

# Design Hour Traffic Estimations: Automated Vs Manual Procedures

Ravi Ambadipudi



**BURGESS & NIPL**

..... **Since 1912**

# Presentation Overview

- Introduction
- NCHRP 255 Procedure
- Case Studies
- Conclusions



# Introduction

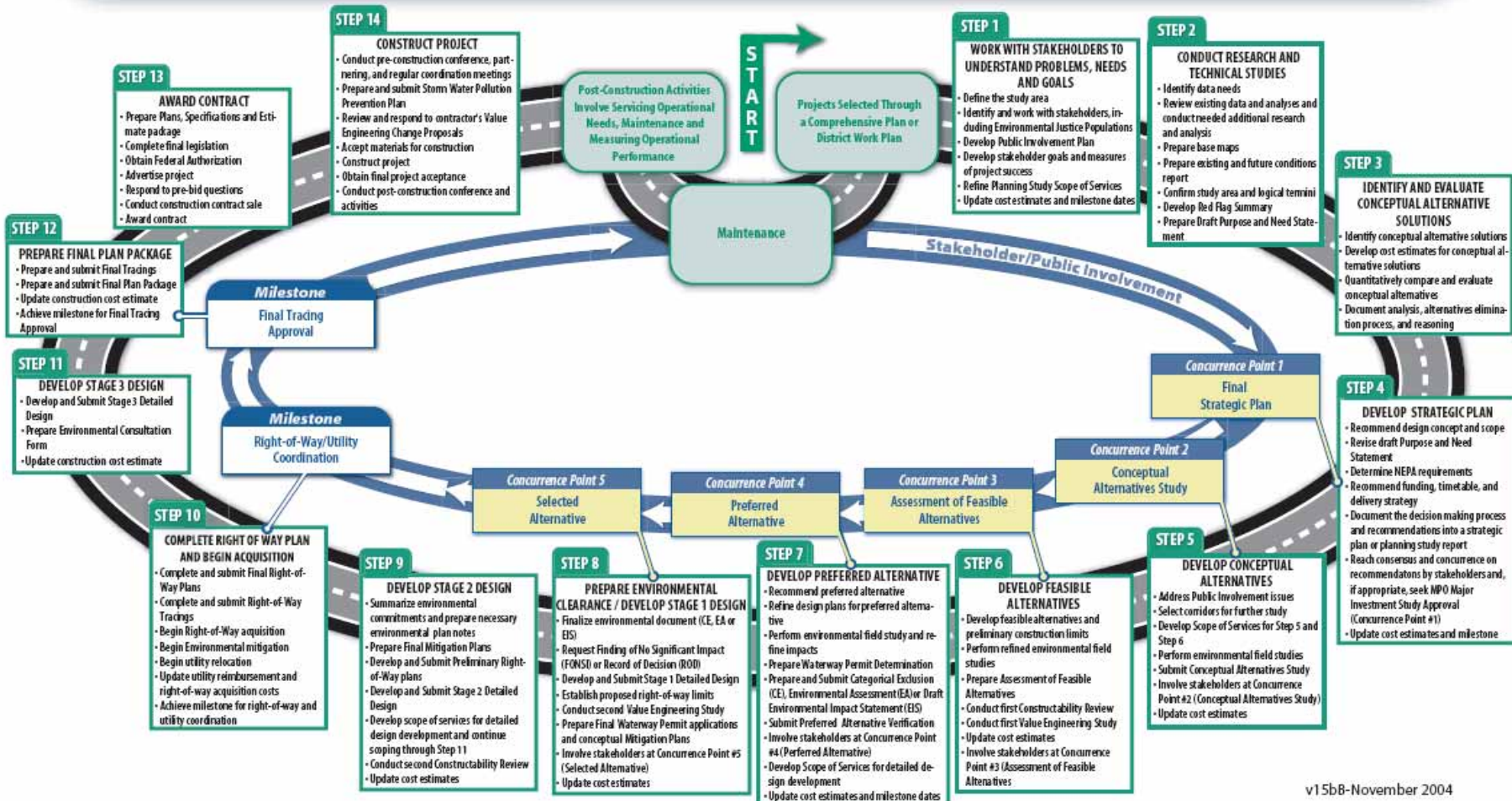
- Transportation Improvements typically considered for 25 to 30 years
- Require projected traffic volumes
  - Design hour traffic volumes for links and turns
  - To demonstrate satisfactory traffic operations with proposed design (example: IMS, IJS)
  - Environmental Impact Studies



# ODOT PDP



## Ohio Department of Transportation Project Development Process (PDP) for Major Projects



# Future Traffic Volumes

- Good source of future traffic volumes are planning models
- Traffic volumes in planning models is derived data
- Models are validated to macroscopic measures
- Planning model volumes require post processing



# NCHRP 255

- Report documents procedures to estimate design hour traffic volumes
  - Used by several agencies
- Required for the procedure
  - Existing Counts (Link and turn volumes)
  - Planning Data (Link Volumes)

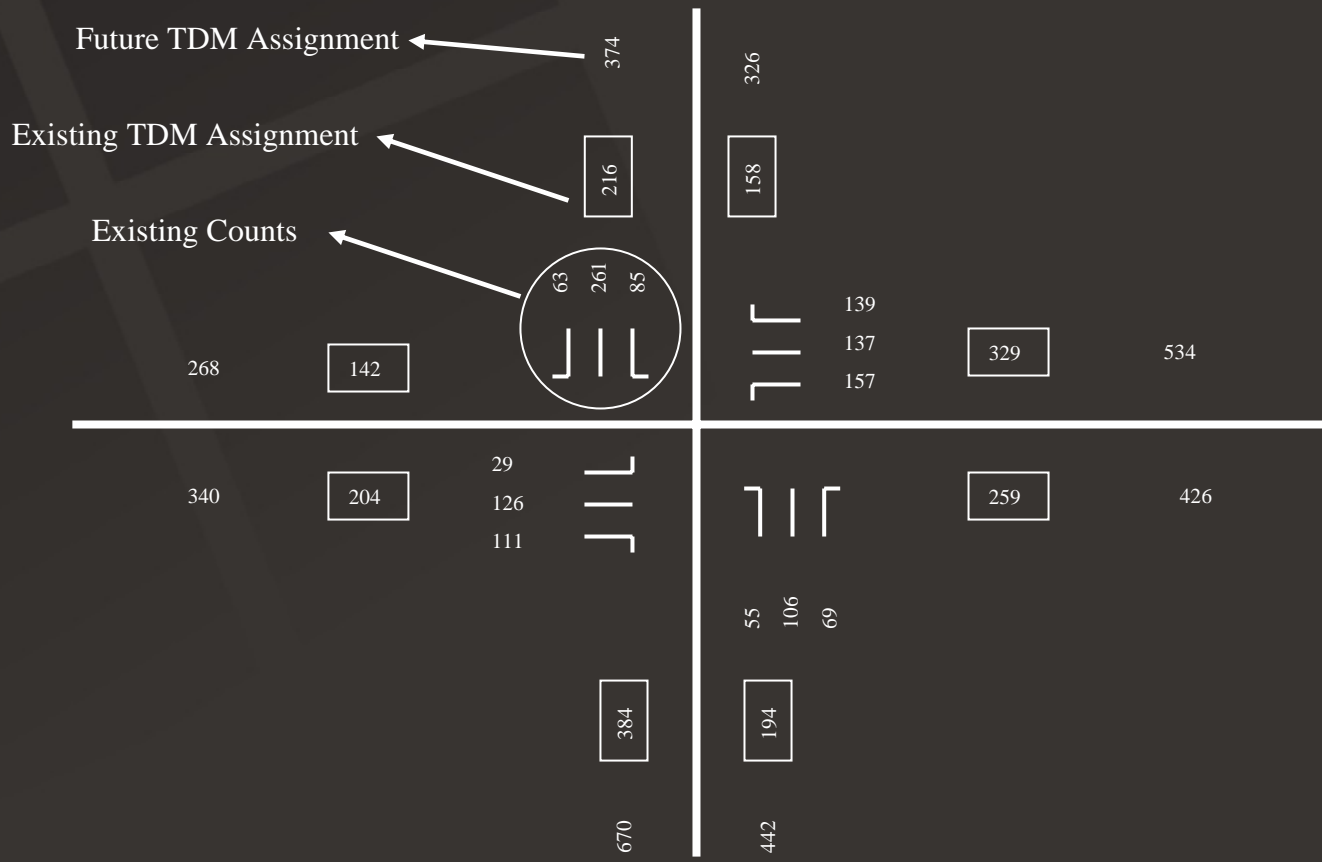


# Work Flow

- Obtain Existing Counts
- Generate Planning Data
- Gather Traffic Counts
- Data Processing in Excel
- Data transfer to CADD Drawings



# NCHRP 255 Procedure



# Use of the procedure

- Small-Scale Studies
- Large-Scale Studies
  - Cleveland Innerbelt Study
  - Hamilton County I-75 Corridor – Cincinnati
  - I-70/71 Columbus Southern Innerbelt Study



# Case Study: Large-Scale



**BURGESS & NIPLÉ**

Since 1912

# Manual Procedures

- Challenges Encountered
  - Frequent Updates to Travel Demand Model
  - Intersection Balance in Urban Corridor
  - Conversion of freeway interchanges to an intersection layout for calculation purpose



# Semi-Automated Tool

- Imports count data to excel
- Excel File Set up Automated for all the intersections
- All Computations in Excel
- Processed Data Entered Manually into CADD files

Design Traffic Beta Version : For B & N Internal use by Ravi Ambadipudi

Input Location

Peak Hour Start

Peak Hour End

Output Required

- Link Ins and Outs
- 30th Highest Hour
- D-Factor
- Existing TDM
- Future TDM
- Ratio Proc Calcs
- Delta Proc Calcs
- Average Calcs
- Design Traffic
- Select All

30th Highest Factor

Output File Name

Create New File

Update Existing File

Process Data

Close



# Fully Automated Tool : VISUM

- Post Processor
- Four Different Methods
- Output Stored in UDA
- Messages stored in Protocol File

NCHRP 255 Post Processor

Only active nodes

Adjustment method: Average

Boundaries: Ratio, Difference

Input data:

- Counted turn volume: AddValue1
- Base Assigned Volume: AddValue1
- Future Assigned Volume: AddValue2

Output data:

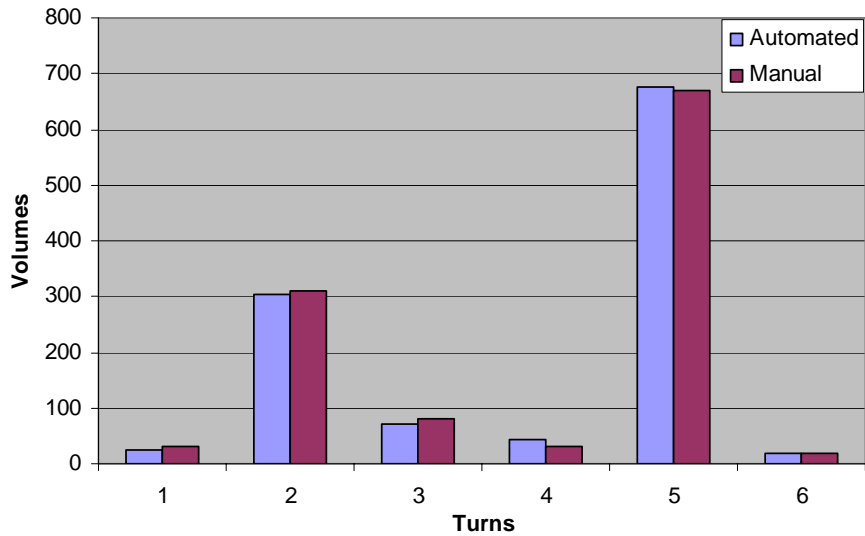
- Protocol file
- Link Adjusted Volume: ...
- Turn Adjusted Volume: AddValue2

OK Cancel

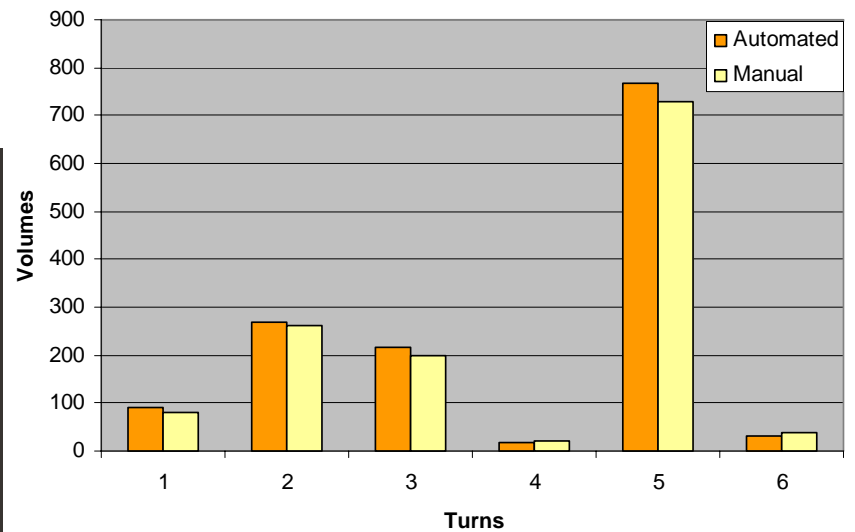


# Observations

### Balanced Intersection



### Unbalanced Intersection



# Future Updates

- Intermediate steps that enables user interaction with the process
- Incorporation of Screenline Refinements
- User Defined Values for
  - Convergence Criteria
  - Number of Iterations
- Red Flags for Nodes that did not converge
  - Currently this Information is available in trace file



# Conclusions

- Automated tools can significantly cut down time required to estimate design year traffic
- Data available in electronic format is transferable
- Scope of better data for planning studies
- Certified traffic data for multiple alternatives
- NCHRP 255 tool in VISUM is valuable
- Future implementation efforts by PTV very valuable to Ohio



# Questions



**BURGESS & NIPL**

**Since 1912**