## "To Market, To Market"

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HOW COMPATIBLE LAND USES REDUCE THE NEED FOR INFRASTRUCTURE

## **Internal Capture**

### Definition

Internal trip capture is the portion of trips generated by a mixed-use development that both begin and end within the development.

#### **Benefits**

Those trips satisfy a portion of the total development's trip generation and do so without using the external road system.



Source: Evaluating Traffic Impact Studies - A Recommended Practice for Michigan Communities



HOW COMPATIBLE LAND USES REDUCE THE NEED FOR INFRASTRUCTURE

### Internal Capture – The Urban Condition

### Why is Rural Capture Different?

- Calculations developed with urban data
- Urban residential densities are higher
- Many retail opportunities for urban residents
- Residential uses are not typically combined with retail and office

#### How to Enhance Internal Capture

- Proximity to other development areas
- Development phasing
- Work live income compatibility
- Competing opportunities
- Internal circulation



Mixed Use Entertainment District in Peoria, AZ



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## **Internal Capture – The Rural Reality**

### The Realities of Rural Capture

- Trip length is typically longer
- Fewer developed roadway corridors to distribute traffic
- Centers cannot immediately support the diversity of uses needed to obtain the highest capture (i.e. office space)
- Development is typically unplanned and can be along State Highway
- But the upside, residents don't typically have as many choices
- The infrastructure to support an interim condition may be greater than the ultimate condition when all uses are not present





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## **Rural Benefits – Pass-By Traffic**

#### **Definition of Pass-By Traffic**

• Pass-by trips are made by traffic already using the adjacent roadway and enter the site as an intermediate stop on the way from another destination.

#### **Benefits of Pass-By Traffic**

- longer trip length = better planned trips
- better planned trip = higher pass-by
- higher pass-by = less infrastructure



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## **Case Study for Rural Pass-By Traffic – Medical Office**

### Setup

- Located on Pinal County/Town of Queen Creek Border
- Service area is seen as a 10-mile radius from the medical offices
- ITE has no pass-by data for Medical Office

### **Trip Generation, Purpose and Length**

- 7 locations identified for observation
- 188 Origin-Destination interviews

### Findings

- Trips were better planned due to length
- 17% of trips were Pass-By
- 26% of trips were Diverted Link
- 57% of trips were new to road network





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## **Community Capture**

### Definition

Community Capture has been used to describe the unique trip internalization of new communities, separated from existing urban areas.

- TRB Record 1780, Paper No. 01-3524, Internalizing Travel by Mixing Land Uses, Study of Master Planned Communities in South Florida.
- Depending on the mix of uses and the size of the development, external trips were reduced by up to 58 percent.



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## Case Study – Red River

#### **Traffic Generation**

- projected using Pinal County traffic modeling
- Also projected using standard trip generation
  - All traffic
  - Site generated traffic

Land Use	Acreage	DU	SF of Building
Industrial Park	10	-	108,900
Single Family Homes	3,207	12,827	-
Apartments	101	2,020	-
Business Park	133		2,324,362
Commercial	200		2,172,555
Elementary School	12		130,680
Open Space	286	-	-
TOTAL	3,949	14,847	4,736,497



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## Case Study – Red River



Red River Traffic Impact Analysis



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## Case Study – Red River

### Findings

- Approximately 42 percent of the total trips generated will utilize the Pinal County regional roadway network.
- 10.7 percent of the trips will use the adjacent ADOT highway
- About 48 percent will stay internal to the development

### Important Notes:

- The vehicles remaining internal to the development still need to be accounted for in the internal street infrastructure
- Regional roadway network connectivity
- Reduces the amount of external infrastructure required saving cost, maintenance





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## Case Study – Anthem

### Why Anthem?

- Validate the findings of Red River
- No studies had been completed in Arizona
- Florida has published many studies
- Difficult since point of entry and exit of the development must be clearly defined



#### Methodology

- 24-hour daily traffic counts for 7 days at all points of entry and exit
- Review of census data for actual homes occupied
- Review of assessors data for total constructed square footage of non-residential
- Field review of each non-residential land use for operation and occupancy



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## Case Study – Anthem





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## Case Study – Anthem

					Trip Generation
Land Use	DU	Building S.F.	Employees	Students	
Industrial Park	-	351,239	811	-	2,434
Single Family Homes	6,616	-	-	-	36,388
Apartments	435	-	-	-	2,393
Business Park	-	257,471	814	-	7,322
Commercial	-	1,075,292	2,957	-	59,141
Elementary School	-	693,419	-	6,726	6,726
TOTAL	7,051	2,377,421	4,582	6,726	114,404

### Findings

- Anthem produces a total of 114,404 vehicle trips.
- The existing count data approximated 48,943 total ADT traveling in and out of Anthem.
- A total community capture of **57%** was computed for the community of Anthem.
- The community capture for Anthem exceeds the community capture predicted for Red River.



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### **Issues with Capture**

### **Calculation Methodology**

- Typical methods of limiting capture can lead to overbuilding infrastructure (i.e. 20%)
- Existing methods of calculating are inconsistent

#### Infrastructure

 The interim condition must be evaluated – capture is at its lowest

### Mix of Uses

 Market may not have a need for the mix of uses that create the highest capture





HOW COMPATIBLE LAND USES REDUCE THE NEED FOR INFRASTRUCTURE

### **Infrastructure Benefits**

### Regional

- Lower per unit infrastructure
- Lower per unit public-service costs

### Local

- Shared driveway connections increase capture
- Shared driveways reduce friction on main roadway and increase capacity
- Typically increase property values and therefore increase property tax revenue
- Lower per unit improvement cost may help support affordable housing

