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November 4, 2026

PROJECT NAME: Carter Mill Subdivision – Phase IX
SUBJECT: Phase IX Weekday Trip Portion of Total Development on the western end of Carter Mill Drive

Knox County Engineering and Public Works Staff:

This memorandum documents how Carter Mill Subdivision's Phase IX weekday traffic is calculated as a portion of the full nine-phase, 555-unit single-family detached house development and how that portion is assigned to and impacts the western end of Carter Mill Drive. Phase IX's contribution is reported consistently in this letter with the size of the completed residential development begun in 2004, not as a standalone 121-unit project. The residential project begun in 2004 was developed across two separately named subdivisions, Carter Mill and Carter Ridge, as one community.

Land Use and Source Data:

- Land use: Single-Family Detached Housing (ITE Land Use 210)
- Source: Trip Generation Manual, 12th Edition, Institute of Transportation Engineers (ITE)
- Independent variable: dwelling units
- Full-site weekday total for the 555-unit residential development: 4,744 vehicle trip ends / AM peak hour total = 377 trips / PM peak hour total = 466 trips (fitted equations; plots attached)
- Map of Phases of Residential Development (attached figure)
- Transportation Impact Studies (TIS) for Carter Ridge Phase IV, Carter Ridge Phases VI-VIII, and Carter Ridge Phase IX

Trip Generation and Allocation of Trips:
ITE fitted equations for Land Use 210 are not linear in every period. Trip rate per dwelling unit generally declines as site size increases, so summing nine separate phase calculations would overstate project-wide trips for this development. The appropriate method is to compute trip generation for the entire 555-unit development first, then allocate that total to each phase in proportion to dwelling units.

Phase IX unit share factor: 121 / 555 = 0.2180 (21.8%)
Weekday trips allocated to Phase IX units: 4,744 × 21.8% = 1,034 trips

The unit inventory of the development was based on physical counts of existing house lots in KGIS mapping or based on proposed lots used in prior Transportation Impact Studies (TIS). Allocated trips are rounded to the nearest trip. Totals exclude lots reserved for stormwater detention or common areas. Phase totals sum to the 4,744-trip project total and are shown in the following table.

Phase Group	Dwelling Units	Weekday Trips (allocated)
Phases I-II	133	1,137
Phase III	98	838
Phases IV-V	75	641
Phases VI-VII	89	761
Phase VIII	39	333
Phase IX	121	1,034
TOTAL	555	4,744

Assignment of Trips to the Western End of Carter Mill Drive:
Daily route percentages for the western end of Carter Mill Drive were developed for two phase groups of the subdivision: Phases I-II and Phases III-IX due to expected travel differences between the two. No field-based daily distribution was available for this segment of Carter Mill Drive, so the daily percentages were estimated by converting the assumed AM and PM peak hour entering/exiting splits to daily values, weighted by the relative size of the full-site ITE peak hour trip generation (377 AM and 466 PM trip ends). Those peak totals are for project-wide generation, and not all of these trip ends produced will impact the western end of Carter Mill Drive.

The peak hour percentages used for this review are entering and exiting splits (a percentage of outbound trips and a percentage of inbound trips assumed from the previous TIS reports). Weekday ITE Land Use 210 trips are 50% inbound and 50% outbound. The daily percentages are therefore applied only to the matching half of each group's weekday trips.

Phases I-II (133 units) - lower usage of the western end of Carter Mill Drive:

- These phases did not have a separate TIS completed. Their lower use of the western end of Carter Mill Drive was based on turning movements counted on May 12th, 2026, at the intersection of Carter Mill Drive / Carter View Lane / Carter Ridge Drive, and on the expectation that residents in these phases use Strawberry Plains Pike more often for travel to and from the west because of their proximity to this major roadway to the north.
- Assumed peak hour distributions on the western end of Carter Mill Drive: 5% of exiting trips to the west and 10% of entering trips from the west in the AM peak; 10% of exiting trips to the west and 5% of entering trips from the west in the PM peak.
- Daily representation: 8% westbound and 7% eastbound. A sample calculation in detail for these calculations: westbound daily traffic = ((0.05 x 377) + (0.10 x 466)) / (377+466) = approximately 8%

Phases III-IX (422 units, including Phase IX) - higher usage of the western end of Carter Mill Drive:

- Assumed peak hour distributions on the western end of Carter Mill Drive were taken from the trip distributions used in prior TIS reports for these phases: 20% of exiting trips to the west and 25% of entering trips from the west in the AM peak; 35% of exiting trips to the west and 30% of entering trips from the west in the PM peak. The May 12th, 2026, counts were also used as supporting observations for these assumptions.
- Daily representation: 28% westbound and 28% eastbound. These daily shares are the AM and PM orientations weighted by the 377 and 466 peak totals, not a simple average of the two peaks.

Phase IX Daily Volumes on the Western End of Carter Mill Drive:
Phase IX is assigned the Phases III–IX higher usage rates. Weekday trips are 50% inbound and 50% outbound, so each half is 0.50 x 1,034 = 517 trips.

Movement	% of Inbound or Outbound	Weekday Trips
Westbound (toward the west)	28% of outbound	(517 x 0.28) ~ 145
Eastbound (toward the east)	28% of inbound	(517 x 0.28) ~ 145
Two-Way		290

Phase IX Share of Development Daily Traffic on the Western End of Carter Mill Drive:
Converting every phase to west-end trips on Carter Mill Drive with its own rates and summing produces:

- Phases I–II (lower use): 1,137 x 0.50 x (0.08 + 0.07) = 85 two-way trips
- Phases III–IX (higher use): 3,607 x 0.50 x (0.28 + 0.28) = 1,010 two-way trips
- All phases on the western end of Carter Mill Drive: 85 + 1,010 = 1,095 two-way trips

Phase IX's share is 290 / 1,095 = approximately 26.5%. This 26.5% is Phase IX's share of all development traffic assigned to the western end of Carter Mill Drive, and not its share of dwelling units. It is higher than the 21.8% unit share because Phases I–II are assumed to add relatively little traffic to the western end as compared to the other phases.

Knox County Engineering & Public Works 24-Hour Traffic Count Results:
After completion of the Carter Ridge Phase IX Transportation Impact Study, Knox County Engineering & Public Works conducted 24-hour traffic counts on the western end of Carter Mill Drive from October 13th –19th, 2026. The seven-day average (including weekends) was 448 vehicles, with travel approximately 57% westbound and 43% eastbound. These traffic counts do not affect the results in this letter. The calculations above are based solely on ITE trip generation for the full 555-unit development and the phase-group route percentages. They are not based on measured 24-hour volumes on Carter Mill Drive. The Phase IX TIS had previously assumed 540 vehicles on this western end of Carter Mill Drive (page 66 of the TIS). The County's measured average of 448 is in a similar range and reflects current, partial build-out conditions.

Final Reporting Statement:
In conclusion, Phase IX is estimated to contribute approximately 290 two-way weekday trips to the western end of Carter Mill Drive, or about 26.5% of the completed development's traffic on that segment.

Please contact me with any questions or comments about the calculations or approach taken in this review.

Sincerely,

Ajax Engineering, LLC
Robert W. Jacks, P.E.



Single-Family Detached Housing
(210)

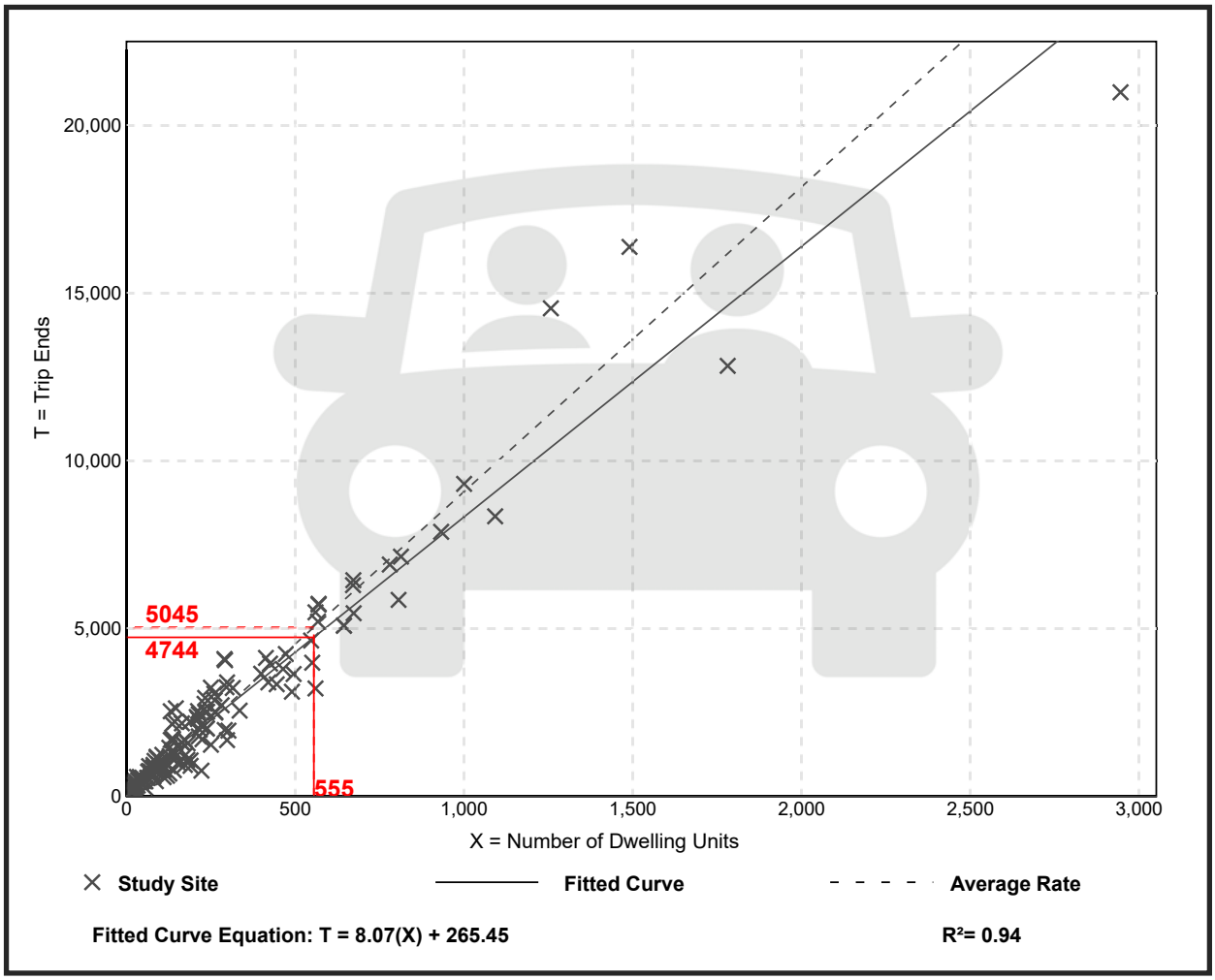
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 155
Avg. Num. of Dwelling Units: 261
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.09	3.47 - 23.80	2.29

Data Plot and Equation



Trip Gen Manual, 12th Edition • Institute of Transportation Engineers

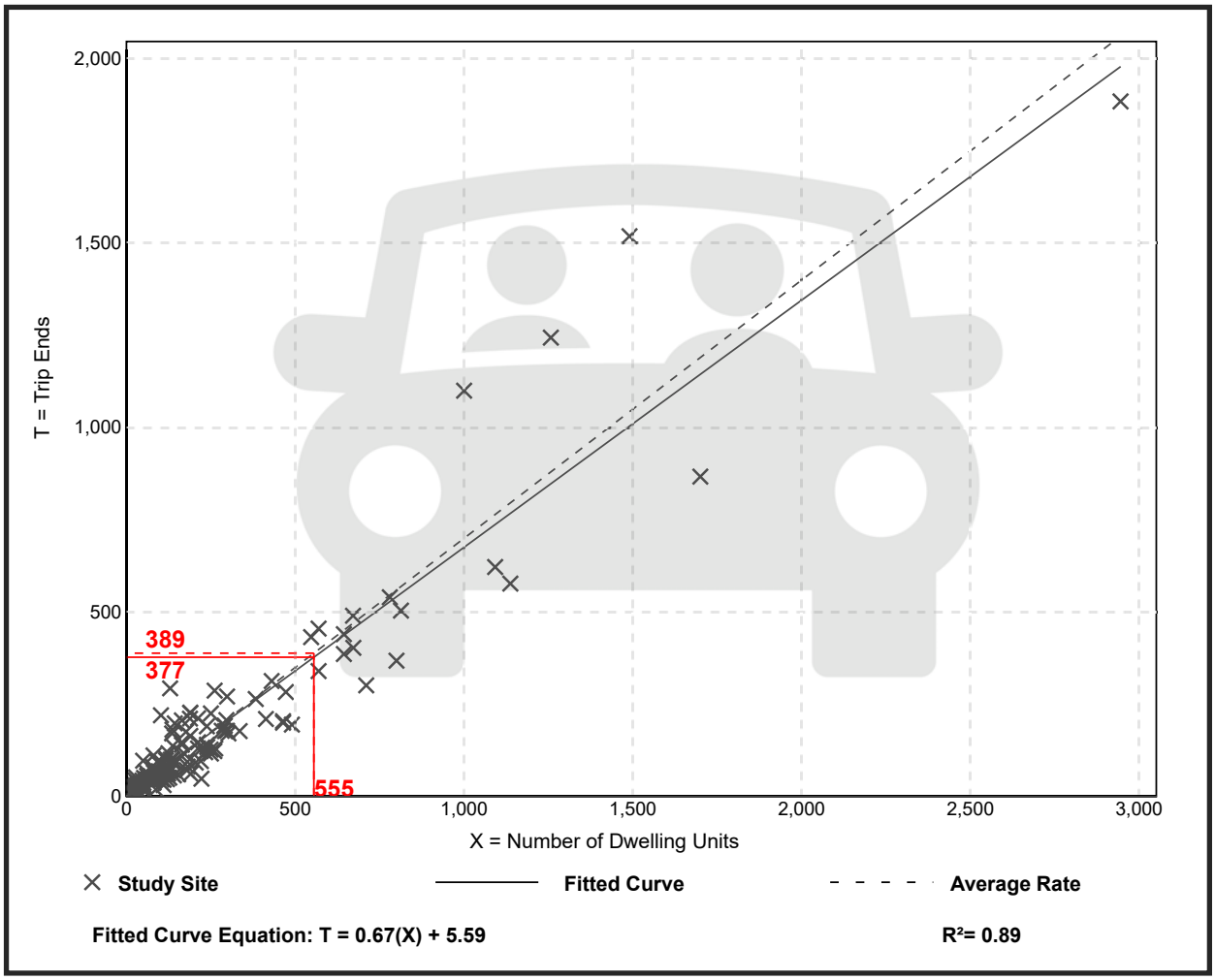
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 153
Avg. Num. of Dwelling Units: 239
Directional Distribution: 27% entering, 73% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.70	0.22 - 2.27	0.26

Data Plot and Equation



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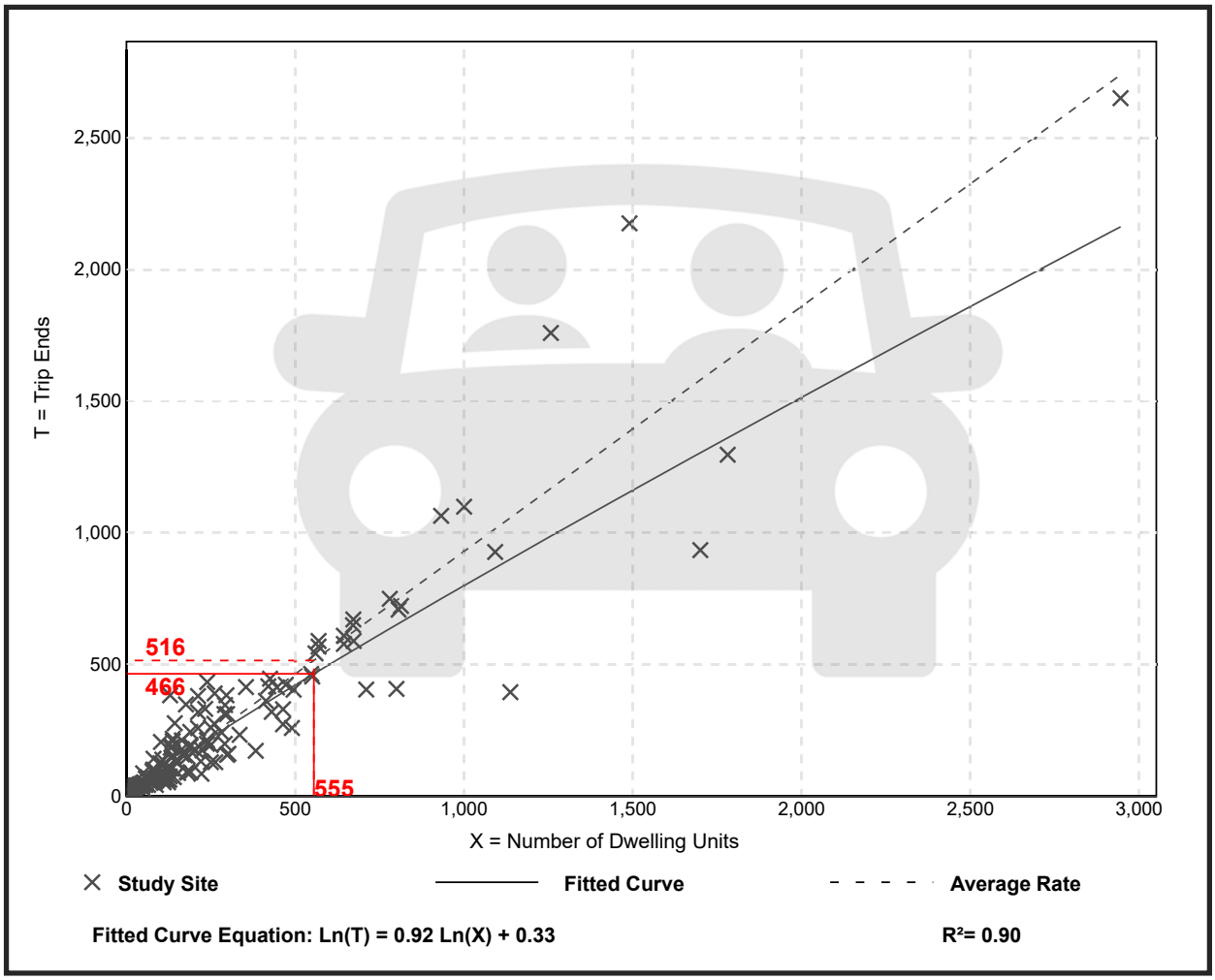
Single-Family Detached Housing
(210)

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:	166
Avg. Num. of Dwelling Units:	266
Directional Distribution:	62% entering, 38% exiting

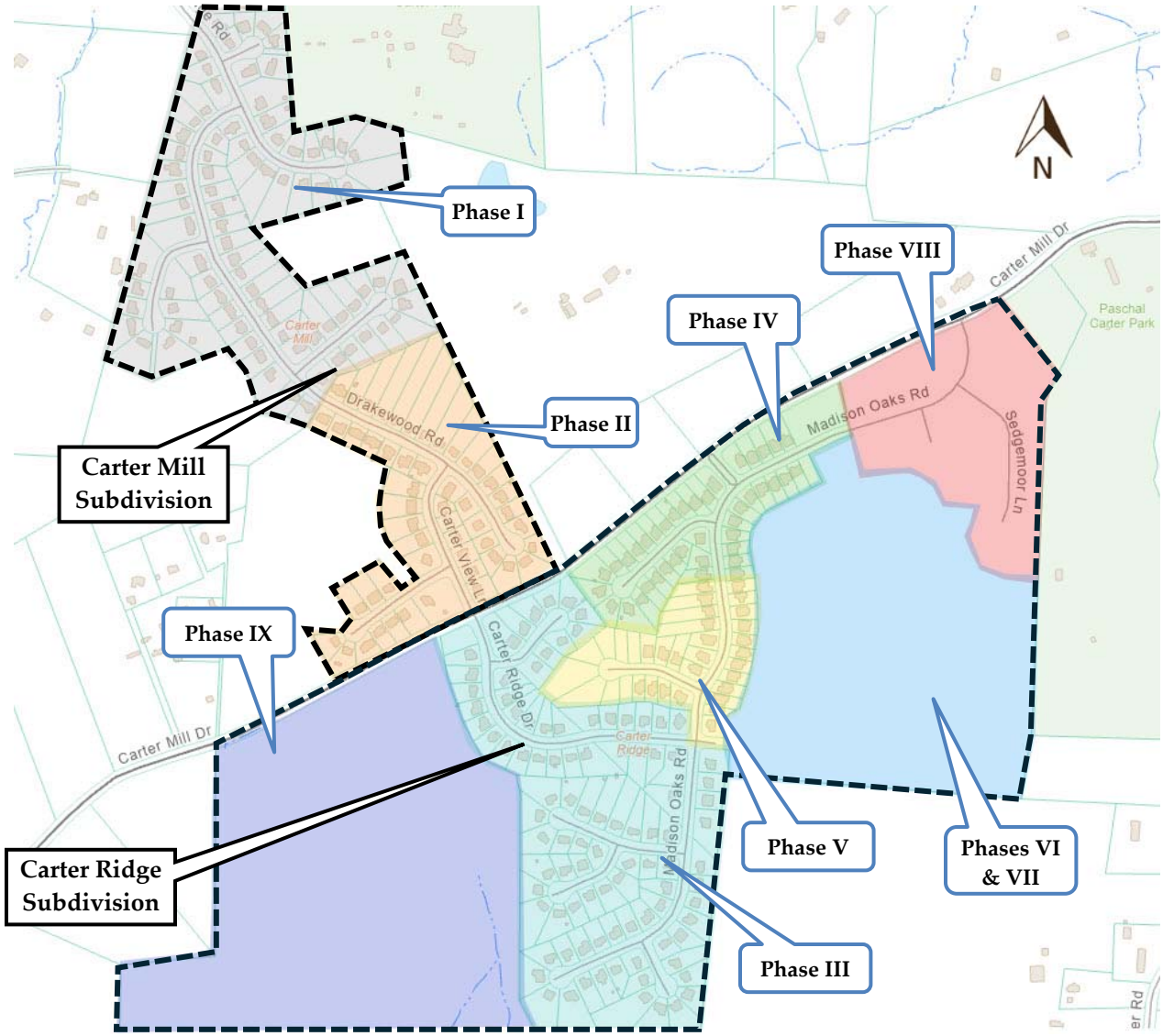
Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.93	0.35 - 2.98	0.33

Data Plot and Equation



Trip Gen Manual, 12th Edition ● Institute of Transportation Engineers



Phases of Carter Mill and Carter Ridge Subdivisions

Exhibit 4 of 4