

TRAFFIC IMPACT STUDY CONSIDERATIONS



Agenda

When is a Traffic Impact Study Required?

Existing / No Build Conditions

Build Conditions

Mitigation

Final Tips & Takeaways

**WHEN IS A TRAFFIC
IMPACT STUDY REQUIRED?**

What are the City/KYTC Requirements?

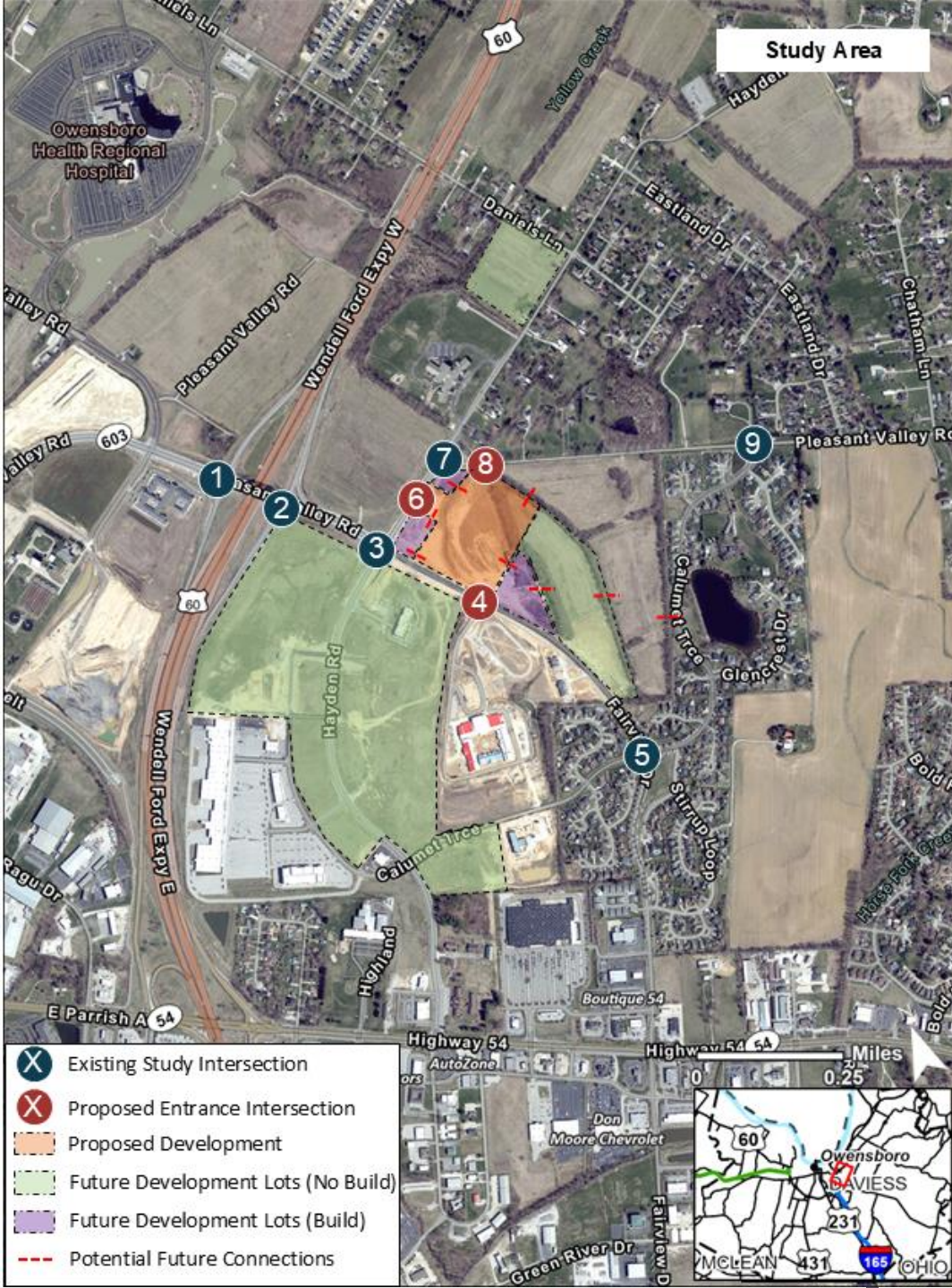
Louisville Metro Land Development Code

- Developed December 1990, Last Updated **August 1995**
- 5 Conditions Can Trigger a TIS
 - Generates **200** or more Peak Hour trips
 - Known Issues or Requires Roadway Modifications

KYTC TIS Requirements

- Last Updated **January 2023**
- 4 Conditions Can Trigger a TIS
 - Generates **100** or more Peak Hour trips
 - Doesn't Meet Access Spacing Recommendations or Requires Traffic Control/Roadway Modifications

EXISTING AND NO BUILD CONDITIONS



Study Area/No Build

Conduct Initial Review Meeting with City/KYTC Staff

Define Study Area - Include at Least an Intersection in Each Direction

Consider All Previously Approved Developments

Include Background Traffic Growth

Future No Build - +10 years

Safety Considerations

What is Level of Service (LOS)?

Performance Measure of Quality of Service

LOS C or D aren't "bad".

Level of Service	Description	Average Control Delay (sec/veh)	
		Signalized Intersections	Unsignalized Intersections
A	Little or no delay	≤ 10	≤ 10
B	Short traffic delay	$>10 - 20$	$>10 - 15$
C	Average traffic delay	$>20 - 35$	$>15 - 25$
D	Long traffic delay	$>35 - 55$	$>25 - 35$
E	Very long traffic delay	$>55 - 80$	$>35 - 50$
F	Unacceptable delay	>80	>50

Data Calibration / Software Adjustments

Existing Conditions

Data Collection Should Include Delay Studies, Travel Time Runs, and/or Queue Studies

Adjust Factors to Ensure Software Results Closely Match Existing Conditions

These Calibration Adjustments Should be Applied to No Build and Build Analysis

Other Changes to Geometry / Signal Timing / etc. Should be Justified

BUILD CONDITIONS

Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 208

Avg. Num. of Dwelling Units: 248

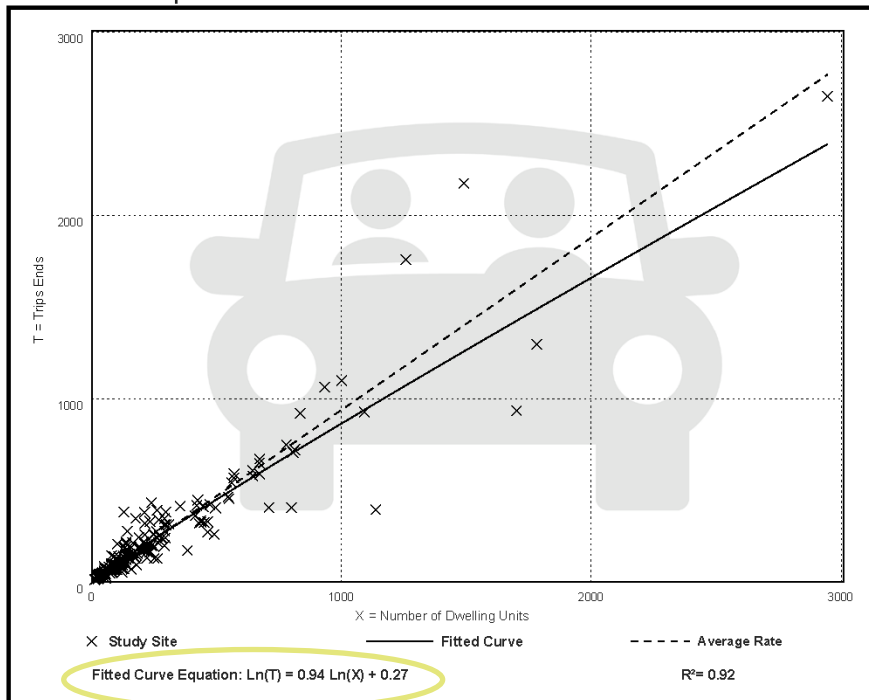
Directional Distribution: 63% entering, 37% exiting

>6

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.94	0.35 - 2.98	0.31

Data Plot and Equation



Trip Generation

Define Land Use and Size

For Example: Single-Family Detached Housing

Which Line/Curve Do I Use?

Average vs. Fitted

Ensure There are Enough Studies (>6)

Note Directional Distribution

Metric	Variable	Daily	Peak Hour	What Generates 100 Trips?
Single Family Houses	Units	9.43	0.94	106 Units
General Office	1,000 SF of GFA	10.84	1.52	66,000 SF
Shopping Plaza (40-150k)	1,000 SF of GFA	94.49	9.03	11,100 SF
Fast Food Rest. w/ Drive-Through	1,000 SF of GFA	467.48	44.61	2,250 SF

Trip Generation – Typical Values

Trip Generation

Potentially Include:

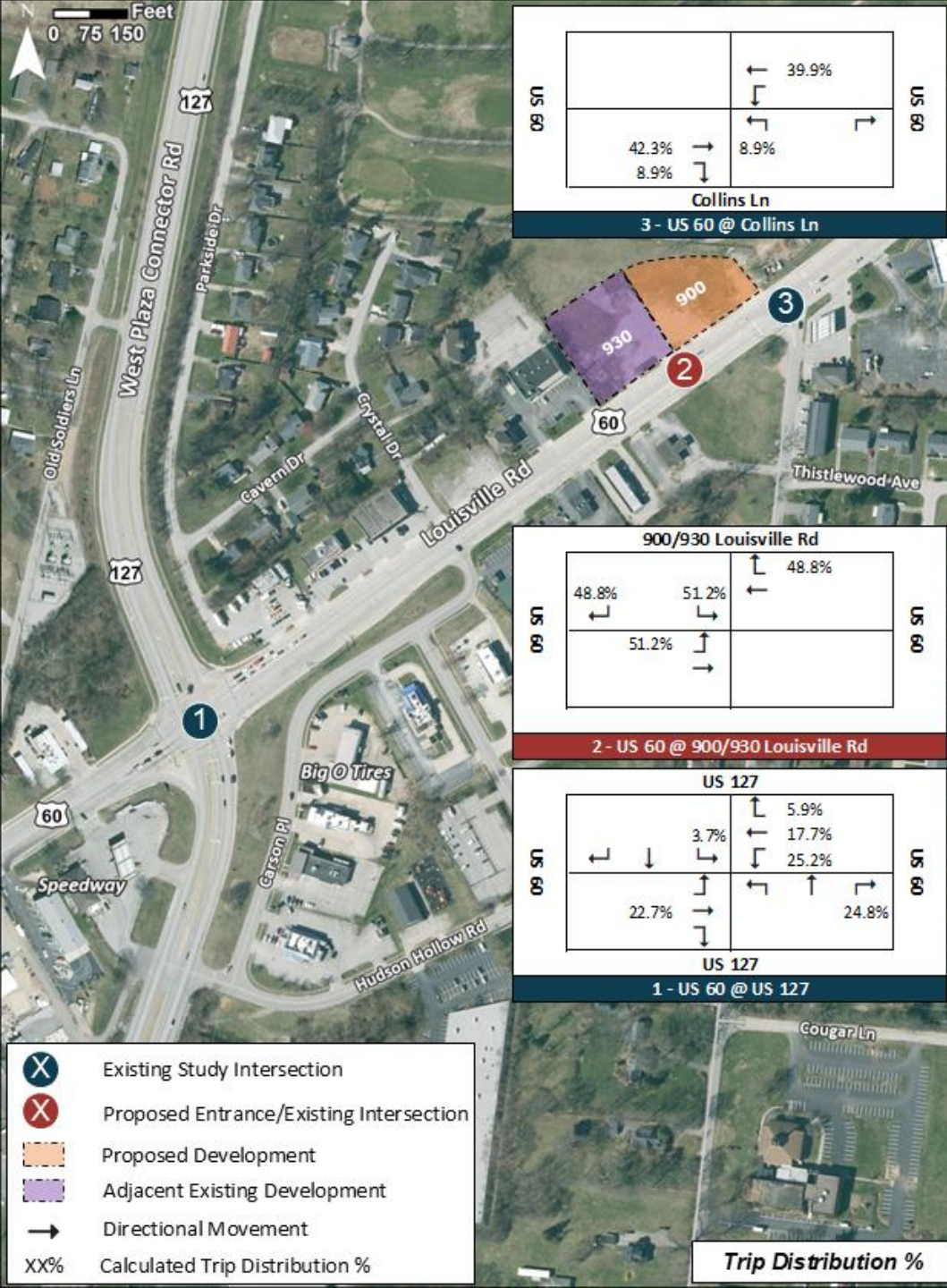
Daily Trips

Peak Hour Trips

Internal Capture

Pass-By Trips

ITE Land Use Code	Land Use	Size	Units	AM Peak			PM Peak		
				Total	In	Out	Total	In	Out
710	General Office Building	30.00	1,000 Sq Ft	46	40	6	43	7	36
822	Strip Retail Plaza	30.00	1,000 Sq Ft GLA	59	36	23	170	85	85
850	Supermarket	123.00	1,000 Sq Ft	352	208	144	1,101	551	550
930	Fast Casual Restaurant	9.00	1,000 Sq Ft	13	7	6	113	62	51
934	Fast-Food Restaurant w/ D.T.	3.00	1,000 Sq Ft	134	68	66	99	51	48
937	Coffee/Donut Shop w/ D.T.	2.00	1,000 Sq Ft	172	88	84	78	39	39
944	Gasoline/Service Station	18.00	Fueling Position(s)	185	93	92	253	127	126
Total Project Trips				961	540	421	1,857	922	935
Internal Capture				122	61	61	172	86	86
Pass-by				141	68	68	441	219	219
Total External Project Trips				699	411	292	1,244	617	630

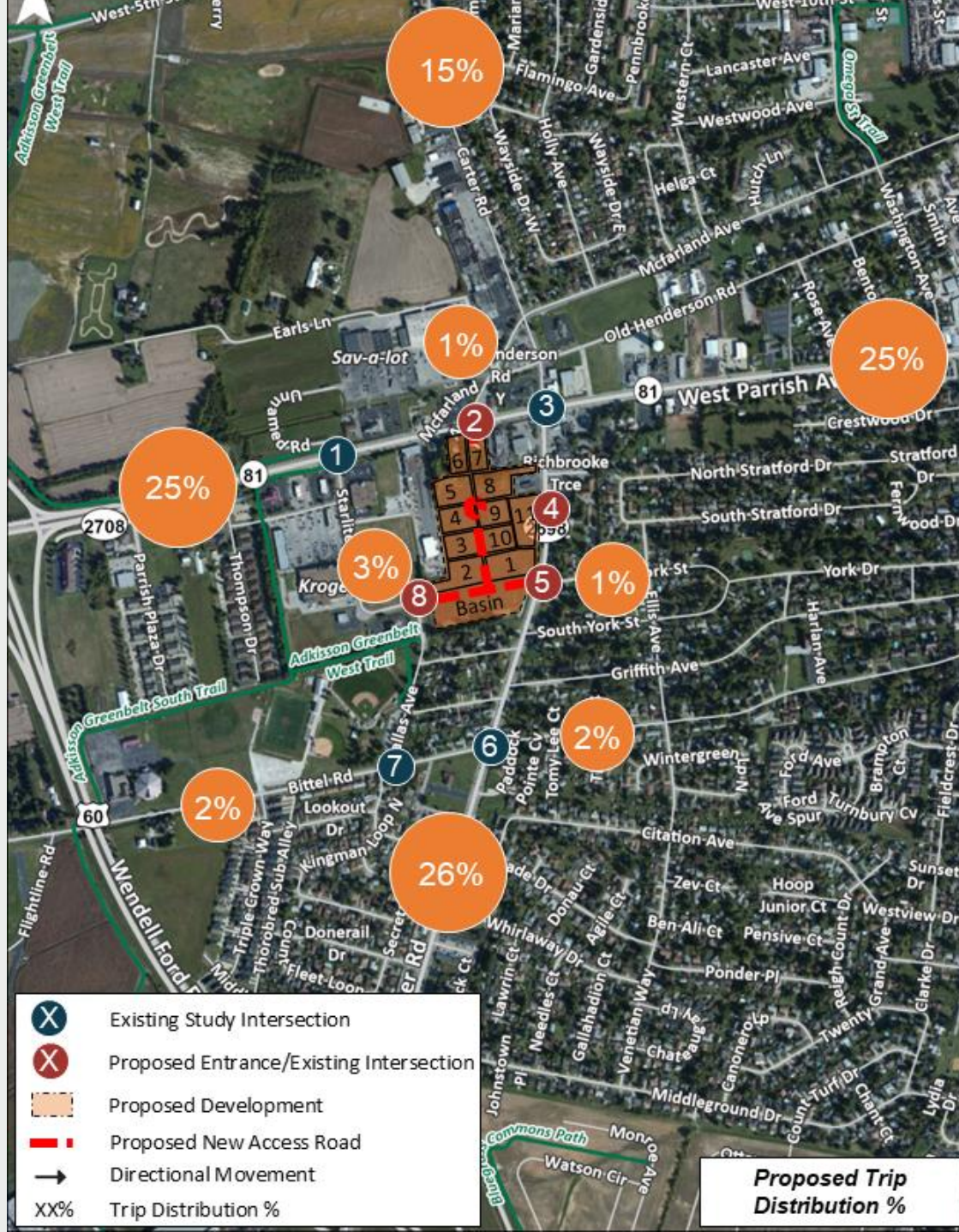


Trip Distribution

Two Methods:

Calculate Based On Existing Turning Movement Counts – KYTC Defined Methodology

Regional Distribution - High Level Origin/Destination Considerations

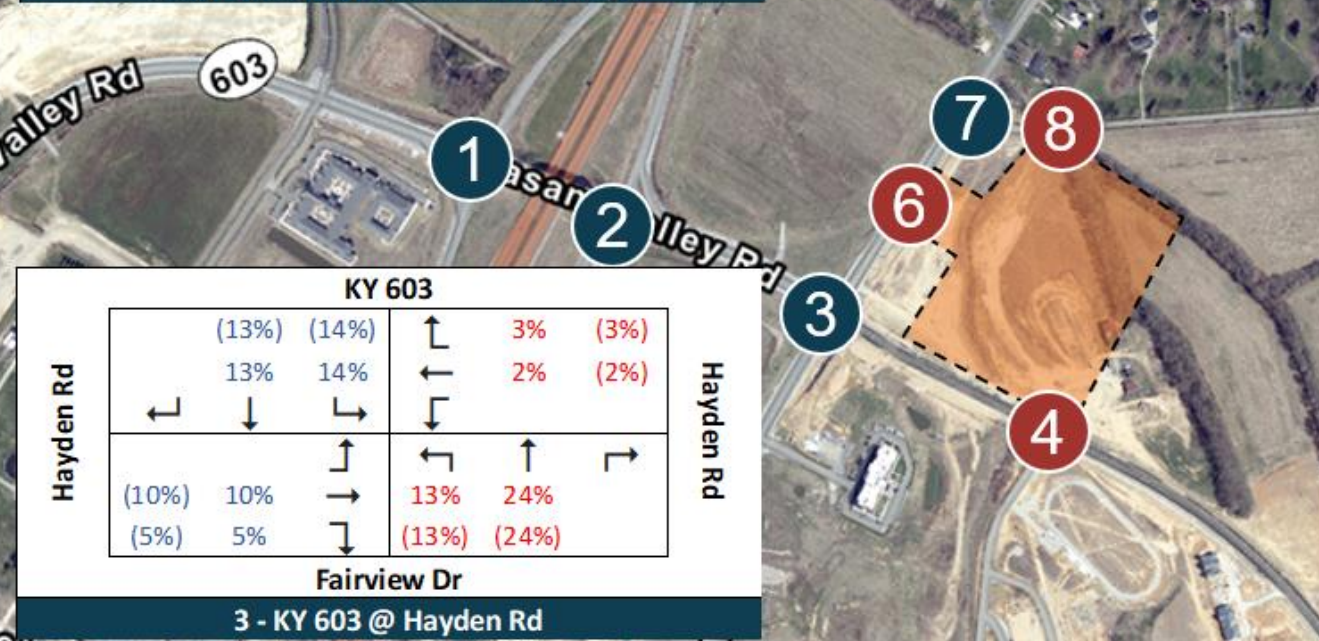


KY 603					
US 60 WB Ramps	(7%) 7%		↑		US 60 WB Ramps
	←	↓	↙	12% (12%) 8% (8%)	

1 - KY 603 @ US 60 Westbound Ramps

KY 603					
US 60 EB Ramps	(19%) 19%		↑		US 60 EB Ramps
	←	↓	↙	15% (15%) 12% (12%)	

2 - KY 603 @ US 60 Eastbound Ramps



KY 603					
Hayden Rd	(13%) 13%	(14%) 14%	↑	3% (3%) 2% (2%)	Hayden Rd
	←	↓	↙	13% (13%) 24% (24%)	

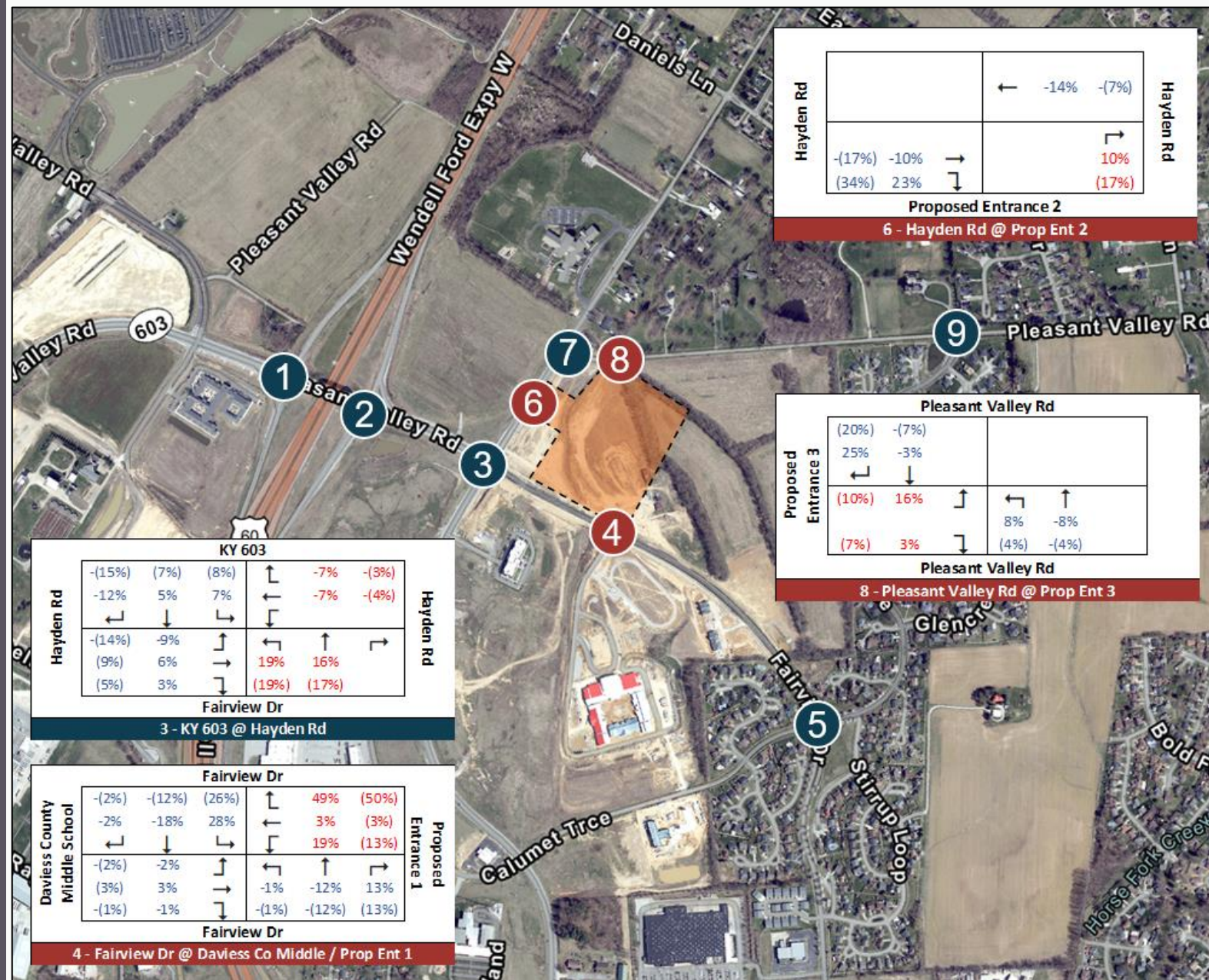
3 - KY 603 @ Hayden Rd

Pass By Trips/Internal Capture

Pass By Trips: Vehicles Already
on the Roadways (ITE Defined
Percentages)

Diverted Link: Vehicles on
Nearby Roadways – Typically
Not Considered

Internal Capture: Trips Between
Land Uses That Don't Enter
Roadway Network





Publix and
Speedway Would be
Considered Internal
Capture

A Reduction is Made
Because Both Trips Can be
Made Without Getting
Back Onto Terra Crossing
Blvd

Internal Capture

What is the Change in LOS/Delay?

- Does the Change between No Build and Build exceed 30%?
- Does the Delay Exceed 80 sec/veh?

These are both KYTC Thresholds.

Does the Volume to Capacity (V/C) approach or exceed 1.0 meaning it exceeds the Capacity of the Roadway or Intersection?

Are Queues Contained Within Available Storage?

What Warrants Mitigation?

MITIGATION

Signal / Turn Lane Warrants (KYTC Forms Available)

Additional Lanes

Signal Improvements: Phasing Changes (i.e. Permitted/Protected Lefts), Right Turn Overlaps, Lead/Lag

New Intersection Type: Roundabouts, RI/RO, Alternative Intersections

Access Spacing/Management

Mitigation Considerations

System Development Charges

First Adopted by Metro Council in 2006

Monetary Charge Imposed by Louisville Metro as a
Condition of Issuance of a Residential Building Permit

Development Impact Fees

All New Development Assessed Impact Fees

Other Considerations

FINAL TIPS & TAKEAWAYS

THANK YOU

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