

Transportation Planning **VS.** Transportation Engineering

A transportation engineers' perspective to Transportation Planning

A collaboration between:

Rafael Villarreal P.Eng., MCIP, RPP

Ahmed Idris, PhD, P.Eng.

Stephen Sargeant, P.Eng., PTOE



a place of mind
THE UNIVERSITY OF BRITISH COLUMBIA



What is Transportation Planning?

It's a matter of perspective

What is Transportation Planning?

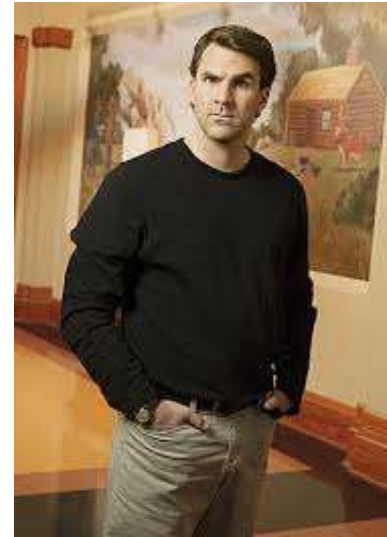
Stereo-typical Engineer



Numbers, designs,
standards, operations.

*"I do it all, I know it all,
just stay out of my way !!"*

Stereo-typical Planner



Source: Parks & Recreation

Consultation
Complete streets
Urban design
Development approvals

What is Transportation Engineering?

Technical

What is Transportation Engineering?

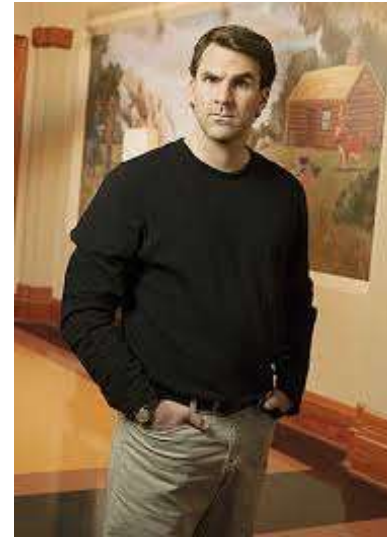
Stereo-typical Engineer



Numbers, designs,
standards, operations.

*"I do it all, I know it all,
just stay out of my way !!"*

Stereo-typical Planner



Source: Parks & Recreation

Consultation
Complete streets
Urban design
Development approvals

Even within Transportation professionals, there are different perspectives

Three different perspectives

The confused, planner or engineer?

The academic, in theory...

The hired gun, also known as the engineering consultant

Planner or Engineer

Engineering Academic

Engineering Consultant

Perspective 1 - the confused



<http://www.cafepress.com/+urban-planner+accessories>



Planner or Engineer

Engineering Academic

Engineering Consultant

Transportation demand is derived

By activities

“The best Transportation plan is...

a land use plan”

Definition (Wikipedia)

*“As practiced today, it is a **collaborative** process that incorporates the input of many stakeholders including various government agencies, the public and private businesses. Transportation planners apply a multi-modal and/or comprehensive approach to analyzing the wide range of alternatives and impacts on the transportation system to influence beneficial outcomes”*

Traditionally Transportation Planning is..

In a nutshell (Traditional approach to Transportation Planning)

Can use? really?



Region/Metropolitan Strategic Transportation
Planning (area wide)

Planner or Engineer

Engineering Academic

Engineering Consultant

In a nutshell (Traditional approach to Transportation Planning)

Can use? really?



Region/Metropolitan Strategic Transportation
Planning (area wide)

Link Volumes



Planner or Engineer

Engineering Academic

Engineering Consultant

In a nutshell (Traditional approach to Transportation Planning)

Can use? really?



Region/Metropolitan Strategic Transportation
Planning (area wide)



Corridor Planning, Conceptual/Functional Design
(Engineering)

Link Volumes



Planner or Engineer

Engineering Academic

Engineering Consultant

In a nutshell (Traditional approach to Transportation Planning)

Can use? really?



Region/Metropolitan Strategic Transportation Planning (area wide)



Corridor Planning, Conceptual/Functional Design (Engineering)

Link Volumes



Planner or Engineer

Engineering Academic

Engineering Consultant

In a nutshell (Traditional approach to Transportation Planning and Engineering)

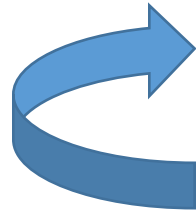
Can use? really?



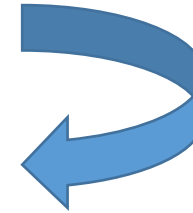
Region/Metropolitan Strategic Transportation Planning (area wide)



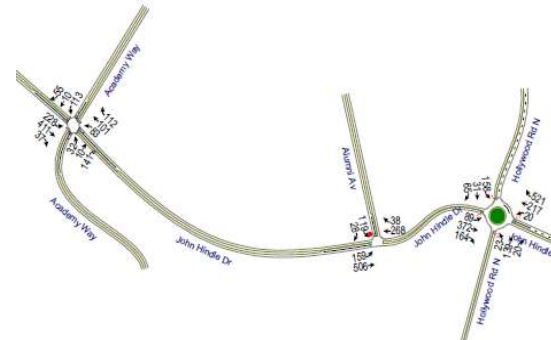
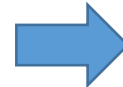
Corridor Planning, Conceptual/Functional Design (Engineering)



Transportation and Traffic Operations



Link Volumes



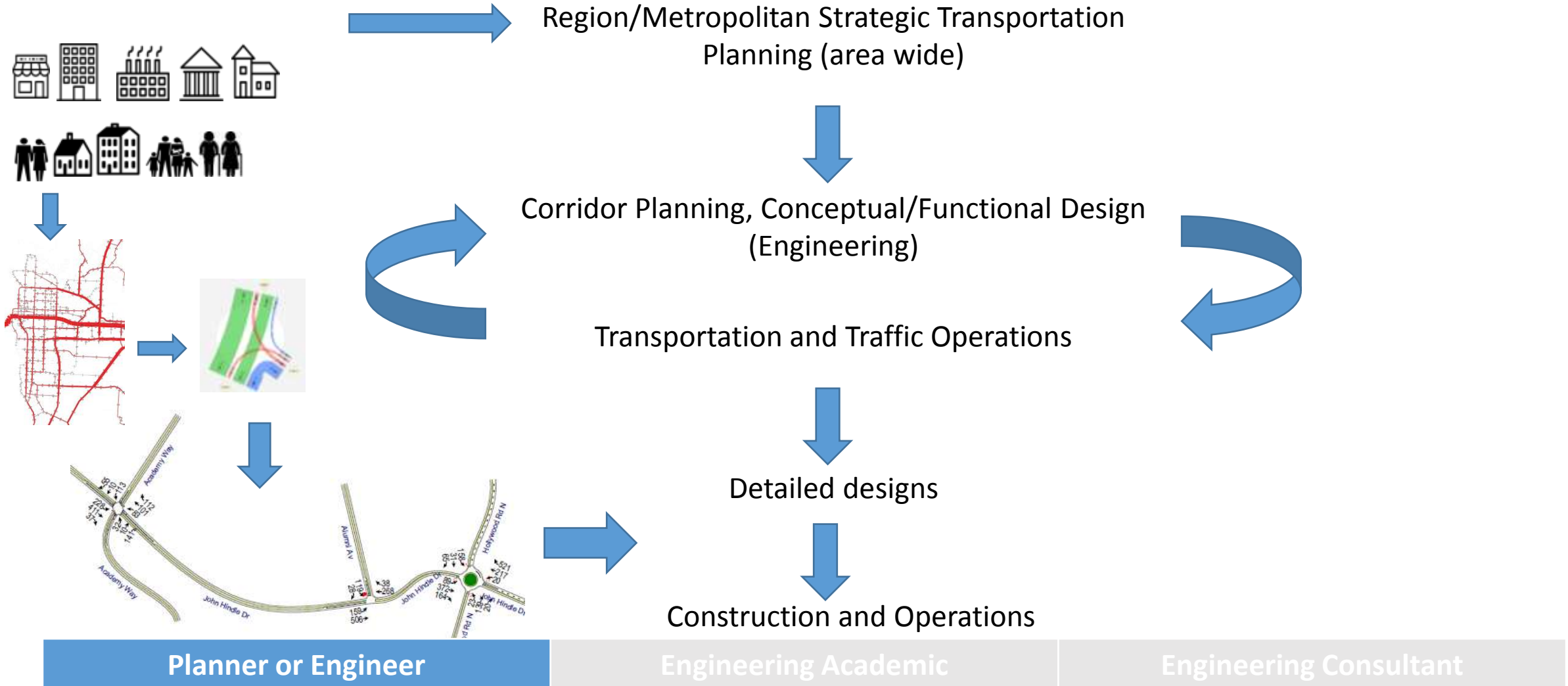
Planner or Engineer

Engineering Academic

Engineering Consultant

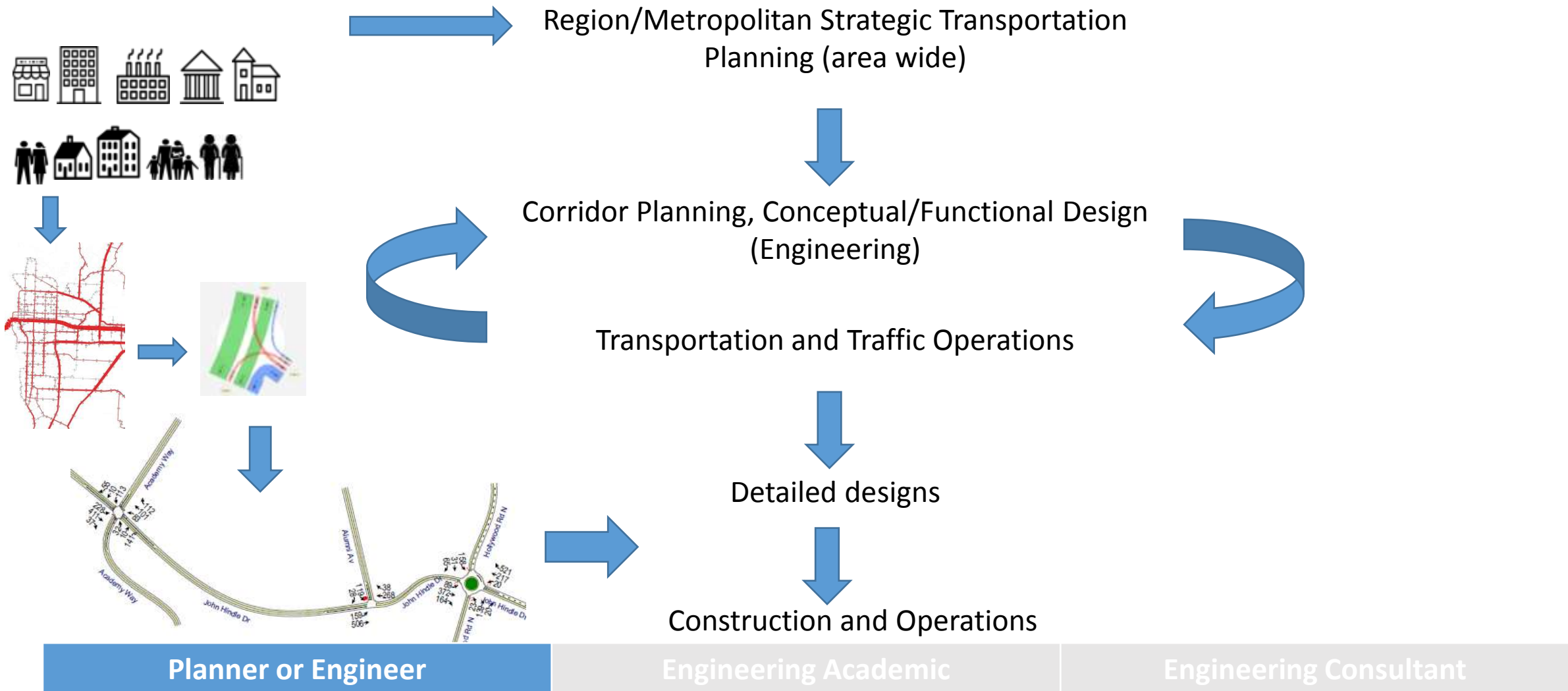
In a nutshell (Traditional approach to Transportation Planning and Engineering)

Can use? really?

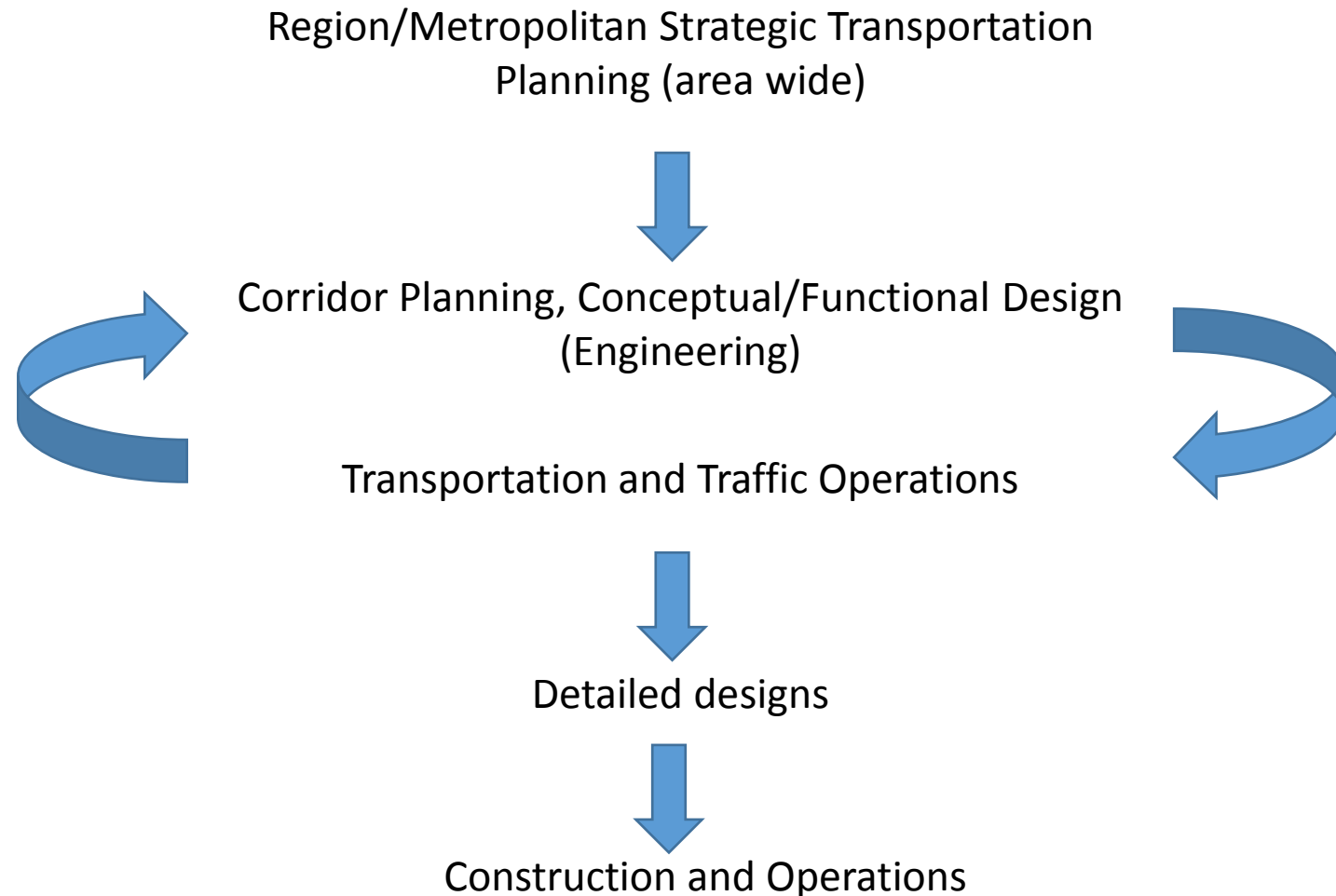


In a nutshell (Traditional approach to Transportation Planning and Engineering)

Can use? really?



In a nutshell (Traditional approach to Transportation Planning and Engineering)



Planner or Engineer

Engineering Academic

Engineering Consultant

Oh, Yes, right, the community...

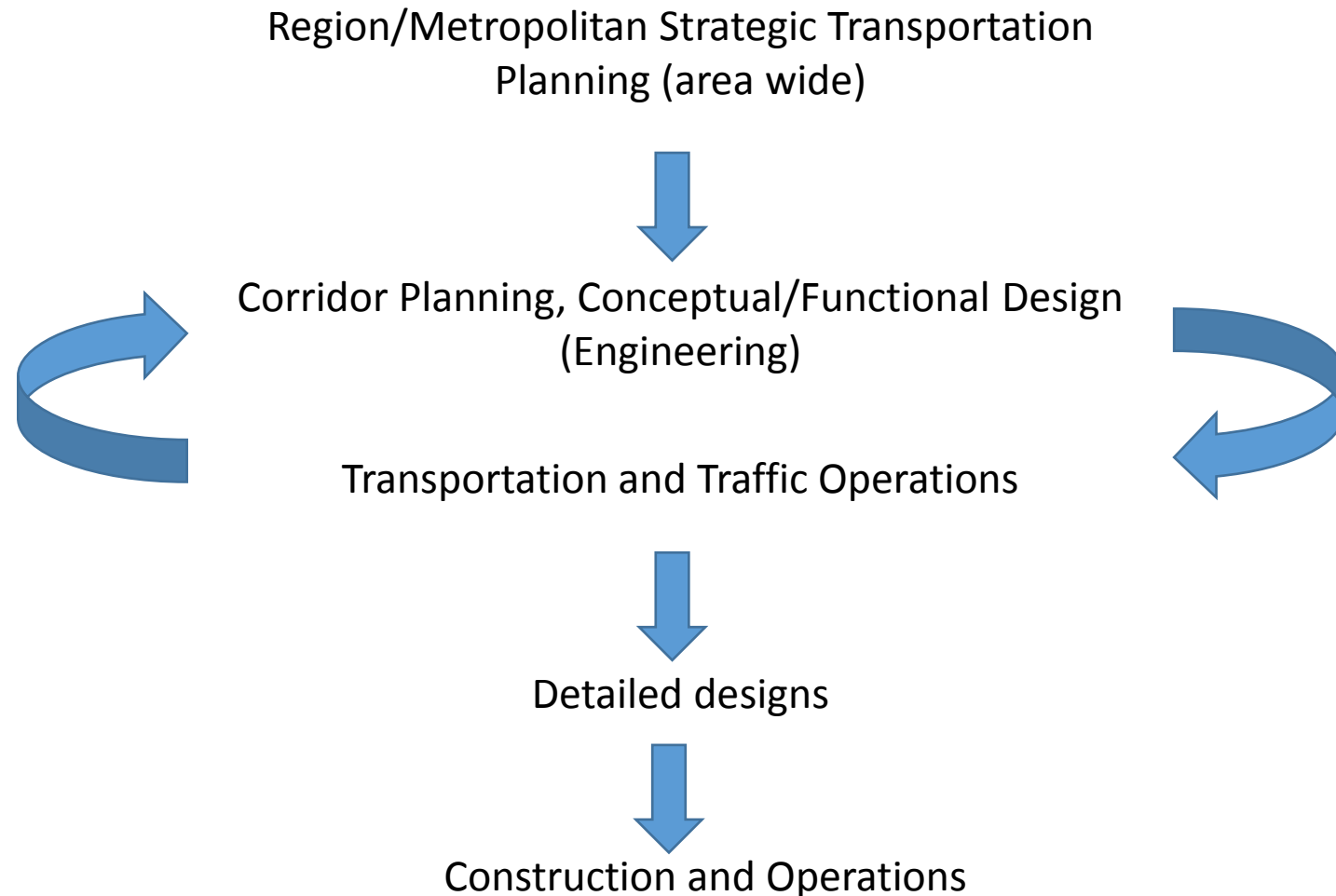


Planner or Engineer

Engineering Academic

Engineering Consultant

In a nutshell (Traditional approach to Transportation Planning and Engineering)

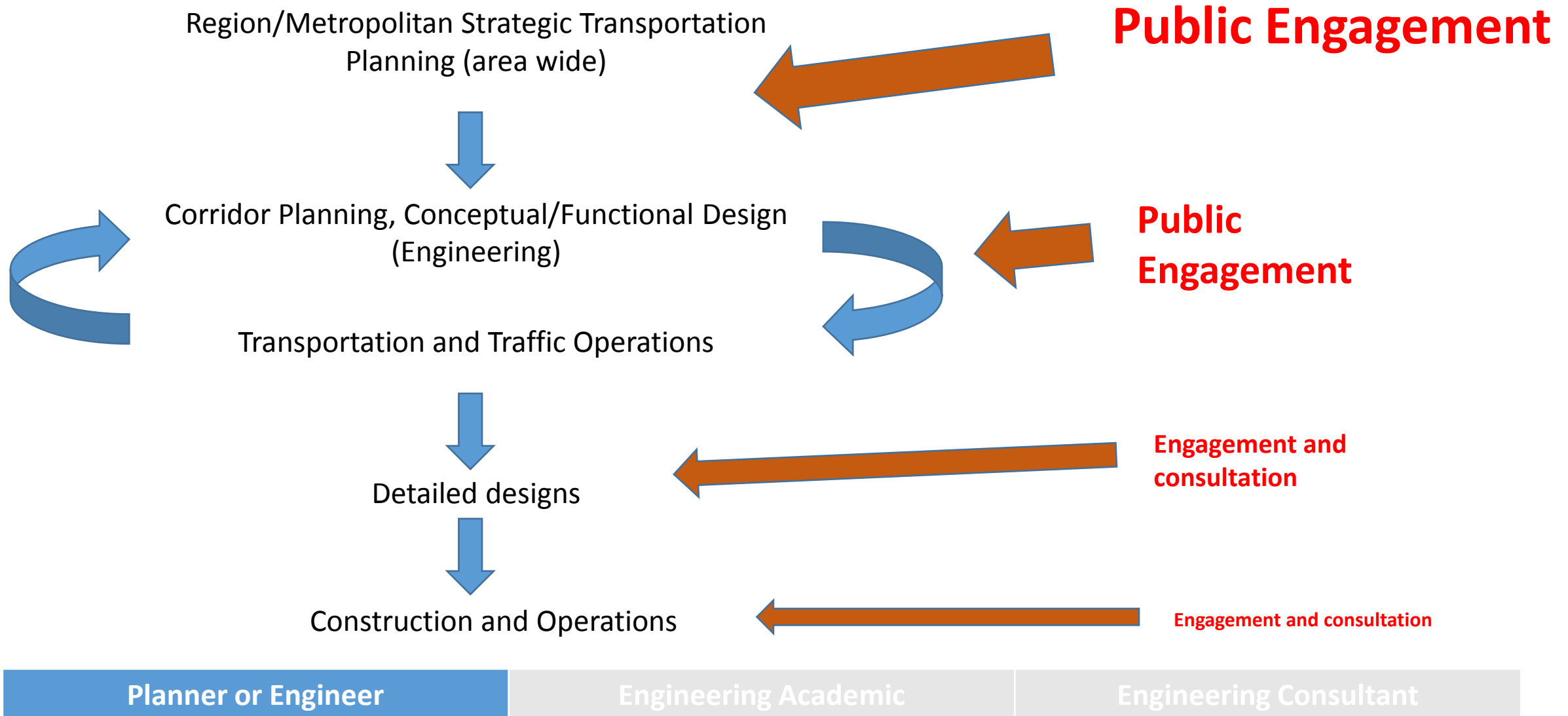


Planner or Engineer

Engineering Academic

Engineering Consultant

In a nutshell (Traditional approach to Transportation Planning)



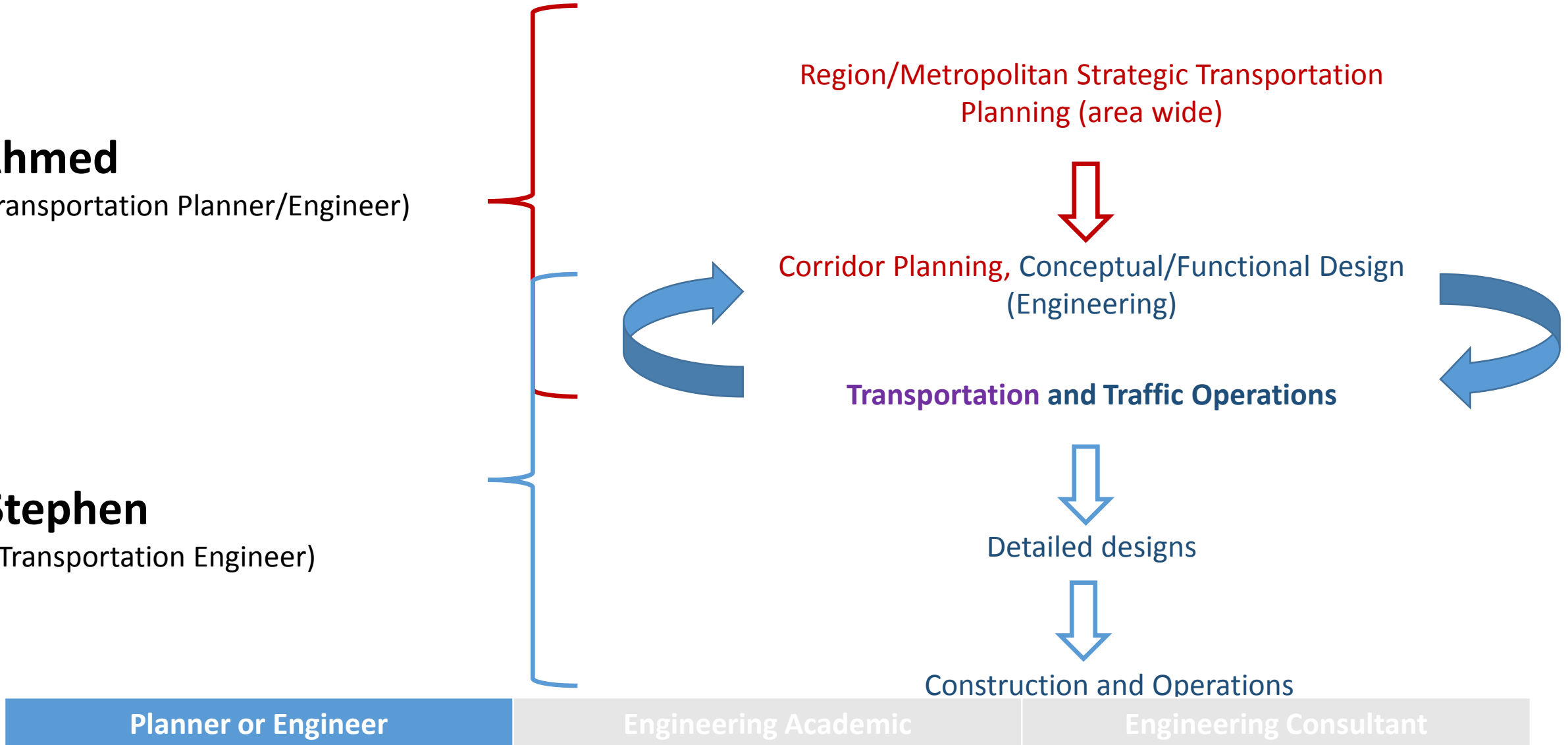
In a nutshell (Traditional approach to Transportation Planning)

Ahmed

(Transportation Planner/Engineer)

Stephen

(Transportation Engineer)



That's it...

No, there is more

New paradigm

Facilitate the connection between community and mobility options

Information technology

Moving people instead of moving vehicles

Moving data instead of people

The entire trip, not just that portion of the trip on one mode or another

Transportation Planning is

Very complex: Multidimensional & Holistic approach

- Land use planning (real)
- Energy efficiency
- Emissions
- Traffic management
- Human behaviours (beyond models)
- Economics
- Finance
- Public policy
- Governance
- Health
- Safety
- Gender
- Disability
- Affordability
- Technology



How to relate all these?

Planner or Engineer

Engineering Academic

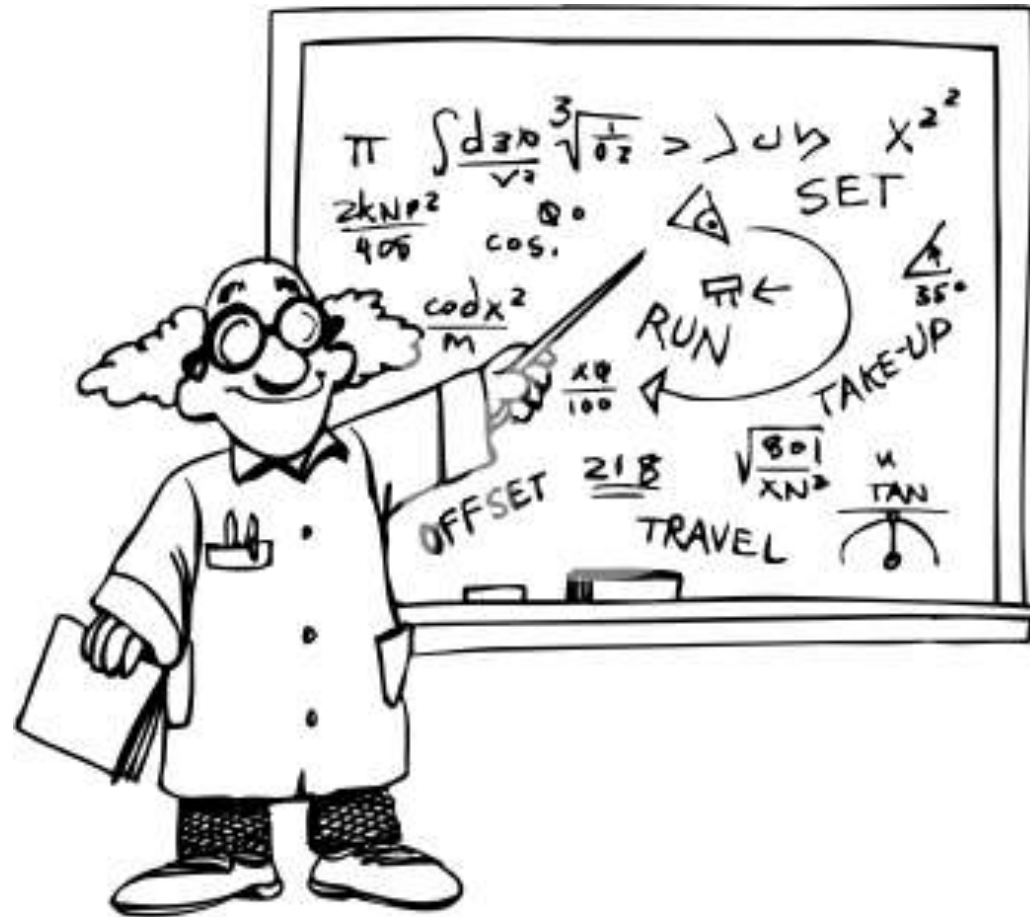
Engineering Consultant

How do we respond?

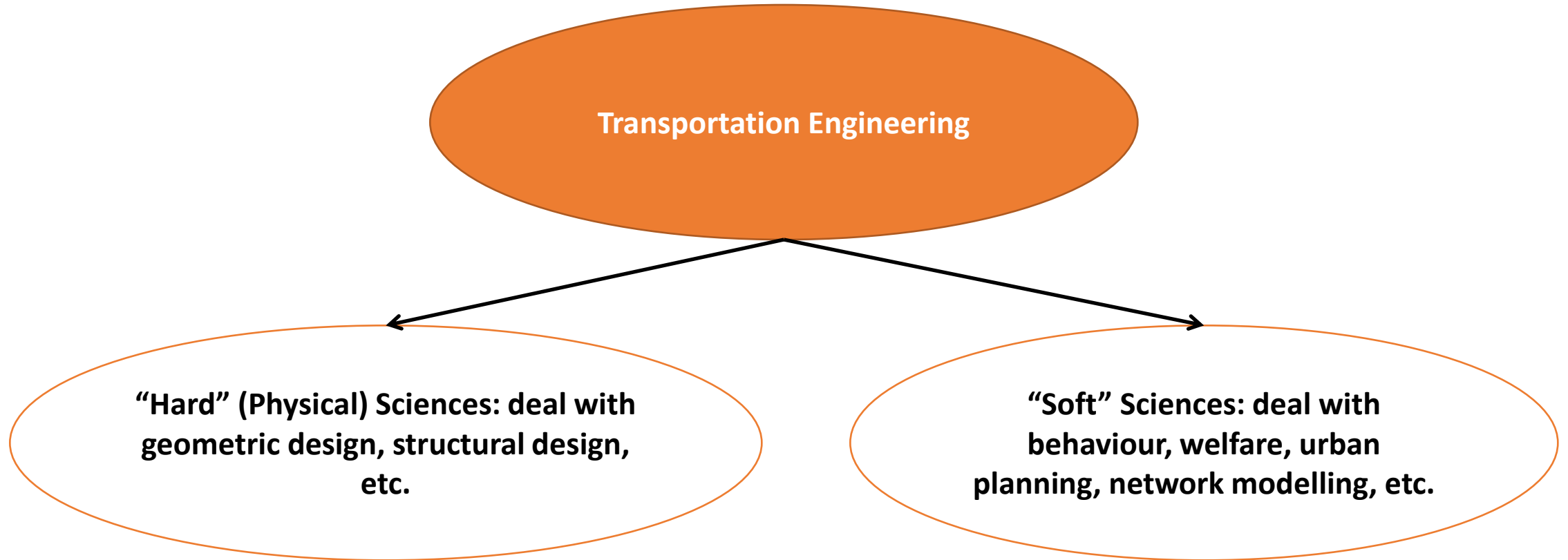
We will discuss after we hear Ahmed and Stephen's perspective,

but the reality is that we need to start thinking transportation outside of the traditional box and traditional professions

Perspective 2 – the academic



Transportation Engineering

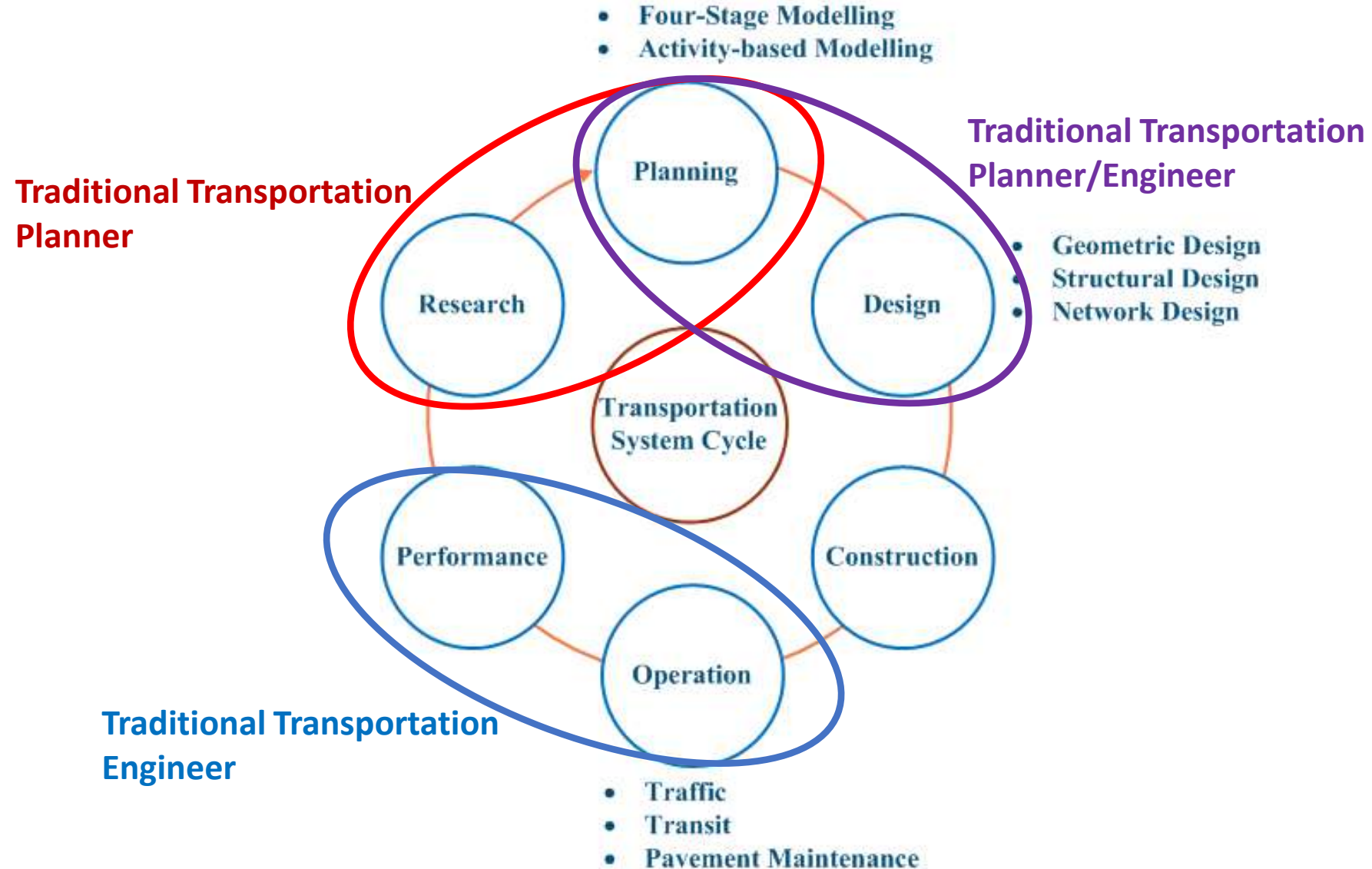


Planning as Part of Transportation Engineering

*Transportation engineering is the application of technology and scientific principles to the **planning**, functional design, operation, and management of facilities for any mode of transportation in order to provide for the safe, rapid, comfortable, convenient, economical, and environmentally compatible movement of people and goods (ITE, 1987).*

❑ From my perspective, **Planning is part of Engineering!**

Traditional Transportation System Cycle



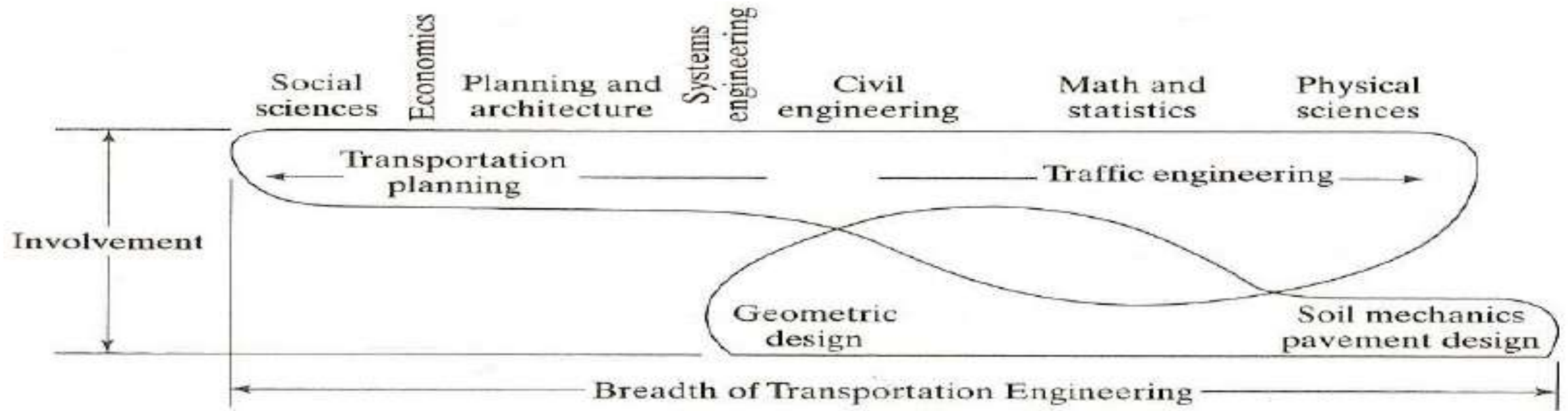
Planner or Engineer

Engineering Academic

Engineering Consultant

Interdisciplinary Nature of Transportation Engineering

- ❑ Transportation engineering is an interdisciplinary field drawing on more established disciplines to provide its basic framework



Planner or Engineer

Engineering Academic

Engineering Consultant

Transportation Planning

- ❑ The purpose of planning is to provide decision-makers with the information they need **to make informed decisions**
- ❑ What is a model?
 - **Simplification** and **abstraction of real-world phenomena** that attempt to capture key elements of real-world behaviour
- ❑ What for (in the context of transportation planning)?
 - Ask “what if” questions about system performance under various scenarios
 - Evaluate the impacts of infrastructure investments (e.g. LRT/BRT, HOV, TDM, etc.)
 - Policy analysis (e.g. congestion pricing, transit fare, GHG emission, etc.)

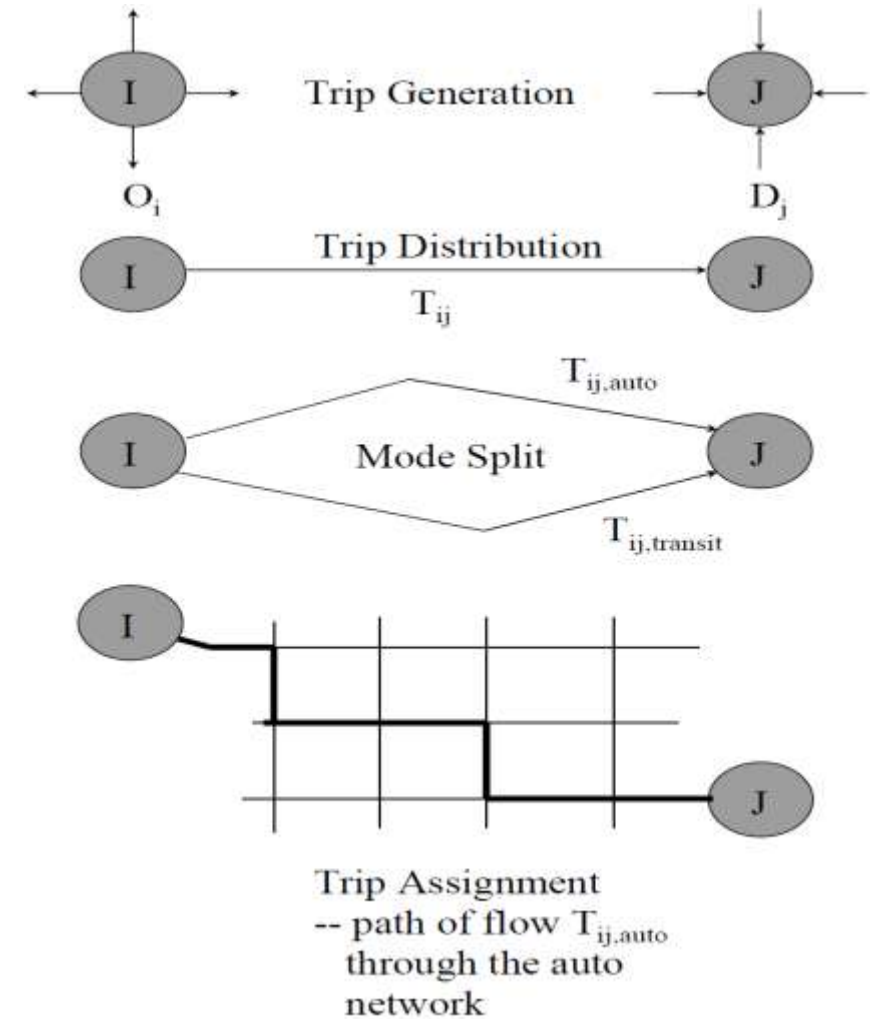
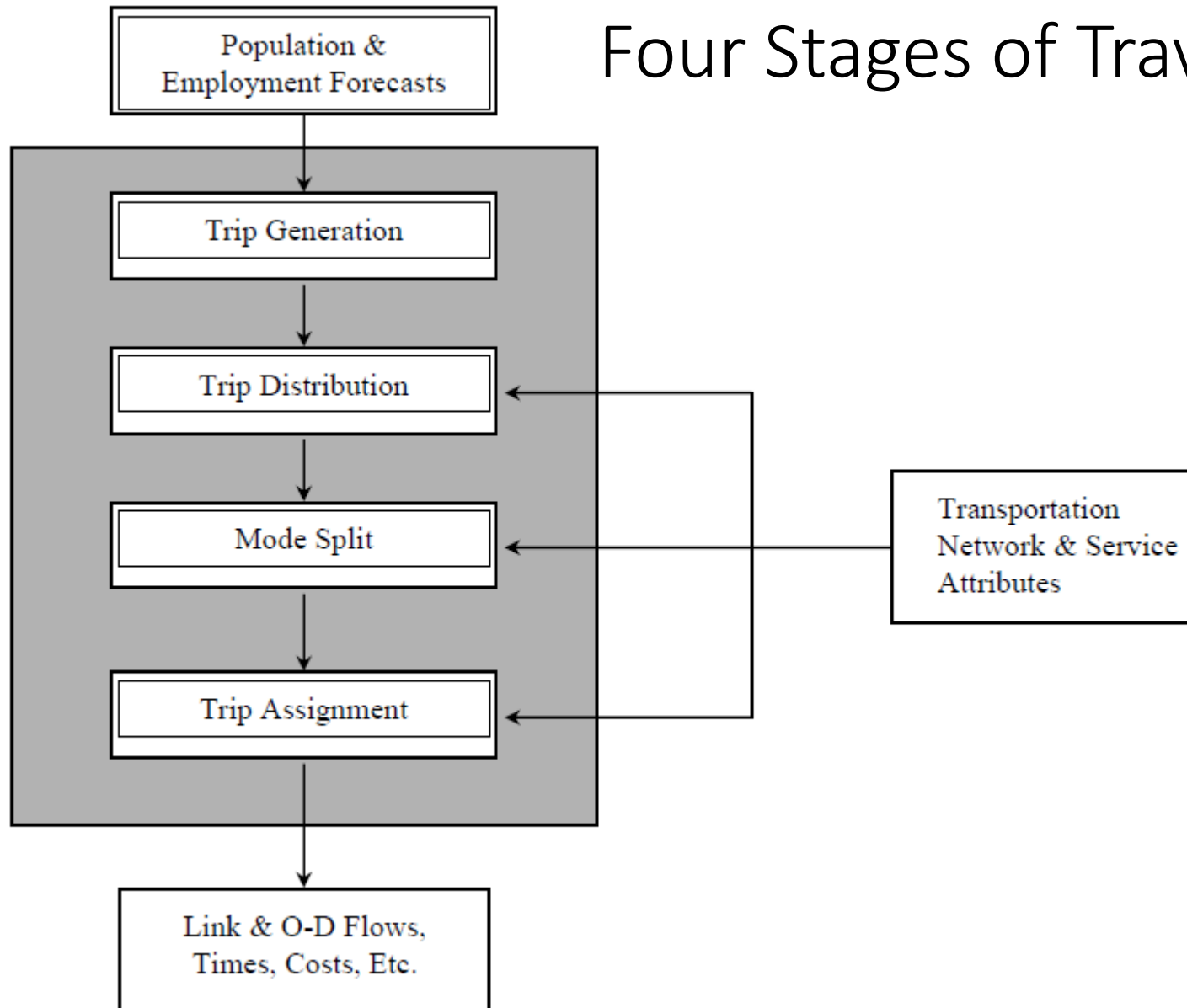
Representing Space and Activities

- ❑ Trips: are the **basic unit** of most travel demand analyses
- ❑ Zones: represent the urban area where **people and activities** are located
- ❑ Links: represent **major streets, transit lines**, etc.
- ❑ Nodes: generally correspond to **intersections, transit stops/stations**, etc.

The Urban Transportation Modelling System (UTMS)

- ❑ Understanding/predicting travel demand is the first step of all transportation planning practice
- ❑ The UTMS
 - A standard modelling framework
 - Developed over the past 50 years
 - Also called the “four-step” model
 - Criticized world-wide by academics as well!

Four Stages of Travel Demand Modelling



Approaches to Urban Transportation Planning

- ❑ Transportation Planning is an indispensable component of Transportation Engineering!
- Historically, transportation planning was **automobile oriented**, **infrastructure oriented**, and in some cases discriminatory!
- Recent transportation planning trends are more concerned with **multimodal transportation** aiming at **limiting automobile use** and **reducing emissions**

Perspective 3 – the hired gun (the consultant)



Planner or Engineer

Engineering Academic

Engineering Consultant

In our infancy as a field. Growing up.

- Transportation Engineers didn't exist
 - Traffic Engineers – Signals, Operations
 - Civil Engineers – Structural, Pavement, Maintenance
- Transportation Planners didn't exist

Confusing enough without
bringing in the architects



Land Use and Transportation

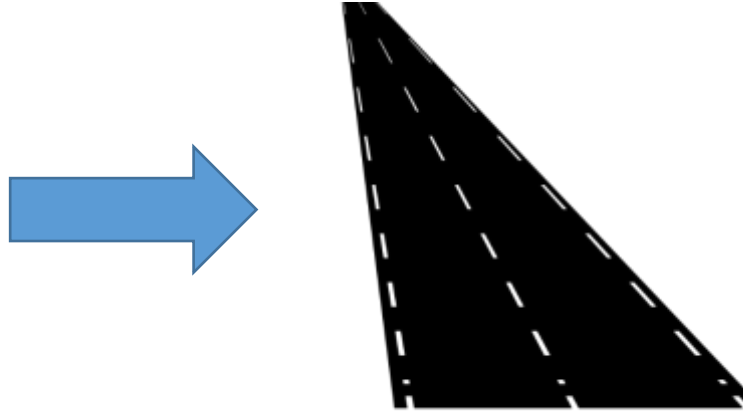
- Historically looked at cars as a result of the land use design.

Land Use: Suburbs



Created by Yohan Quintar
from Noun Project

Transportation: Drive



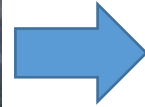
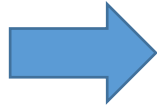
Created by Maurizio Fusillo
from Noun Project

Land Use: Parking at Work



Created by Jaime Carrion
from Noun Project

The result is...



City of Toronto Archives Series B 50008_550004_00004_100011

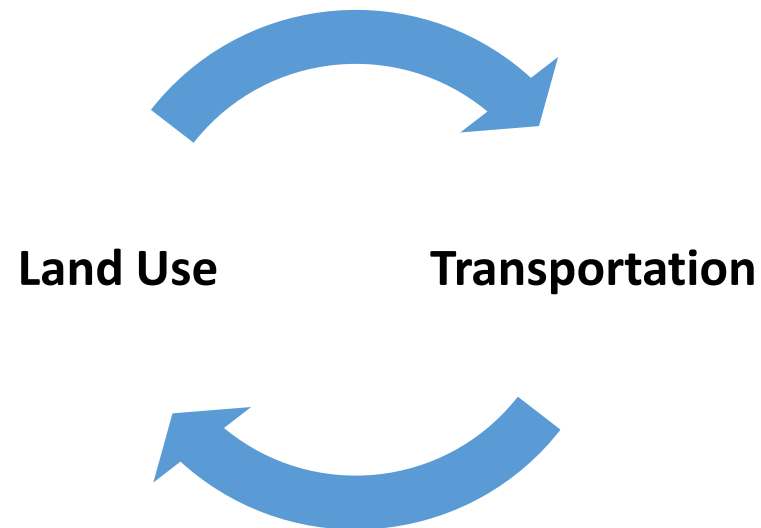
By SimonP <https://commons.wikimedia.org/w/index.php?curid=6688026>

<https://canadaalive.files.wordpress.com/2014/01/img-067.jpg>

<http://www.blogto.com/upload/2011/10/20111011-Toronto-parking-lots-history.jpg>

Land Use and Transportation

- Decades of experience, study and review
- Land use connection to transportation design and operations
- Reality is a circular relationship where the result is the next cause.



Can't stay isolated

- Engineers rarely can work in a silo and ignore the planning consequences
- Within the workplace and throughout projects
- Conducting more studies on usage impacts caused by design elements
- Be cognisant that reports and results are going to be read, interpreted and acted upon by non-engineers



Move forward or get left behind

- Base philosophies for good transportation systems:
 - Old: build roads
 - Old results: +lanes, +pollutants, +maintenance, -health, =congestion
 - Current: support communities
 - Current efforts: multimodal, +transit, +walk, +bike, -parking



Source: <http://catherinemckenney.ca/>



Source: https://en.wikipedia.org/wiki/Urban_sprawl

Distinct Jobs Now Overlapping

- Engineers are not planners but they can do planning
- Planners are not engineers and cannot do engineering
- Nothing personal, it is a **legal** distinction
- ***...the noise engineer for the wind developer is being sued.***
- ***Wet roads have cost DOT millions in claims, lawsuits***
- ***City alleges negligence in lawsuit over bridge engineering***
- ***After fatal crash, changes coming to San Francisco's Twin Peaks***
- ***Woman serves city with \$9-million lawsuit notice***
- ***Judge says lawsuit against Everett in fatal accident can proceed***
- ***Motor vehicle accidents: top tips on suing for damages***

Distinct Jobs Now In Need of Communication

- Engineers and Planners are all delving into the middle ground of Transportation Planning
 - Requires some education as to the legal dividing lines to protect the public and the planners
 - More engineers at PIBC and more planners at ITE
-
- Not - Transportation Planning VERSUS Transportation Engineering
 - Instead - Transportation Planning with Planners and Engineers



<https://www.cite7.org/>

Planner or Engineer

Engineering Academic

Engineering Consultant

Let's now hear from you!

Let's think