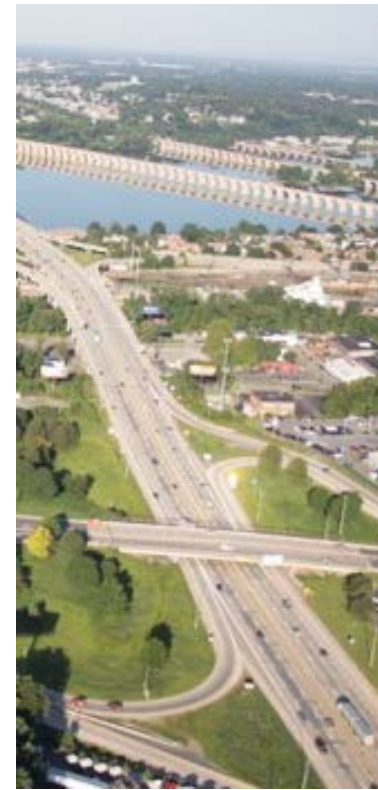


Highway Innovations, Start to Finish: Innovation in Data Collection/Traffic Modeling



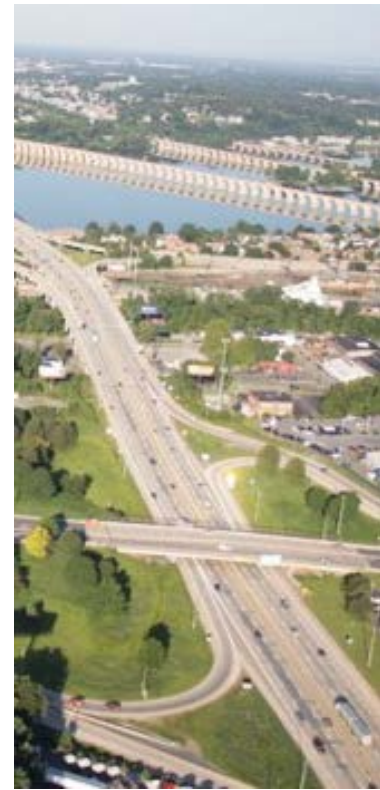
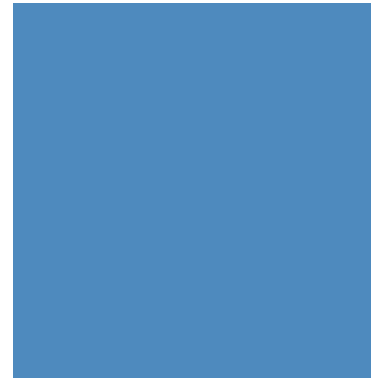
Presenters:

Brian Williams, PE, PTOE

Highway Innovations, Start to Finish: Innovation in Data Collection/Traffic Modeling

Agenda

- Project Overview
- Traffic Data Collection Program
 - TLAP Counts, ATRs, Calibration, O-D, Travel Time
- Transportation Model Development
 - PTV VISUM > VISTRO > VISSIM
 - HCS7
- Alternatives Development Process
 - VISSIM Simulation

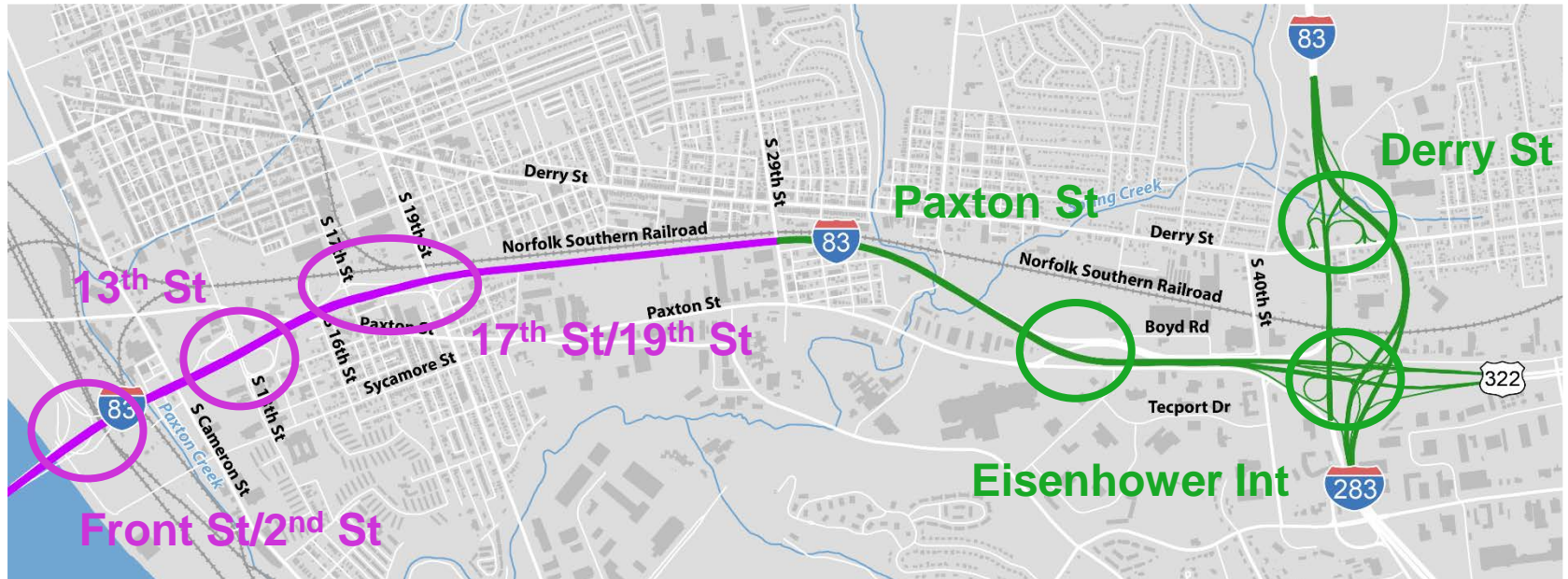


Project Overview

I-83 Capitol Beltway and Master Plan



Project Overview



East Shore Section 3 (Section 079)
29th Street to Susquehanna River

East Shore Section 2 (Section 078)
*Union Deposit Road to 29th Street,
including the Eisenhower Interchange*



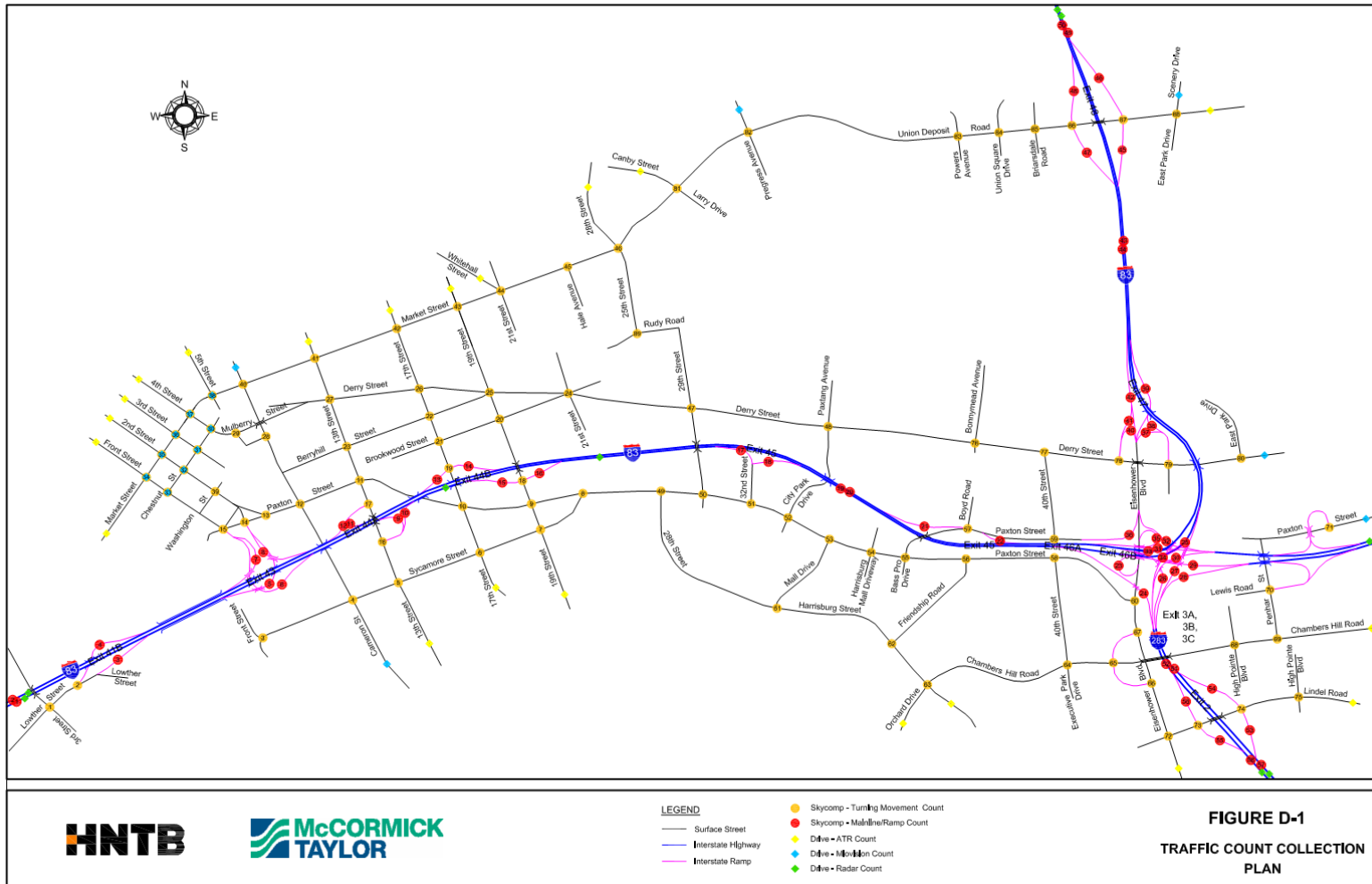
Project Overview

Why did we go through an extensive Traffic Data Collection and Traffic Modeling process?

- Complex Urban Location
- Multiple Interchanges and System Interchanges
- Congestion on mainline impacts local roadway network
- Latent Demand

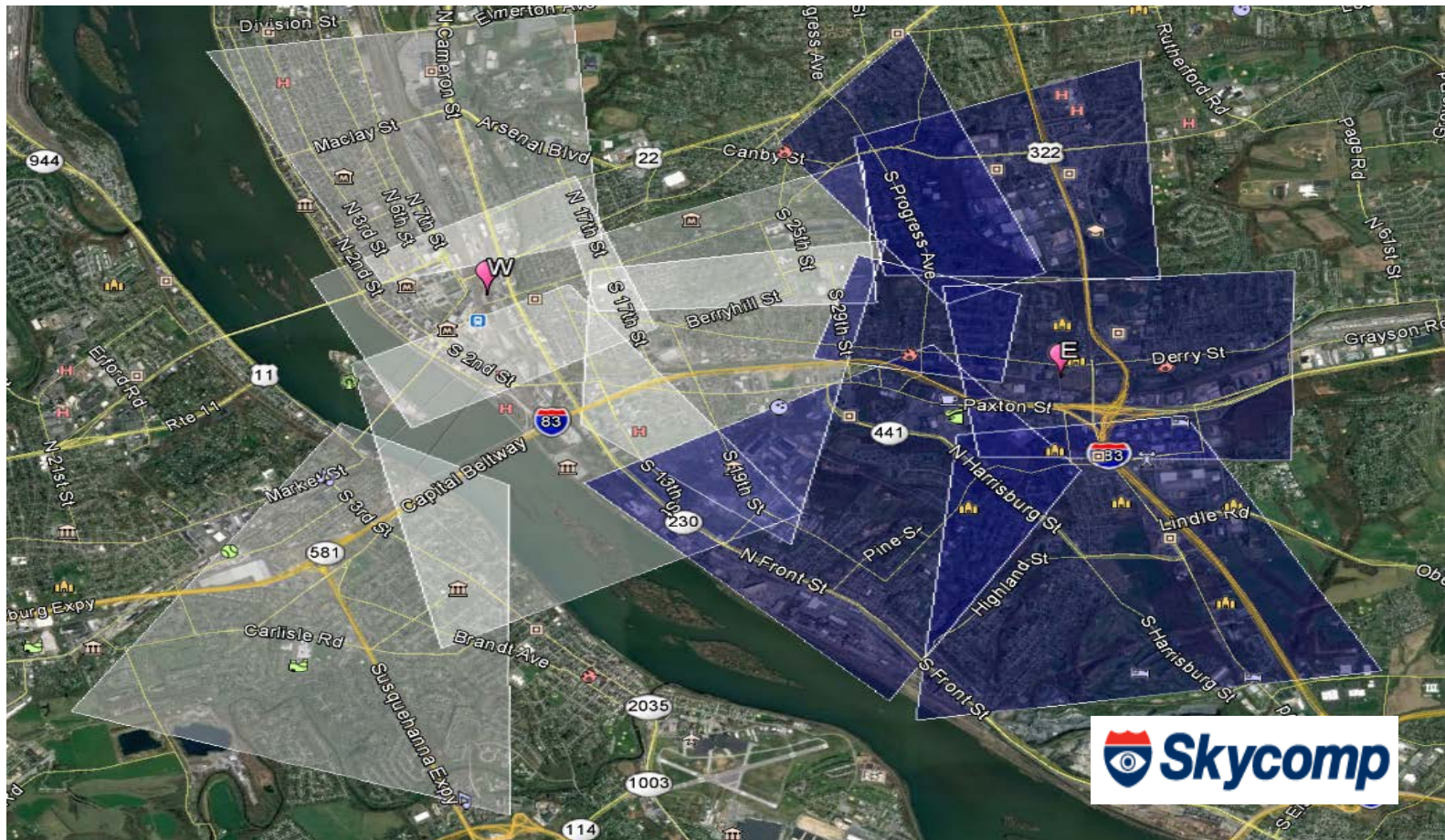
Traffic Data Collection Program

Traffic Count Locations



Traffic Data Collection Program

- TLAP Peak Period Counts – Conducted by Skycomp



Traffic Data Collection Program

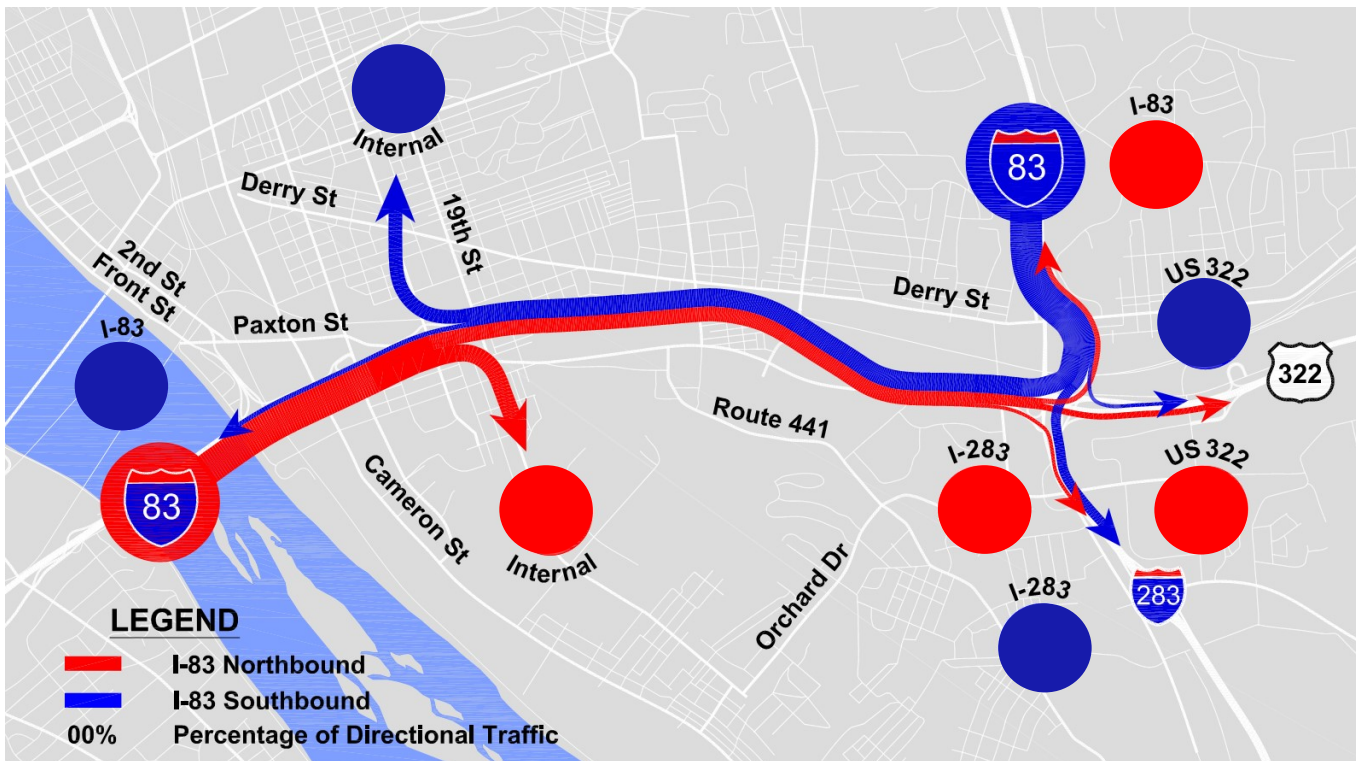
- TLAP Video

Traffic Data Collection Program

- ATR Daily Counts – Conducted by Drive Engineering
 - 6 freeway ‘side-fire’ radar count locations – 2 weeks
 - 22 freeway and arterial locations by ‘tube counters’ – 2 weeks
 - 6 intersection locations by video counter – 24 hour period
- Calibration Studies - Local factors calculated to calibrate traffic models to existing conditions:
 - Saturation Flow Rate
 - Start-up Lost Time
 - Extension of Effective Green

Traffic Data Collection Program

- O-D data provided by Airsage
- Travel Time Data from Inrix & here
- Field Inventories

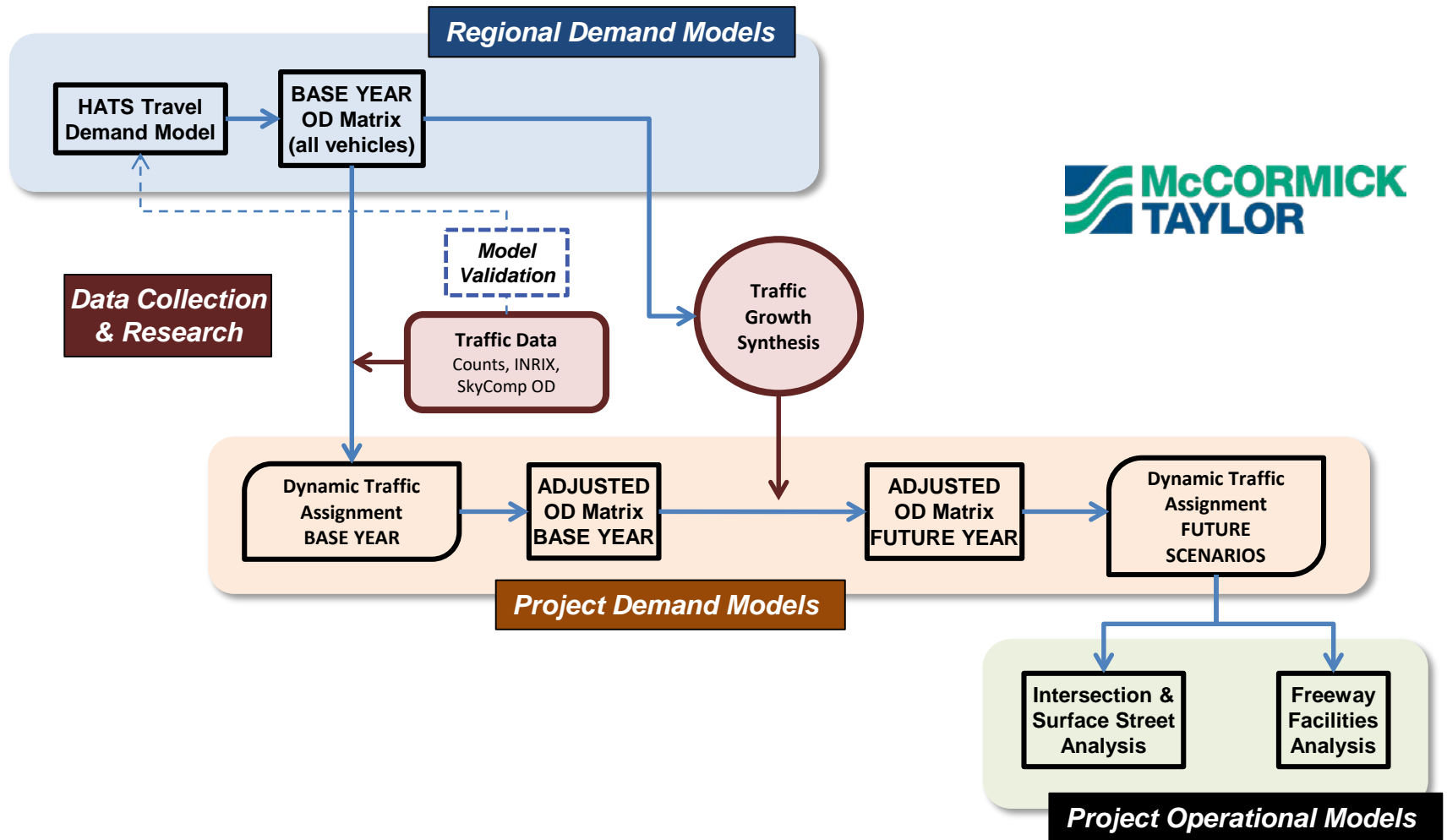


Transportation Model Development

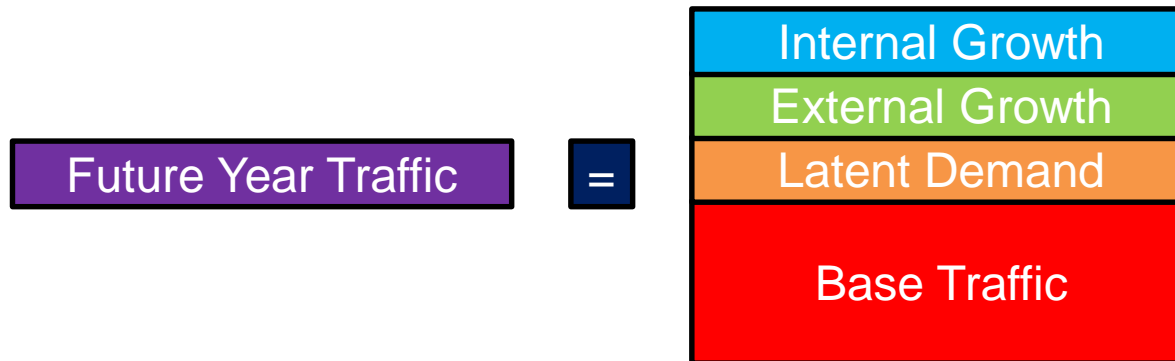
- Software Used
 - VISUM by PTV
 - Travel Demand Modeling
 - VISSIM by PTV
 - Microsimulation Modeling
 - VISTRO by PTV
 - Traffic Signal Optimization / HCM (intersections)
 - Highway Capacity Software
 - Deterministic HCM (Freeway & Ramps)



Transportation Model Development



Transportation Model Development

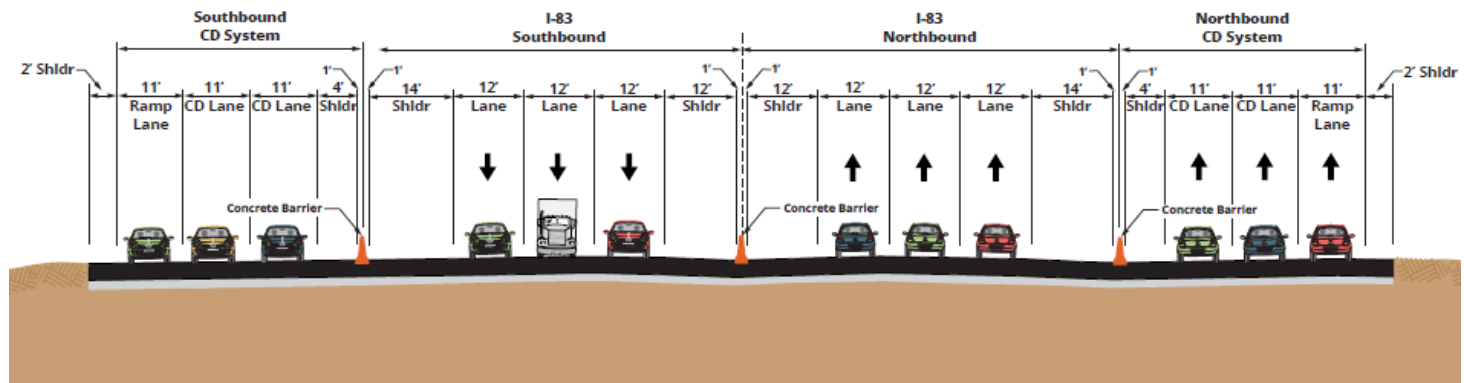
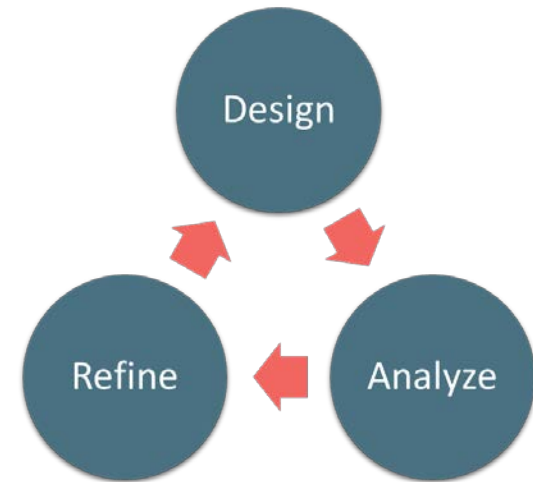


I-83 East Shore Sections 2 & 3 - Design Year Traffic Projections - PM Peak Hour							
Location	Base Model (Year 2016)			Year 2050 Projections			Growth Rate (%/year)
	Inbound	Outbound	Total	Inbound	Outbound	Total	
I-283 South of PA 441 Interchange	2,005	2,612	4,617	2,831	3,521	6,352	0.94%
I-83 North of Union Deposit Interchange	3,762	3,607	7,369	5,484	5,509	10,993	1.18%
I-83 North of 19th Street Interchange	3,182	3,609	6,791	4,507	6,009	10,516	1.29%
I-83 South of Lemoyne Interchange	3,432	4,945	8,377	4,717	6,512	11,229	0.87%
US 322 East of Penhar Interchange	1,748	2,193	3,941	2,185	2,571	4,756	0.55%
Total Study Area	42,344			54,094			0.72%
Change				11,750			

Volumes factored by +4% to approximate 30th highest hourly volume

Alternatives Development Process

- Develop Alternatives
- Project Traffic Data
- Analyze
- Refine
- Recommend



I-83 MAINLINE WITH CD SYSTEM

Alternatives Development Process

Measures of Effectiveness

- Freeway Segment LOS
- Overall Intersection LOS
- Cordon Travel Times
- Average Travel Time
- Average Delay Per Trip
- Average Speed
- Travel Time Reliability
- Network Wide Total Trips
- Unmet Demand

PM Peak Hour								
MOE	Location	Alt 1	Alt 1.1	Alt 1.2	Alt 2	Alt 4	Alt 5	
Average Travel Time (min)	I-83 NB	6.0	6.0	6.0	5.1	4.9	5.1	
	I-83 SB	5.9	6.2	9.5	6.4	5.4	6.3	
Average Delay per Trip (sec)	Network Wide	146.3	93.4	185.9	221.7	110.2	62.2	
	Freeway Only	66.2	36.7	106.6	105.4	29.8	16.5	
Average Speed (mph)	Network Wide	28.4	33.7	24.6	22.3	32.8	37.9	
	Freeway Only	36.6	46.3	38.9	30.6	41.5	51.5	
Travel Time Reliability (Planning Time Index)	I-83 NB	Mainline	2.0	2.0	2.0	2.1	2.0	2.1
		CD Road	2.0	2.0	2.0	1.3	1.3	1.4
	I-83 SB	Mainline	1.8	3.1	3.8	2.4	2.3	2.2
		CD Road	1.2	1.2	1.2	1.2	1.1	1.2
Network Wide Total Trips (PCE)	Network Wide	22,851	22,851	22,851	22,858	22,910	22,866	
Unmet Demand (veh)	Network Wide	1,712	1,395	427	2,269	1,843	203	

Alternatives Development Process

VISSIM Video