
TECHNICAL MEMORANDUM

TO: Michael Johnson, PLA, ASLA/SmithGroup

FROM: Bridget Bienkowski, PE, PTOE/Wade Trim

DATE: 11-02-2021

RE: Y-Lot Development – Area Plan Traffic and Multimodal Evaluation

INTRODUCTION

A new residential/commercial development is proposed for the existing Y-lot, on the north side of E. William Street between S. Fourth Avenue and E. Fifth Avenue in the City of Ann Arbor. The new site location is shown in the red box below, taken from the SmithGroup Public Presentation.

Figure 1. Proposed Site Location.



The purpose of this analysis is to provide a high level traffic and multimodal trip analysis, with the intent of the study to provide an abstract level of evaluation to meet the City of Ann Arbor preliminary Area Plan requirements. This includes developing a basic traffic evaluation for the additional trips generated by the development for multimodal travel and estimation of the trip distribution most likely to occur based on existing traffic and multimodal patterns in the transportation network surrounding the site. This analysis does not include detailed level of effort required for the Site Plan review phase, which may require a full traffic impact study as the project plans progress into final stages of design.

EXISTING CONDITIONS

The existing site is a permit-only parking lot. E. William Street is a two-way street that run east/west consisting of one lane in each direction and a two-way cycle track on the north side. S. Fourth Avenue is a two-way street that runs north/south to the west of the site. The site is bounded on the east by S. Fifth Avenue, a one-way southbound only street with parking spaces on the east side and a bus pull off to the west side. Ann Arbor Area Transportation Authority (AAATA) The Ride's large transit center bus hub is located the north of the site.

Due to a large-scale decrease in motorized vehicle traffic volumes imposed by the current pandemic, pre-COVID traffic counts were used in this analysis to provide an estimate for typical traffic patterns surrounding the site. Traffic counts were provided by the City of Ann Arbor that were taken in November 2019. Additional traffic counts taken by Quality Counts for the William Street Study and First/Ashley Two-Way conversion study were also used to fill in gaps in the 2019 data.

PROPOSED DEVELOPMENT

The new development conceptually consists of the following:

- 370 total housing units (inclusive of 145 affordable units)
- 5,685 sq ft of retail space
- 7,348 sq ft of office space

These numbers are based on the conceptual plans at this moment in time; however, modifications to the concepts may require changes in the unit count which will be finalized in the next phase of design – the Site Plan. There is no off street parking and no planned vehicular access to the site, with the exception of loading/unloading zones. It is anticipated that pedestrians will enter the building off of E. William Street, and there will also be bicycle parking off of E. William Street. The concept plan recommends a mix of standard horizontal bike parking with hoops and some vertical wall mounted parking. With no access for vehicles, it was discussed with the DDA that one-half of the vehicles would use the Fourth and William Parking Deck (on the northwest quadrant of S. Fourth Ave and E. William St) and one-half of the vehicles would use the Library Lane Deck (on S. Fifth Ave south of E. Liberty St). Per the DDA staff, parking permits are currently available at the two Parking Decks and the DDA has a long term parking permit policy that addresses requests for long term parking contracts, specifically for development that provides substantial community benefit projects, such as affordable housing units.

As part of the PUD Area Plan Development, SmithGroup has coordinated some of the assumptions necessary for the project. For the purposes of this submittal, it was assumed that parking needs will be evenly distributed between the two nearby parking facilities. The justification for this is provided in the SmithGroup October 7, 2021 memo. No on-site parking is required for the first 400% FAR per zoning. Per zoning, parking is only required for any non-affordable square footage between the 400% and 900% delta. For this project, the total required parking by zoning is approximately 90 spaces. Current PUD assumes working with the DDA to secure parking permits in nearby parking structures to accommodate parking needs. The project location directly adjacent to the City's transit hub and two existing parking structures provides a unique opportunity to promote sustainable growth while increasing affordable housing units in the community.

The October 7, 2021 memo also provides evaluation/justification that the identified nearby parking facilities have or will have capacity to meet the parking needs of proposed project: "Per DDA staff, parking permits are currently available at two of the nearby parking facilities, the Fourth & William structure, and the Library Lane garage. Availability fluctuates based on demand; current COVID recovery conditions may not reflect future demand. It is important to note, however, the DDA is a committed partner with the AAHC in accomplishing the City's goal of increasing the number of affordable housing units in the community. The DDA has a long-term parking permit policy that addresses requests for long-term parking contracts. Criteria for considering such requests include encouraging development that provides substantial community benefit specifically projects that create affordable housing units."

MULTIMODAL GENERATED TRIPS

New multimodal trips for walking, biking, transit and motor vehicle generated by the proposed residential development were estimated based on information and procedures contained in the Institute of Transportation Engineer's (ITE) report *Trip Generation, Tenth Edition*. With unknown businesses going into the development, conservative land uses were used to generate the trips which yield greater numbers of trips per use:

- Land Use Code 222 – Multifamily Housing (High-Rise) was used to estimate the trips for the proposed housing units.
- Land Use Code 710– General Office Building was used to estimate the trips for the proposed office space.
- Land Use Code 820 – Shopping Center was used to estimate the trips for the proposed retail space.

Using the ITE Trip Generation Manual for a dense multi-use urban setting, the number of person trips per peak period of the adjacent roadway were generated for the three land uses. Next, the internal trips were calculated based on the standard practice of using the NCHRP 8-51 Internal Trip Capture Estimation Tool spreadsheet, shown in Appendix B. This spreadsheet provides the percentage of internal trips from one land use to a different land use type. The internal trips include the portion of trips that start and end within the development (i.e., a resident in one of the housing units going to work in the

office on the ground floor space) and therefore, never use the external roadway system. These trips were removed from the generated trips. Finally, the trips generated for each land use were then sorted into mode choice-walking, transit, bicycle, or a vehicle.

The mode choice percentages were provided in the ITE Trip Generation Manual. Currently, ITE does not provide any data for affordable housing units. However, understanding that income may play a role in mode choice, trip generation values were estimated based on data developed in the *Affordable Housing Trip Generation Strategies and Rates* (2018) by CalTrans study on affordable housing. With little data available on affordable housing trip generation in ITE or other reports, the CalTrans study was used as income does play a role in mode choice, it's a better prediction of trips generated from affordable housing units than the standard ITE Trip Generation Manual. The data was used to predict the modal choices for the trips generated by the estimated 145 affordable housing units. Using the above method, Table 1 shows the estimated generated multimodal new trips for the Y-Lot:

Table 1. Multimodal Trip Generation								
TOTAL TRIPS	ENTER				EXIT			
GENERATED TRIPS	Walk	Transit	Bicycle	Vehicle	Walk	Transit	Bicycle	Vehicle
AM Peak Hour	23	13	2	39	62	42	5	117
PM Peak Hour	50	26	4	82	37	21	3	71
INTERNAL CAPTURE TRIPS	ENTER				EXIT			
AM Peak Hour	4	1	0	3	5	2	0	5
PM Peak Hour	24	12	2	34	16	9	1	27
NET TRIPS	ENTER				EXIT			
AM Peak Hour	19	12	2	36	57	40	5	112
PM Peak Hour	26	14	2	48	21	12	2	44

As stated above, internal trips were captured based on the NCHRP report and removed from the generated trips. The internal trip capture from the NCHRP 8-51 report is provided in Table 1. These trips were removed from the generated trips based on the internal capture estimations and represent the maximum number of trips if no internal trips are made.

For a future Site Plan evaluation, the number of internal trips will be discussed with the City of Ann Arbor Traffic Department to determine a realistic amount based on the NCHRP report, land use of the proposed development, and engineering judgement. For the purposes of this analysis, the internal capture trips have been removed based on the standard practice guidelines as described above.

The calculations for generating trips are included in Appendix A.

SURROUNDING TRANSPORTATION NETWORK

Based on a review of the road network adjacent to the proposed site and conversations with the City of Ann Arbor traffic engineering department, the impact area for this study was identified. Being a high level traffic evaluation, no additional data collection was included as part of this analysis. Traffic counts taken in 2019 provided by the City of Ann Arbor, 2017 counts from the William Street project, and various counts from the MDOT's Transportation Data Management System were all used to populate the study area with volumes. As recent counts are not available on Liberty Street, the Liberty Street area was not included as part of the scope this study but may be included in a future Site Plan evaluation. Due to the parking being off site, two midblock crossings were included in the estimations: one crossing somewhere on Fifth Avenue and one crossing on Fourth Avenue. These crossing currently do not exist, but it is likely that the future needs will include potential crossings somewhere on these two streets based on the proposed development. Exact locations and treatments for these crosswalks may be included in a future Site Plan evaluation.

Other elements impacting the transportation network were addressed in the October 7, 2021 Smithgroup memo including the following:

- Evaluation and justification for design exceptions: "The Area Plan includes an 18-foot service lane and 35-foot dedicated bus lane with four (4) off-street bus bays. A shared bus and service lane was not acceptable to AAATA's operations. The increased driveway width is needed to accommodate large vehicle turning movements, including buses, solid waste trucks, a typical 2-bedroom capacity rental moving vehicle, and WB-40 semi-truck for a possible commercial use, as shown on CS103 and CS104. The service lane also includes a 3 FT egress path to allow for egress from the P1 and P2 stair towers. The AAATA also had specific requirements for the bus lane dimensions to accommodate multiple configurations for the bus bays to be determined at Site Plan. Modification to the maximum driveway width requirements is one of the primary drivers for the rezoning from D-1 to PUD."
- Propose pedestrian crossing treatments at site access intersections: "Shown on CU102, pedestrian sidewalks will carry through the drive aprons associated with the site access intersections thus providing a visual cue for vehicles that the drive aprons are not solely for vehicular access. Additionally, pavement markings could be added to the drives alerting motorists exiting the site that a pedestrian crossing exists. When more detailed design begins, AAATA will be engaged to discuss their requirements for drive aprons accessing their facilities and these will be coordinated with pedestrian movements across the site access intersections."
- Coordination with other significant projects: "The DDA's Fourth Avenue project is currently in conceptual design phase and has not be revised since the Spring 2021 Public Engagement. While the proposed concept increases the adjacent sidewalk and provides for more on-street bus loading, the design doesn't change the overall number of lanes and it doesn't change configuration at intersections. It does propose new speed tables which slowing but do not inhibit the flow of vehicular traffic while also allowing for pedestrian crossing. The Fourth Avenue project will impact the site by improving the pedestrian and transit rider experience."

The Fourth Avenue project has not involved any additional traffic counts or modeling to be included in the study. In the long term, Fourth and Fifth may provide for transit leading signals between Liberty and Huron to help the flow of buses to and from the Blake Transit Center.”

METHODOLOGY

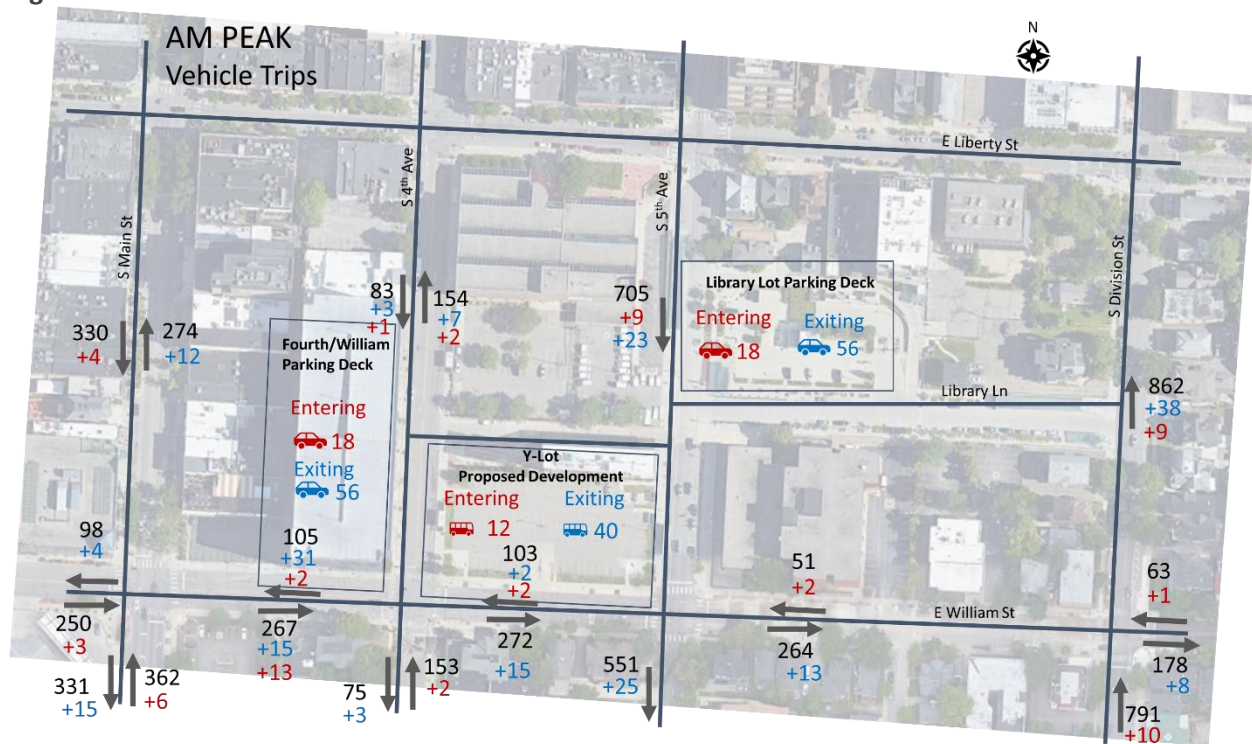
These intersection volumes were used to find the volumes at the entrance and exit points into the study area network. The total number of vehicles entering the network was calculated. The percentage of vehicles at each entrance point of the network were calculated to find the distribution of where vehicles are currently entering the study area. The same process was applied to vehicles exiting the network for the AM and PM peak hours, and the process was repeated for bicycle and pedestrian trips. This provided an outline for where the existing vehicle, bicycle, and pedestrian traffic is currently entering and exiting the network.

TRIP DISTRIBUTION

Trip distribution for the generated trips for the site was determined based on existing peak hour traffic volumes on the study area roadways. Using the same enter/exit percentages calculated using the existing volumes, the generated trips were distributed to the network. The resultant trip distribution for the proposed development is shown in Figures 2 through 5. It is important to note that the pedestrian trips will show a larger volume than what was generated using ITE. This is due to the additional pedestrian trips required from a person parking a vehicle and then walking from the garage to the proposed development.

As discussed in the SmithGroup memo, at this time, the on-site transit layout and operations have not been finalized. Therefore, it was assumed that existing transit stops/routes will be used, and trips were not distributed. Once the transit operations are finalized with AATA, the bus trips can be analyzed. This may also include additional pedestrian/bicycle trips from the bus stop to the proposed development depending on the final location of transit stops.

Figure 2. AM Peak vehicle distribution.



Note: The transit trips are not distributed in the network since it is assumed the trips will occur on already existing routes/stops.

Figure 3. AM Peak pedestrian/bicycle distribution.

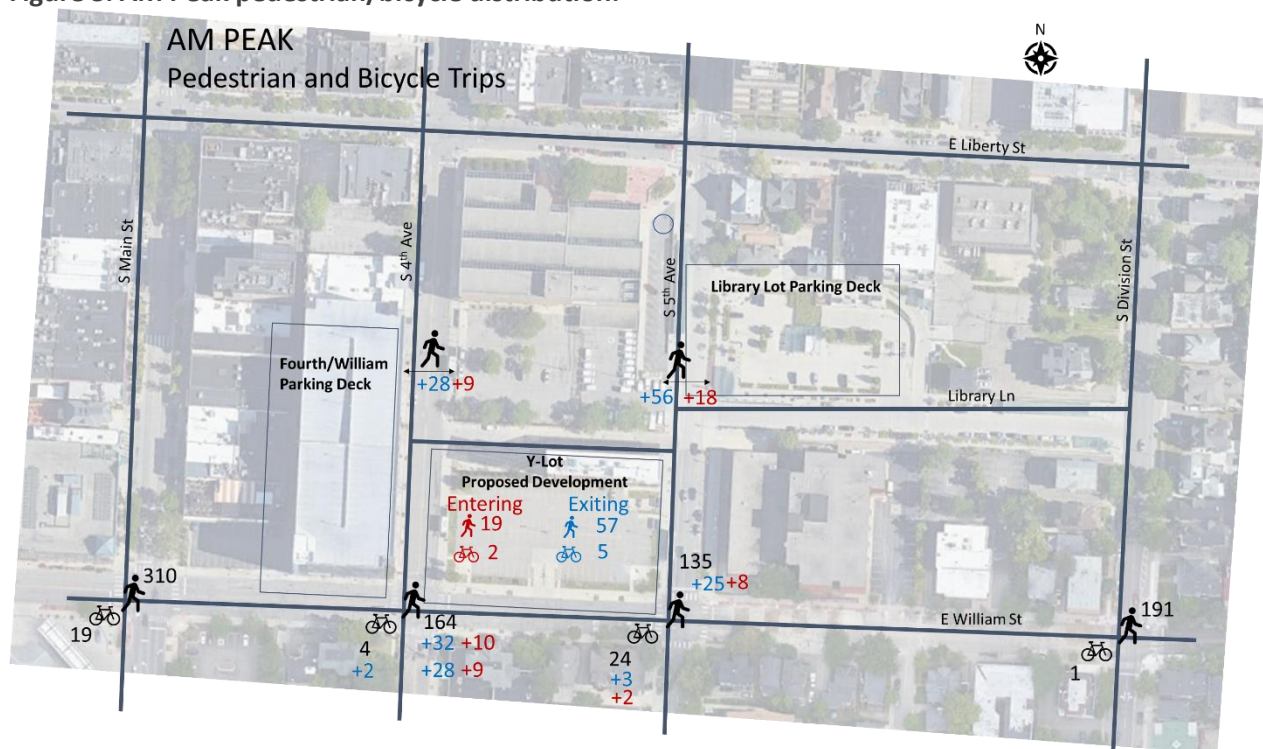
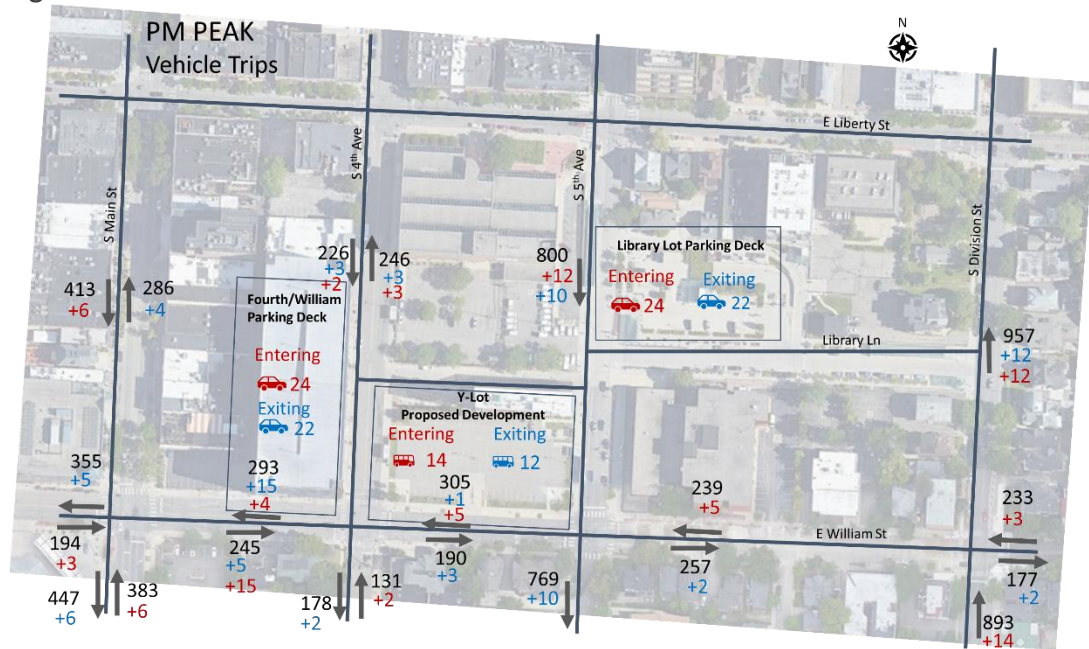


Figure 4. PM Peak vehicle distribution.



Note: The transit trips are not distributed in the network since it is assumed the trips will occur on already existing routes/stops.

Figure 5. PM Peak pedestrian/bicycle trip distribution.



Without intersection pedestrian/bicycle volumes at each study location, the nonmotorized trips were not further distributed throughout the network at a microscopic level, but were evaluated in high level terms of percentages. As shown in Figure 2, the AM Peak period experiences about a 1.3% increase in vehicle trips entering the network and an increase 4.4% increase in vehicle trips exiting the network. As shown in Figure 4, the PM Peak period experiences about a 1.5% increase in vehicle trips entering the network and a 1.3% increase in vehicle trips exiting the network.

CONCLUSION

With the development of the proposed Y-lot building, there will be additional transit, vehicle, bicycle, and pedestrian trips on the network surrounding the development. The purpose of this analysis was to provide a high level assessment estimating additional trips expected on the surrounding roadway network for each mode.

Based on this high level assessment, there less than 5% increase in any direction of traffic for either peak period, engineering judgment was used to determine that multimodal trips are expected to have moderate impacts to the adjacent transportation network; however, detailed traffic modeling and corresponding intersection Levels of Service were not required to be evaluated at this phase in development. Using the ITE Trip Generation Manual and distributing the trips throughout the network using existing traffic patterns, the following is the new estimated volume information:

- AM Peak Period
 - 36 vehicle entering trips, with 1.3% increase in vehicle trips entering the immediate adjacent roadway network of S. Main St, S. Fourth Ave, S. Fifth Ave, S. Division St and E. William S.
 - 112 vehicle exiting trips, with 4.4% increase in vehicle trips exiting the network
 - 76 (19 entering, 57 exiting) pedestrian trips plus the additional trips from transit and parking vehicles offsite
 - 7 (2 entering/5 exiting) bicycle trips
 - 52 transit trips (12 entering/40 exiting)
- PM Peak Period
 - 48 vehicle entering trips, with 1.5% increase in vehicles trips entering the immediate adjacent roadway network of S. Main St, S. Fourth Ave, S. Fifth Ave, S. Division St and E. William S.
 - 44 vehicle exiting trips, with 1.3% increase in vehicle trips exiting the network
 - 47 (26 entering, 21 exiting) pedestrian trips plus the additional trips from transit and parking vehicles offsite
 - 4 (2 entering/2 exiting) bicycle trips
 - 26 transit trips (14 entering/12 exiting)

Once the final design is set, the traffic evaluation will proceed to include Site Plan level details.

APPENDIX A: TRIP GENERATION CALCULATIONS

APPENDIX B: INTERNAL CAPTURE TRIPS

Table 7.2a Adjusted Internal Trip Capture Rates for Trip Destinations within a Multi-Use Development

Land Use Pairs		Weekday	
		AM Peak Hour	PM Peak Hour
To OFFICE	From Office	0.0%	0.0%
	From Retail	4.0%	31.0%
	From Restaurant	14.0%	30.0%
	From Cinema/Entertainment	0.0%	6.0%
	From Residential	3.0%	57.0%
	From Hotel	3.0%	0.0%
To RETAIL	From Office	32.0%	8.0%
	From Retail	0.0%	0.0%
	From Restaurant	8.0%	50.0%
	From Cinema/Entertainment	0.0%	4.0%
	From Residential	17.0%	10.0%
	From Hotel	4.0%	2.0%
To RESTAURANT	From Office	23.0%	2.0%
	From Retail	50.0%	29.0%
	From Restaurant	0.0%	0.0%
	From Cinema/Entertainment	0.0%	3.0%
	From Residential	20.0%	14.0%
	From Hotel	6.0%	5.0%
To CINEMA/ENTERTAINMENT	From Office	0.0%	1.0%
	From Retail	0.0%	26.0%
	From Restaurant	0.0%	32.0%
	From Cinema/Entertainment	0.0%	0.0%
	From Residential	0.0%	0.0%
	From Hotel	0.0%	0.0%
To RESIDENTIAL	From Office	0.0%	4.0%
	From Retail	2.0%	46.0%
	From Restaurant	5.0%	16.0%
	From Cinema/Entertainment	0.0%	4.0%
	From Residential	0.0%	0.0%
	From Hotel	0.0%	0.0%
To HOTEL	From Office	0.0%	0.0%
	From Retail	0.0%	17.0%
	From Restaurant	4.0%	71.0%
	From Cinema/Entertainment	0.0%	1.0%
	From Residential	0.0%	12.0%
	From Hotel	0.0%	0.0%

Table 7.1a Adjusted Internal Trip Capture Rates for Trip Origins within a Multi-Use Development			
Land Use Pairs		Weekday	
		AM Peak Hour	PM Peak Hour
From OFFICE	To Office	0.0%	0.0%
	To Retail	28.0%	20.0%
	To Restaurant	63.0%	4.0%
	To Cinema/Entertainment	0.0%	0.0%
	To Residential	1.0%	2.0%
	To Hotel	0.0%	0.0%
From RETAIL	To Office	29.0%	2.0%
	To Retail	0.0%	0.0%
	To Restaurant	13.0%	29.0%
	To Cinema/Entertainment	0.0%	4.0%
	To Residential	14.0%	26.0%
	To Hotel	0.0%	5.0%
From RESTAURANT	To Office	31.0%	3.0%
	To Retail	14.0%	41.0%
	To Restaurant	0.0%	0.0%
	To Cinema/Entertainment	0.0%	8.0%
	To Residential	4.0%	18.0%
	To Hotel	3.0%	7.0%
From CINEMA/ENTERTAINMENT	To Office	0.0%	2.0%
	To Retail	0.0%	21.0%
	To Restaurant	0.0%	31.0%
	To Cinema/Entertainment	0.0%	0.0%
	To Residential	0.0%	8.0%
	To Hotel	0.0%	2.0%
From RESIDENTIAL	To Office	2.0%	4.0%
	To Retail	1.0%	42.0%
	To Restaurant	20.0%	21.0%
	To Cinema/Entertainment	0.0%	0.0%
	To Residential	0.0%	0.0%
	To Hotel	0.0%	3.0%
From HOTEL	To Office	75.0%	0.0%
	To Retail	14.0%	16.0%
	To Restaurant	9.0%	68.0%
	To Cinema/Entertainment	0.0%	0.0%
	To Residential	0.0%	2.0%
	To Hotel	0.0%	0.0%