Date: July 27, 2009 | Revised Date: August 31, 2009

XYZ DEVELOPMENT TRANSPORTATION IMPACT STUDY

SR 743, SR74 & the intersection of Minor Road & Main Street

Etters, York Township (York County, Pennsylvania



Prepared for:

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ATTACHMENT F: TRANSPORTATION IMPACT STUDY (TIS) / TRANSPORTATION IMPACT ASSESSMENT (TIA) REVIEW CHECKLIST

TIS / TIA Review Checklist

General

- □ Study signed and sealed by PA P.E.
- □ Scoping meeting application completed, signed, and attached
- □ Meeting minutes for all previous correspondence with the Department
- □ Municipal review/approval of TIS/TIS
- □ Review/approval of TIS/TIA from adjacent municipality required/provided
- □ FHWA review required/provided for interstate projects
- □ Report contains a cover page, table of contents, and body
- □ Report contains all applicable sections
- □ Report appendices marked and tabbed
- Central Office and/or FHWA approval required/provided for median break/POA studies
- □ Municipal and Central Office approval of ATP
- □ Municipal Waste Facilities adhere to Pub. 46, Ch. 11 guidance and criteria

Executive Summary/Recommendations

- □ Project description
- □ Impacts of proposed development
- Proposed methods of mitigation
- Design waivers requested
- D Parties responsible for improvements identified
- Details on the location, nature and extent of the proposed improvements
- □ Turn lane storage lengths, shifting taper lengths, and bay taper lengths identified
- □ All improvements to be ADA-compliant noted
- Driveway classification identified for each driveway serving the development
- □ Studies / construction projects which may affect the design are identified, if applicable

Introduction/Project Summary

- Description of analysis and assumptions
- □ Legible study area map
- Description of study area (indicate roadway intersections) and boundaries
- Legible site plan (1:50 scale min.) with lot size, building size(s) and types provided
- Discussion and/or illustration of the site layout
- □ Site plan reflects all the latest findings of the study
- Description of project phasing

Data Collection

- Data collection methodology described
- Data collection consistent with Pub. 46, Ch. 10 parameters
- □ Raw count data provided in Appendix
- □ Count data less than 3 years old
- □ Recent construction project that may have impacted count data
- □ Counts conducted on an avg. weekday, on a non-holiday week, while school was in session
- □ RTOR volumes included in right-turn volumes
- □ Additional peak hour counts (AM, Midday, PM, Sat, Sun) required
- □ 24-hour ATR counts include volume, class, and speed
- Counts include heavy vehicles, pedestrians, bicycles and transit vehicles (if present)

- □ Counts include walking school children and school bus stops where applicable
- Peak hour factors calculated consistent with Pub. 46, Ch. 10
- □ Volume balancing necessary
- □ Pedestrian activity/accommodations recorded and reflected in the study
- □ Midblock pedestrian crossing data required/provided
- □ Bicyclists riding on sidewalk documented/addressed
- □ Inventory of roadway data (signal permits, sketches, or table)
- □ Land use contexts documented
- □ Sight distance calculations / tabular summary / narrative
- □ Sight distance Safe sight distance criteria met
- Sight distance For safe sight distance, posted speeds used unless operating speeds vary by > 10 MPH
- □ Sight distance PennDOT Form M-950 S
- □ Sight distance Improvements necessary to achieve acceptable sight distance
- □ Photos at all study intersections (including proposed driveways)
- □ Photos include 2 views of each approach (50-feet and 200-feet)
- Crash data extracts provided separately for most recent 5 years / excluded from report
- Crash data analysis provided in separately bound Appendix / excluded from report
- □ Crash data proper confidentiality statement included on crash data
- □ Crash data non-reportable data required/provided per scoping meeting
- □ Crash data crash trend mitigation needed/provided
- Bicycle and Pedestrian Checklist (Publication 10X, Design Manual Part 1X) provided
- □ Impacts to ped/bike facilities noted
- Existing transit facilities identified (bus routes within 1/4 mile and rail centers within 1/2 mile)
- Description of proposed pedestrian, bicycle, and transit accommodations

Existing Conditions Scenario

- Study area/roadway network described
- □ Functional classifications/roadway types documented
- □ Rural/urban setting justified
- 102" wide combinations (w/trailer lengths greater than 28') restrictions identified (refer to Title 75 PA. C.S. §4908)
- Existing conditions documented
- □ Multimodal transportation discussion
- □ ADA compliance discussion
- D Permits plans included in Appendix
- □ Capacity analyses software/version indicated
- □ Latest version of capacity analyses software used
- □ HCM reports provided
- □ Synchro Lane, Volume, and Timings reports provided
- Multi-period analysis used at signalized intersections in accordance with Pub. 46, Ch. 10 and HCM 2010 where high v/c ratio exists
- □ If simulation software is used, 10 min. seeding and 60 min. durations are used / results based on 5-10 runs
- □ Traffic volumes consistent between the count data, tables, figures, spreadsheets, and analyses
- □ System peak hour required per scoping meeting
- Peak hour factors used in analyses match count data

- HV percentages used in analyses match count data
- □ Lane configurations, widths and grades match field data/signal permit
- Capacity analyses inputs match signal permits
- C-Max recall mode used for coordinated phases unless noted otherwise on signal permit
- □ Calibration parameters consistent with Pub 46, Ch. 10
- □ Base saturation flow rate consistent with Pub 46, Ch. 10
- □ Travel time study needed
- □ Gap study needed

Background Traffic

- □ Correct growth factor used and compounded correctly
- Planned and permitted development traffic included
- □ Study indicates if planned developments are consistent with formal land use plans
- □ Improvements proposed as part of planned/permitted development documented
- □ Background traffic growth documented in Appendix

Trip Generation

- □ Approval of land use codes and methodology obtained
- □ Latest edition of ITE Trip Generation Manual used
- □ Regression equation or average rate used correctly
- □ More conservative methodology used, where appropriate and in conjunction with engineering judgment
- □ Land use consistent with land use code
- □ Local rate needed
- □ Local trip generation data approved by District and Central Office
- D Pass-by / diverted link trips estimated according to ITE Trip Generation Handbook
- □ Internal trips estimated according to ITE *Trip Generation Handbook*
- □ Internal capture rates other than ITE rates justified
- □ Trip credits consistent with scoping meeting documentation
- □ For trip credits, documentation shows existing land use was open during counts

Modal Splits

□ Modal split reductions are in accordance with Step 6 of *Policies and Procedures for TIS's* and ITE's *Trip Generation Handbook*

Trip Distribution

- Based on gravity model / existing volume distributions
- □ Engineering justification provided
- □ Supporting assumptions and calculations provided
- □ Figures provided

Traffic Assignment

- Brief description of the proposed project / permissible movements / distance to int.
- □ Based on travel time (quickest route)
- □ For multiple driveways, assignment methodology is clearly explained and considers travel time, most logical path, location of development features such as parking, etc.
- □ Figures for percentages and volumes provided
- □ Volumes match trip generation

Future Analysis

- □ Volume development spreadsheet provided
- □ Figures provided
- □ Capacity analyses inputs consistent with existing conditions
- □ Opening year analysis provided (TIS and TIA)
- Design Horizon year analysis provided (TIS only or as discussed at scoping meeting)
- □ With dev. analysis provided for 2 scenarios (no improvements and with improvements)
- □ Analysis for 5 years after phase opening provided for phased developments
- □ Without Dev. volumes = exist. volumes + annual growth + permitted or planned projects
- □ With Development volumes = Without Development volumes + proposed site volumes
- $\hfill\square$ Volumes consistent between analyses, volume development spreadsheets, and figures
- □ Committed transportation improvements described/included
- □ Signal timings optimized for Without Development and With Development in Opening and Design

Horizon year analyses

- □ Lead/lag phasing not optimized
- □ PHF of 0.90 used for proposed driveway movements
- □ Heavy vehicle % for proposed driveway movements based on ITE *Trip Generation Manual* data, if available. Otherwise 2% is used.
- □ Left turn signal phasing calculations required/provided
- □ Proposed signal timings within Min/Max range shown on existing permit; copy of plan included
- □ Opening year signal timings are realistic
- □ Cycle lengths consistent with corridor for coordinated systems
- □ Signal timing changes required/included in recommendations
- □ Queue analysis provided for all movements (Synchro and HCM methodologies)
- □ Queue analysis lengths match analysis
- □ Queue analysis With Dev. queues<Without Dev. queues or storage length
- □ Queue analysis Analysis in electronic format needed for further review
- □ Queue analysis Study addresses V/C >1 and theoretically infinite queues
- □ Queue analysis Distances to adjacent intersections provided in queue table
- □ Turn lane warrant/length analysis provided
- □ Turn lane warrant/length analysis –consistent with Pub. 46, Ch. 11
- □ Turn lane warrant/length analysis correct traffic volumes/percentages used
- □ Turn lane warrant/length analysis correct type of terrain used
- □ Turn lane warrant/length analysis correct speed used
- □ Turn lane warrant/length analysis cycle length matches capacity analysis
- □ Turn lane warrant/length analysis storage lengths rounded to the next highest 25-foot increment
- □ Turn lane warrant/length analysis provided for proposed off-site turn lanes
- □ Turn lane warrant/length analysis included in recommendations / lengths match analysis

Level of Service Requirements

- LOS/delay presented
- □ Mitigation provided at int.'s with overall int. LOS drop and increase in delay >10 s
- Mitigation improves int. LOS to original Without Development int. LOS
- □ Mitigation provided at int.'s with overall int. LOS F and increase in delay >10 s
- □ If LOS F, mitigation improves int. delay to original Without Development int. delay
- □ Mitigation provided to address critical lanes or approaches

- □ MOE's at unsignalized int.'s presented
- □ Toolbox for unsignalized intersection evaluation used for lane movement LOS drop
- □ New signals acceptable LOS (LOS C in rural areas/LOS D in urban areas)
- □ Other mitigation explored for LOS drops at int. not meeting warrants for a traffic signal or roundabout
- Municipal input provided seeking Department approval for an unsignalized int. Design (LOS) Waiver.
- □ New int. acceptable LOS (LOS C in rural areas/LOS D in urban areas)
- □ New int. provides best access plan
- □ New int. municipal input provided if LOS E
- Number of driveways acceptable
- □ Proposed driveway aligns w/ driveways/road/lanes across highway
- □ Proposed driveway located as far as possible from signalized intersection
- □ LOS/delay results from analyses match figures and tables
- □ Correct lane configurations shown in figures/tables

Mitigation Analysis

- □ Analysis provided
- Description of proposed mitigations provided
- □ Concept plans at 1:50 scale provided; proposed improvements dimensioned
- Design (lane/shoulder widths, tapers, etc.) shown on concept plans consistent with design criteria
- Cost estimates provided for proposed improvements
- □ Right-of-way issues identified
- □ Impractical/infeasible improvements reasons documented
- □ Impractical/infeasible improvements Local Land Use Transportation Plan for marginal LOS degradation
- □ Impractical/infeasible improvements ATP for significant LOS degradation
- LOS waiver if Local Land Use Transportation Plan or ATP are unachievable
- □ Alternatives other than signals evaluated for new/reconstructed int.'s
- □ Signal warrant analysis needed/provided
- □ Signal warrant analysis all applicable MUTCD warrants evaluated
- □ Signal warrant analysis warrants other than peak hour warrant met
- □ Signal warrant analysis Central Office approval provided if only peak hour warrant is met
- □ Signal warrant analysis ADT volume warrant analysis required/provided
- □ Signal warrant analysis separate analysis provided if not met in Opening year
- □ Signal warrant analysis correct number of lanes and volumes used
- □ Signal warrant analysis correct graphs and volume thresholds used
- □ Signal warrant analysis reduction in minor-street right-turning traffic required/applied
- □ Signal warrant analysis acceptable method used to project new trips for off-peak hours
- □ Signal monitoring agreement with municipality needed/provided
- □ Underground conduit needed for future signal installation
- □ Roundabout analysis provided
- □ Study addresses impacts to coordinated system caused by signal retiming at one of the int.
- $\hfill\square$ Longer cycle lengths required to help alleviate over-capacity conditions
- $\hfill\square$ Traffic signal timed to balance capacity / additional capacity is provided to state road
- Type of proposed coordinated system identified
- □ Fair share contributions not acceptable