Memorandum

To: Chris Boyce
Lyndsey Arute

Date: September 20, 2021

From: Marcus Coenen, AICP, PTP

RE: Hilldale Development TDM

Project Information

- **Property:** 200 block of Price Place
- **Use:** Residential + Commercial (Retail, Hotel)
- **No. of DUs:** 120
- **Retail Floor Area:** 107,332 sq. ft.
- **Hotel Rooms:** 90
- **Proposed Parking Capacity:** 314 stalls (Residential: 126 stalls; Commercial: 188 stalls)
- **Commercial Parking Minimum:** 335 stalls (Retail: 1 per 400 sq. ft.; Hotel: 0.75 per room)

TDM Requirements

	Small	**Low-Medium**	**Medium**	**High-15Medium**	**Large**
Residential	**10-25 du**	**25-50 du**	**50-100 du**	**100-150 du**	**150+ du**
Parking Stalls per DU	Mitigation Points required				
< 0.5	5	8	10	12	15
0.5 - 0.99	10	12	15	18	20
1.0 - 1.49	15	18	20	22	25
1.49 - 2.0	20	22	25	28	30
2.0 - 2.5	25	28	30	32	35
2.5 +	30	32	35	38	40

Commercial	Under 40K	40-100K sqft	100-200K sqft	200K+ sqft
Under parking minimums	no TDM	8	10	15
1 - 1.25 X parking minimum	no TDM	10	15	20
1.25 - 1.5 X PM	10	15	20	25
1.5 - 1.75 X PM	15	20	25	30
1.75 - 2 X PM	20	25	30	35
2+ X PM	25	30	35	40

Proposed TDM Measures

Measure Code	Measure	Points Achieved	
		Residential	Commercial
Basic-1	TDM coordinator and pay program fee	1	1
Basic-2	Pedestrian path to sidewalk	1	1
Basic-3	Bike parking	1	1
AT-1	Enhanced access to bike parking Option A: Segregated access to bike parking with no stairs	1	-
AT-2	No drive aisle crossing	1	-
AT-4	Bike user facilities Option B: Bike Maintenance Facilities	1	1
AT-6	Bike share Option A: Develop a bike share station	5	5
IC-2	Multimodal wayfinding signs	1	1
LU-2	Location efficiency	3	1
LU-3	Add LU Mix Option B: Three Land Uses	4	-
LU-6	Quarter-mile of all-day bus service	3	3
P-1	Priced Parking Program Option C: Unbundled for Residential	5	-
	Total	27	14

Memorandum

To: Chris Boyce
Lyndsey Arute

Date: September 20, 2021

From: Marcus Coenen, AICP, PTP
Scott Anderson, PE

RE: Hilldale Development Trip Generation

The BMO Harris Bank location at 216 Price Place adjacent to the Hilldale Shopping Center is being redeveloped into a mixed use complex that will provide complementary uses to the existing shopping center located north of Kelab Drive/Heather Crest. The redevelopment plan also includes two improvements located north of the main site and north of Kelab Drive/Heather Crest. The northern development includes a new retail building and the redevelopment of the AMC Theater to retail uses. This memo will provide a review of traffic trip generation for the previous use (bank/office) and the proposed mix of uses to demonstrate the expected change in daily and peak hour trips into the site.

Executive Summary

- Previous uses include office and multiplex movie theater with varying peak hour trips.
- New uses include retail, hotel, and residential with more daily trips than previous uses.
- After factoring internal capture and multimodal uses, peak hour external vehicle trips are similar to previous use peak hour trips.
- Trip distribution for residential trips will likely reduce vehicle trips through intersections on Kelab Drive/Heather Crest

Previous Uses

The BMO Harris Bank building is currently unoccupied as the operations previously housed at the bank were moved across Vernon Boulevard to a redeveloped site that allowed for a more compact footprint. The BMO Harris Bank building at 216 Price Place is approximately 150,000 square feet and primarily functions as an office. The AMC Theater was a six screen facility. Trip generation estimates for the site were developed based on available *ITE Trip Generation Manual, 10th Edition* data. **Table 1** presents trip generation estimates for the two previous uses.

Table 1. Trip Generation for Previous Uses

ITE Code		710	445	Total
Quantity		150	6	
Unit		kSF	Screens	
Land Use		General Office Building	Multiplex Movie Theater	
Daily	Rate	9.74	-	
	Total	1461	-	1461
	Entering	730	-	730
	Exiting	731	-	731
AM Peak	Rate	1.16	-	
	Total Trips	174	-	174
	Entering	150	-	150
	Exiting	24	-	24
PM Peak	Rate	1.15	13.73	
	Total Trips	173	82	255
	Entering	28	42	70
	Exiting	145	40	185
Saturday Peak	Rate	0.53	65.07	
	Total Trips	80	390	470
	Entering	43	203	246
	Exiting	37	187	224

Proposed Uses

The proposed uses for the redeveloped sites include hotel, multifamily housing, and a mix of retail, restaurant, and office uses. As the mix of uses in the retail space may include a mix of retail stores (department, specialty, etc.) the ITE "Shopping Center" land use was identified for the retail calculations. Additionally, the development team is examining the feasibility of three options for the second and third stories above the retail units of the primary buildings. Trip generation estimates for the three options for the site were developed based on available *ITE Trip Generation Manual, 10th Edition* data.

Table 2 presents trip generation estimates for the first development option that includes retail, residential, and a hotel.

Table 2. Trip Generation for Land Use Option One

Building		100	200	300	400	200/300	Residential	Total
ITE Code		820	820	820	820	310	221	
Quantity		29	16.8	44.6	16.8	90	125	
Unit		kSF	kSF	kSF	kSF	Rooms	DU	
Land Use		Shopping Center	Shopping Center	Shopping Center	Shopping Center	Hotel	Multifamily Housing (Mid-Rise)	
Daily	Rate	37.75	37.75	37.75	37.75	8.36	5.44	
	Total	1095	634	1684	634	752	680	5479
	Entering	547	317	842	317	376	340	2739
	Exiting	548	317	842	317	376	340	2740
AM Peak	Rate	0.94	0.94	0.94	0.94	0.47	0.36	
	Total Trips	27	16	42	16	42	45	188
	Entering	17	10	26	10	25	12	100
	Exiting	10	6	16	6	17	33	88
PM Peak	Rate	3.81	3.81	3.81	3.81	0.60	0.44	
	Total Trips	110	64	170	64	54	55	517
	Entering	53	31	82	31	28	34	259
	Exiting	57	33	88	33	26	21	258
Saturday Peak	Rate	4.5	4.5	4.5	4.5	0.72	0.44	
	Total Trips	131	76	201	76	65	55	604
	Entering	68	39	104	39	36	27	313
	Exiting	63	37	97	37	29	28	291

Table 3 presents trip generation estimates for the second development option that includes retail, residential, and office.

Table 3. Trip Generation for Land Use Option Two

Building		100	200	300	400	200/300	Residential	Total
ITE Code		820	820	820	820	710	221	
Quantity		29	16.8	29.5	16.8	60	125	
Unit		kSF	kSF	kSF	kSF	kSF	DU	
Land Use		Shopping Center	Shopping Center	Shopping Center	Shopping Center	Office	Multifamily Housing (Mid-Rise)	
Daily	Rate	37.75	37.75	37.75	37.75	8.36	5.44	
	Total	1095	634	1114	634	586	680	4743
	Entering	547	317	557	317	293	340	2371
	Exiting	548	317	557	317	293	340	2372
AM Peak	Rate	0.94	0.94	0.94	0.94	0.47	0.36	
	Total Trips	27	16	28	16	71	45	203
	Entering	17	10	17	10	61	12	127
	Exiting	10	6	11	6	10	33	76
PM Peak	Rate	3.81	3.81	3.81	3.81	0.6	0.44	
	Total Trips	110	64	112	64	70	55	475
	Entering	53	31	54	31	12	34	215
	Exiting	57	33	58	33	58	21	260
Saturday Peak	Rate	4.5	4.5	4.5	4.5	0.72	0.44	
	Total Trips	131	76	133	76	33	55	504
	Entering	68	39	69	39	18	27	260
	Exiting	63	37	64	37	15	28	244

Table 4 presents trip generation estimates for the third development option that includes retail and residential. Residential uses in the third option are located in the planned residential structure and above the primary retail buildings (200 and 300).

Table 4. Trip Generation for Land Use Option Three

Building		100	200	300	400	200/300	Residential	Total
ITE Code		820	820	820	820	710	221	
Quantity		29	16.8	29.5	16.8	50	125	
Unit		kSF	kSF	kSF	kSF	DU	DU	
Land Use		Shopping Center	Shopping Center	Shopping Center	Shopping Center	Multifamily Housing (Mid-Rise)	Multifamily Housing (Mid-Rise)	
Daily	Rate	37.75	37.75	37.75	37.75	8.36	5.44	
	Total	1095	634	1114	634	272	680	4429
	Entering	547	317	557	317	136	340	2214
	Exiting	548	317	557	317	136	340	2215
AM Peak	Rate	0.94	0.94	0.94	0.94	0.47	0.36	
	Total Trips	27	16	28	16	19	45	151
	Entering	17	10	17	10	5	12	71
	Exiting	10	6	11	6	14	33	80
PM Peak	Rate	3.81	3.81	3.81	3.81	0.6	0.44	
	Total Trips	110	64	112	64	23	55	428
	Entering	53	31	54	31	14	34	217
	Exiting	57	33	58	33	9	21	211
Saturday Peak	Rate	4.5	4.5	4.5	4.5	0.72	0.44	
	Total Trips	131	76	133	76	23	55	494
	Entering	68	39	69	39	11	27	253
	Exiting	63	37	64	37	12	28	241

Internal Capture

Due to the mix of uses within the proposed development options and the proximity of the various retail uses on the redevelopment site, there is likely to be interaction between the various retail buildings that would potentially reduce the number of trips entering the site. Based on this assumptions, an internal capture analysis was completed for the proposed redevelopment site. The larger Hilldale Shopping Center will also likely provide internal capture trips on the larger mixed use site, but uses outside the proposed developments were not included in the analysis.

Trip generation estimates shown above were adjusted for the internal capture of trips based on the NCHRP Report 684 guidance. For midday and Saturday trips, adjustments are completed using PM peak hour worksheets. Internal capture adjustment analyses are provided in the

appendix. Vehicle occupancy was estimated at one person per vehicle, while transit use and non-motorized were estimated at nine (9) percent of trips and five (5) percent of trips.[1]

Table 5 presents the internal capture results for land use development option one.

Table 5. Internal Capture and Multimodal Trip Estimates Option One

		ITE Estimate	Internal Trips	External Trips – Vehicle	External Trips – Transit	External Trips – Non-Motorized
Daily	Total	5479	826	4002	419	232
	Entering	2739	413	2000	210	116
	Exiting	2740	413	2002	209	116
AM Peak	Total Trips	188	4	159	15	10
	Entering	100	2	85	8	5
	Exiting	88	2	74	7	5
PM Peak	Total Trips	517	70	383	41	23
	Entering	259	35	192	21	11
	Exiting	258	35	191	20	12
Saturday Peak	Total Trips	604	72	458	47	27
	Entering	313	36	238	25	14
	Exiting	291	36	220	22	13

Table 6 presents the internal capture results for land use development option two.

[1] Based on current commuting reports by the Madison Area MPO for transit and bicycle commuting.

Table 6. Internal Capture and Multimodal Trip Estimates Option Two

		ITE Estimate	Internal Trips	External Trips – Vehicle	External Trips – Transit	External Trips – Non-Motorized
Daily	Total	4743	826	3370	352	195
	Entering	2371	413	1684	176	98
	Exiting	2372	413	1686	176	97
AM Peak	Total Trips	203	12	162	18	11
	Entering	127	6	103	11	7
	Exiting	76	6	59	7	4
PM Peak	Total Trips	475	86	335	35	19
	Entering	215	43	148	16	8
	Exiting	260	43	187	19	11
Saturday Peak	Total Trips	504	64	378	39	23
	Entering	260	32	196	20	12
	Exiting	244	32	182	19	11

Table 7 presents the internal capture results for land use development option two.

Table 7. Internal Capture and Multimodal Trip Estimates Option Three

		ITE Estimate	Internal Trips	External Trips – Vehicle	External Trips – Transit	External Trips – Non-Motorized
Daily	Total	4429	786	3133	328	182
	Entering	2214	393	1566	164	91
	Exiting	2215	393	1567	164	91
AM Peak	Total Trips	151	0	129	14	8
	Entering	71	0	60	7	4
	Exiting	80	0	69	7	4
PM Peak	Total Trips	428	70	308	32	18
	Entering	217	35	157	16	9
	Exiting	211	35	151	16	9
Saturday Peak	Total Trips	494	68	366	39	21
	Entering	253	34	188	20	11
	Exiting	241	34	178	19	10

Trip Distribution Considerations

An additional consideration related to how existing/previous use conditions are likely to vary from proposed uses include how trips will be distributed from the site. The existing land uses are primarily accessed via Kelab Drive/Heather Crest or Price Place. In the proposed redevelopment plan, Kelab Drive/Heather Crest and Price Place will continue to be primary access corridors for the retail and hotel uses. The proposed residential use has a right-in/right-out access planned on Vernon Boulevard to support entry/exit of the parking facility under the residential structure. An additional entrance into the residential parking will be located on Price Place. Based on these two access locations, it is unlikely that traffic will regularly use Kelab Drive/Heather Crest to support the residential use.

Conclusion

Based on trip generation estimates for the two previous uses on the redevelopment site, traffic volumes varied between the AM Peak and PM Peak hours. The office use attracted more trips in the AM Peak than a movie theater, but during the theater's operating hours theater bound trips increased. Additionally, the theater brought more trips to the area on Saturday than the office use across the street.

The estimated trip generation for the proposed options for the mixed-use facility will have an impact on the level of traffic at the site but may not have large impacts during the peak hours. In the AM Peak, the proposed external vehicle trip generation is lower than the previous office use in all three options. In the PM Peak, the proposed land uses have a higher trip count, but the mix of entering and exiting traffic is more even. Estimated external PM Peak trips are between 53 and 128 trips greater than the estimate for the previous uses.

Table 8. Existing and Proposed Trip Generation Comparison

		Existing	Option 1	Option 2	Option 3
		ITE Estimate	ITE Estimate (External Vehicle Trips)	ITE Estimate (External Vehicle Trips)	ITE Estimate (External Vehicle Trips)
Daily	Total	**1461**	5479 (4002)	4743 (3370)	4429 (3133)
	Entering	**730**	2739 (2000)	2371 (1684)	2214 (1566)
	Exiting	**731**	2740 (2002)	2372 (1686)	2215 (1567)
AM Peak	Total Trips	**174**	188 (159)	203 (162)	151 (129)
	Entering	**150**	100 (85)	127 (103)	71 (60)
	Exiting	**24**	88 (74)	76 (59)	80 (69)
PM Peak	Total Trips	**255**	517 (383)	475 (335)	428 (308)
	Entering	**70**	259 (192)	215 (148)	217 (157)
	Exiting	**185**	258 (191)	260 (187)	211 (151)
Saturday Peak	Total Trips	**470**	604 (458)	504 (378)	494 (366)
	Entering	**246**	313 (238)	260 (196)	253 (188)
	Exiting	**224**	291 (220)	244 (182)	241 (178)

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	Hilldale	**Organization:**	Snyder & Associates
Project Location:	Madison, WI	**Performed By:**	Marcus Coenen
Scenario Description:	Option 1	**Date:**	9/20/2021
Analysis Year:		**Checked By:**	
Analysis Period:	**Daily Street**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail				4047	2023	2024
Restaurant				0		
Cinema/Entertainment				0		
Residential				680	340	340
Hotel				752	376	376
All Other Land Uses[2]				0		
Total				5479	2739	2740

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office	1.00	9%	5%	1.00	9%	5%
Retail	1.00	9%	5%	1.00	9%	5%
Restaurant	1.00	9%	5%	1.00	9%	5%
Cinema/Entertainment	1.00	9%	5%	1.00	9%	5%
Residential	1.00	9%	5%	1.00	9%	5%
Hotel	1.00	9%	5%	1.00	9%	5%
All Other Land Uses[2]	1.00	9%	5%	1.00	9%	5%

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	156	64
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	143	0	0		10
Hotel	0	40	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	5,479	2,739	2,740
Internal Capture Percentage	15%	15%	15%
External Vehicle-Trips[3]	4,002	2,000	2,002
External Transit-Trips[4]	419	210	209
External Non-Motorized Trips[4]	232	116	116

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	9%	11%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	46%	45%
Hotel	20%	11%

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	Hilldale	**Organization:**	Snyder & Associates
Project Location:	Madison, WI	**Performed By:**	Marcus Coenen
Scenario Description:	Option 1	**Date:**	9/20/2021
Analysis Year:		**Checked By:**	
Analysis Period:	**AM Street Peak Hour**	**Date:**	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail				101	63	38
Restaurant				0		
Cinema/Entertainment				0		
Residential				45	12	33
Hotel				42	25	17
All Other Land Uses[2]				0		
Total				188	100	88

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office	1.00	9%	5%	1.00	9%	5%
Retail	1.00	9%	5%	1.00	9%	5%
Restaurant	1.00	9%	5%	1.00	9%	5%
Cinema/Entertainment	1.00	9%	5%	1.00	9%	5%
Residential	1.00	9%	5%	1.00	9%	5%
Hotel	1.00	9%	5%	1.00	9%	5%
All Other Land Uses[2]	1.00	9%	5%	1.00	9%	5%

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	0	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	2	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	188	100	88
Internal Capture Percentage	2%	2%	2%
External Vehicle-Trips[3]	159	85	74
External Transit-Trips[4]	15	8	7
External Non-Motorized Trips[4]	10	5	5

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	3%	0%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	0%	0%
Hotel	0%	12%

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	Hilldale	**Organization:**	Snyder & Associates
Project Location:	Madison, WI	**Performed By:**	Marcus Coenen
Scenario Description:	Option 1	**Date:**	9/20/2021
Analysis Year:		**Checked By:**	
Analysis Period:	**PM Street Peak Hour**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail				408	197	211
Restaurant				0		
Cinema/Entertainment				0		
Residential				55	34	21
Hotel				54	28	26
All Other Land Uses[2]				0		
Total				517	259	258

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office	1.00	9%	5%	1.00	9%	5%
Retail	1.00	9%	5%	1.00	9%	5%
Restaurant	1.00	9%	5%	1.00	9%	5%
Cinema/Entertainment	1.00	9%	5%	1.00	9%	5%
Residential	1.00	9%	5%	1.00	9%	5%
Hotel	1.00	9%	5%	1.00	9%	5%
All Other Land Uses[2]	1.00	9%	5%	1.00	9%	5%

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	16	5
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	9	0	0		1
Hotel	0	4	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	517	259	258
Internal Capture Percentage	14%	14%	14%
External Vehicle-Trips[3]	383	192	191
External Transit-Trips[4]	41	21	20
External Non-Motorized Trips[4]	23	11	12

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	7%	10%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	47%	48%
Hotel	21%	15%

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	Hilldale	**Organization:**	Snyder & Associates
Project Location:	Madison, WI	**Performed By:**	Marcus Coenen
Scenario Description:	Option 1	**Date:**	9/20/2021
Analysis Year:		**Checked By:**	
Analysis Period:	**Saturday Street Peak Hour**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail				484	250	234
Restaurant				0		
Cinema/Entertainment				0		
Residential				55	27	28
Hotel				65	36	29
All Other Land Uses[2]				0		
Total				604	313	291

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office	1.00	9%	5%	1.00	9%	5%
Retail	1.00	9%	5%	1.00	9%	5%
Restaurant	1.00	9%	5%	1.00	9%	5%
Cinema/Entertainment	1.00	9%	5%	1.00	9%	5%
Residential	1.00	9%	5%	1.00	9%	5%
Hotel	1.00	9%	5%	1.00	9%	5%
All Other Land Uses[2]	1.00	9%	5%	1.00	9%	5%

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	12	6
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	12	0	0		1
Hotel	0	5	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	604	313	291
Internal Capture Percentage	12%	12%	12%
External Vehicle-Trips[3]	458	238	220
External Transit-Trips[4]	47	25	22
External Non-Motorized Trips[4]	27	14	13

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	7%	8%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	44%	46%
Hotel	19%	17%

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	Hilldale	**Organization:**	Snyder & Associates
Project Location:	Madison, WI	**Performed By:**	Marcus Coenen
Scenario Description:	Option 2	**Date:**	9/20/2021
Analysis Year:		**Checked By:**	
Analysis Period:	**Daily Street**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				586	293	293
Retail				3477	1738	1739
Restaurant				0		
Cinema/Entertainment				0		
Residential				680	340	340
Hotel				0		
All Other Land Uses[2]				0		
Total				4743	2371	2372

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office	1.00	9%	5%	1.00	9%	5%
Retail	1.00	9%	5%	1.00	9%	5%
Restaurant	1.00	9%	5%	1.00	9%	5%
Cinema/Entertainment	1.00	9%	5%	1.00	9%	5%
Residential	1.00	9%	5%	1.00	9%	5%
Hotel	1.00	9%	5%	1.00	9%	5%
All Other Land Uses[2]	1.00	9%	5%	1.00	9%	5%

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		59	0	0	6	0
Retail	35		0	0	156	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	14	143	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	4,743	2,371	2,372
Internal Capture Percentage	17%	17%	17%
External Vehicle-Trips[3]	3,370	1,684	1,686
External Transit-Trips[4]	352	176	176
External Non-Motorized Trips[4]	195	98	97

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	17%	22%
Retail	12%	11%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	48%	46%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	Hilldale	**Organization:**	Snyder & Associates
Project Location:	Madison, WI	**Performed By:**	Marcus Coenen
Scenario Description:	Option 2	**Date:**	9/20/2021
Analysis Year:		**Checked By:**	
Analysis Period:	**AM Street Peak Hour**	**Date:**	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				71	61	10
Retail				87	54	33
Restaurant				0		
Cinema/Entertainment				0		
Residential				45	12	33
Hotel				0		
All Other Land Uses[2]				0		
Total				203	127	76

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office	1.00	9%	5%	1.00	9%	5%
Retail	1.00	9%	5%	1.00	9%	5%
Restaurant	1.00	9%	5%	1.00	9%	5%
Cinema/Entertainment	1.00	9%	5%	1.00	9%	5%
Residential	1.00	9%	5%	1.00	9%	5%
Hotel	1.00	9%	5%	1.00	9%	5%
All Other Land Uses[2]	1.00	9%	5%	1.00	9%	5%

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		3	0	0	0	0
Retail	2		0	0	0	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	1	0	0	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	203	127	76
Internal Capture Percentage	6%	5%	8%
External Vehicle-Trips[3]	162	103	59
External Transit-Trips[4]	18	11	7
External Non-Motorized Trips[4]	11	7	4

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	5%	30%
Retail	6%	6%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	0%	3%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	Hilldale	**Organization:**	Snyder & Associates
Project Location:	Madison, WI	**Performed By:**	Marcus Coenen
Scenario Description:	Option 2	**Date:**	9/20/2021
Analysis Year:		**Checked By:**	
Analysis Period:	**PM Street Peak Hour**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				70	12	58
Retail				350	169	181
Restaurant				0		
Cinema/Entertainment				0		
Residential				55	34	21
Hotel				0		
All Other Land Uses[2]				0		
Total				475	215	260

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office	1.00	9%	5%	1.00	9%	5%
Retail	1.00	9%	5%	1.00	9%	5%
Restaurant	1.00	9%	5%	1.00	9%	5%
Cinema/Entertainment	1.00	9%	5%	1.00	9%	5%
Residential	1.00	9%	5%	1.00	9%	5%
Hotel	1.00	9%	5%	1.00	9%	5%
All Other Land Uses[2]	1.00	9%	5%	1.00	9%	5%

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		12	0	0	1	0
Retail	4		0	0	16	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	1	9	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	475	215	260
Internal Capture Percentage	18%	20%	17%
External Vehicle-Trips[3]	335	148	187
External Transit-Trips[4]	35	16	19
External Non-Motorized Trips[4]	19	8	11

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	42%	22%
Retail	12%	11%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	50%	48%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	Hilldale	**Organization:**	Snyder & Associates
Project Location:	Madison, WI	**Performed By:**	Marcus Coenen
Scenario Description:	Option 2	**Date:**	9/20/2021
Analysis Year:		**Checked By:**	
Analysis Period:	**Saturday Street Peak Hour**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				33	18	15
Retail				416	215	201
Restaurant				0		
Cinema/Entertainment				0		
Residential				55	27	28
Hotel				0		
All Other Land Uses[2]				0		
Total				504	260	244

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office	1.00	9%	5%	1.00	9%	5%
Retail	1.00	9%	5%	1.00	9%	5%
Restaurant	1.00	9%	5%	1.00	9%	5%
Cinema/Entertainment	1.00	9%	5%	1.00	9%	5%
Residential	1.00	9%	5%	1.00	9%	5%
Hotel	1.00	9%	5%	1.00	9%	5%
All Other Land Uses[2]	1.00	9%	5%	1.00	9%	5%

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		3	0	0	0	0
Retail	4		0	0	12	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	1	12	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	504	260	244
Internal Capture Percentage	13%	12%	13%
External Vehicle-Trips[3]	378	196	182
External Transit-Trips[4]	39	20	19
External Non-Motorized Trips[4]	23	12	11

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	28%	20%
Retail	7%	8%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	44%	46%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	Hilldale	**Organization:**	Snyder & Associates
Project Location:	Madison, WI	**Performed By:**	Marcus Coenen
Scenario Description:	Option 3	**Date:**	9/20/2021
Analysis Year:		**Checked By:**	
Analysis Period:	**Daily Street**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail				3477	1738	1739
Restaurant				0		
Cinema/Entertainment				0		
Residential				952	476	476
Hotel				0		
All Other Land Uses[2]				0		
Total				4429	2214	2215

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office	1.00	9%	5%	1.00	9%	5%
Retail	1.00	9%	5%	1.00	9%	5%
Restaurant	1.00	9%	5%	1.00	9%	5%
Cinema/Entertainment	1.00	9%	5%	1.00	9%	5%
Residential	1.00	9%	5%	1.00	9%	5%
Hotel	1.00	9%	5%	1.00	9%	5%
All Other Land Uses[2]	1.00	9%	5%	1.00	9%	5%

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	219	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	174	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	4,429	2,214	2,215
Internal Capture Percentage	18%	18%	18%
External Vehicle-Trips[3]	3,133	1,566	1,567
External Transit-Trips[4]	328	164	164
External Non-Motorized Trips[4]	182	91	91

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	10%	13%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	46%	37%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	Hilldale	**Organization:**	Snyder & Associates
Project Location:	Madison, WI	**Performed By:**	Marcus Coenen
Scenario Description:	Option 3	**Date:**	9/20/2021
Analysis Year:		**Checked By:**	
Analysis Period:	**AM Street Peak Hour**	**Date:**	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail				87	54	33
Restaurant				0		
Cinema/Entertainment				0		
Residential				64	17	47
Hotel				0		
All Other Land Uses[2]				0		
Total				151	71	80

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office	1.00	9%	5%	1.00	9%	5%
Retail	1.00	9%	5%	1.00	9%	5%
Restaurant	1.00	9%	5%	1.00	9%	5%
Cinema/Entertainment	1.00	9%	5%	1.00	9%	5%
Residential	1.00	9%	5%	1.00	9%	5%
Hotel	1.00	9%	5%	1.00	9%	5%
All Other Land Uses[2]	1.00	9%	5%	1.00	9%	5%

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	0	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	151	71	80
Internal Capture Percentage	0%	0%	0%
External Vehicle-Trips[3]	129	60	69
External Transit-Trips[4]	14	7	7
External Non-Motorized Trips[4]	8	4	4

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	0%	0%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	0%	0%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	Hilldale	**Organization:**	Snyder & Associates
Project Location:	Madison, WI	**Performed By:**	Marcus Coenen
Scenario Description:	Option 3	**Date:**	9/20/2021
Analysis Year:		**Checked By:**	
Analysis Period:	**PM Street Peak Hour**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail				350	169	181
Restaurant				0		
Cinema/Entertainment				0		
Residential				78	48	30
Hotel				0		
All Other Land Uses[2]				0		
Total				428	217	211

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office	1.00	9%	5%	1.00	9%	5%
Retail	1.00	9%	5%	1.00	9%	5%
Restaurant	1.00	9%	5%	1.00	9%	5%
Cinema/Entertainment	1.00	9%	5%	1.00	9%	5%
Residential	1.00	9%	5%	1.00	9%	5%
Hotel	1.00	9%	5%	1.00	9%	5%
All Other Land Uses[2]	1.00	9%	5%	1.00	9%	5%

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	22	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	13	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	428	217	211
Internal Capture Percentage	16%	16%	17%
External Vehicle-Trips[3]	308	157	151
External Transit-Trips[4]	32	16	16
External Non-Motorized Trips[4]	18	9	9

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	8%	12%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	46%	43%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	Hilldale	**Organization:**	Snyder & Associates
Project Location:	Madison, WI	**Performed By:**	Marcus Coenen
Scenario Description:	Option 3	**Date:**	9/20/2021
Analysis Year:		**Checked By:**	
Analysis Period:	**Saturday Street Peak Hour**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail				416	215	201
Restaurant				0		
Cinema/Entertainment				0		
Residential				78	38	40
Hotel				0		
All Other Land Uses[2]				0		
Total				494	253	241

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office	1.00	9%	5%	1.00	9%	5%
Retail	1.00	9%	5%	1.00	9%	5%
Restaurant	1.00	9%	5%	1.00	9%	5%
Cinema/Entertainment	1.00	9%	5%	1.00	9%	5%
Residential	1.00	9%	5%	1.00	9%	5%
Hotel	1.00	9%	5%	1.00	9%	5%
All Other Land Uses[2]	1.00	9%	5%	1.00	9%	5%

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	17	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	17	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	494	253	241
Internal Capture Percentage	14%	13%	14%
External Vehicle-Trips[3]	366	188	178
External Transit-Trips[4]	39	20	19
External Non-Motorized Trips[4]	21	11	10

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	8%	8%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	45%	43%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute