Toll Modeling in Context of Regional Travel Demand Model

presented by

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What is Travel Demand Model (TDM) ?

- Computer models used for long range transportation forecasts.
- to identify future year transportation system deficiencies.
- to evaluate the impact of alternative transportation solutions .
- basis for "Certified Traffic " forecasts, for pollution emissions estimates, and for congestion management system statistics.

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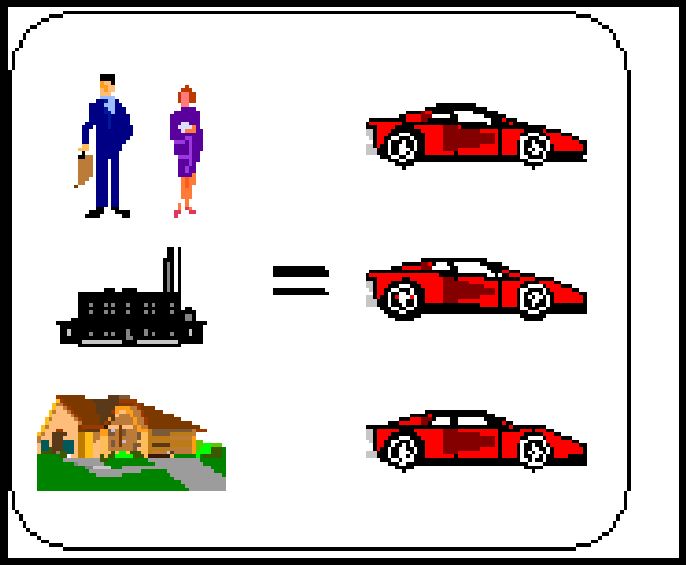
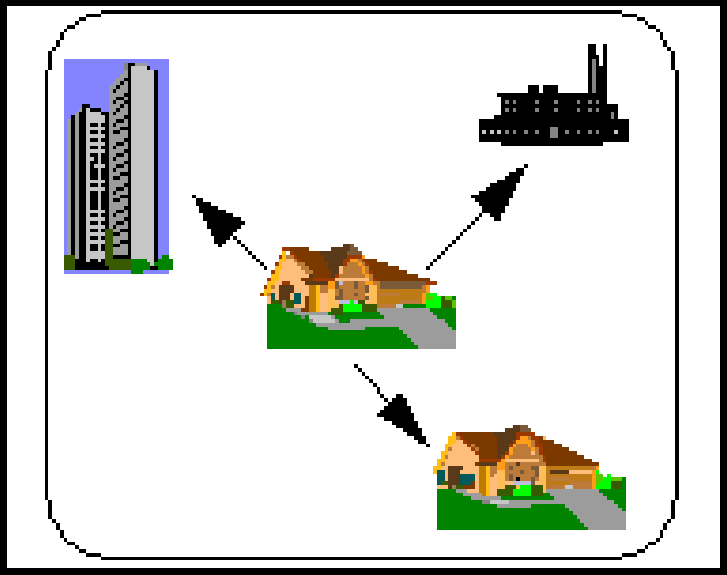
Four Step TDM

1. Trip Generation – number of trips estimation



Four Step TDM

2. Trip Distribution - trips estimation in origin and destination zone



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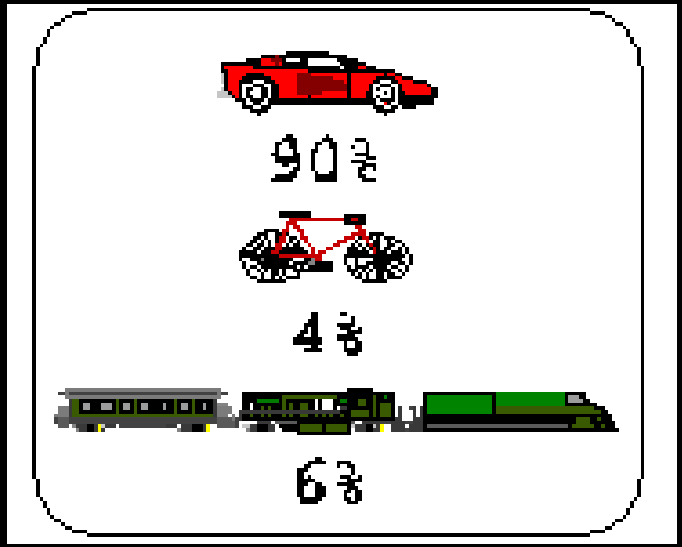
Four Step TDM

3. Mode Choice – Estimate mode of Travel



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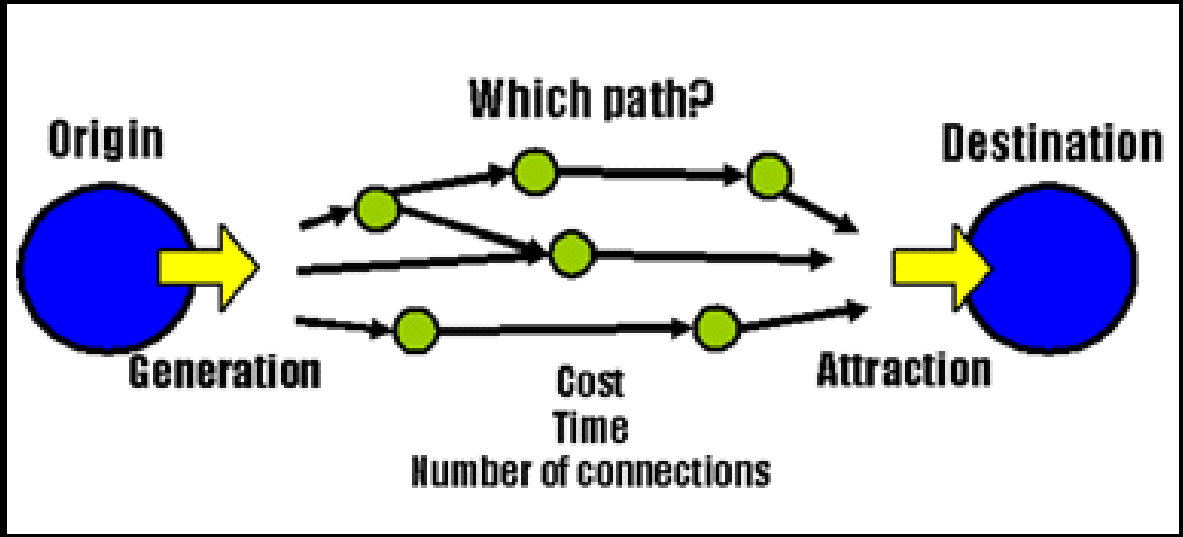
Four Step TDM

4. Assignment - estimated traffic volume on roadway



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Cost Factor in Path Finding

- Transit Fare
- Vehicle Occupancy >1
- Toll Cost

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Tolls Influence

- Trip Distribution
  - Destination Choice
- Mode Choice
  - SOV, HOV or Toll Path
  - Alternative Competitive Mode
- Trip Assignment
  - Alternative Path Finding

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Toll Choice Factors

- Socio-Economic Characteristics of trip makers in combination with travel costs

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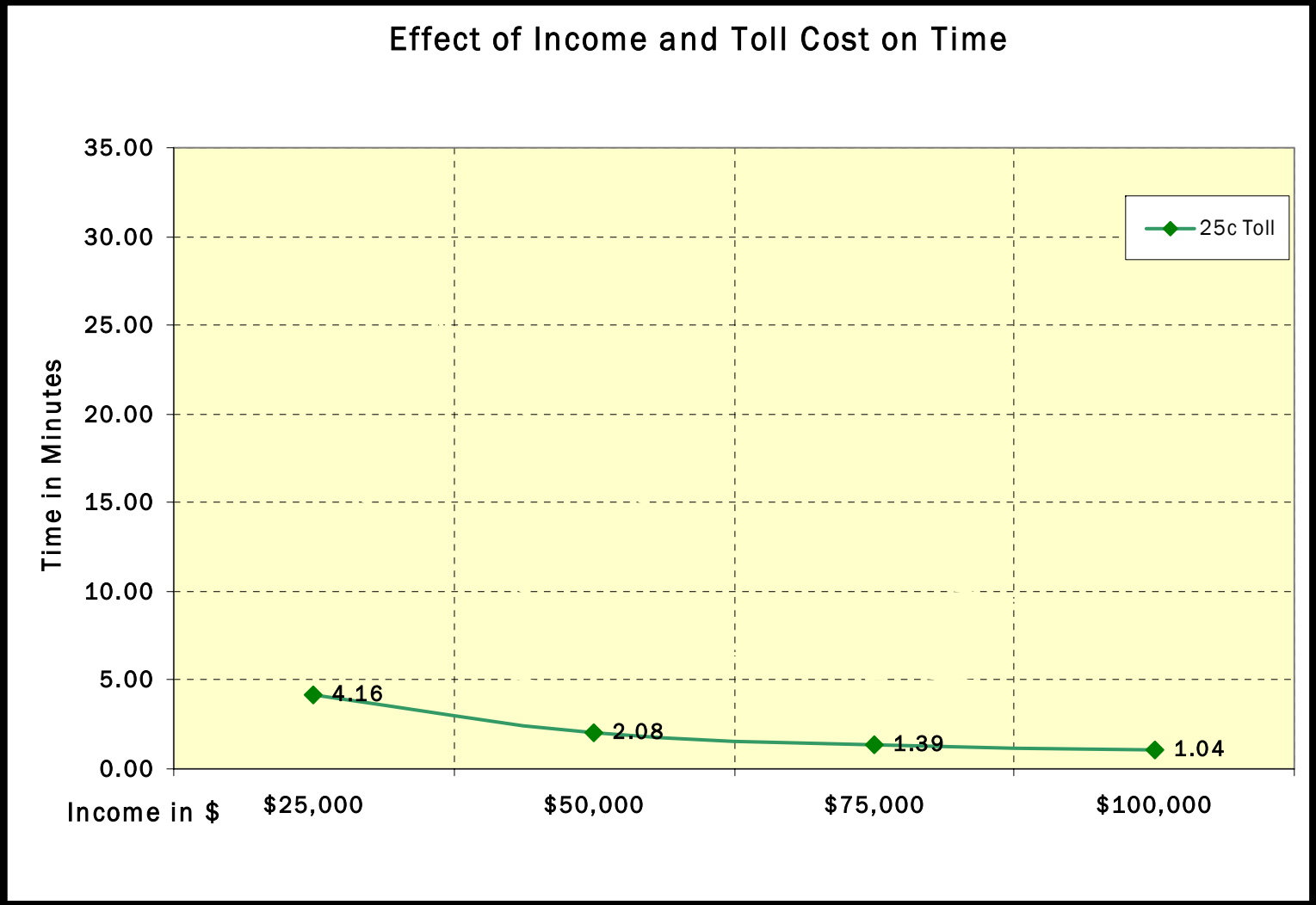
Toll Choice Factors - Income



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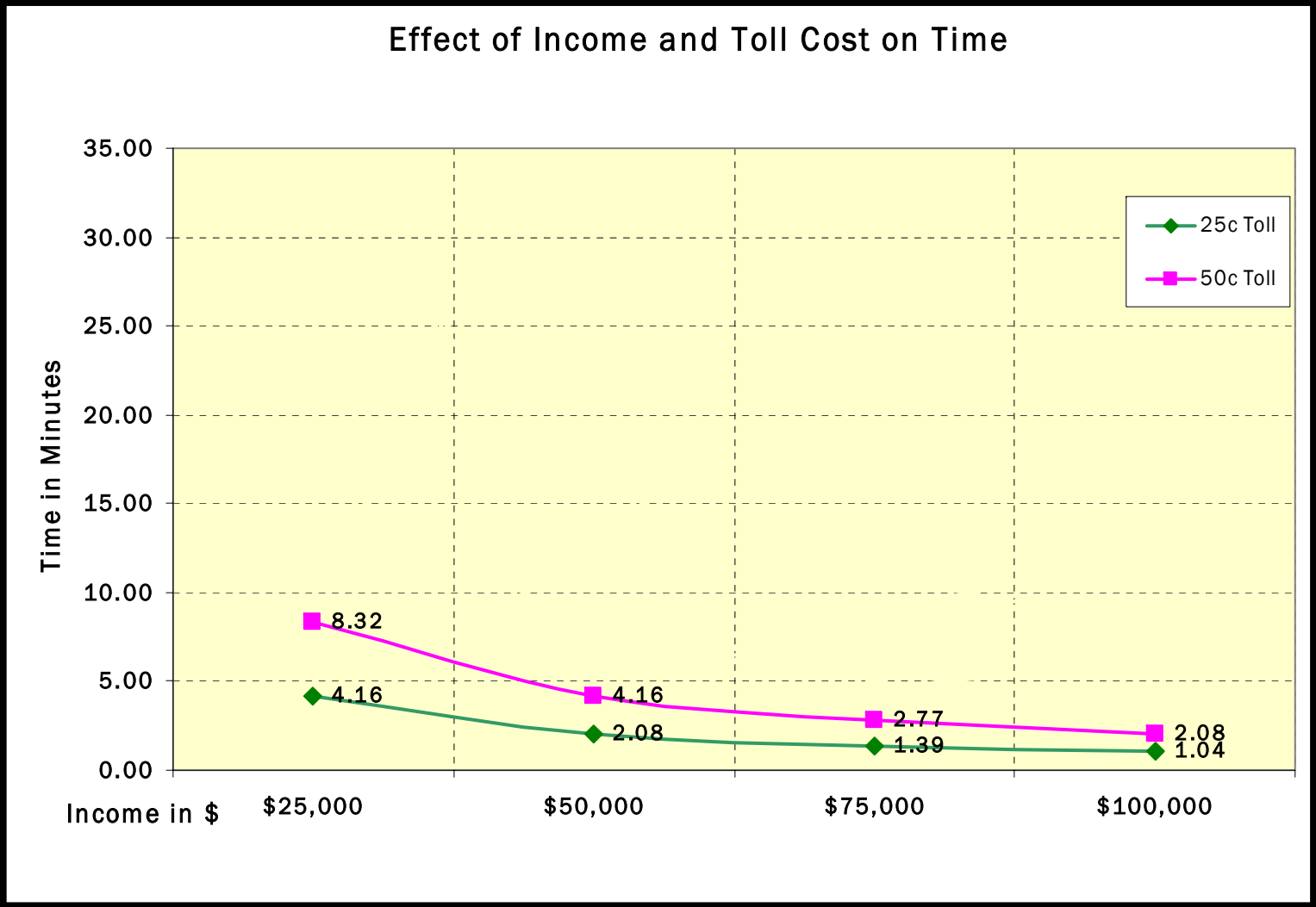
Toll Choice Factors - Income



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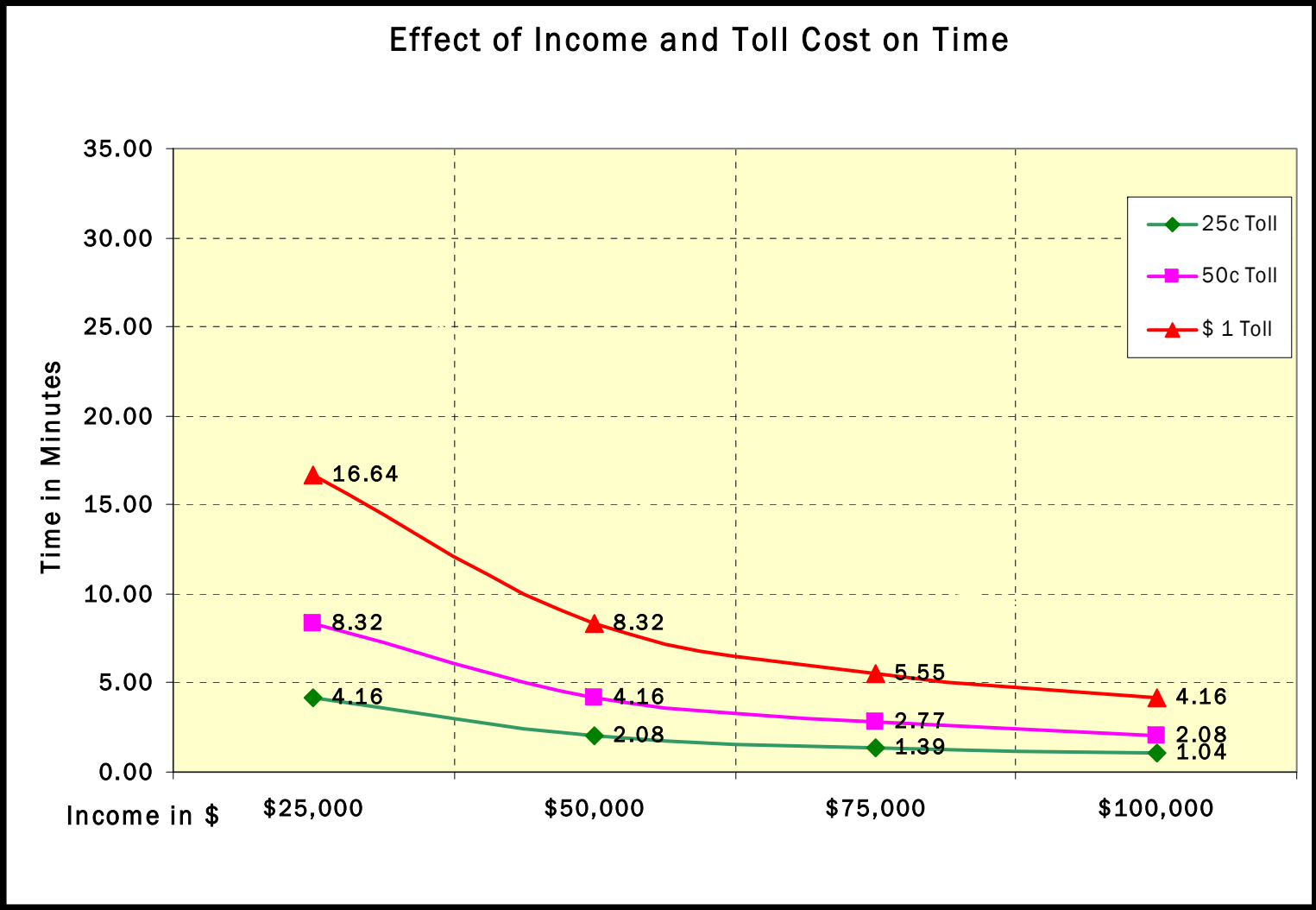
Toll Choice Factors - Income



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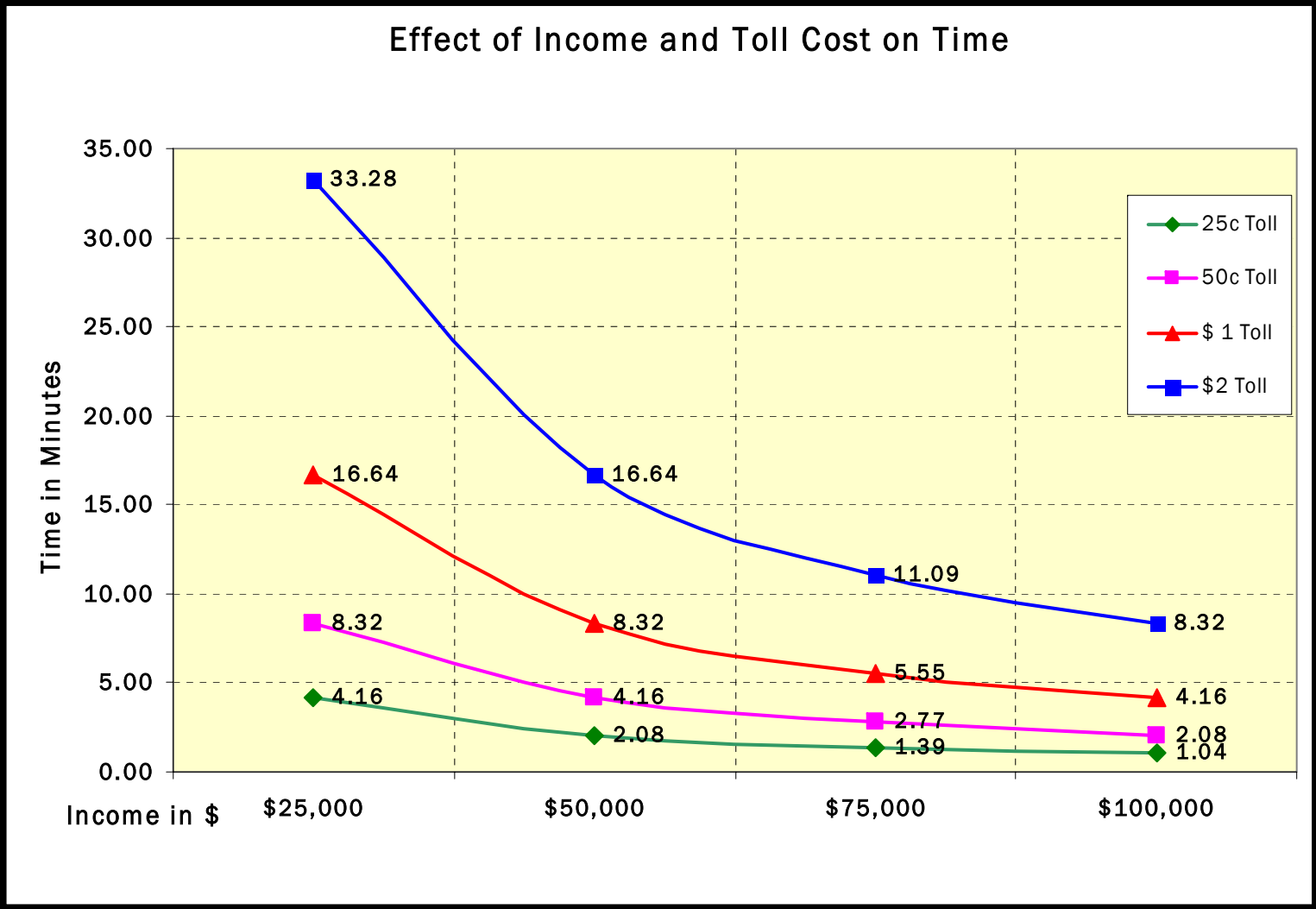
Toll Choice Factors - Income



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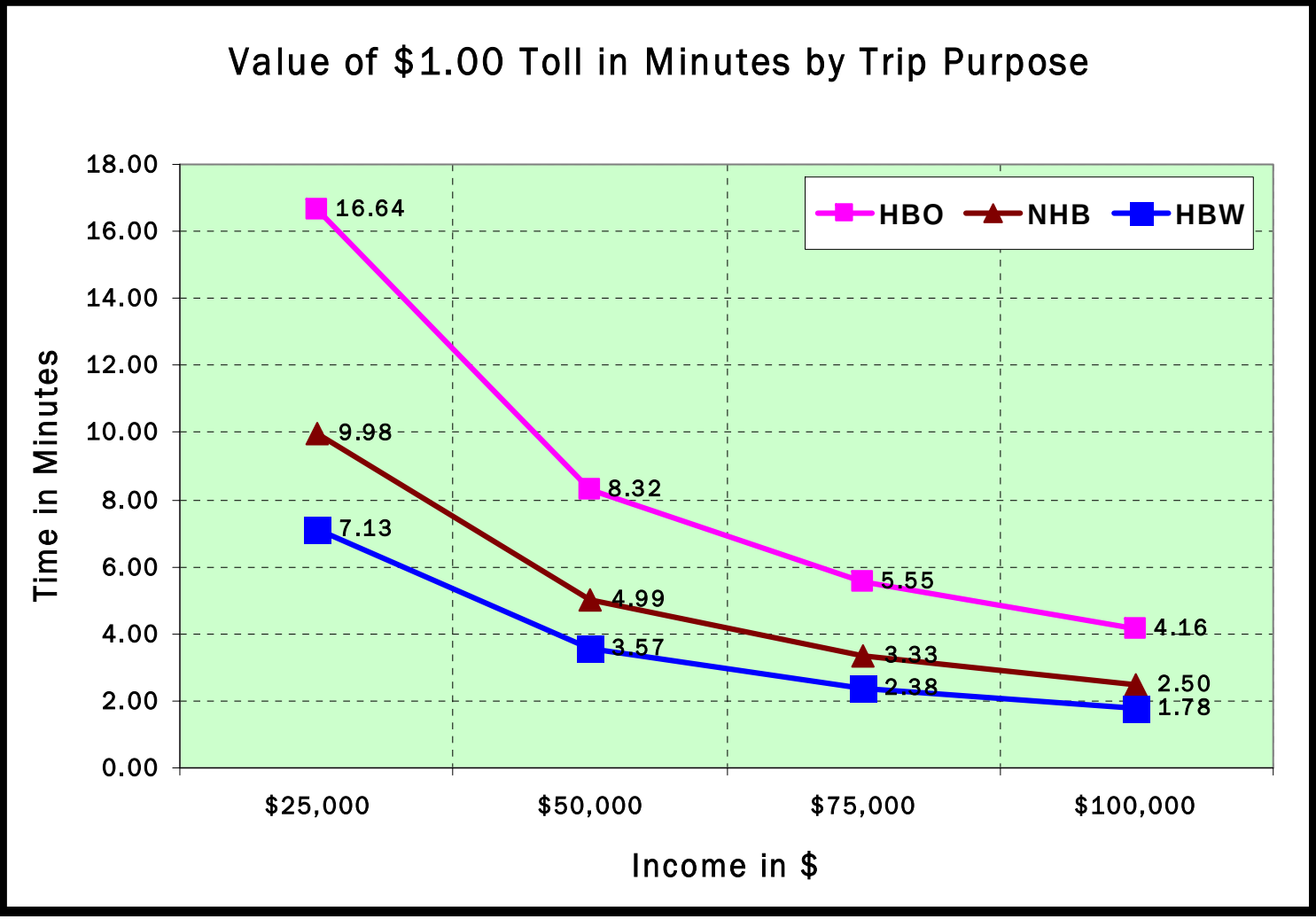
Toll Choice Factors

- Trip Purpose



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Toll Choice Factors

- Time of Day
  - AM and PM Peak
  - Off Peak
- Method of Toll Collection
  - Cash
  - Electronic Toll Collection
- Vehicle Type

  Car, Trucks
- Vehicle Occupancy

  SOV, HOV

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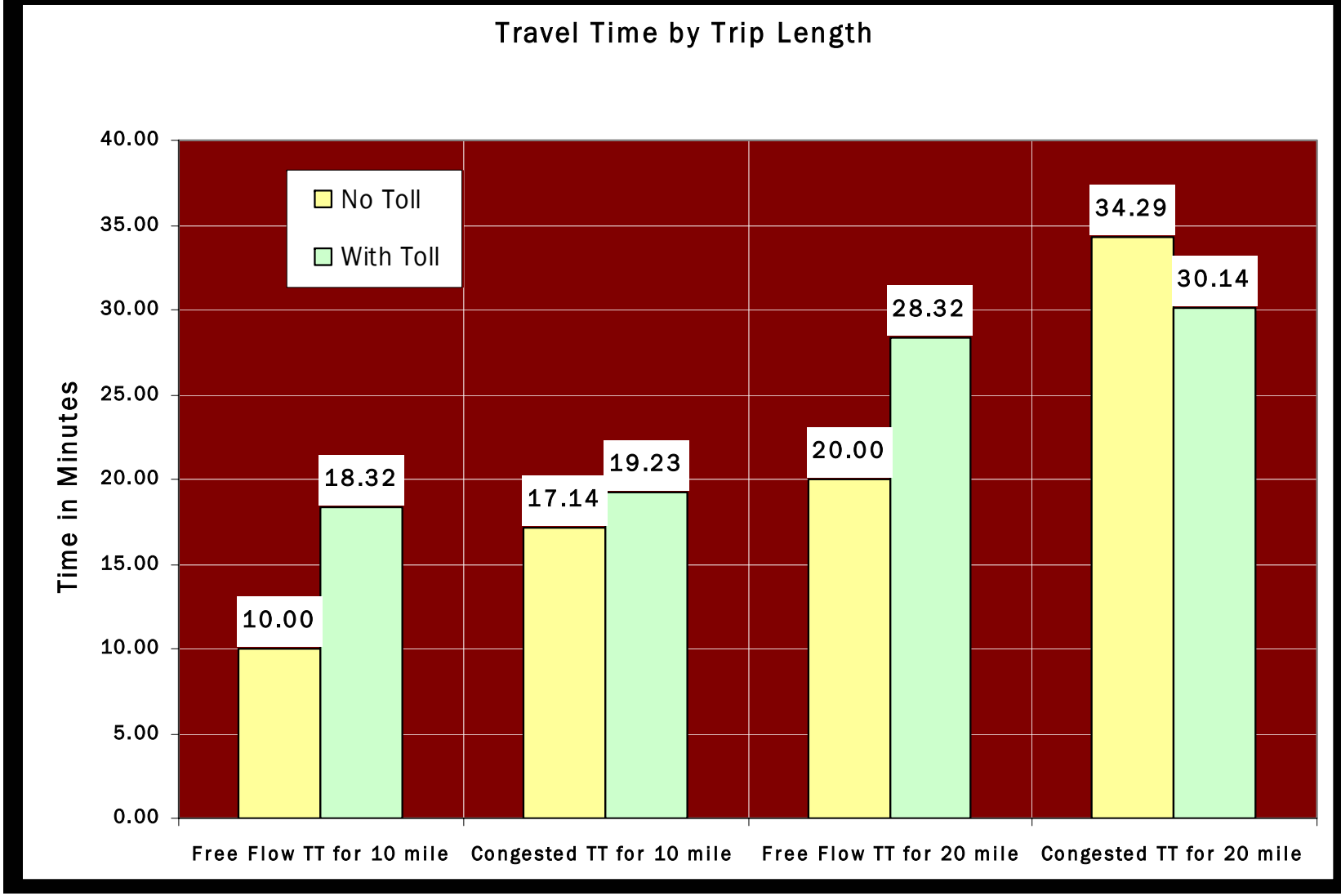
Toll Choice Factors

- Trip length for toll users



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Tolls Diversion Model

- Mode Choice
- Highway Assignment
  - Route Choice Sub-Model
- Highway Assignment
  - Equivalent Time Penalties

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Assignment Toll Models

Generalized assignment procedure

- uses travel time and costs by time of day

Feedback loop through mode choice

- uses successive averaging of travel times

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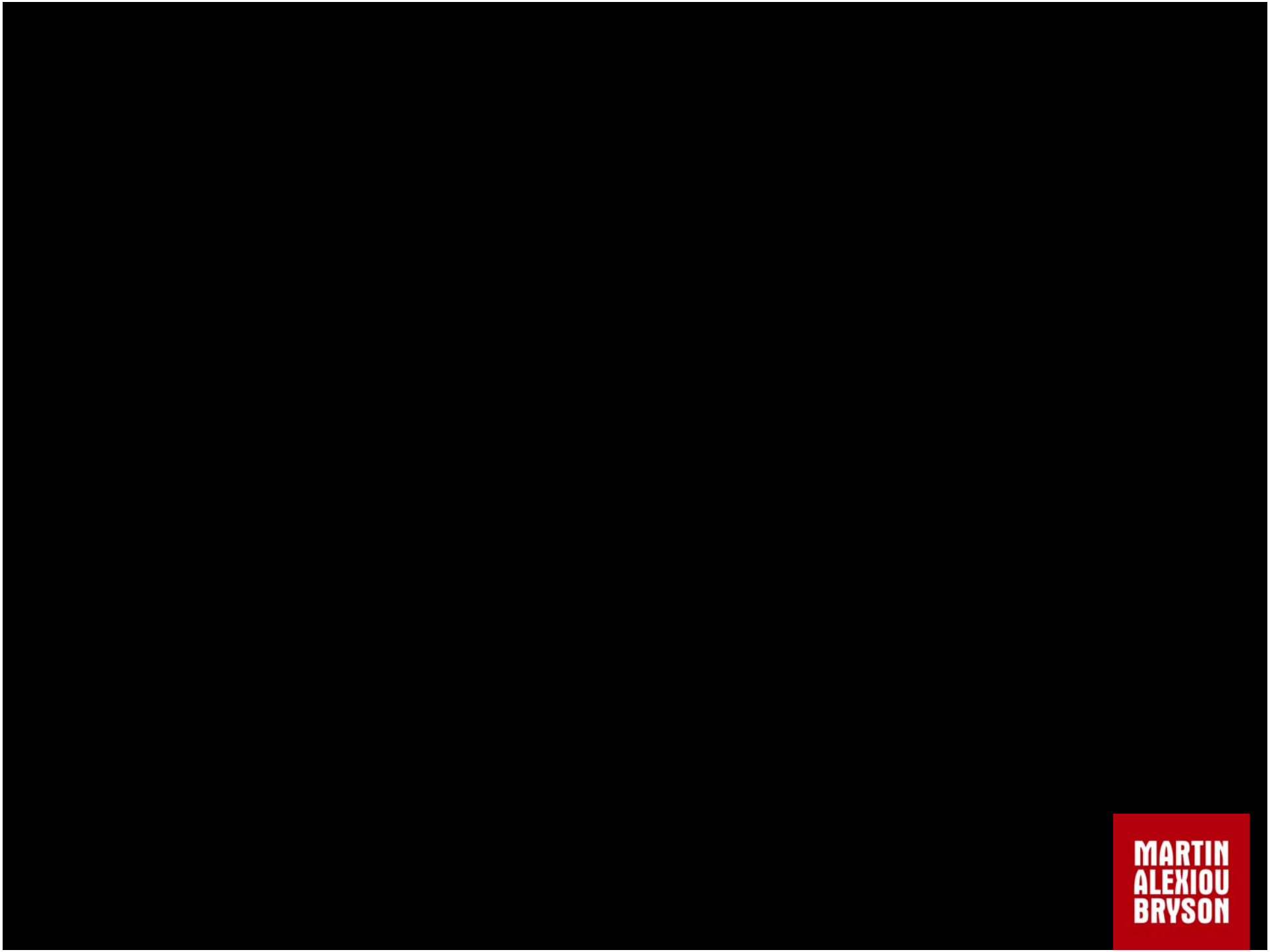
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Diversion Modeled

- Within Regional Model
- Post Process – Model
- Post Process - Off Model

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Toll Diversion Sensitivity

- Trip length for toll users
- Household income in combination with travel costs
- Assignment Estimated Congestion
- Tolls varied by Estimated Congestion

Source: Estimating Demand for Value Pricing Projects prepared for NCTCOG

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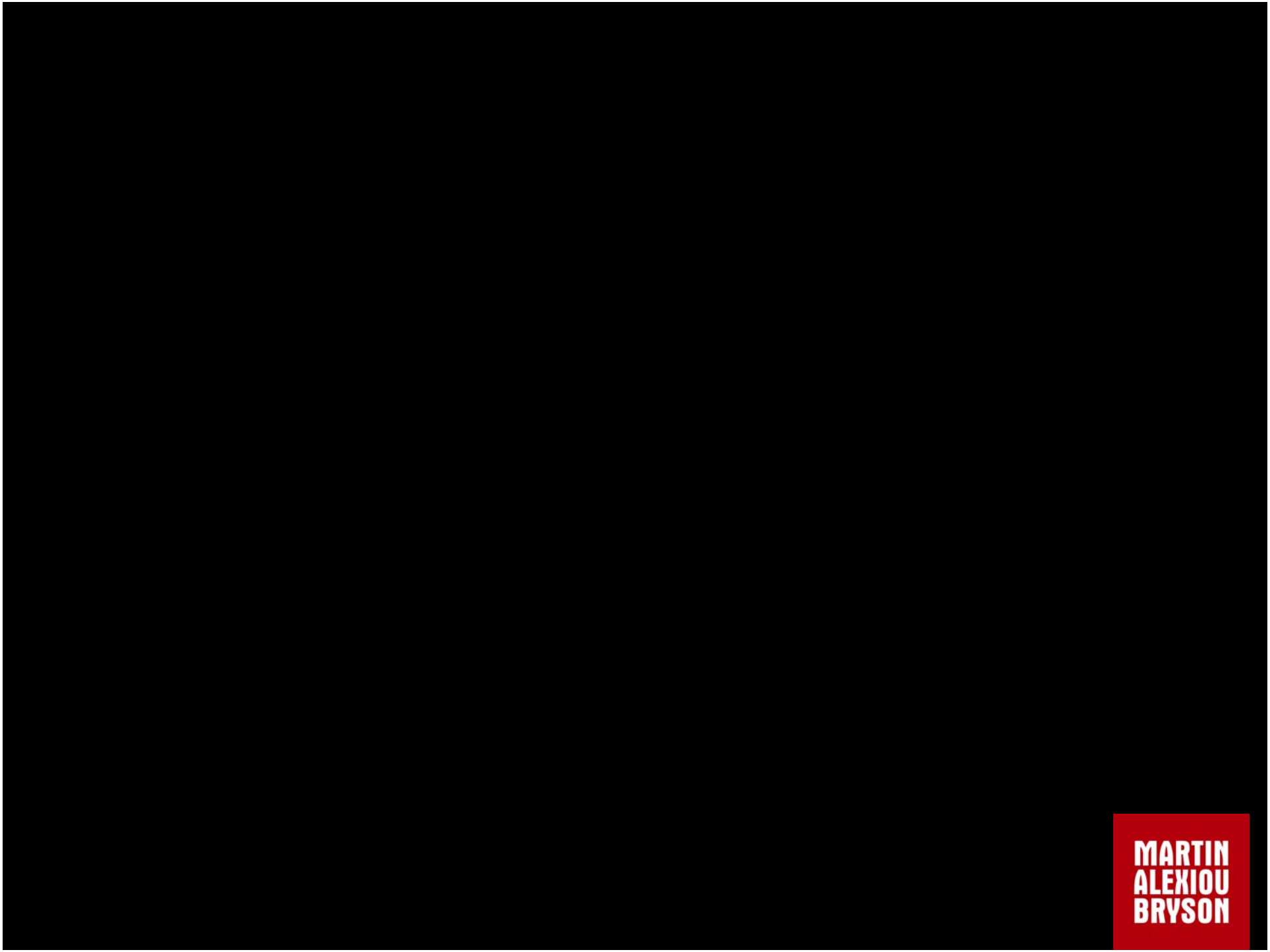
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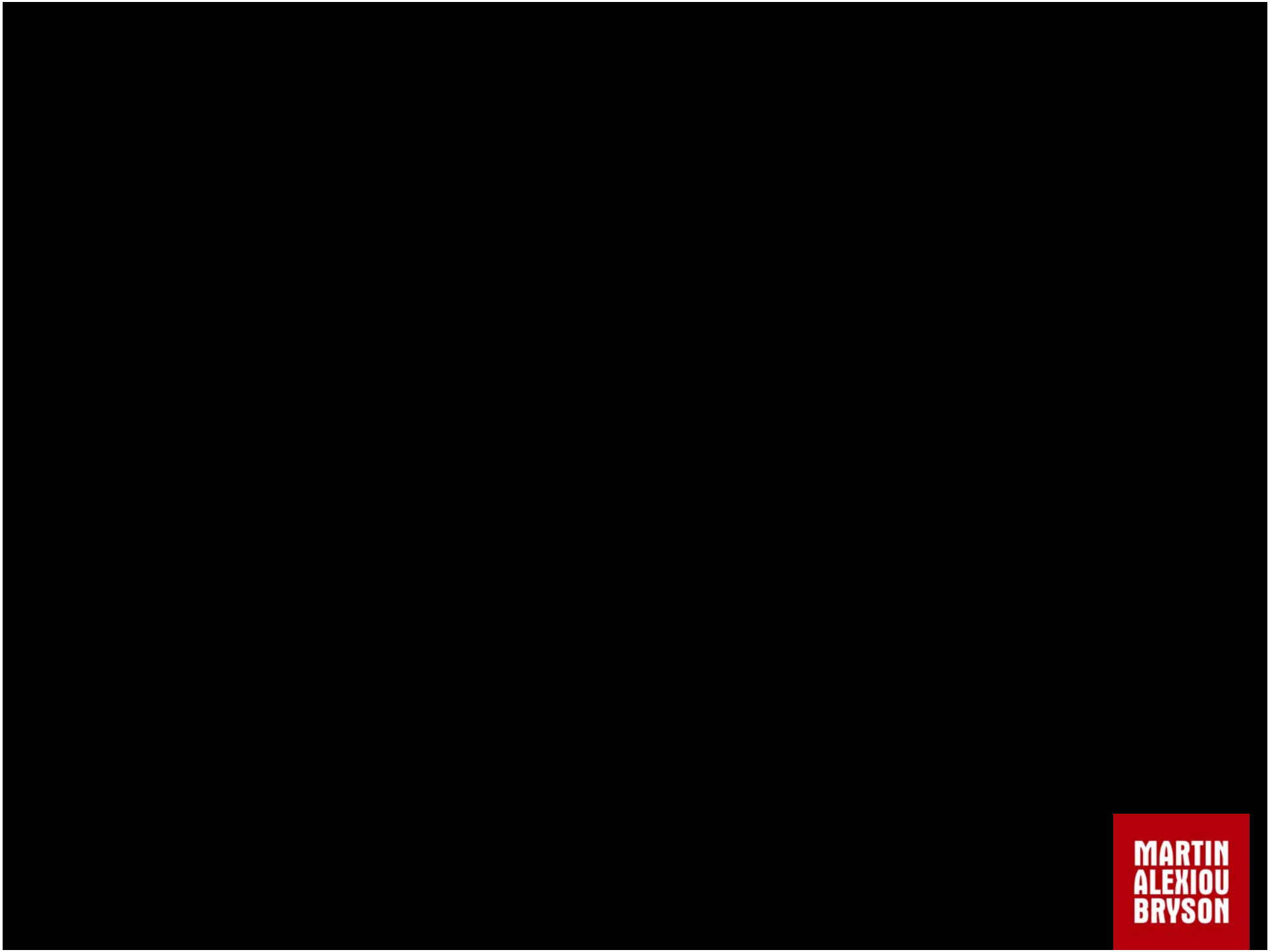
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