish
Transport
Administration**



TRAFIKVERKET

**ETSI
2012-05-14**

Terms and definition

- LCC = Life Cycle Costs
- LCA = Life Cycle Analysis

Methods for performance of LCC

- Calculation based on statistic experience for investment as well as maintenance costs. Gives an well-balanced estimation of investment costs and maintenance costs.
- Experience based judgement of maintenance costs. Gives estimations solely based on maintenance costs.
- Judgements based on best praxis. Can take into account both investments cost as well as maintenance costs. Very seldom so well documented so that the best praxis can be used for evaluation and improvement of the method and judgement.

Bridges across railroad at Rotebro

Arlandabanan

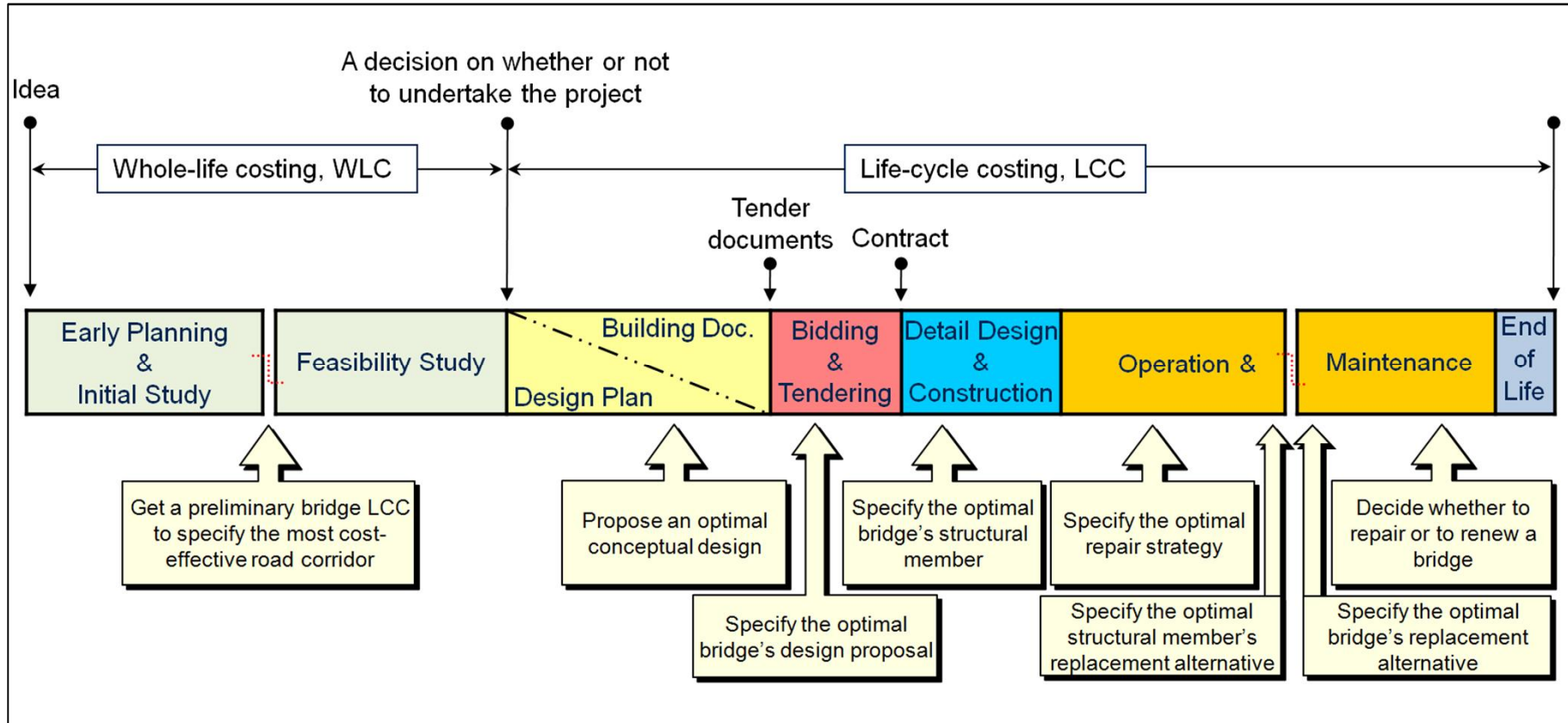
North main railway (TEN)
600 trains/24 hours, speed
200 km/h
Time free of traffic 2h/night

Konsumentvägen
8 000 vehicles/24 hours

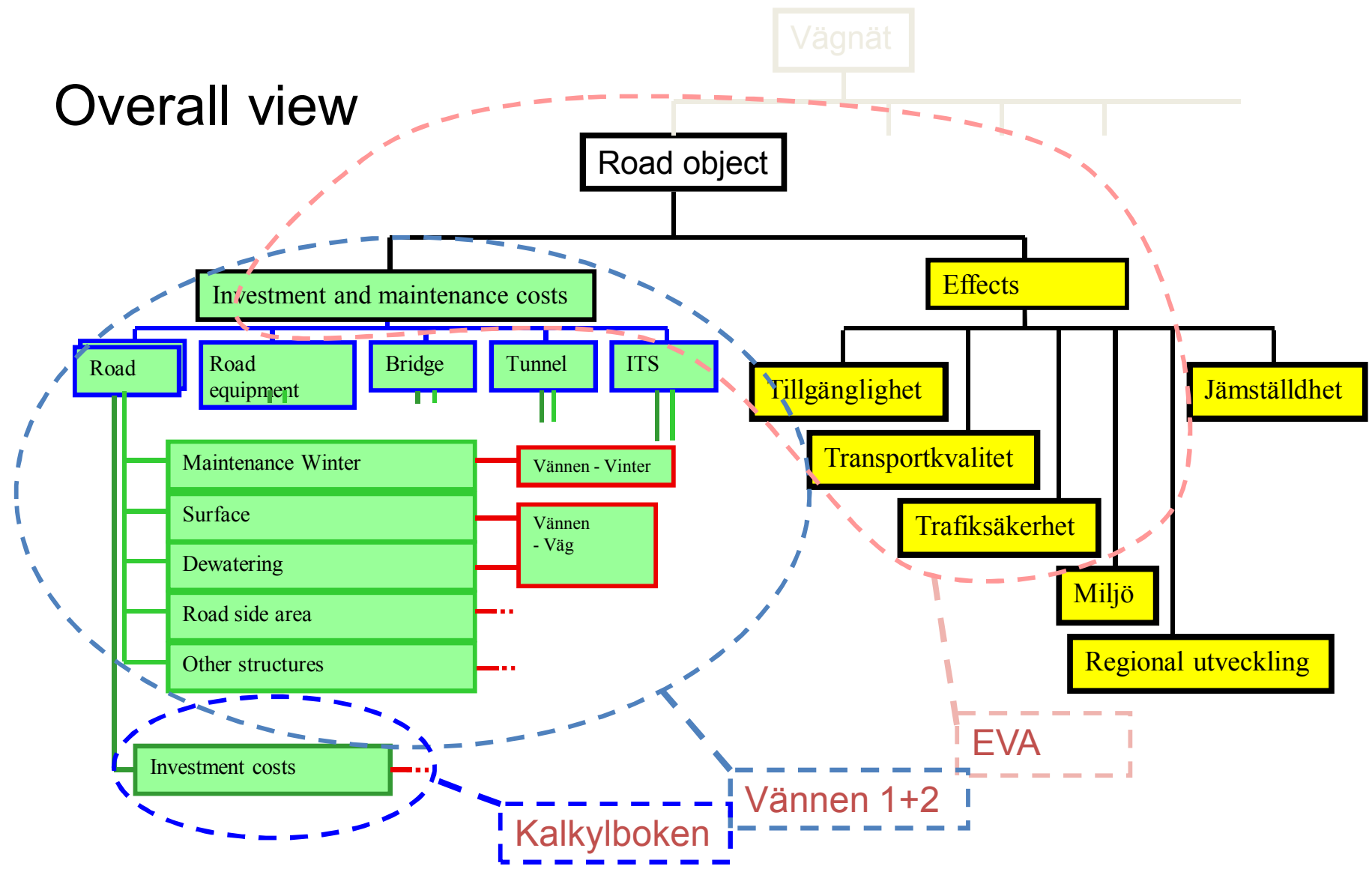
Norrvikenleden
17 000 vehicles /24 hours

E4
70 000 vehicles/24 hours

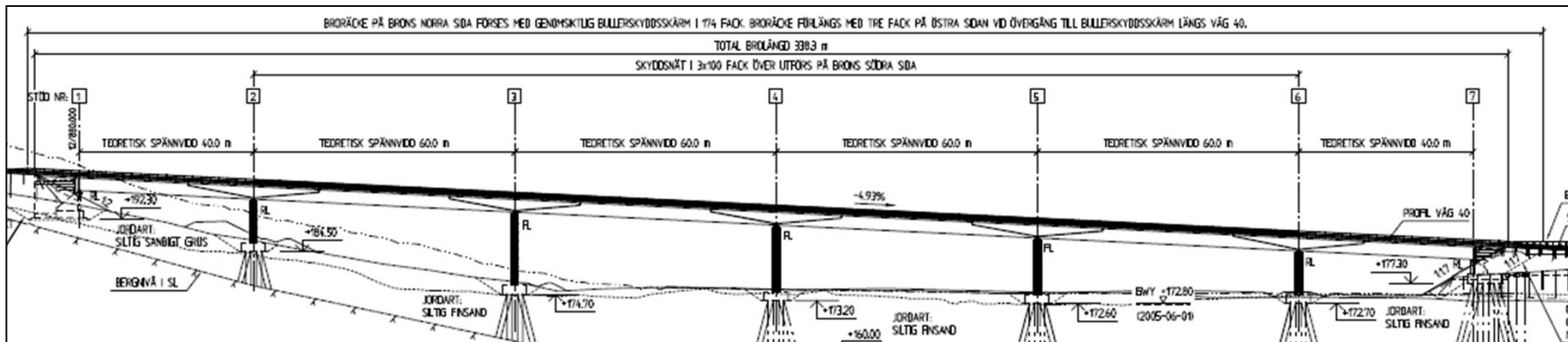
LCC



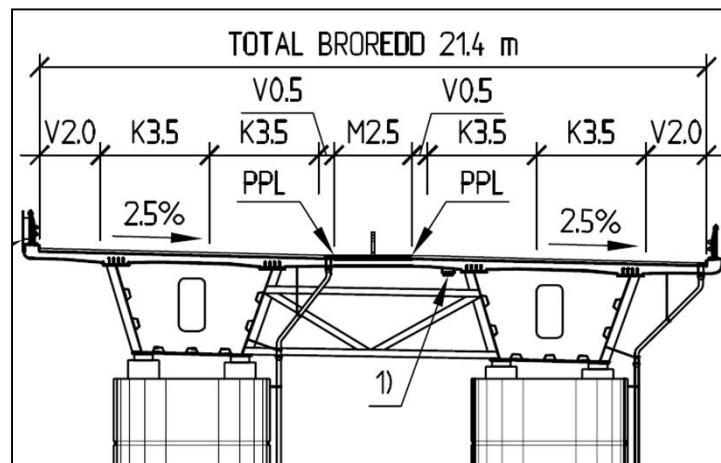
Overall view



Pilot project 1:



[15-1758-1] Bro över Karlsnäs ind-område, 300m s Vist kyrka (Karin Bridge)



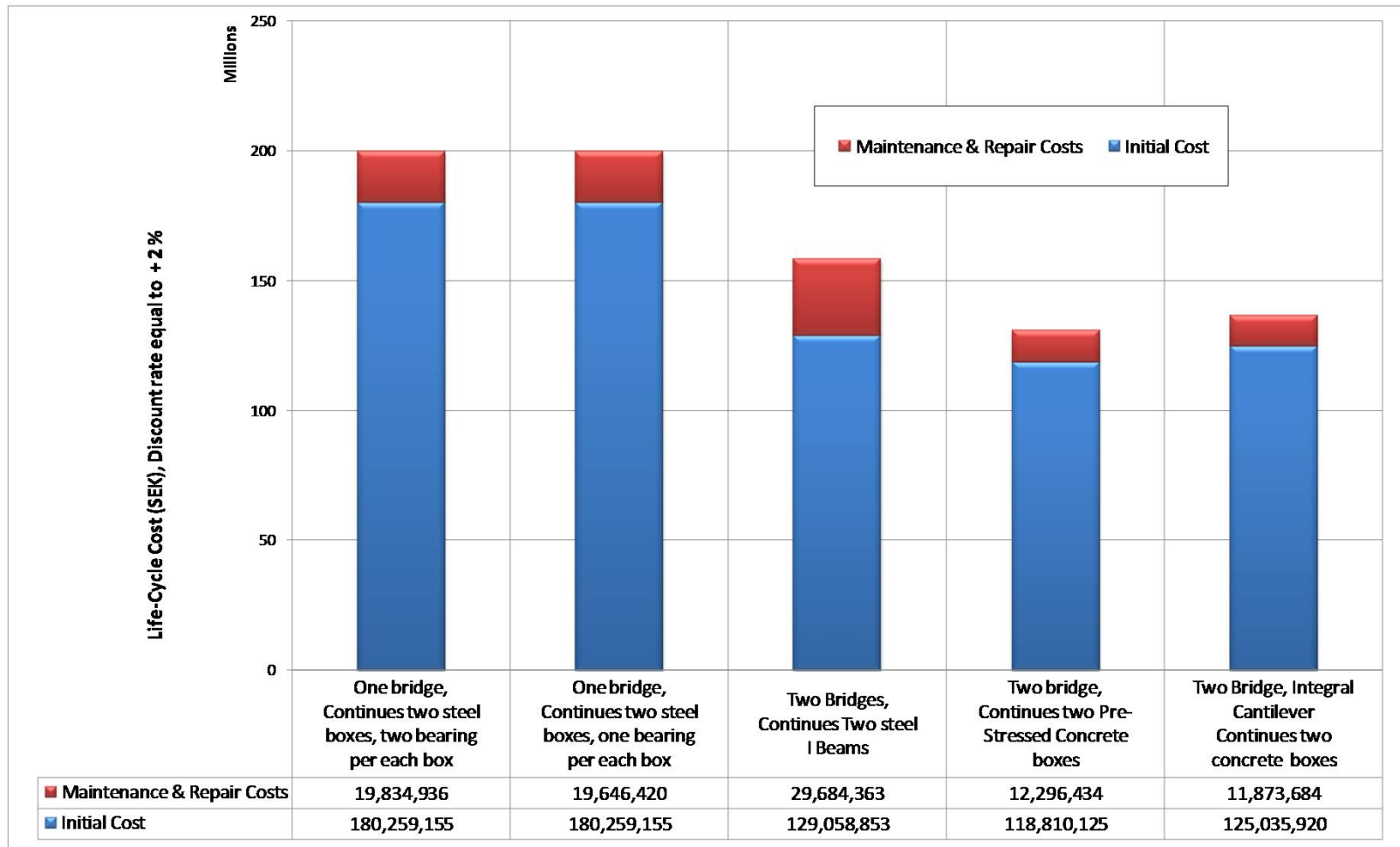
Förväntat byggår 2013

Trafikverket Proposal

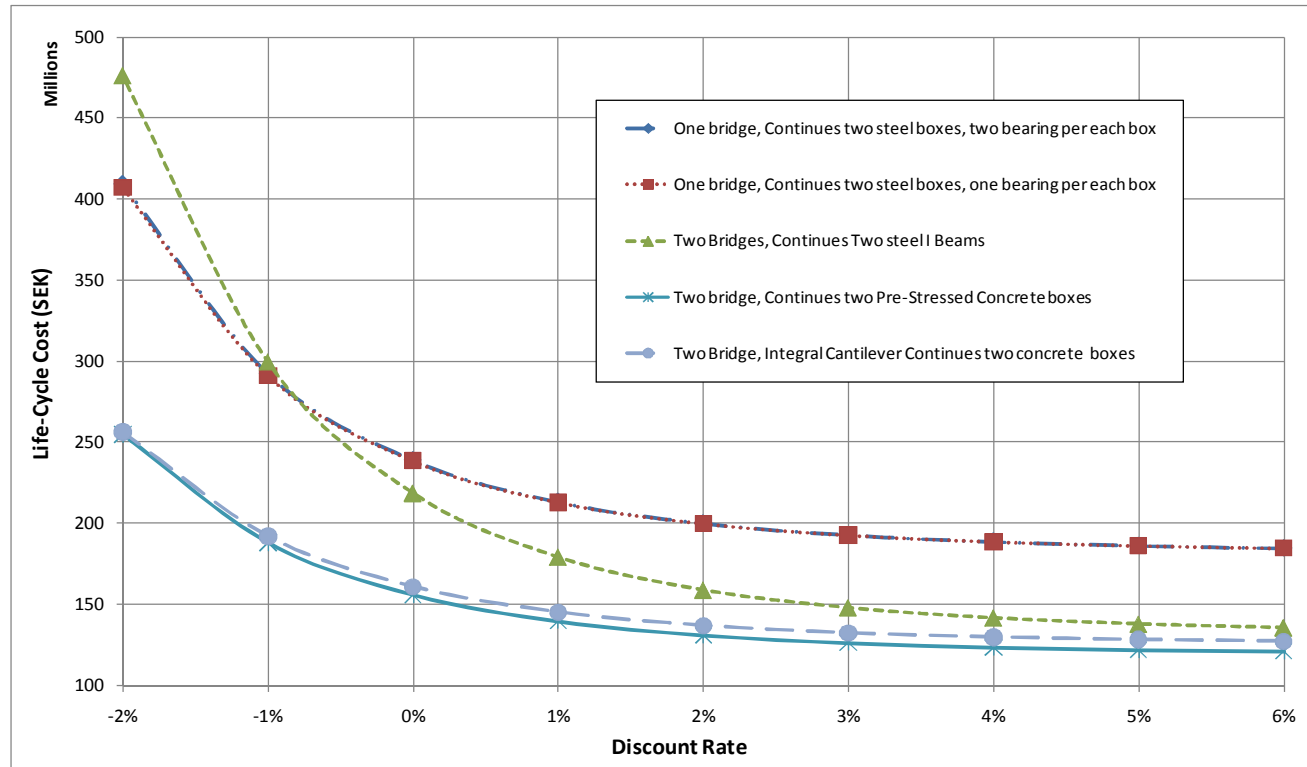
Pilot project 1: Comparison different bridge solutions

Proposal No.	Description	Similar & Reference Bridges	Cross-Section Details	Average Constr. Height
1	Trafikverkets proposal: One bridge, Continuous two steel boxes, two bearing per box	11-788-2, 22-1455-1, 22-1106-1, 22-999-1, 22-1125-1, 14-1817-1	<p>(Trafikverket conceptual design)</p>	2.3m
2	One bridge, Continuous two steel boxes, one bearing per box			2.3 m
3	Two bridges, Continuous, two I-steel Beams, One bearing per beam	18-1017-1, 14-1506-1, 3-339-2, 22-1533-1, 20-1220-1		Haunch beam Max. 3.2m Min. 1.8m
4	Two bridges, Continuous, one Pre- Stressed Concrete box per bridge, two bearings per box	7-674-1, 19-841-1		2.8 m
5	Two Bridges, Integral Pre-Stressed Cantilever Continuous, one concrete box per bridge	18-767-1		Haunch beam Max. 3.4m Min. 1.3m

Pilot project 1: BaTMan-LCC Analysis



Pilot project 1: Sensitivity analysis



- The most cost effective proposal is No.4 (Two bridges, one pre-stressed concrete box per bridge, two bearings per box).
- In case of implementing this proposal, Trafikverket can save **83 Million SEK** in a comparison of implementing the first proposal.

Use of LCC-calculations in investment projects

- Scope: Bridges and road super structures
- Evaluation of possible technical solutions in feasibility studies.
- Forms basis for evaluation of technical solution for a build contract and will be used in detail design phase
- Forms basis in producing demands for the tender documents for a design and build contract and also used when evaluating the contractors proposal of technical solution in design and construction phase

Course of action

- Educate "super-users", one per region, during 2012.
- Perform pilot projects, at least one per region during 2012.
- Develop a procedure description for the use of LCC- analysis's and incorporate it into the investment project management system during 2013.
- Produce standard LCC-analysis's for typical technical solutions to be used as standard LCC-analysis, during 2013.