
Traffic Projections

CE 492 Environmental
Impact Assessment

Topics

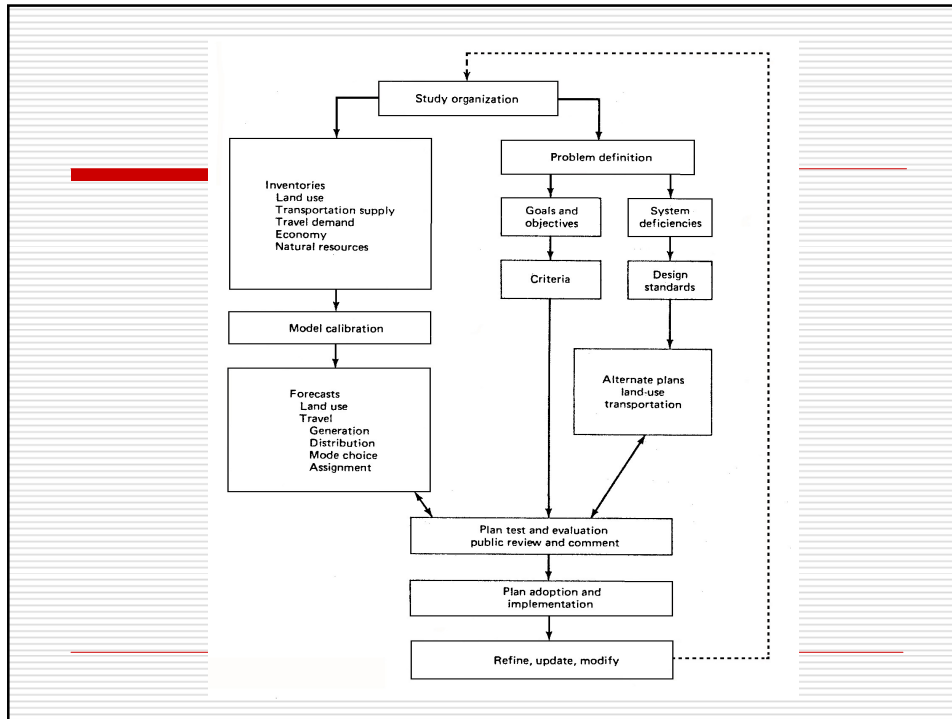
- Regional Traffic Projections
 - Trend Analysis
 - Traffic Impact Studies
 - Functional Classification
 - Related Topics
 - Access Management
 - Complete Streets
 - Traffic Calming
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Regional Traffic Projections

- Required as a condition for federal funding in urbanized areas
 - Responsibility of Metropolitan Planning Organization i.e. SEWRPC
 - FHWA 'Three C' Process
 - Coordinated
 - Continuing
 - Comprehensive
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Regional Traffic Projections

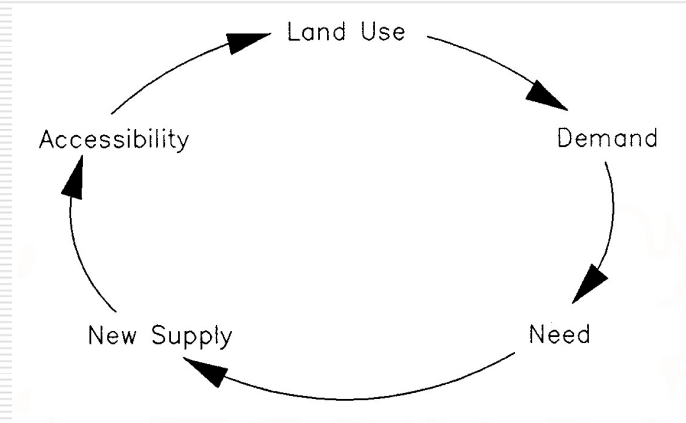
- Major topic in CE 590, Urban Transportation Planning
 - Transportation Planning Process
 - Goals & Objectives
 - Inventories, Facilities and traffic
 - Social/Economic Data
 - Build and Calibrate Models
 - Travel Forecasts
 - Alternative Plan Evaluation
 - Recommendations
 - Continuous Planning
 - Public Involvement
-



Basic Concepts

- ❑ Demand for travel is a derived demand – because of the demand for other things – income, education, goods, services, etc. #trips = F(land use)
- ❑ Individuals and goods make choices to minimize impedance (time, cost, waiting, etc.)
- ❑ Supply and demand reach an equilibrium. Demand will shift to better facilities (new capacity gets filled up)
- ❑ See: A travel model primer:
<http://www4.uwm.edu/cuts/utp/models.pdf>

Land Use Transportation Cycle



Regional Traffic Projections

- Used to Evaluate Alternative Land Use patterns & Networks
 - Geographic Information System tools
 - Recommendations
 - Continuous Planning
 - Public Involvement
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Four step travel forecasting process

- A trip is defined as a one-way journey between an origin and a destination by a person over five years of age involving a carrier (automobile, bus, etc.) and at least one block long.
- Zones: The study area is divided up into small zones (traffic analysis zones).
- Network: Describe transportation system as a series of links and nodes, not all streets included, coded for computer analysis.

Four Steps

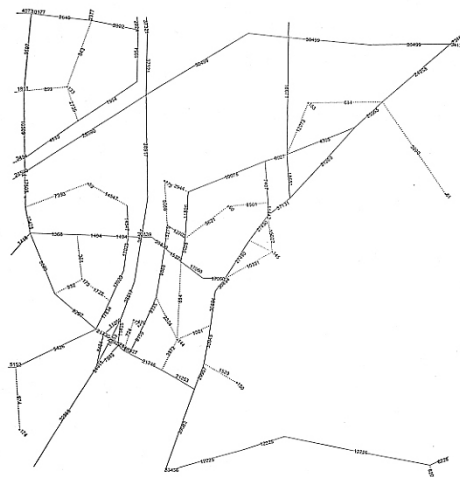
- Trip Generation
 - how many trips?
- Trip Distribution
 - what is origin-destination pattern?
- Mode Choice
 - what modes are used?
- Traffic Assignment
 - Minimum path routes?
 - Equilibrium

Traffic Projections

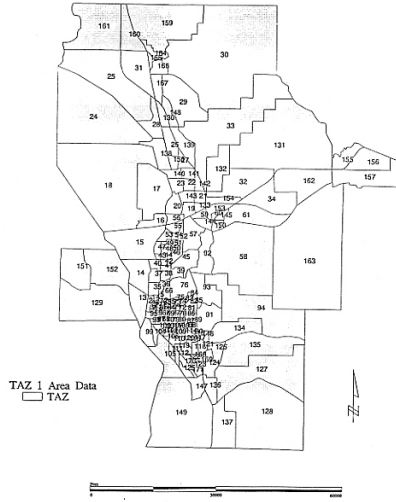
□ Goals & Objectives

- Reduce miles of travel
 - Minimize environmental impacts
 - Reduce fuel use & emissions
 - Achieve modal balance
 - Influence/control land development
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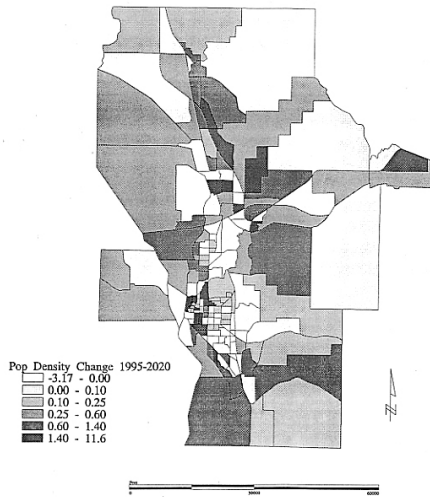
2020 LAX N-S Arterial: Diamond Concept 5x210
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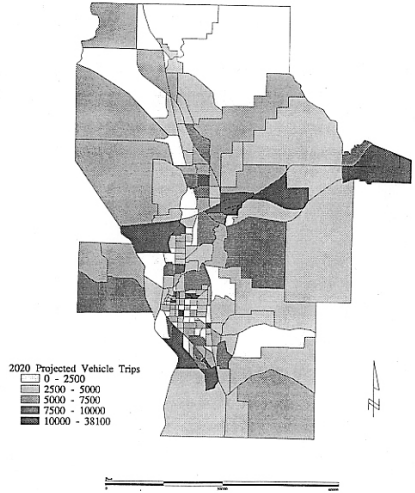
Transportation Analysis Zones
La Crosse, Wisconsin



Population Density/Acre Change, 1995-2020
La Crosse, Wisconsin



2020 Projected Vehicle Trips by TAZ
La Crosse, Wisconsin



Historic Corridor Trends

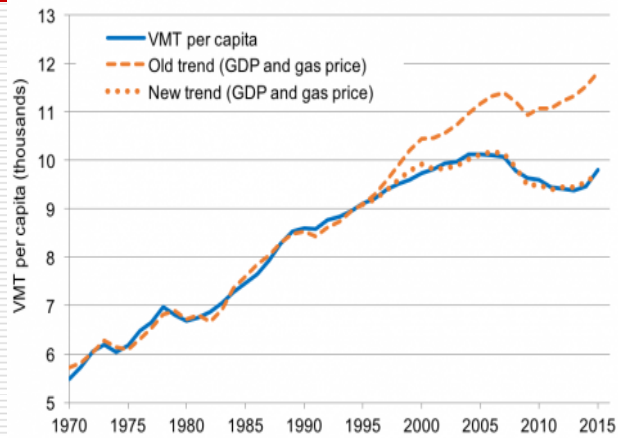
Growth rate Projections

- Historic Corridor Trends
 - Annual Average Traffic Growth Rates
 - 3% growth rate per year = doubling of volume over 20 year period in some locations
 - Residential & CBD = 0 to 2 % growth rate
 - Urban = 0 to 3 % growth rate
 - Developing Areas = > than 3 % growth rate
 - Will the trends continue or moderate?
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Future Traffic Growth?

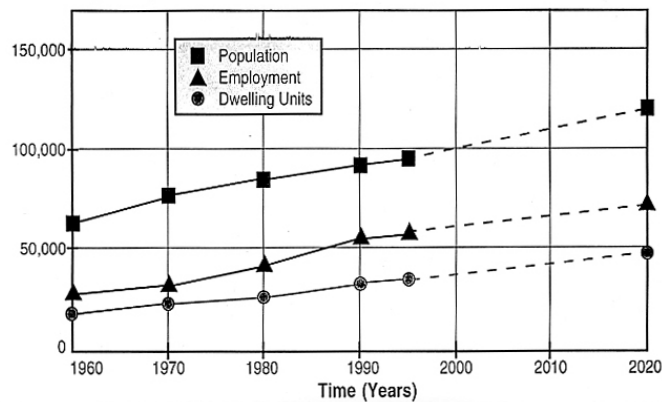
- Traffic growth in the past was faster than population growth, underlying factors have hit limits
 - Growth has slowed down and is more likely to match population growth in the future.
 - Reasons
 - Aging population, age specific travel rates
 - Mode shifts
 - Trend to concentrated land uses
 - Trip chaining
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Recent Growth Trend



State Smart Transportation Initiative

La Crosse Area Historic and Projected Demographics



Area Impact Studies

Project Level Traffic Projections

- Area Impact Studies
 - Macro
 - Miller Park
 - Foxcon
 - Bluemound Road Cost Recovery
 - Micro
 - Walmart
 - Shopping Centers
 - Office Parks
 - Krispy Kreme
-

Project Traffic Projections

□ Area Impact Study Process

- Identify Impact Area
 - Existing Conditions (streets, volumes, operations, crashes)
 - Trip Generation (trip rates, projections, multiple developments, pass-by and linked trips, directional distribution)
 - Future Conditions (new traffic, background growth, operations)
 - Roadway Impacts
 - Allocate costs
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Street Systems:
Functional Classification
Access Management and
Complete Streets

Functional Classification

- Highways have conflicting purposes - functions
 - Through Movement
 - Mobility
 - Land Access
 - When these can be separated, facilities will perform better
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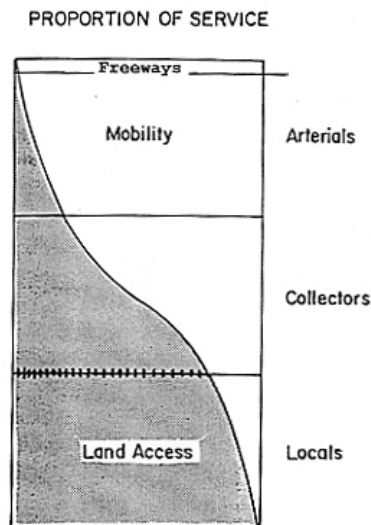


Figure I-5. Relationship of functionally classified systems in service traffic mobility and land access.

Functional Classification

- Purpose of Classification System
 - Move traffic on appropriate facilities
 - Avoid through traffic on local roads
 - Reduce overall travel time within urban area
 - Reduce land access/mobility conflicts
 - Most conflicts are at the middle of the diagram
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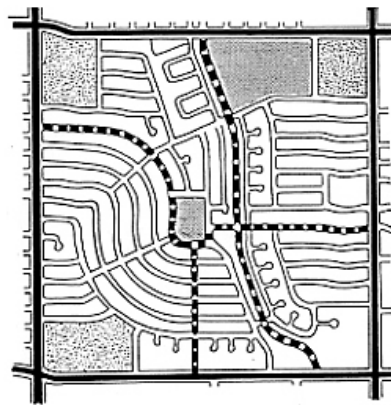
Functional Classification

- Grouping of Streets by Character of Service They Provide
 - Freeways
 - Arterials
 - Collectors
 - Locals
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Functional Classification

□ Street Categories

- **Freeways:** through movements
 - **Arterials:** primarily through with managed land access
 - **Collectors:** accommodate flow to above facilities and access to abutting land
 - **Locals:** access to abutting land and local circulation, restricted through movement
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LEGEND

- | | |
|-----------------|------------------|
| Arterial Street | Collector Street |
| Commercial Area | Public Area |
| Local Street | |

Figure I-4. Schematic illustration of a portion of a suburban street network.

Functional Classification

- Hierarchy of Movements
 - Main Movement (freeway)
 - Transition (ramp)
 - Distribution (arterial)
 - Collection (collector)
 - Access (local)
 - Termination (local)

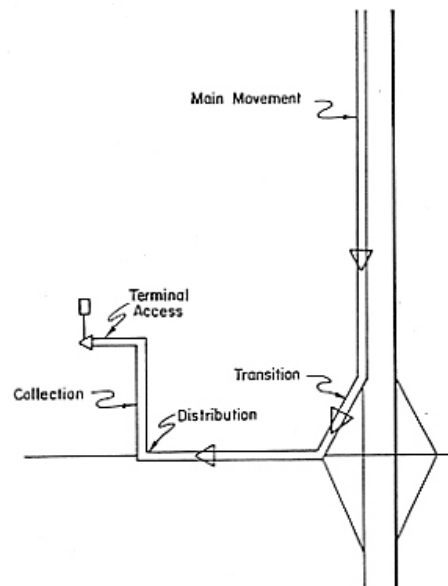


Figure I-1. Hierarchy of movement.

Functional Classification

- Used as a Major Determination of Design Factors
 - Features & Traffic Controls are based on purpose
 - Design speed
 - Curves
 - Lane widths
 - Parking
 - Traffic control
 - Traffic calming
 - Access Management
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Functional Classification

- Advantages
 - All streets adequately designed to safely handle volumes & speeds
 - Traffic control is simplified
 - Economy of pavement design
 - Residential streets are subject to very little through traffic
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Functional Classification

□ Distribution of Urban Mileage

Classification	Travel Volume	Mileage
<u>Trip Length</u>		
Principle Arterial	40-65 %	5-10 %
Long Principle & Minor Arterials	65-80 %	15-25 %
Collector	5-10 %	5-10 %
Local	10-30 %	65-80 %
Short		

Functional Classification Spacing Guidelines

CLASSIFICATION	AASHTO	SEWRPC
PRINCIPLE ARTERIAL		
CBD	> 1 mile	0.5 – 1.5 miles
SUBURBAN	2 – 5 miles	---
MINOR ARTERIAL	1/8 – 1/2 mile	1/4 – 1 mile

Access Management

- Restrict and control direct driveway access on arterial and collector streets
 - Driveway spacing
 - Driveway location
 - Interconnect adjacent properties
 - Left turn locations
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Complete streets

- Look at entire right of way and multiple uses
 - Accommodate pedestrians, bicycles, transit, automobiles and trucking
 - Street furniture and amenities for local business
 - Traffic calming, use geometric features to control vehicle paths and speeds.
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Traffic Calming

- Application of Traffic Engineering and other physical measures to control vehicle speeds and encourage driving behavior appropriate to the environment
 - Slow down, relax
 - Shift from a goal of rapidly moving vehicles to safer roads for all users and a better environment.
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Traffic Calming Objectives

- Safety
 - Speed reduction in neighborhoods
 - Safety
 - Environmental Improvement
 - Safety
 - Encourage appropriate behavior
 - Safety
 - Air, pollution, noise reduction
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Techniques

- Humps, Bumps and Undulations
 - Pushouts
 - Gateways
 - Closures
 - Medians
 - Diverters
 - Chicanes
 - Bicycle openings
 - Combinations
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"They are making the speed humps much higher now."



