TRANSPORTATION IMPACT STUDY
(TIS) SCOPING MEETING APPLICATION

Scoping Meeting Date: To be determined

Applicant: Sproul Rd Developers, LLC (Carlino Development Group)

Business Partner ID: To be determined

Applicant's Consultant: McMahon Associates, Inc.

Applicant's Primary Contact: Nicole R. Kline-Elsier, P.E., PTOE

(Attach a list of meeting attendees along with phone numbers and email addresses)

(1) LOCATION OF PROPOSED DEVELOPMENT: (Attach location map if available)

PennDOT Engineering Dist.: 6-0 County: Delaware County

Municipality: Marple Township

State Route(s) (SR): S.R. 0320 (Sproul Road)

Segment(s)/Offset(s): 0170/1530 to 0170/3380
0171/1530 to 0171/3380

Are 102" wide combinations (w/ trailer lengths greater than 28') allowed access to SR in accordance with 75 PA. C.S. §4908:

> Based on the Delaware County map within PennDOT Publication 411 *STAA Truck Routes*, Sproul Road (S.R. 0320) is a Pennsylvania Access Approved Route for 102" twins and 102" – 48' and 53' trailers.

A map of the area is provided in the attached **Exhibit 1.**

(2) DESCRIPTION OF PROPOSED DEVELOPMENT: (Attach site plan if available)

Proposed site access: Access to the development is proposed to be provided via three driveways along Sproul Road (S.R. 0320), including one right-in/right-out driveway, one full-movement signalized driveway (opposite the existing St. Peter and Paul Cemetery northern driveway), and one left-in/right-in/right-out driveway.

Proposed land uses: Copies of the concept plan are included with this submission. The development is proposed to consist of approximately 452,700 square feet of commercial space. At this time, the tenants within this development are unknown. The trip generation calculations have been prepared conservatively based on potential higher generating land uses. For example, the concept plan illustrates an 80,000 square foot fitness center, but since a tenant is unknown at this

time, retail space was assumed since it generates more traffic. Additionally, based on ongoing local coordination, the applicant may provide a recreational component within the development consisting of three to six multipurpose sports fields. It is anticipated that the fields would be located behind the commercial development and traffic would utilize the same access points. Further information will be provided as the land development plans are prepared.

Community linkages *(access to neighboring properties, cross easements, pedestrian and transit accommodations)*: Sidewalk is present along the site frontage on Sproul Road (S.R. 0320), beginning just north of the Cardinal O'Hara High School and extending north past Reed Road. SEPTA Bus Route 107 operates along Sproul Road (S.R. 0320), traveling from the Lawrence Park Shopping Center to the 69th Street Transportation Center, with stops along the site frontage. SEPTA Bus Route 126 also operates within the area along Parkway Boulevard, traveling from the Lawrence Park Shopping Center to the 69th Street Transportation Center.

(3) DEVELOPMENT SCHEDULE AND STAGING:

Anticipated Opening Date: 2022

Full Buildout Date: 2022

Describe Proposed Development Schedule/Staging: No phasing is proposed at this time.

(4) TRIP GENERATION

(Use the most recent edition of "Institute of Transportation Engineers (ITE) Trip Generation," unless the Department approves another source. Non-ITE methods must be fully justified based on surveys of multiple sites of the same land use type and size.)

Trip generation for the proposed development will be based on:

_X_ ITE Trip Generation Manual.
(List proposed development land uses and associated ITE Land Use Codes)

_X_ Other independent surveys.
(Attach justification for non-ITE methods)

List land development and trip generation information, as appropriate. If necessary, attach additional sheets to indicate additional land uses or development phases.

Based on the concept plan, prepared by Arna Engineering and last revised December 12, 2017, the development is proposed to consisted of approximately 452,700 square feet of commercial space. The site trip generation estimates have been prepared based on the more conservative (higher trip generating) ITE commercial land uses, specifically shopping center, convenience market with fueling, and medical office.

Additionally, a combination of ITE and site-specific trip generation data was utilized for the supermarket land use. Specifically, daily and weekday morning peak hour trip generation is based on ITE data for Land Use Code 850, while weekday afternoon and Saturday midday peak hour trip generation is based on data within the ITE article, *Trip Generation and Travel Characteristics*

Associated with Mega Food Markets, published in 1999, which includes data from the specific tenant anticipated to occupy the proposed development.

Table 1 provides the trips estimated to be generated by the proposed commercial development. Details regarding the trip generation for each land use, the ITE article, and the internalization between the land uses are provided in **Attachment 1**.

Table 1. Trip Generation – Commercial Development

		Weekday Morning Peak Hour			Weekday Afternoon Peak Hour			Saturday Midday Peak Hour		
Trip Type	**Daily**	**In**	**Out**	**In**	**In**	**Out**	**Total**	**In**	**Out**	**Total**
Total (External) Trips	30,468	861	564	1,425	1,124	1,328	2,452	1,496	1,353	2,849
- Pass-by Trips	-7,040	-252	-229	-481	-405	-425	-830	-332	-320	-652
"New" Trips	*23,428*	*609*	*335*	*944*	*719*	*903*	*1,622*	*1,164*	*1,033*	*2,197*

Based on local coordination, the applicant may provide a recreational component to the development consisting of three to six multipurpose sports fields. **Table 2** provides the trips anticipated to be generated by this potential additional land use.

Table 2. Trip Generation – Recreational Fields

			Weekday Morning Peak Hour			Weekday Afternoon Peak Hour			Saturday Midday Peak Hour		
Land Use	**Size**	**Daily**	**In**	**Out**	**In**	**In**	**Out**	**Total**	**In**	**Out**	**Total**
488 – Soccer Complex	3 fields	214	2	1	3	32	17	49	58	62	120
488 – Soccer Complex	6 fields	428	4	2	6	65	34	99	116	125	241

(5) ESTIMATED DAILY TRIP GENERATION/DRIVEWAY CLASSIFICATION:

(a) Estimated Daily Trip Generation of Proposed Development – Assuming One Access Point and Full Build out/Occupancy of Entire Tract:

Commercial Development: 30,468 external trips/day and 23,428 "new" trips/day
Recreational Fields: 214 to 428 external trips/day

(b) Driveway Classification Based on Trip Generation and One Access Point:
Medium Volume: ____
High Volume: __X__

(6) TRANSPORTATION IMPACT STUDY REQUIRED?

____ No

__X__ Yes, based on:

__X__ 3,000 or more vehicle trips/day generated

__X__ During any one-hour time period, 100 or more new (added) vehicle trips generated entering or 100 or more new (added) vehicle trips generated exiting development

____ Other considerations as described below:

(7) TRANSPORTATION IMPACT ASSESSMENT REQUIRED? __X__ No _____ Yes

(If a TIS is required, the following sections of this checklist will be discussed at the TIS Scoping Meeting. The applicant may provide preliminary information.)

(8) STUDY AREA: (Describe; attach map and/or diagram)

Roadway and Study Intersections

- Sproul Road (S.R. 0320) & Lawrence Road (S.R. 1020)
- Sproul Road (S.R. 0320) & Williamsburg Drive/Lawrence Park Shopping Center Access
- Sproul Road (S.R. 0320) & Reed Road
- Sproul Road (S.R. 0320) & Crum Creek Road
- Sproul Road (S.R. 0320) & St. Peter and Paul Cemetery Access (Northern Access)
- Sproul Road (S.R. 0320) & Springfield Road (S.R. 2009)
- Sproul Road (S.R. 0320) & Old Marple Road/Old Sproul Road (S.R. 1008)
- Sproul Road (S.R. 0320) & State Road (S.R. 0001)
- Springfield Road (S.R. 2009) & Eagle Road (S.R. 1006)
- Springfield Road (S.R. 2009) & Old Sproul Road (S.R. 1008)
- Springfield Road (S.R. 2009) & State Road (S.R. 0001)

Land use context (Refer to PennDOT Design Manual, Part 1X, Appendix B)

Land Use Context: Suburban Corridor
Transportation Context:

- Sproul Road (S.R. 0320) – Regional Arterial
- State Road (S.R. 0001) – Regional Arterial
- Springfield Road (S.R. 2009) - Community Arterial
- Lawrence Road (S.R. 1020) – Community Arterial
- Old Marple Road/Old Sproul Road (S.R. 1008) – Community Collector
- Eagle Road (S.R. 1006) – Community Collector
- Reed Road – Community Collector
- Crum Creek Road – Neighborhood Collector
- Williamsburg Drive – Local Road

Known Congestion Areas

Congestion is present within the study area during the peak hours, particularly along Sproul Road (S.R. 0320), Springfield Road (S.R. 2009), and State Road (S.R. 0001). Initial queue observations will be completed at seven signalized intersections that were identified as having unmet demand (i.e. operating over capacity) within previous studies prior to the weekday morning, weekday afternoon, and Saturday midday peak hours.

Known Safety Concerns

Not known at this time.

Known Environmental Constraints

Not known at this time.

Pedestrian/Bike Review (Community Centers, Parks, Schools, etc.)

Cardinal O'Hara High School is located along Sproul Road (S.R. 0320), just south of the proposed development. Paxon Hollow Middle School is located along Paxon Hollow Road (S.R.1022), approximately 1.4 miles northwest of the site. Russell Elementary School is located along Sproul Road (S.R. 0320), approximately 1.3 miles north of the site. St. Pius X School is located along Lawrence Road (S.R. 1020), approximately 1.5 miles northeast of the site. Loomis Elementary School is located along Central Boulevard, approximately 1.0 mile northeast of the site.

Transit Review (Current routes/stops)

SEPTA Bus Route 107 operates along Sproul Road (S.R. 0320), traveling from the Lawrence Park Shopping Center to the 69th Street Transportation Center. This bus route has a bus stop on each side of Sproul Road (S.R. 0320) along the site frontage. SEPTA Bus Route 126 also operates within the area along Parkway Boulevard, traveling from the Lawrence Park Shopping Center to the 69th Street Transportation Center.

(9) STUDY AREA TYPE: Urban __X__ Rural _____

(10) TIS ANALYSIS PERIODS AND TIMES:
(List periods and times. Normal analysis periods are existing conditions, 5 years in the future without development, and 5 years in the future with development. Normal analysis times for each period are the AM peak hour, the PM peak hour, and the peak hour of site-generated traffic).

Study Analysis Periods:

- 2017 Existing Conditions
- 2022 Future Build-Out Year Conditions
- 2027 Future Design Year Conditions

Study Time Periods:

- Weekday morning commuter peak period (7:00 AM to 9:00 AM)
- Weekday afternoon commuter peak period (4:00 PM to 6:00 PM)
- Saturday midday peak period (11:00 AM to 2:00 PM)

(11) TRAFFIC ADJUSTMENT FACTORS:

(a) Seasonal Adjustment: (Identify counts requiring adjustment and methodology)

No seasonal adjustments are proposed at this time, as the traffic counts will be completed while school is in session.

(b) Annual Base Traffic Growth: 0.00 %/yr. Source: Bureau of Planning and Research

(c) Pass-By Trips: (Attach justification where required)

Land Use	%	Source
Shopping Center (LUC 820)	Daily & AM: 24% PM: 34% SAT: 26%	ITE Trip Generation Handbook 3rd Edition, 2014

Super Convenience Market/ Gas Station (LUC 960) (Pass-By for LUC 853)	Daily: 46% AM: 63% PM 66% SAT: 56%
Supermarket (LUC 850 for Daily & AM, ITE article data for PM & Sat)	Daily & AM: 22% PM: 32% SAT: 19%

(d) Captured Trips for Multi-Use Sites:
(List % and manner of application. Attach justification where required.)

Internalization worksheets are provided in **Attachment 1**, which have been prepared based on ITE data.

(e) Modal Split Reductions

A reduction of one percent was applied to the shopping center, supermarket, and medical office land uses for proximity to a bus transit corridor based on PennDOT modal split data.

(f) Other Reductions

None.

(12) OTHER PROJECTS WITHIN STUDY AREA TO BE ADDED TO BASE TRAFFIC:
(Identify proposed developments with issues permits that need to be included.)

Pleased provide information regarding any proposed developments that will have an impact on traffic operations within the study area and should be included in the Transportation Impact Study.

(13) TRIP DISTRIBUTION AND ASSIGNMENT:
(Describe; explain/justify; attach diagram and related information.)

Trip distributions and assignments will be prepared based on existing traffic patterns and the location of the site accesses upon completion of the data collection efforts.

(14) APPROVAL OF DATA COLLECTION ELEMENTS AND METHODOLOGIES:

Manual turning movement counts will be collected during the weekday morning (7:00 AM to 9:00 AM), weekday afternoon (4:00 PM to 6:00 PM) and Saturday midday (11:00 AM to 2:00 PM) peak periods at the following intersections:

- Sproul Road (S.R. 0320) & Lawrence Road (S.R. 1020)*
- Sproul Road (S.R. 0320) & Williamsburg Drive/Lawrence Park Shopping Center Access*
- Sproul Road (S.R. 0320) & Reed Road*
- Sproul Road (S.R. 0320) & Crum Creek Road
- Sproul Road (S.R. 0320) & St. Peter and Paul Cemetery Access (Northern Access)
- Sproul Road (S.R. 0320) & Springfield Road (S.R. 2009)
- Sproul Road (S.R. 0320) & Old Marple Road/Old Sproul Road (S.R. 1008)*

- Sproul Road (S.R. 0320) & State Road (S.R. 0001)*
- Springfield Road (S.R. 2009) & Eagle Road (S.R. 1006)*
- Springfield Road (S.R. 2009) & Old Sproul Road (S.R. 1008)
- Springfield Road (S.R. 2009) & State Road (S.R. 0001)*

* Initial queue observations will be completed at these seven signalized intersections prior to the weekday morning, weekday afternoon, and Saturday midday peak hours that were identified as having unmet demands (i.e. operating over capacity) within previous studies in the area.

Additionally, automatic traffic recorder tube counts will be completed along Sproul Road (S.R. 0320) along the site frontage, to collect daily traffic volumes, vehicle classifications, and vehicle speeds.

(15) CAPACITY/LOS ANALYSIS:

Intersection capacity/level-of-service analysis will be completed for the existing, future build-out year, and future design year traffic conditions at the following intersections:

- Sproul Road (S.R. 0320) & Lawrence Road (S.R. 1020)
- Sproul Road (S.R. 0320) & Williamsburg Drive/Lawrence Park Shopping Center Access
- Sproul Road (S.R. 0320) & Reed Road
- Sproul Road (S.R. 0320) & Crum Creek Road
- Sproul Road (S.R. 0320) & St. Peter and Paul Cemetery Access (Northern Access)
- Sproul Road (S.R. 0320) & Springfield Road (S.R. 2009)
- Sproul Road (S.R. 0320) & Old Marple Road/Old Sproul Road (S.R. 1008)
- Sproul Road (S.R. 0320) & State Road (S.R. 0001)
- Springfield Road (S.R. 2009) & Eagle Road (S.R. 1006)
- Springfield Road (S.R. 2009) & Old Sproul Road (S.R. 1008)
- Springfield Road (S.R. 2009) & State Road (S.R. 0001)
- Sproul Road (S.R. 0320) & Site Accesses (3)

(16) ROADWAY IMPROVEMENTS/MODIFICATIONS BY OTHERS TO BE INCLUDED:
(Projects programmed for construction of other developments with issued permits.)

No improvements known at this time.

(17) OTHER NEEDED ANALYSES:

(a) Sight Distance Analysis:
(Required for all site access driveways; identify other locations)

To be provided for all site accesses.

(b) Signal Warrant Analysis:
(Identify locations)

To be provided for the proposed full-movement signalized driveway, based on all applicable warrants per MUTCD.

(c) Required Signal Phasing/Timing Modifications:
(Determine for all signalized intersections; specify methodology)

To be provided for the proposed full-movement signalized driveway, and to be evaluated as necessary for all signalized study intersections.

(d) Traffic Signal Corridor/Network Analysis:
(Identify locations/methodology)

The existing coordinated signal system along Sproul Road (S.R. 0320) and the new proposed signal will be evaluated utilizing Synchro.

(e) Analysis of the Need for Turning Lanes:
(Identify locations/methodology)

To be provided for all site accesses and study intersections, as necessary, based on PennDOT PUB 46 criteria.

(f) Turning Lane Lengths:
(Identify methodology to be used)

To be provided for all site accesses, based on PennDOT PUB 46 criteria and queues

(g) Left Turn Signal Phasing Analysis:
(Identify locations/methodology)

To be provided for the proposed full-movement signalized driveway, and study intersections, as necessary.

(h) Queuing Analysis:
(Identify locations/methodology)

To be completed at all study intersections and site accesses.

(i) Gap Studies:
(Identify locations/methodology)

Not proposed at this time.

(j) Crash Analysis:
(Identify locations)

- Sproul Road (S.R. 0320) & Lawrence Road (S.R. 1020)
- Sproul Road (S.R. 0320) & Williamsburg Drive/Lawrence Park Shopping Center
- Sproul Road (S.R. 0320) & Reed Road
- Sproul Road (S.R. 0320) & Crum Creek Road
- Sproul Road (S.R. 0320) & St. Peter and Paul Cemetery Access (Northern Access)
- Sproul Road (S.R. 0320) & Springfield Road (S.R. 2009)
- Sproul Road (S.R. 0320) & Old Marple Road/Old Sproul Road (S.R. 1008)
- Sproul Road (S.R. 0320) & State Road (S.R. 0001)

- Springfield Road (S.R. 2009) & Eagle Road (S.R. 1006)
- Springfield Road (S.R. 2009) & Old Sproul Road (S.R. 1008)
- Springfield Road (S.R. 2009) & State Road (S.R. 0001)

(k) Weaving Analysis:
(Identify locations)

Not applicable.

(l) Other Required Studies:
(Specify locations/methodology)

None proposed at this time.

(18) ADDITIONAL COMMENTS OR RECOMMENDATIONS RELATIVE TO THE SCOPE OF THE TIS:

_____ Date: _____
Signature of Applicant's Engineer

_____ Date: _____
Signature of District Traffic PennDOT Representative

_____ Date: _____
Signature of District Permit PennDOT Representative (if present)

_____ Date: _____
Signature of Municipal Traffic Representative

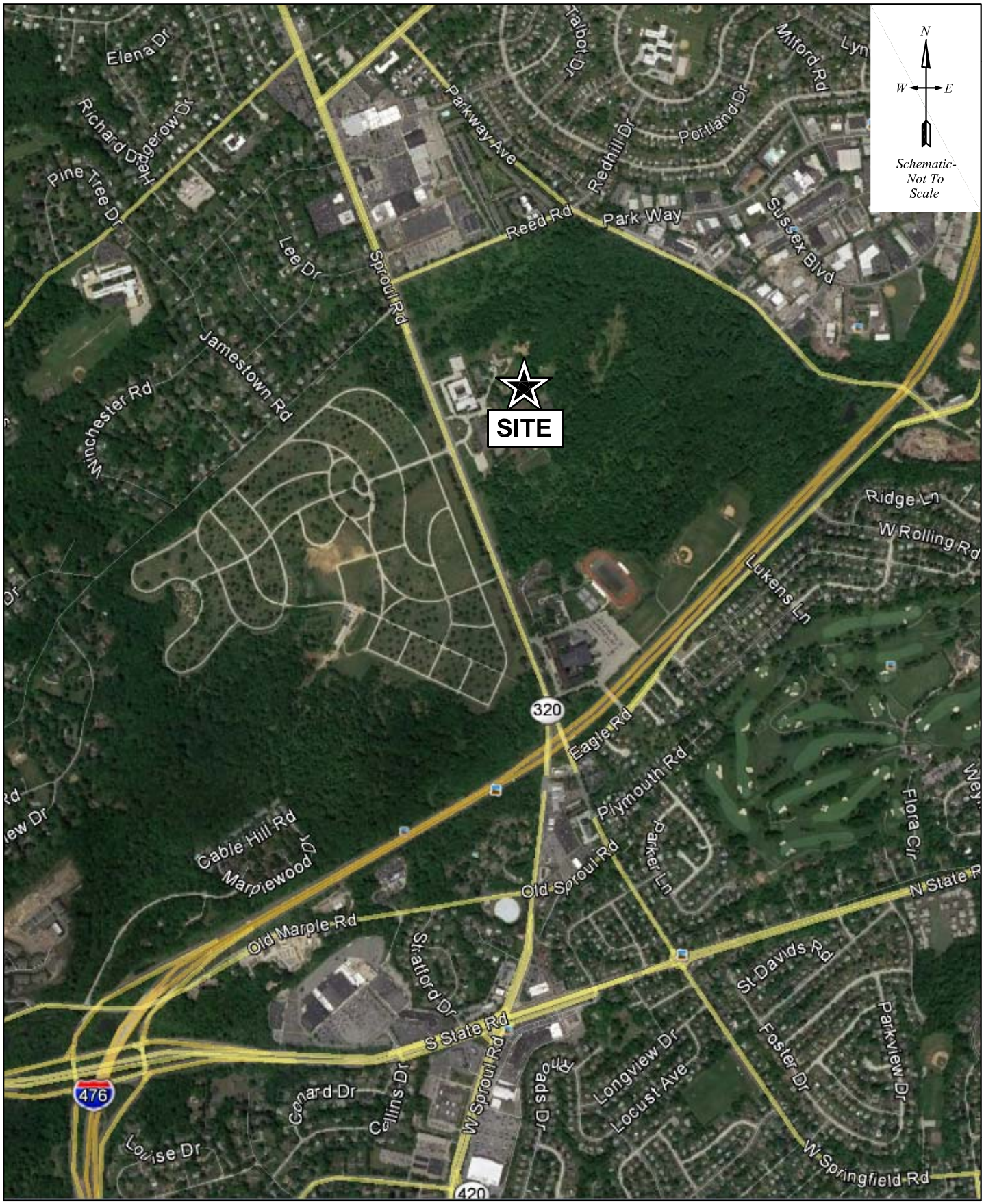


EXHIBIT 1

Study Area Map

MARPLE COMMERCIAL DEVELOPMENT

MARPLE TOWNSHIP, DELAWARE COUNTY, PA

McMAHON TRANSPORTATION ENGINEERS & PLANNERS

I:\eng\817111 - Marple Carlino\dwg\Figures\2017-11 Scoping App\Exhibit 1.dwg

ATTACHMENT 1

Project Information	
Project Name:	Marple Carlino
McMahon Project No:	817111
Date:	12/15/2017
City/Municipality:	Marple Township
State:	PA
Client Name:	Carlino
Analyst's Name:	TML
ITE Edition:	ITE - TGM 10th Edition

		Daily			Weekday Morning Peak Hour			Weekday Afternoon Peak Hour			Saturday Midday Peak Hour		
Land Use	**Size**	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**
820 - Shopping Center		4,934	4,933	9,867	158	97	255	447	485	932	576	528	1,104
Vehicle Occupancy[1]		1.00	1.00		1.17	1.16		1.21	1.18		1.00	1.00	
Person Trips		4,934	4,933	9,867	185	113	298	541	572	1,113	576	528	1,104
Internal Person Trips	207,200 square feet	-87	-49	-136	-5	-2	-7	-28	-11	-39	-11	-5	-16
External Person Trips	PB: Daily - 24%	4,847	4,884	9,731	180	111	291	513	561	1,074	565	523	1,088
Bus Transit Reduction (Person Trips)[2]	AM - 24%	-48	-49	-97	-2	-1	-3	-5	-6	-11	-6	-5	-11
External Person Trips with Bus Transit Reduction	PM - 34%	4,799	4,835	9,634	178	110	288	508	555	1,063	559	518	1,077
External Vehicle Trips	SAT - 26%	4,799	4,835	9,634	152	95	247	420	471	891	559	518	1,077
Pass-By Trips		-1152	-1160	-2312	-37	-23	-60	-143	-160	-303	-145	-135	-280
"New" Person Trips		3,647	3,675	7,322	115	72	187	277	311	588	414	383	797
Supermarket[3]		6,140	6,140	12,280	263	176	439	440	423	863	461	442	903
Vehicle Occupancy		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Person Trips		6,140	6,140	12,280	263	176	439	440	423	863	461	442	903
Internal Person Trips	115,000 square feet	-108	-62	-170	-6	-2	-8	-23	-9	-32	-9	-5	-14
External Person Trips	PB: Daily - 22%	6,032	6,078	12,110	257	174	431	417	414	831	452	437	889
Bus Transit Reduction (Person Trips)[2]	AM - 22%	-60	-61	-121	-3	-2	-5	-4	-4	-8	-5	-4	-9
External Person Trips with Bus Transit Reduction	PM - 32%	5,972	6,017	11,989	254	172	426	413	410	823	447	433	880
External Vehicle Trips	SAT - 19%	5,972	6,017	11,989	254	172	426	413	410	823	447	433	880
Pass-By Trips		-1314	-1324	-2638	-56	-38	-94	-132	-131	-263	-85	-82	-167
"New" Person Trips		4,658	4,693	9,351	198	134	332	281	279	560	362	351	713
960 - Super Convenience Market with Gas[4]		2,304	2,303	4,607	259	258	517	207	207	414	186	186	372
Vehicle Occupancy	5,500 square feet	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Person Trips	16 fueling positions	2,304	2,303	4,607	259	258	517	207	207	414	186	186	372
Internal Person Trips	PB: Daily - 46%	-41	-23	-64	-6	-4	-10	-10	-4	-14	-4	-2	-6
External Person Trips	AM - 63%	2,263	2,280	4,543	253	254	507	197	203	400	182	184	366
External Vehicle Trips	PM - 66%	2,263	2,280	4,543	253	254	507	197	203	400	182	184	366
Pass-By Trips	SAT - 56%	-1041	-1049	-2090	-159	-168	-327	-130	-134	-264	-102	-103	-205
"New" Person Trips		1,222	1,231	2,453	94	86	180	67	69	136	80	81	161
720 - Medical / Dental Office Building		2,358	2,357	4,715	212	60	272	119	307	426	323	244	567
Vehicle Occupancy		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Person Trips		2,358	2,357	4,715	212	60	272	119	307	426	323	244	567
Internal Person Trips	125,000 square feet	-134	-236	-370	-8	-17	-25	-24	-61	-85	-12	-24	-36
External Person Trips		2,224	2,121	4,345	204	43	247	95	246	341	311	220	531
Bus Transit Reduction (Person Trips)[2]		-22	-21	-43	-2	-0	-2	-1	-2	-3	-3	-2	-5
External Person Trips with Bus Transit Reduction		2,202	2,100	4,302	202	43	245	94	244	338	308	218	526
"New" Vehice Trips		2,202	2,100	4,302	202	43	245	94	244	338	308	218	526
Total Vehicle Trips		***15,736***	***15,733***	***31,469***	***892***	***591***	***1,483***	***1,213***	***1,422***	***2,635***	***1,546***	***1,400***	***2,946***
Total Person Trips		***15,736***	***15,733***	***31,469***	***919***	***607***	***1,526***	***1,307***	***1,509***	***2,816***	***1,546***	***1,400***	***2,946***
Total Internal Person Trips		***-370***	***-370***	***-740***	***-25***	***-25***	***-50***	***-85***	***-85***	***-170***	***-36***	***-36***	***-72***
Total External Person Trips		***15,366***	***15,363***	***30,729***	***894***	***582***	***1,476***	***1,222***	***1,424***	***2,646***	***1,510***	***1,364***	***2,874***
Total Bus Transit Reduction (Person Trips)		***-130***	***-131***	***-261***	***-7***	***-3***	***-10***	***-10***	***-12***	***-22***	***-14***	***-11***	***-25***
Total External Person Trips with Bus Transit Reduction		***15,236***	***15,232***	***30,468***	***887***	***579***	***1,466***	***1,212***	***1,412***	***2,624***	***1,496***	***1,353***	***2,849***
Total External Vehicle Trips		***15,236***	***15,232***	***30,468***	***861***	***564***	***1,425***	***1,124***	***1,328***	***2,452***	***1,496***	***1,353***	***2,849***
Total Pass-by Trips		***-3507***	***-3533***	***-7040***	***-252***	***-229***	***-481***	***-405***	***-425***	***-830***	***-332***	***-320***	***-652***
Total "New" Vehicle Trips		***11,729***	***11,699***	***23,428***	***609***	***335***	***944***	***719***	***903***	***1,622***	***1,164***	***1,033***	***2,197***

1 - Vehicle occupancy rates for Shopping Center (LUC 820) are based on data provided in Tables C.1 and C.2 within the *ITE Trip Generation Handbook, 3rd Edition* for the weekday morning and weekday afternoon peak hours.

2 - A reduction of 1% was applied to the external person trips for proximity to a bus transit corridor based on PennDOT data.

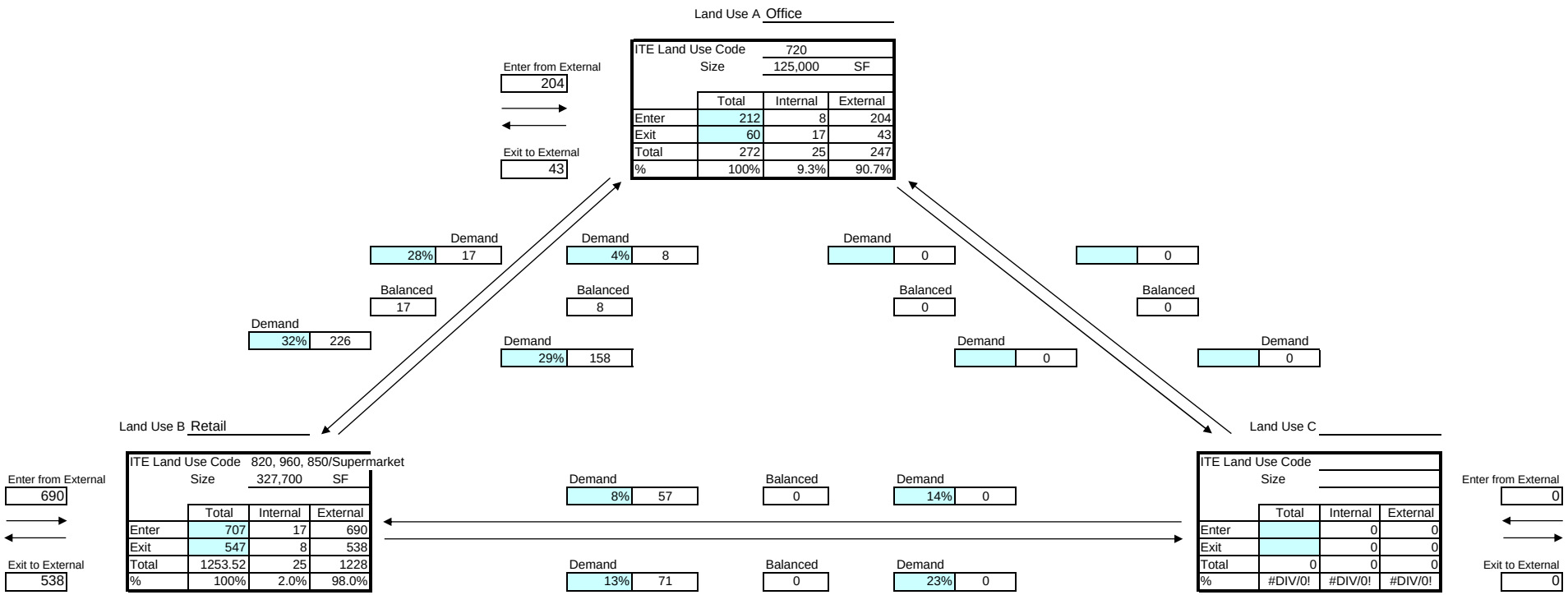
3 - Daily and weekday morning peak hour trip generation is based on Land Use Code 850 for Supermarket within the *ITE Trip Generation, 10th Edition* . Weekday afternoon and Saturday midday peak hour trip generation is based on Wegman's-specific data provided with the ITE Article, *Trip Generation and Travel Characteristics Associated with Mega Food Markets* , published in 1999.

4 - A multi-variable regression analysis, based on both the convenience market gross floor area (GFA) and the number of vehicle fueling positions, has been utilized to estimate the weekday morning and weekday afternoon peak hour trip generation. The independent variable of 100 square foot gross floor area was used to calculate the number of trips for the weekday daily and Saturday midday peak hour.

Analyst TML
Date 12/15/2017

Multi-Use Development
Trip Generation
and Internal Capture Summary

Name of Devlpt Marple - Carlino
Time Period Weekday AM



Net External Trips for Multi-Use Development

	Land Use A		Land Use B		Land Use C		Total	
Enter	204		690		0		894	
Exit	43		538		0		581	Internal
Total	247		1228		0		1475	Capture
Single-Use Trip Gen Estimate	272		1253.52		0		1526	3.3%

Analyst TML
Date 12/15/2017

Multi-Use Development
Trip Generation
and Internal Capture Summary

Name of Devlpt Marple - Carlino
Time Period Weekday PM

Land Use A Office

ITE Land Use Code 720
Size 125,000 SF

	Total	Internal	External
Enter	119	24	95
Exit	307	61	246
Total	426	85	341
%	100%	20.1%	79.9%

Enter from External 95
Exit to External 246

Demand 20% 61
Balanced 61
Demand 31% 37
Balanced 24
Demand 8% 95
Demand 2% 24
Demand 0
Balanced 0
Demand 0
Balanced 0

Land Use B Retail

ITE Land Use Code 820, 960, 850/Supermarket
Size 327,700 SF

	Total	Internal	External
Enter	1,188	61	1126
Exit	1,202	24	1178
Total	2390.12	85	2305
%	100%	3.6%	96.4%

Enter from External 1126
Exit to External 1178

Demand 50% 594
Balanced 0
Demand 29% 349
Balanced 0
Demand 41% 0
Demand 29% 0

Land Use C

ITE Land Use Code
Size

	Total	Internal	External
Enter		0	0
Exit		0	0
Total	0	0	0
%	#DIV/0!	#DIV/0!	#DIV/0!

Enter from External 0
Exit to External 0

Demand 0
Balanced 0
Demand 0
Balanced 0
Demand 0
Demand 0

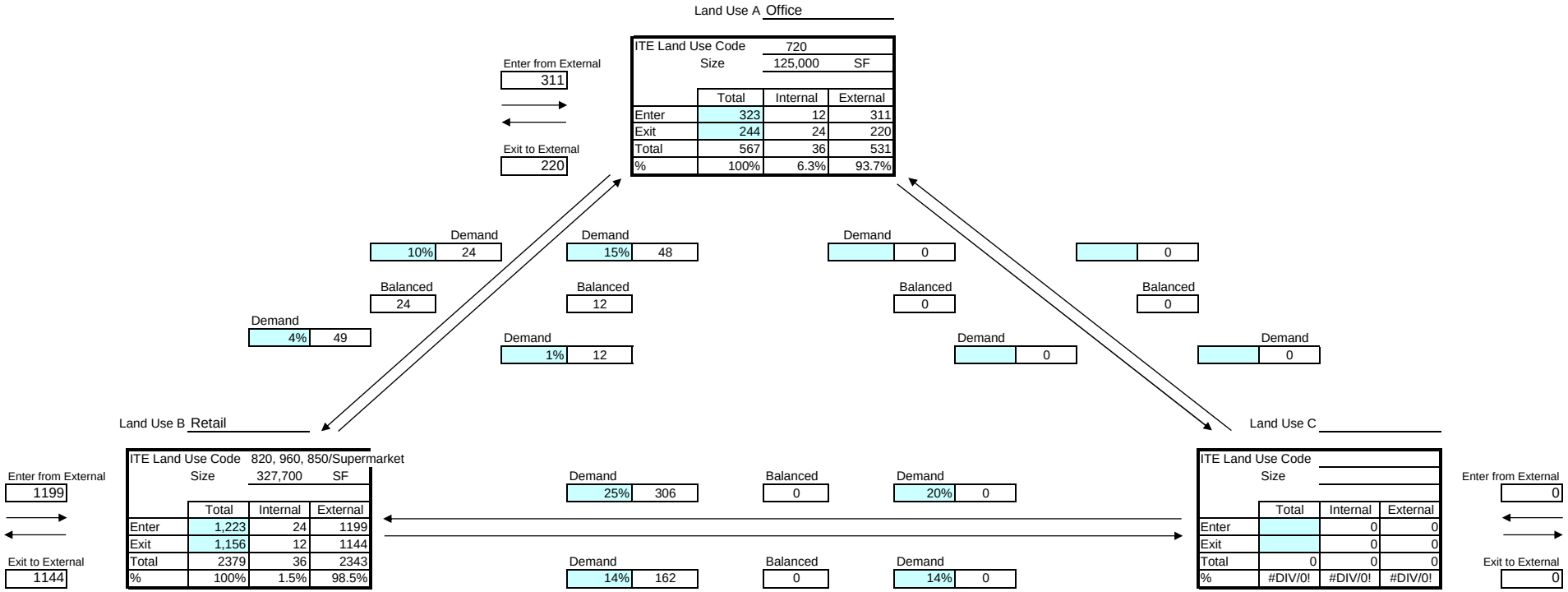
Net External Trips for Multi-Use Development

	Land Use A		Land Use B		Land Use C		Total	
Enter	95		1126		0		1221	
Exit	246		1178		0		1424	Internal
Total	341		2305		0		2645	Capture
Single-Use Trip Gen Estimate	426		2390.12		0		2816	6.1%

Analyst TML
Date 12/15/2017

Multi-Use Development
Trip Generation
and Internal Capture Summary

Name of Devlpt Marple - Carlino
Time Period Saturday Midday



Net External Trips for Multi-Use Development

	Land Use A		Land Use B		Land Use C		Total	
Enter	311		1199		0		1510	
Exit	220		1144		0		1364	Internal
Total	531		2343		0		2874	Capture
Single-Use Trip Gen Estimate	567		2379		0		2946	2.4%

Trip Generation and Travel Characteristics Associated with Mega Food Markets

Paula F. Benway
Cindy McCormick, P.E.

INTRODUCTION

Transportation authorities may sometimes desire to establish local trip generation rates reflecting special conditions found in a community or rates for specific generators not clearly defined in the Institute of Transportation Engineers, Trip Generation[1] report. In the situation where a generator is not clearly defined, interpretations on trip generation rates vary. While this may not be of issue for a one time, small project, it certainly can play havoc for major commercial development projects.

One such generator not clearly defined in the Institute of Transportation Engineers (ITE), Trip Generation is a supermarket in excess of 80,000 square feet. There are currently four related Land Use Codes (LUC) which could be considered. These are: Supermarket-LUC 850, Discount Supermarket-LUC 854, Discount Superstore - LUC 813, and Free-Standing Discount Store-LUC 815. In addition to these four land uses, experience has shown that the Wegmans Food Market trip generation rates have resembled those of Shopping Center-LUC 820 rates.

Recently, some transportation authorities have required the use of ITE Supermarket rates in determining the effects of proposed Wegmans Food Markets. Prior to the 6th Edition of Trip Generation, the Supermarket data base had relatively few sample studies. Even with the increase in sample studies provided in the 6th Edition, the average size of these sample studies are not reflective of the average Wegmans Food Market. In addition, the average Supermarket rate for 100,000 square feet, for example, is approximately 1.5 times that of Shopping Center rates. The range in rates between these two land uses is significant enough to effect the projected impact and mitigating measures identified for the surrounding roadway system.

Even with the five related land use codes available through ITE, the actual Wegmans Food Market trip generation rates do not fit into the rate structure or description of, average supermarket characteristics. The ITE Supermarket (LUC 850) data base now has 29 sample studies for the weekday evening peak hour. This data base has an average supermarket size of 43,000 square feet, and an average trip rate of 11.51 trips per 1,000 square feet. During the Saturday peak hour, the data base has 20 samples with an average size of 51,000 square feet, and an average trip rate of 12.25 trips per 1,000 square feet. National statistics obtained from the Food Marketing Institute (FMI) also represent the average food market to be less than 50,000 square feet. According

to FMI, which keeps statistical information on 127,000 supermarkets nationwide, the median store size is 38,600 square feet[3].

The current databases primarily do not fit the average store size or the number of samples are too small to be reliable. The Supermarket land use has samples with an average size of 43,000 square feet that is much smaller than the average 89,150 square foot Wegmans Food Markets. The Discount Supermarket land use samples are more comparable in average size. However, the developed rates are based on only three (3) sample studies. The same can be said about the other related land uses.

Wegmans Food Markets, as well as other local supermarket chains, have recently come under scrutiny regarding how much traffic their stores actually generate. The question all along, has really been, what is a Wegmans Food Market? How do they compare to the current ITE land uses? Within the last five years, the trend in new Wegmans Food Market construction and expansions have focused on stores ranging from 80,000 to 130,000 square feet in size. The types of services being offered at a typical Wegmans is increasingly diversified relative to the traditional 40,000 square foot supermarket. The majority of the Food Markets in operation today have: auto supplies, automatic teller machines, books/magazines, bulk foods, floral/horticulture, gourmet/specialty foods, greeting cards, in-store bakeries, nutrition center, pharmacy, photo finishing, prepared foods, service deli, service fish, and video rental centers. Some of the more recent service trends are: dry cleaning, sit-down restaurants, and coffee bars.

This research project focuses on measuring the actual travel characteristics and generation patterns associated with a Wegmans Food Market and comparing them to the published ITE land use categories.

STUDY APPROACH

This study follows the ITE recommended guidelines for conducting a local trip generation study[2]. The intent of this study is to determine the basic trip generation characteristics of an average Wegmans Food Market, and to investigate the variations from the national rates published through ITE. This study will also identify the "*type*" of trips being generated by these Food Markets. Identification of the primary, captured and diverted link trip components can have just as significant of an effect on the proposed overall impact to the adjacent roadway system as the actual trip generation rate used.

The following sections will thoroughly document the study steps.

STRATIFICATION OF SAMPLE SITES

Once a development is built, it is rare that an "after-study" is conducted to determine the actual number of trips a site generates. Over the years, several Food Markets have undergone major expansions where through the approval process traffic data became available for before and after expansion conditions. This data was compiled, however found to be dated, conducted at different times of the year, and obtained by various sources. This data did show a pattern of trip generation rates that were not characteristic of the established ITE rates for similar facilities. This data was one of the catalysts to this research study. It was determined, nevertheless, that this miscellaneous data would not be used for purposes of this study. New data was determined to provide consistent sampling procedures that would provide for reliable data and trip rates. The methodology was to collect data at selected sites using a systematic process.

The initial challenge was site selection. Each of the sample sites were specifically selected to meet certain variables. These variables for site selection included: community setting; adjacent roadway system classification; ancillary retail uses; free-standing or plaza setting; and representative sizes. Of the current 54 Food Markets, an initial list of 27 sites were selected using this criterion. This preliminary list was then refined based on consideration of number of access points, the ease of data collection process and if any construction activities were underway or scheduled for that site. The final list of 27 sites selected generically include:

Facility Type
- Free-Standing Food Markets..... 8
- Plaza Setting..... 19

Size
- Average Food Market..... 87,890 SF
- Range..... 21,400 - 123,500 SF
- Average Total Plaza..... 126,600 SF
- Plaza Range..... 30,700 - 349,000 SF

Community Setting
- Urban..... 6
- Suburban..... 19
- Rural..... 2

Location
- New York State
  - Rochester..... 10
  - Syracuse..... 7
  - Buffalo..... 6
- Pennsylvania..... 4

Site specific information for each of the selected sites is displayed in Table 1. The selected sites also include Food Markets in size resembling nationwide supermarket statistics for comparison purposes. This study will focus on the sites that exceed these statistics and are not clearly identified in the published ITE Trip Generation manual.

The sites located in a plaza setting typically are accompanied by another major retail tenant. The plaza setting samples can be classified as neighborhood, community and regional shopping centers. Associated retail tenants include: Wal-Mart, Target, Chase Pitkin (home improvement store), Service Merchandise, or Ames. In addition to these major tenants, an array of small (+5,000 square feet) commercial establishments accompany each of the sites:

- Banks (with and without drive-through)
- Pet stores
- Card shops
- Liquor stores
- Fast food / quality restaurants
- Drug stores / pharmacies

Part of the methodology was to determine when to collect the new data. The period that should be used in determining the appropriate design requirements for a proposed development is directly related to the type of land use and the traffic characteristics on the adjacent street system. In most cases, the traffic volume generated by the site combined with the traffic volume already on the adjacent street is highest during the traditional commuting peak hours.

As the study goal is to review trip generation and its impact on the adjacent roadway system, the typical adjacent roadway peak periods were chosen for analysis purposes. For commercial establishments the Friday evening peak period (4:00 - 6:00 PM) and the Saturday peak period (12:00 - 2:00 PM) are assessed. The pass-by assessment was completed concurrently with the trip generation data. The weekday generator peak hour will not be addressed in detail in this study. Data on the daily variation was collected and is displayed later in this report.

Table 1
Selected Study Sites

Location	Greater Metropolitan Area	Size			Adjacent Roadways	Community Setting
		Food Market	Retail	Total Plaza		
Mt. Hope Avenue	Rochester, NY	21,400	9,300	30,700	County Rd	Urban-City
East Avenue	Rochester, NY	41,350	3,000	44,350	City Street	Urban-City
E. Henrietta Road	Rochester, NY	57,050	0	57,050	State Rd	Urban-suburb
James Street	Syracuse, NY	58,600	0	58,600	County Rd	Urban-City
Dick Road	Buffalo, NY	64,900	0	64,900	County Rd	Urban-City
Fairmount Fair	Syracuse, NY	74,000	12,100	86,100	State Rd	Urban-suburb
Sheridan Drive	Buffalo, NY	90,050	0	90,050	State Rd	Urban-City
Williamsport	Williamsport, PA	92,000	0	92,000	County Rd	Urban-City
West Seneca	Buffalo, NY	90,700	0	90,700	State Rd	Urban-suburb
Losson Road	Buffalo, NY	105,850	0	105,850	State/County	Urban-suburb
Canandaigua	Rochester, NY	107,200	0	107,200	State Rd	Rural Comm.
Chili Paul Plaza	Rochester, NY	96,800	14,500	111,300	State Rd	Urban-suburb
Johnson City	Southern Tier, NY	115,950	0	115,950	County Rd	Urban-suburb
Peach Street	Erie, PA	119,800	0	119,800	State Rd	Urban-suburb
Dickson City	Scranton, PA	119,950	0	119,950	State Rd	Urban-suburb
Latta Road	Rochester, NY	89,800	31,550	121,350	State/County	Urban-suburb
Wilkes-Barre	Wilkes-Barre, PA	121,450	0	121,450	State Rd	Urban-suburb
Geneseo	Rochester, NY	73,150	73,100	146,250	State Rd	Rural Comm.
John Glenn	Syracuse, NY	66,700	79,750	146,450	State Rd	Urban-suburb
Onondaga	Syracuse, NY	105,300	48,300	153,600	County Rd	Urban-suburb
Taft Road	Syracuse, NY	81,900	76,000	157,900	County Rd	Urban-suburb
Transit-Maple	Buffalo, NY	81,000	81,000	162,000	State Rd	Urban-suburb
Alberta Drive	Buffalo, NY	91,000	85,000	176,000	Town Road	Urban-suburb
Holt Road	Rochester, NY	98,150	92,750	190,900	County Rd	Urban-suburb
Brockport	Rochester, NY	98,150	96,100	194,250	State Rd	Rural Comm.
Penfield Plaza	Rochester, NY	87,400	114,500	201,900	State Rd	Urban-suburb
Dewitt Plaza	Syracuse, NY	123,500	225,450	348,950	State Rd	Urban-suburb
Total Square Ft.		***2,373,100***	***1,042,400***	***3,415,500***		
Number of Sites		***27***	***16***	***27***		
Average Size		***87,890***	***65,150***	***126,500***		

DATA COLLECTION PROCESS

This section will focus on the process used in collecting the data for determining both the trip generation characteristics and the trip types.

Traffic Count Program

Once the study sites were selected, the process to obtain the necessary traffic volume data was determined. Several methods to obtain the traffic volume data were available. However, since the focus of the study is trip generation, accuracy was of primary emphasis with the selected method. The most cost effective method to obtain the most

amount of data is to obtain traffic volume counts using pneumatic tube counters. While this method would be preferred under any other circumstances, it has its drawbacks. For instance, some sites access design and configurations were not conducive to installation of tube counters. Older plazas that have virtually no throat length at the access points required manual peak hour counts to be performed.

Using aerial photographs of the selected sites, an assessment was made as to the most effective method to be used in the data collection process. Multiple sites were then tested prior to making final decision on the use of manual counts versus pneumatic counters. Pneumatic counters were installed at test sites. Manual counts were performed at the same sites and then the two were compared. Review of the data indicated that the pneumatic counters varied in reliability by -5% to +10% as compared to the manual counts at the same location. This variability was found to be unacceptable for the purpose of this study. Therefore, manual counts at all of the sites were performed. Tube counts were only performed to determine the daily variation at one of the sample sites.

Manual traffic counts at all access points to each of the 27 sites selected were obtained during the peak periods previously identified. Traffic volume information was collected in the months of March through August 1997. Except for two sites that were observed in November prior to the Holiday season.

Results of the traffic volume counts are displayed in Table 2 for both peak hours. A Wegmans Food Market (between 21,400 to 123,500 square feet) and it's associated retail tenants were found to generate approximately 1,059 vehicular trips during the Friday evening peak hour and 1,078 vehicular trips during the Saturday noon peak hour.

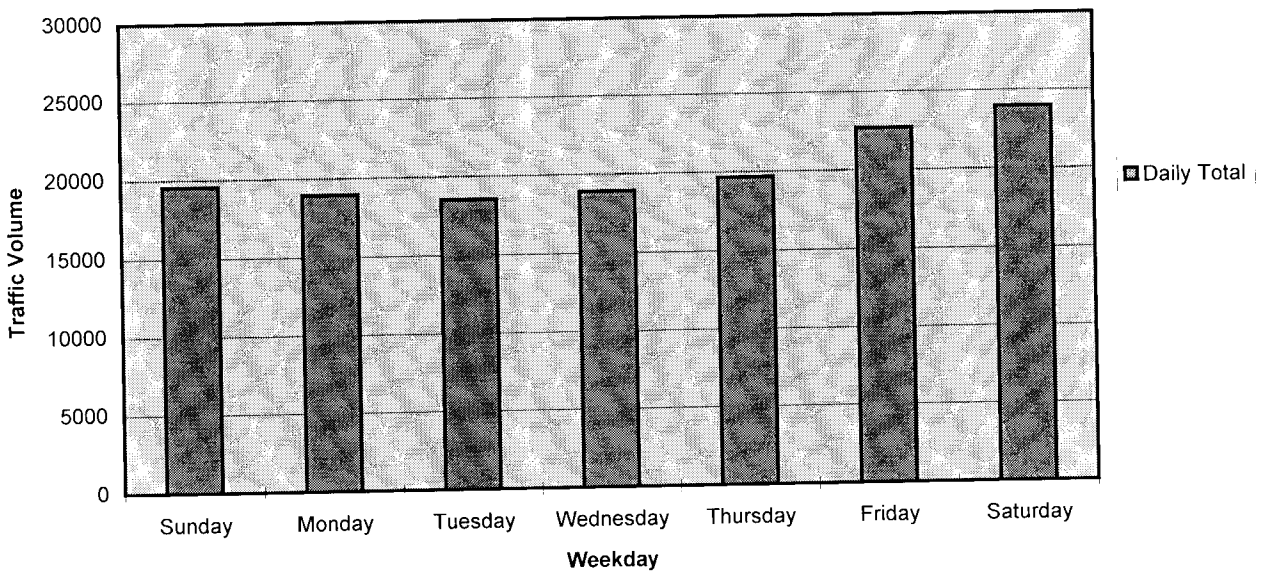
In addition, tube count information obtained at one of the sites over the course of a full week is displayed in Graph 1. This graph indicates and verifies that the peak generation periods for a retail plaza do occur on Friday and Saturday. The data obtained indicates that at typical Wegmans Food Market Plaza is generating approximately 22,700 vehicular trips per day (24-hours) on an average Friday and approximately 24,000 vehicular trips per day on an average Saturday. The Friday daily traffic volumes are approximately 19% higher than the average weekday of 19,000 vehicles per day. The Friday peak hour volumes were also found, for example, to be approximately 18% higher than the average weekday peak hour. Hence, while the average rates established in this report will reflect the worst case weekday traffic volumes (Friday conditions), it should be noted that volumes during the average weekday (Monday through Thursday) will be noticeably lower.

Table 2
Generated Volume Summary

Name	Region	Plaza Size (1000 SF)	Actual Generated Volumes	
			Friday	Saturday
Mt. Hope Avenue	Rochester	30.700	723	485
East Avenue	Rochester	44.350	949	898
E. Henrietta Road	Rochester	57.050	899	971
James Street	Syracuse	58.600	640	617
Dick Road	Buffalo	64.900	1285	1270
Fairmount	Syracuse	86.100	1035	947
Sheridan Drive	Buffalo	90.050	891	851
Williamsport	Pennsylvania	92.000	705	651
West Seneca	Buffalo	93.700	808	1079
Losson Road	Buffalo	105.850	770	787
Canandaigua	Rochester	107.200	1027	1037
Chili Paul Plaza	Rochester	111.300	1288	1235
Johnson City	Southern Tier	115.950	1227	1347
Peach Street	Pennsylvania	119.800	696	730
Dickson City	Pennsylvania	119.950	618	693
Latta Road	Rochester	121.350	1356	1274
Wilkes-Barre	Pennsylvania	121.450	759	836
Geneseo	Rochester	146.150	1235	1267
John Glenn	Syracuse	146.450	866	910
Onondaga	Syracuse	153.600	1102	1034
Taft Road	Syracuse	157.900	1307	1134
Transit-Maple	Buffalo	162.000	615	727
Alberta Drive	Buffalo	176.000	1684	1731
Holt Road	Rochester	190.900	1640	1759
Brockport	Rochester	194.250	1051	1236
Penfield Plaza	Rochester	201.900	1820	1920
Dewitt Plaza	Syracuse	348.950	1600	1712
		Average Volume	1059	1078

Note: Plaza size shown is reflective of total occupied space.

Graph 1
Daily Traffic Volumes (24-Hour)



Pass-By Survey Assessment Program

In a study of this nature it is just as acute to determine what type of trips that are being made. Are all of the trips generated primary trips, captured (pass-by) trips or diverted trips? While primary and diverted trips can be clustered together as new trips to the adjacent roadway system, captured trips should not. The ITE definitions of the various trip types are as follows:

- *Captured Trip (Pass-by):* In case of a new development, particularly retail establishments, certain restaurants, banks, service stations, and convenience markets, trips are attracted from the passing traffic on adjacent streets – that is, traffic already "passing by" the site.

- *Diverted Linked Trip:* Trips that are produced from the traffic volume on roadways within the vicinity of the generator and require a diversion from that roadway to another roadway with access to the site. These roadways could include streets or freeways adjacent to the generator but without access to the generator.

- *Primary Trip:* Trips with the specific purpose of visiting the generator. These trips are typically referred to as new trips to a facility.

When forecasting trips based on the trip generation rates or equations, adjustments are made to account for those trips already on the adjacent highway. The effects of a development at the access points are based on the total trips generated by the facility; the effects of such development on adjacent street network should be based on an adjusted forecast to account for captured (pass-by) and diverted trips. Hence, the magnitude of the captured trips is crucial in determining the required off-site highway improvements associated with any development site. To quantify trip types, customer surveys were performed. This survey was conducted at five of the selected Food Market locations. The pass-by surveys were concurrently performed with the manual traffic counts during the Friday evening and Saturday peak periods.

The pass-by survey was developed to ask customers their origin, destination, duration of visit, and whether their trip had a single or multi-purpose function. A sample size was chosen based on the typical traffic volumes entering a site. Generally a ten percent sample was targeted.

The customer surveys were performed as interviews. Each of the customers were interviewed by engineering staff properly trained in asking and documenting the proper response. The forms were not given out for individuals to respond. The personal interviews assured the proper understanding of the question hence providing a better response. With conducting personal interviews, a 100% return rate is achieved and the data is available upon completion of the interview.

In all, over 850 customer surveys were completed during the Friday evening peak period and 950 surveys during the Saturday peak period at five Food Market sites.

DATA ANALYSIS AND INTERPRETATION

Development of Trip Generation Rates

Local transportation authorities over the last couple of years have required that trips associated with a Food Market be estimated using ITE "Supermarket" rates. If other retail components were proposed in conjunction with the Food Market, "Shopping Center" rates were acceptable to estimate trips only to the additional retail components. What happens, however, is that the average Wegmans Food Market is significantly larger than the average ITE Supermarket. The average Wegmans Food Market is 89,150 square feet as compared to the average ITE Supermarket of 43,000 square feet. The combination of using the ITE Supermarket rates for the Food Market and ITE Shopping Center rates for the remaining retail components of the plaza typically project

volumes at high rates. Using Supermarket rates for the stand alone Food Markets have also shown to overestimate trip generation.

In order to compare the new data obtained in this study, it is necessary to transform the data points into common units. The ITE Trip Generation manual has two methods in developing these common units. There are weighted average rates and equations developed for selected independent variables. Other land uses in the Trip Generation manual have independent variables of land area in acres, number of employees, and square feet of building size. The independent variable associated with retail operations is gross square feet or gross leasable area.

The fundamental and elementary display of the data obtained is a plot of trip ends versus a related independent variable for each individual study or observation. The independent variable for this study was chosen to be size of the Food Market or plaza in 1,000 gross square feet increments. This same information is displayed in a scatter gram form similar to those published in the Trip Generation manual. The next step in the development of trip generation rates is to assume that a specific mathematical relationship exists between trip ends and the related independent variable. Statistically, regression analysis provides a tool for developing an equation that defines the line that best fits through the data points on a scatter gram.

The development of an equation allows a direct calculation of forecasted trip ends based on the independent variable of the proposed development. This eliminates differences of opinion arising from interpolating a plot of individual data points. The correlation coefficient (R) is a measure of the degree of association or closeness of the relation between dependent and independent variables. The coefficient of determination (R^2) is the percent of the variance in number of the trips associated with the variance in the size of the independent variable. For example, an R value of 0.8 results in an R^2 of 0.64, which is to say that 64 percent of the variance in the number of trips generated is accounted for by the variance in the size of the independent variable. Therefore, the closer the R^2 value is to 1.0, the better the relationship between the number of trips and size of the independent variable. ITE in the 6th edition of the Trip Generation manual states that if the R^2 is less than 0.5, an equation will not be provided and the average rates should be used for estimating trips.

With 27 sample sites, an attempt was made to develop a fitted curve equation for the above noted graphs. Both a linear and logarithmic regression analysis were calculated. Both equations, however, produced an R^2 of less than 0.5. This means that both types of equations (linear or logarithmic) did not meet the needs of the relationship between the number of trips and size of the independent variable.

The traditional method of calculating forecasted trips has been to apply a weighted average trip generation rate. The weighted average rate takes into account the variations in size of the Food Markets, weighting the rates based on the size of the stores. The standard deviation, is a measure of how widely dispersed the data points are around the calculated average; the less dispersion the better. The approximated standard deviations are typically provided for uses, independent variable and trip time periods with three or more data points. Graphically, use of the rate simply assumes a linear relationship between trip ends and the independent variable, with the straight line passing through the origin and having a slope equal to the average rate. The average trip generation rates displayed in this report are calculated on the basis of a weighted average trip rate.

Calculations on the trip rates were analyzed and produced some surprising results. The trip rates per 1,000 square feet of plaza were calculated for all 27 sites. The individual trip generation rates for each site where then used to develop the weighted average trip rate per 1,000 square feet. This weighted average rate should be used in estimating trips to a new or expanded Food Market or Plaza. The weighted average rate is calculated by summing the total number of trips generated by the sites and dividing by the sum of the total square feet of the Food Markets. Calculations on the number of trips per 1,000 square feet for each Food Market are shown in Table 3.

These rates were then compared to the ITE Shopping Center rates (typically used in estimating trips at new sites) and the combination Supermarket and Shopping Center rates so recently required by some local authorities. One of the noticeable trends was the disparity in the trip rates for Food Markets of 65,000 square feet or less versus the larger stores. The weighted average rates for Food Markets totaling 65,000 square feet or less were almost double compared to those Food Markets exceeding 65,000 square feet during both peak periods.

The trip generation rates for Food Markets less than 65,000 square feet clearly are at levels above and beyond the levels projected by either of the ITE Shopping Center rates or the Supermarket rates. Since the focus of this investigation is to evaluate trip generation patterns associated with Food Markets in size above the national average, no additional analysis was performed with the Food Markets of 65,000 square feet or less. Wegmans Food Markets are predominantly greater than 80,000 square feet in average size and typically in a plaza setting. Research into the trip generation characteristics of Food Markets greater than 65,000 square feet, which constituted 22 of the 27 selected sites, was progressed.

The trip generation rates at the 22 sites had a standard deviation of 3.1 for the evening and Saturday peak hours. Based on guidelines provided by ITE, standard deviations of

Table 3
Site Summary

Location	Plaza Size (1,000 sf)	Friday Peak Hour			Saturday Peak Hour		
		Actual Rate	Supermarket Rate	Shopping Ctr. Rate	Actual Rate	Supermarket Rate	Shopping Ctr. Rate
Mt. Hope Ave.	30.70	23.55	10.01	9.38	15.80	11.30	13.17
East Ave.	44.35	21.40	11.11	8.28	20.25	11.94	11.58
E.Henrietta Rd.	57.05	15.76	11.51	7.60	17.02	12.25	10.61
James St.	58.60	10.92	11.51	7.53	10.53	12.25	10.51
Dick Rd.	64.90	19.80	11.51	7.27	19.26	12.25	10.14
Fairmount Fair	86.10	12.02	10.52	6.61	11.00	11.39	9.19
Sheridan Dr.	90.05	9.89	11.51	6.51	9.45	12.25	9.05
Williamsport	92.00	7.66	11.51	6.46	7.08	12.25	8.98
West Seneca	93.70	8.62	11.28	6.42	11.52	12.04	8.92
Losson Rd.	105.85	7.27	11.51	6.16	7.44	12.25	8.55
Canandaigua	107.20	9.58	11.51	6.13	9.67	12.25	8.51
Chili Paul Pl.	111.30	11.57	10.54	6.05	11.10	11.38	8.40
Johnson City	115.95	10.56	11.51	5.97	11.62	12.25	8.28
Peach St.	119.80	5.81	11.51	5.91	6.09	12.25	8.19
Dickson City	119.95	5.15	11.51	5.90	5.78	12.25	8.19
Latta Rd.	121.35	11.17	9.58	5.88	10.50	10.52	8.15
Wilkes-Barre	141.45	6.25	11.51	5.88	6.88	12.25	8.15
Geneseo	146.15	8.45	7.78	5.52	8.67	8.90	7.64
John Glenn	146.45	5.91	7.48	5.52	6.21	8.64	7.63
Onondaga	153.60	7.17	9.09	5.43	6.73	10.03	7.51
Taft Rd	157.90	8.28	7.86	5.38	7.18	8.94	7.44
Transit-Maple	162.00	3.80	7.71	5.33	4.48	8.80	7.37
Alberta Dr.	176.00	7.43	7.78	5.18	9.38	8.83	7.16
Holt Rd.	190.90	8.59	7.71	5.04	9.21	8.74	6.96
Bockport	194.25	5.41	7.63	5.01	6.36	8.67	6.92
Penfield Pl.	201.90	9.01	7.08	4.94	9.51	8.17	6.82
Dewitt Pl.	348.95	4.59	6.11	4.11	4.91	7.11	5.64
Weighted Average Rates							
>65,000 Sf Food Market		**7.50**	9.03	5.55	**7.85**	9.99	7.69

less than 100% of the average rate are considered good. The average rates calculated were 7.50 and 7.85 for the evening and Saturday respectively, with the standard deviation being less than 110%. Therefore the data used to calculate the average rates have an acceptable standard deviation and will provide reliable results.

A closer look was then taken at how the average rates varied against other site characteristics. Rates were compared for free-standing versus plaza settings, regional location, community setting, and adjacent roadway classification to identify other trends. Table 4 shows the results of this investigation.

Table 4 -
Factors Contributing to Trip Generation Rates

Criteria Affecting Trip Generation Rates	Number of Stores Fitting Criteria	Average Friday Rate	Average Saturday Rate
Food Market under 65,000 SF	5	17.59	16.51
Food Market over 65,000 SF	22	7.50	7.85
Free Standing Food Market	13	9.47	9.86
Food Market in Plaza	14	7.61	7.76
Buffalo area stores	6	8.20	9.16
Pennsylvania area stores	4	6.13	6.42
Rochester area stores	10	9.95	10.03
Southern Tier area stores	1	10.56	11.62
Syracuse area stores	6	6.88	6.68
City Setting	7	10.70	10.09
Suburban Setting	17	7.86	8.24
Rural setting	3	7.40	7.91
State route adjacent to store	17	7.43	7.80
Local/County streets adjacent to store	10	10.03	9.98

Table 4 above, shows some interesting trends in the trip rates. For example, the Food Markets located in city settings typically generate at higher rates than their suburban counter parts. This can be a factor of the higher density development typically found in a city versus a suburban setting. Free-standing Food Markets with no additional retail components also generate at higher rates then Food Markets in plaza settings. While all of this information is of value in assessing contributing factors, the overall average rates should be used. It is not recommended that, for example, trip generation rates be used by region due to the small sample size within each region.

TRAVEL CHARACTERISTICS ASSESSMENT

Another issue of consequence in identifying the number of trips a site will generate is pass-by or captured trips. Not all trips generated are new to the surrounding highway network. A percentage of the traffic will be captured from traffic already passing the site, traveling to and from other destinations (i.e., home, work, other shopping). This traffic is traveling on the highway system whether or not this site is fully occupied or re-developed, and is referred to as "pass-by" or "captured" traffic.

While information on pass-by traffic is readily available for shopping centers from ITE, little information is available for Food Markets, especially such as Wegmans. Identifying the percentage of pass-by trips during both peak hours is as paramount as determining the overall trip generation rates.

Of the 20 selected sites over 65,000 square feet, five were chosen for an in depth customer survey to determine travel patterns and characteristics. Since the trends in new Food Markets are ones over 80,000 square feet within a plaza setting, the pass-by survey targeted sites with these characteristics. The five sites selected for the survey were:

Store	Food Market (sf)	Total Plaza (sf)
Dewitt	123,500	348,950
Latta Road	89,800	121,350
Onondaga	105,300	153,600
Penfield	87,400	201,900
Transit-Maple	81,000	162,000

The customer surveys were performed during the Friday evening peak hours and Saturday peak hours between July 11, 1997, through August 16, 1997. An attempt was made to interview approximately 200 customers per peak period at each site. A combined total for all sites of over 850 surveys were performed during the Friday evening peak period and 950 surveys were performed during the Saturday peak period. The data was summarized in the Access data base for easy retrieval and query of information. Graphs 2 and 3 show the general overall responses to the customer survey questions during both peak periods. These responses are averaged over the five sites selected.

Some of the interesting points to consider in the overall survey results are the diverted trips documented and the distance of the market draw. During both periods, 80 to 90% of the respondents did not divert from their normal travel route to stop at the Food Market. At the same time, 48% of all trips recorded during the Friday evening peak hour were primary trips. This could be concluded that approximately 32% of the total trips were pass-by or captured trips. During the Saturday peak period, 70% of the trips recorded were primary trips. Leaving an average of approximately 19% of the total trips

being pass-by trips. Table 5 summarizes the various trip component summaries for each site and the averages.

The second interesting observation is the market draw. Overall, the average Food Market is drawing its customers from a five miles radius or less. The magnitude of the Food Markets size has prompted the question of regional market pull. In new market areas, local jurisdictions are not familiar with Wegmans Food Markets or supermarkets of this size. Of the five sites studied, only one site had an average market draw of a ten mile radius. This Food Market however, due to its regional location in a fairly new market area, is drawing at twice the market area from the rest of the sites.

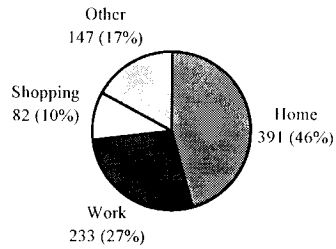
Table 5
Trip Components Summary

Location	Peak Period	Food Market (1000 sf)	Total Plaza Size (1000 sf)	Interviews Performed	Average Trip Length (miles)	Mean Trip Length (miles)	Adjacent Street Average Daily Traffic	New Trips (percent)	Diverted Trips (percent)	Pass-by (percent)
Penfield	Friday	87.4	201.9	148	4.9	3.0	25,800	55%	13%	32%
	Saturday			150	4.8	3.0		85%	2%	13%
Latta	Friday	89.8	121.35	200	3.9	3.0	11,800	47%	14%	38%
	Saturday			199	4.0	3.0		71%	12%	17%
Dewitt	Friday	123.5	348.95	155	10.7	7.0	46,000	44%	30%	26%
	Saturday			204	8.9	6.0		63%	17%	20%
Onondaga	Friday	105.3	153.6	200	3.9	3.0	17,500	48%	19%	33%
	Saturday			197	4.0	3.0		73%	6%	21%
Transit	Friday	81.0	162.0	150	7.0	5.0	24,200	46%	23%	31%
	Saturday			200	6.0	4.0		59%	19%	22%
Average	*Friday*	*97.4*	*197.56*		*6.08*	*4.2*	*25060*	*48%*	*20%*	*32%*
	Saturday				*5.54*	*3.8*		*70%*	*11%*	*19%*

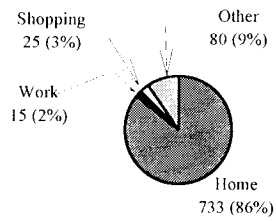
Graph 2

Pass-By Survey Summary
Friday Evening Peak Hour

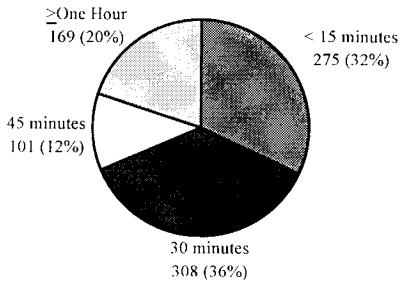
Where did you come from?



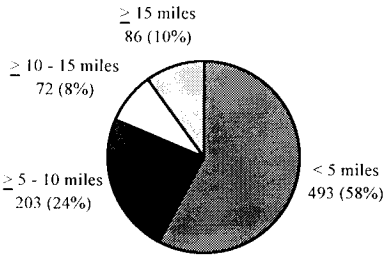
Where are you going?



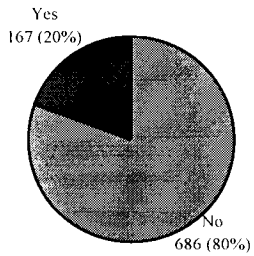
How long will you be at Wegmans?



How far do you live from Wegmans?



Was it necessary to change your travel route?

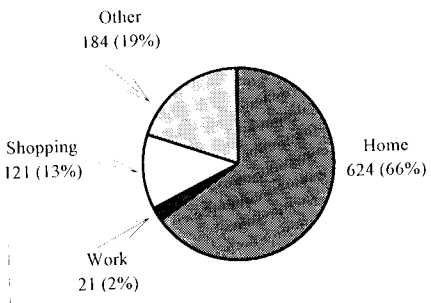


Graph 3

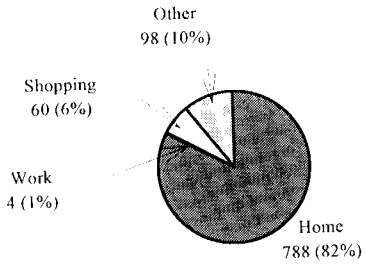
Pass-By Survey Summary

Saturday Peak Hour

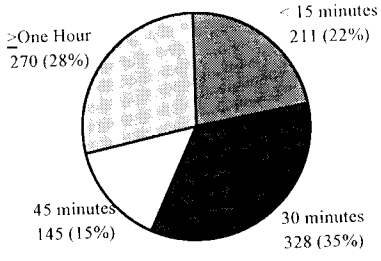
Where did you come from?



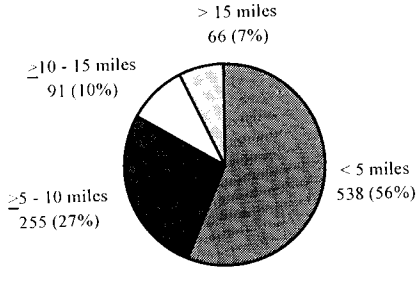
Where are you going?



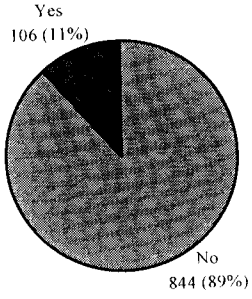
How long will you be at Wegmans?



How far do you live from Wegmans?



Was it necessary to change your travel route?



RECOMMENDATIONS & CONCLUSION

The objective of this study was to measure the actual travel characteristics and trip generation patterns associated with a Wegmans Food Market. A secondary objective was to compare these characteristics to published land use categories by the Institute of Transportation Engineers.

As a result of this study, it is recommended that the average rates calculated based on the 22 sample sites in excess of 65,000 square feet be used in estimating trips to be generated by a new or expanded Wegmans Food Market. The Friday evening peak hour average trip generation rate was calculated to be **7.50** trips per 1,000 square feet. The Saturday peak hour average trip generation rate was found to be **7.85** trips per 1,000 square feet.

In addition to these average trip generation rates, it is recommended that pass-by and diverted trip adjustments be considered in estimating trips to a plaza. The customer survey results indicated that the average pass-by trips attracted to a Food Market is approximately **32%** during the Friday evening peak hour, and **19%** during the Saturday peak hour. The average new trips to a Food Market during the Friday evening peak hour were found to be 48% and 70% during the Saturday peak hour.

To conclude, this study establishes the actual trip generation and travel characteristics associated with a Food Market in excess of 65,000 square feet. In comparison to the documented ITE Trip Generation land uses, the Supermarket rates should not be used for facilities in excess of 65,000 square feet. The ITE Supermarket rates will consistently over estimate the trips to be generated by such a facility.

REFERENCES

1) Institute of Transportation Engineers, 6th edition, Trip Generation, Washington, D.C., 1997.
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BUILDING SUMMARY:	
SUPERMARKET	115,000 SF
RETAIL-A	11,600 SF
RETAIL-B	12,400 SF
RETAIL-C	8,450 SF
RETAIL-D	11,200 SF
RETAIL-E	11,200 SF
RETAIL-F	38,000 SF
JUNIOR-G	12,700 SF
JUNIOR-H	12,150 SF
FITNESS	80,000 SF
MEDICAL	125,000 SF
C-STORE	5,500 SF
REST-A	4,500 SF
REST-B	5,000 SF
TOTAL	452,700± SF

REED ROAD

SPROUL ROAD

STORM WATER BASIN

SUPERMARKET ±115,000 SF 752 SPACES

RETAIL-F 38,000± SF

JUNIOR - G 12,700± SF

JUNIOR - H 12,150± SF

MEDICAL 41,667 SF (1ST FLR.) 41,667 SF (2ND FLR.) 41,667 SF (3RD FLR.) 125,000± SF TOTAL

FITNESS 40,000 SF (1ST FLR.) 40,000 SF (2ND FLR.) 80,000± SF TOTAL 422 SPACES

RETAIL-E 11,200± SF

RETAIL-D 11,200± SF

RETAIL-C 8,450± SF

REST-A 4,500± SF

122 SPACES

RETAIL-B 12,400 SF

RETAIL-A 11,600 SF

REST-B 5,000± SF

C-STORE 5,500± S.F.

C-STORE 12 PUMPS

PROPOSED SIGNAL

D'ANDRA

120 0 60 120

SCALE IN FEET

arna ENGINEERING CIVIL ENGINEERS

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F: 215.434.5280

Project

SPRINGFIELD COMMERCIAL

BLOCK No. ###, LOT No. ###

MARPLE TOWNSHIP
DELAWARE COUNTY PENNSYLVANIA

Drawing Title

CONCEPT PLAN

SIGNATURE
PROFESSIONAL XXXXXXXXXX
STATE LIC. No. XXXXX

NO.	DATE	COMMENTS
1.	12-12-2017	REVISED PLAN

REVISIONS

Project No.	230000201
Date	12-07-2017
Scale	1" = 120'
Drawn By	AG
Checked By	CT

Drawing No.

CP 29

Sheet ### of ###

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