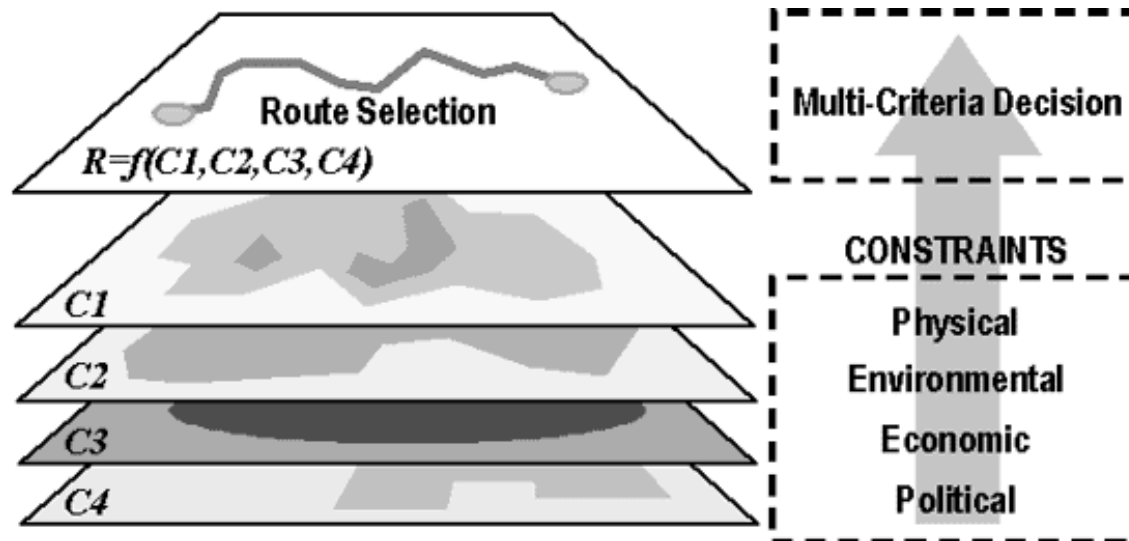


VÝBĚR TRASY PRO NOVOU SILNICI

Cíl cvičení:

- výběr trasy pro novou silnici na základě posouzení více faktorů
- multikriteriální rozhodovací proces



Výchozí podmínky:

- plán spojení dvou měst (Easttown a Westtown)
- zpracování návrhu vedení trasy (sladění různých zájmů)
- stanovení nákladů / přínosů trasy
- obhajoba výsledku

- práce ve skupinkách (cca 5 osob)
- termín dokončení – za 3 týdny (28. března 2006)
- obhajoba výsledku (max. 10 minut)

Podklady:

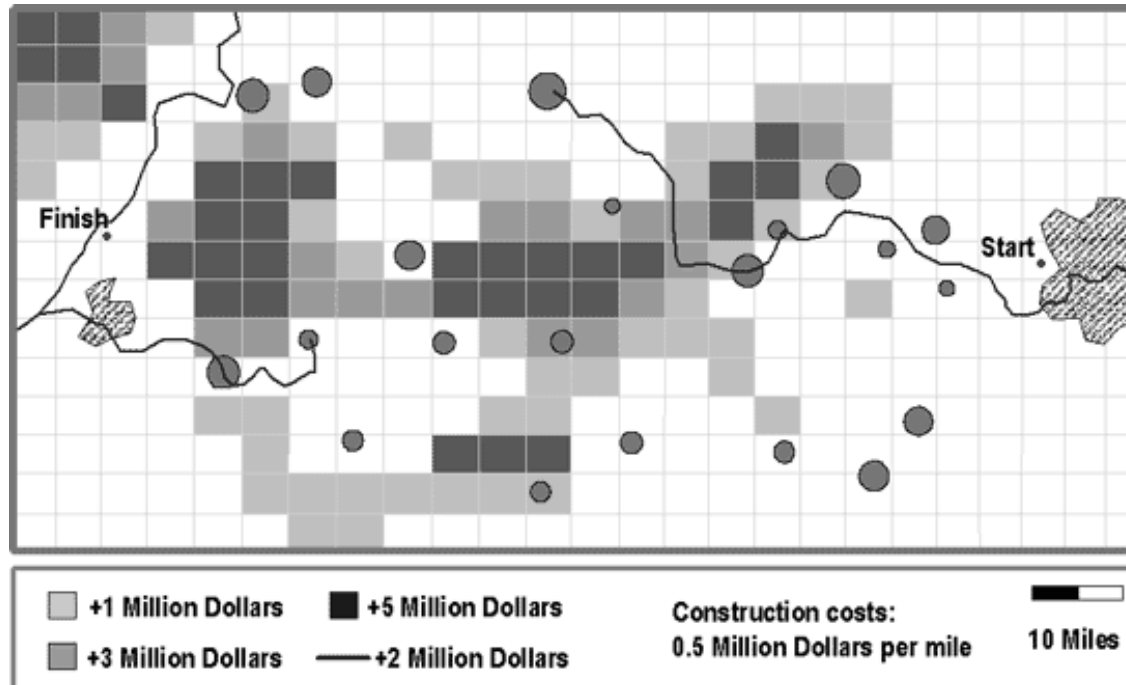
<http://www.people.hofstra.edu/geotrans/eng/ch1en/appl1en/ch1a2en.html>

Způsob zpracování:

- ruční zpracování
- GIS (podklady na internetu)

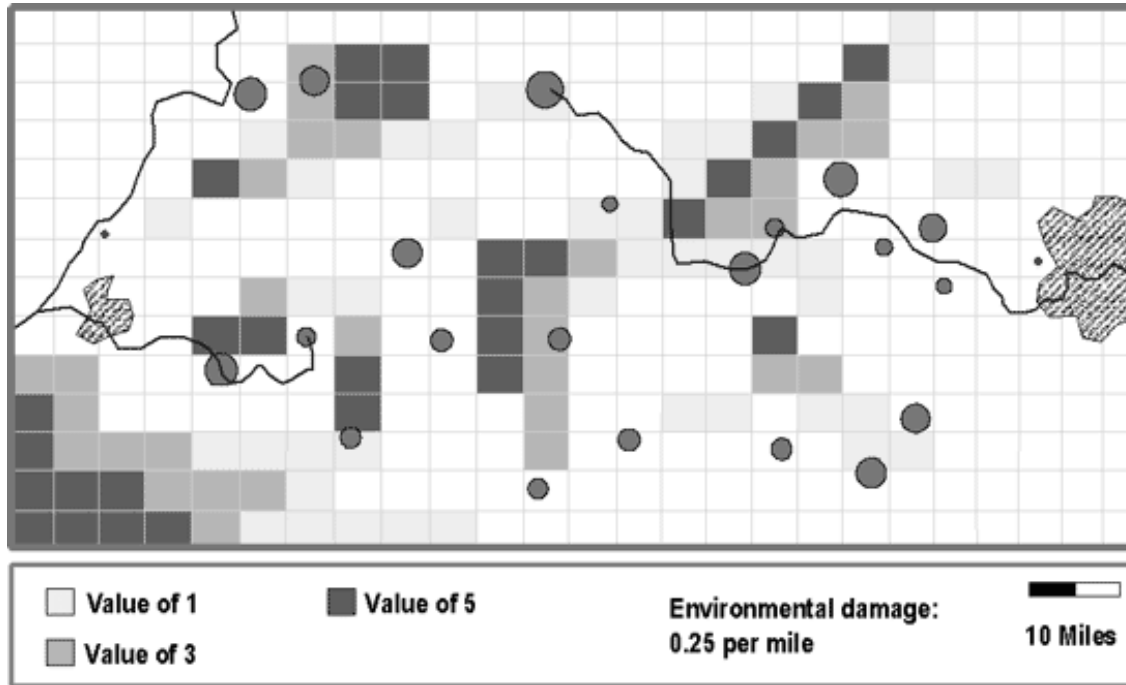
Základní podmínky

- trasa nesmí vést přes střed města (tmavě šedé plochy na mapě)
- město se považuje za obsloužené, pokud se trasa dotkne jeho sféry vlivu (světle šedé plochy na mapě)
- trasa musí vést přímo z výchozího do cílového bodu, odbočky nejsou povoleny

Fyzické / terénní překážky

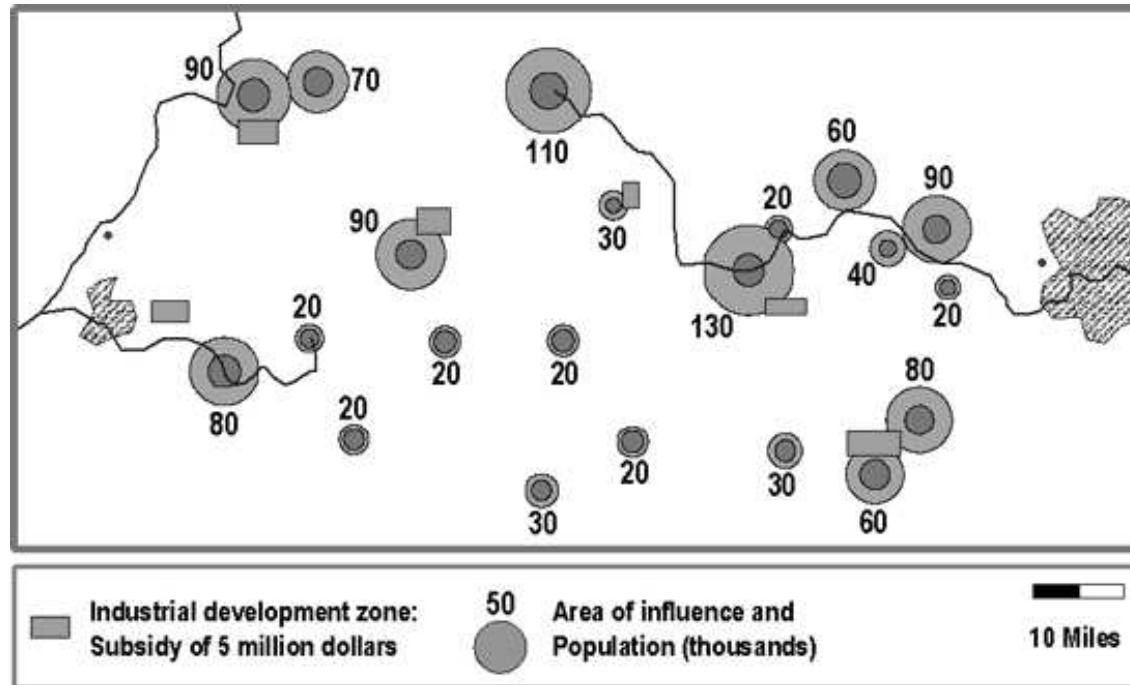
The goal is to find the least expensive road, which should in theory be a straight line between the start and finish points, but road construction is influenced by physical constraints. Base construction costs for two miles of road are 1 million dollars (or **0.5 million dollars per mile**). Each time a **river is crossed**, additional costs of 2 million dollars for the construction of a bridge must be added. **Rugged terrain** characterizes several portions of the territory. This situation generates **supplementary costs for road construction**, ranging from 1 million to 5 million dollars when the road enters that cell.

Environmentální překážky



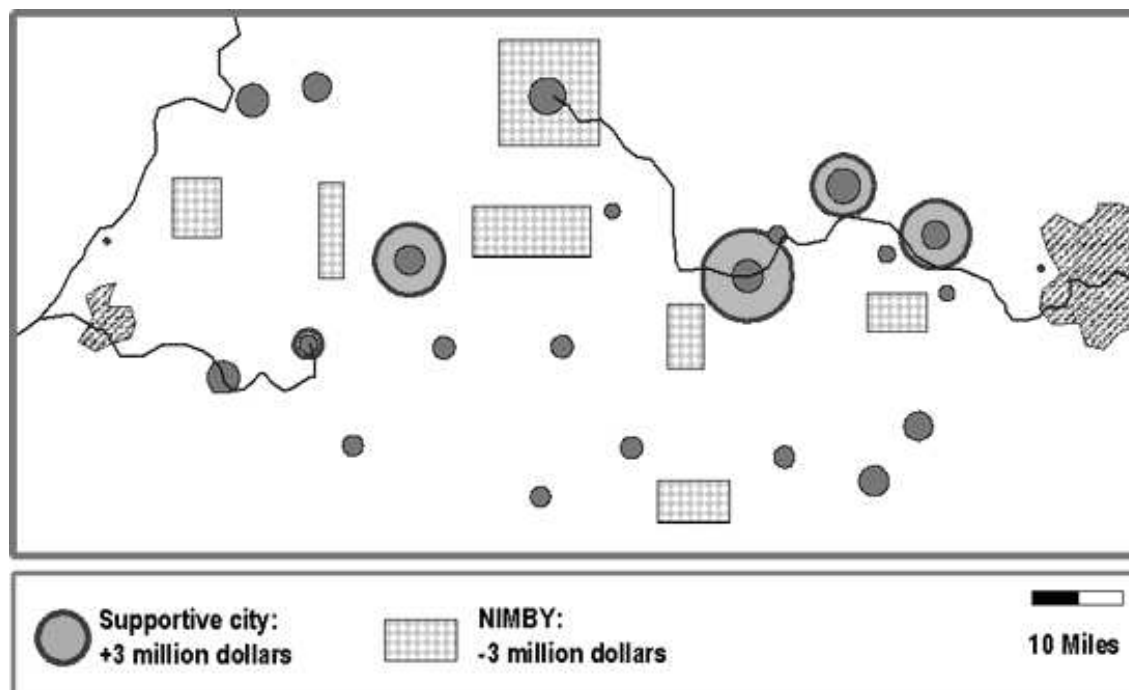
The Department of Environmental Quality has identified areas of ecological value and produced a map where each cell ranks between 0 (no value) and 5 (high value). It has expressed reluctance for the construction of a road over these cells, so when the road touches an ecologically valuable cell, a proportional level of environmental damage is assumed. Further, each mile of road constructed creates 0.25 points of environmental damage, mainly because of land removal, biomass destruction, and air pollution. The task is thus to choose a road that is the least damaging to the environment.

Ekonomický potenciál



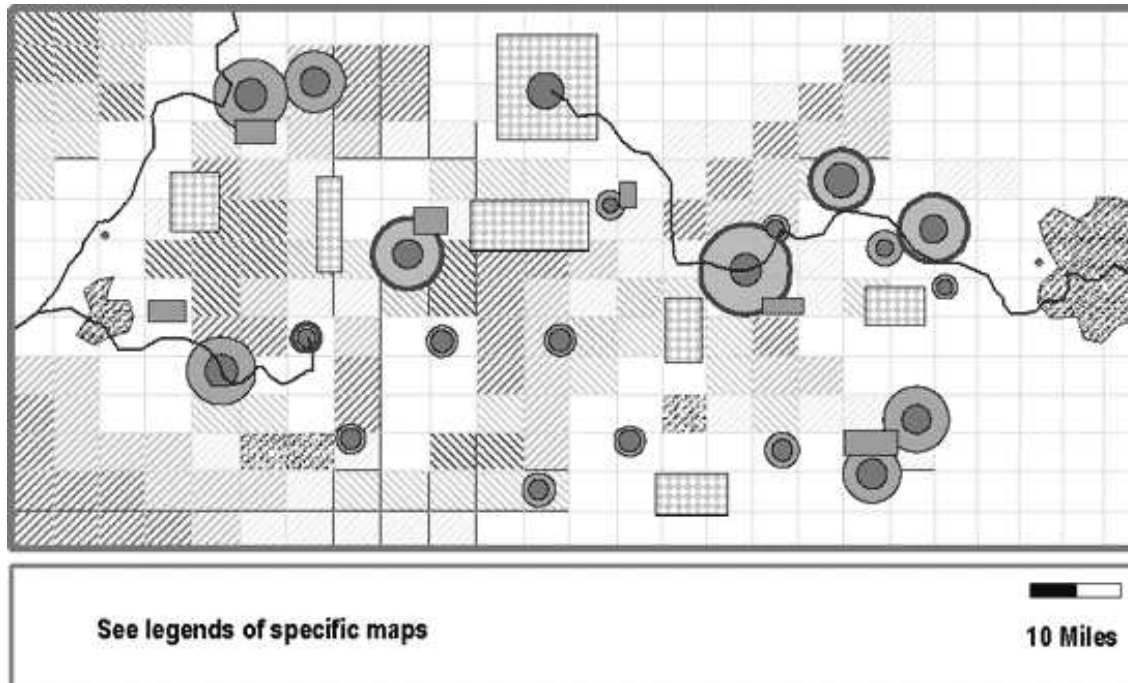
A second component of the economic value in addition to linking Easttown and Westtown is for the road to serve additional populations. The road cannot enter the already built-up areas of the cities. However, if the road can cross into the outskirts of each city, the population of the city is considered to be serviced, and a benefit estimated at \$15 per person can be generated. Furthermore, the government has designated six regions in which it wishes to accelerate industrial development. The Ministry of Finances would give an additional grant of \$5 million for each industrial development zone serviced by the road.

Politické překážky



In addition to physical factors that must be considered when constructing a road, there are also human factors. They are essentially lobbying groups having interest on the land that could be affected by a new road. Some lobbies favor road development in their region and are ready to give a substantial help. In places where the population is in favor of road construction, this will lessen construction costs by three million dollars (red circles). Other groups (often labeled as NIMBY; Not In My Back Yard) are against road construction and will ask for public audiences causing delays and supplementary costs of three million dollars in each case. These areas are identified as pink rectangles.

Kombinace faktorů



Závěr

(1) Road length	___ miles
Construction costs	
(a) Basic construction costs (\$0.5 million per mile)	\$M___
(b) Additional costs for rugged terrain	\$M___
(c) Additional costs for river crossing (\$2 million per bridge)	\$M___
Gross construction cost (a + b +c)	\$M___
(d) Additional costs for public audiences (\$3 millions per unit)	\$M___
(e) Costs saved from collaboration (\$3 millions per city in favor)	\$M___
(f) To serve an industrial development zone (\$5 millions per zone) (b)	
(g) Savings (benefit) from providing new roads to additional population (\$15 per person)	\$M___
(2) Total cost = Gross cost + d - e - f - g	\$M___
Environmental impacts	
(h) Level of environmental damage	___ units
(i) Level of environmental damage for road construction (0.25 per mile)	___ units
(3) Environmental score (h + i)	___ units