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11-A-19-UR

Revised/Received
October 28, 2019

September 19, 2019
Revised October 28, 2019

Mr. Mike Gray, P.E.
Tacala, LLC
3750 Corporate Woods Drive
Vestavia Hills, AL 35242

RE: NORTSHORE TOWN CENTER TACO BELL TRIP GENERATION, KNOXVILLE, TN.

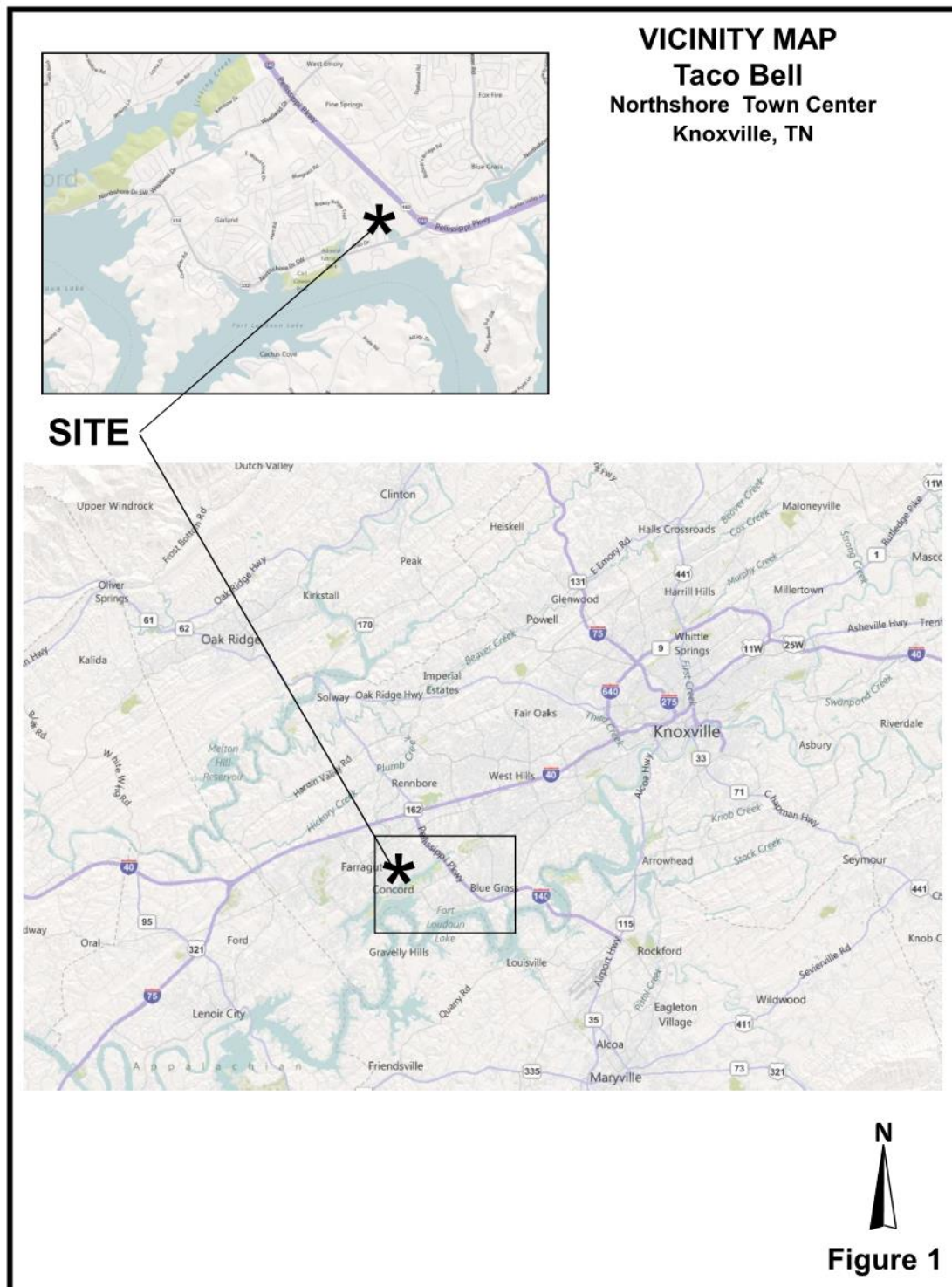
Dear Mr. Gray:

The proposed development of the Taco Bell is in the Northshore Town Center located in southwest Knoxville adjacent to the Pellissippi Parkway and Northshore Drive (SR 332) interchange. **Figure 1** illustrates this location. The Taco Bell is located in an out-lot of the Target site and is a variation of the uses assumed for the original Northshore Town Center traffic study approved March of 2011. The land uses for the Target out-lots were originally assumed to be a bank and a sit-down restaurant. The trip generation of the Northshore Town Center is updated in this letter to reflect the development of a proposed 2,900 square-foot Taco Bell. The proposed site plan is illustrated in **Figure 2**. The trip generation for the Northshore Town Center with the proposed Taco Bell is an update from the trip generation previously updated in the GI for Kids medical office study conducted in April of 2018. With the development of the Taco Bell in the Target site, Zone A of the original 2011 traffic study (See **Figure 3** for the analysis zones), the trip generation was updated with the proposed fast food use and the more current 10th edition of **Trip Generation**, the recognized reference published by the Institute of Transportation Engineers (ITE). In addition to the Taco Bell, this letter reflects the planned 5,500 square-foot TVA Credit Union bank which was approved in July 2019.

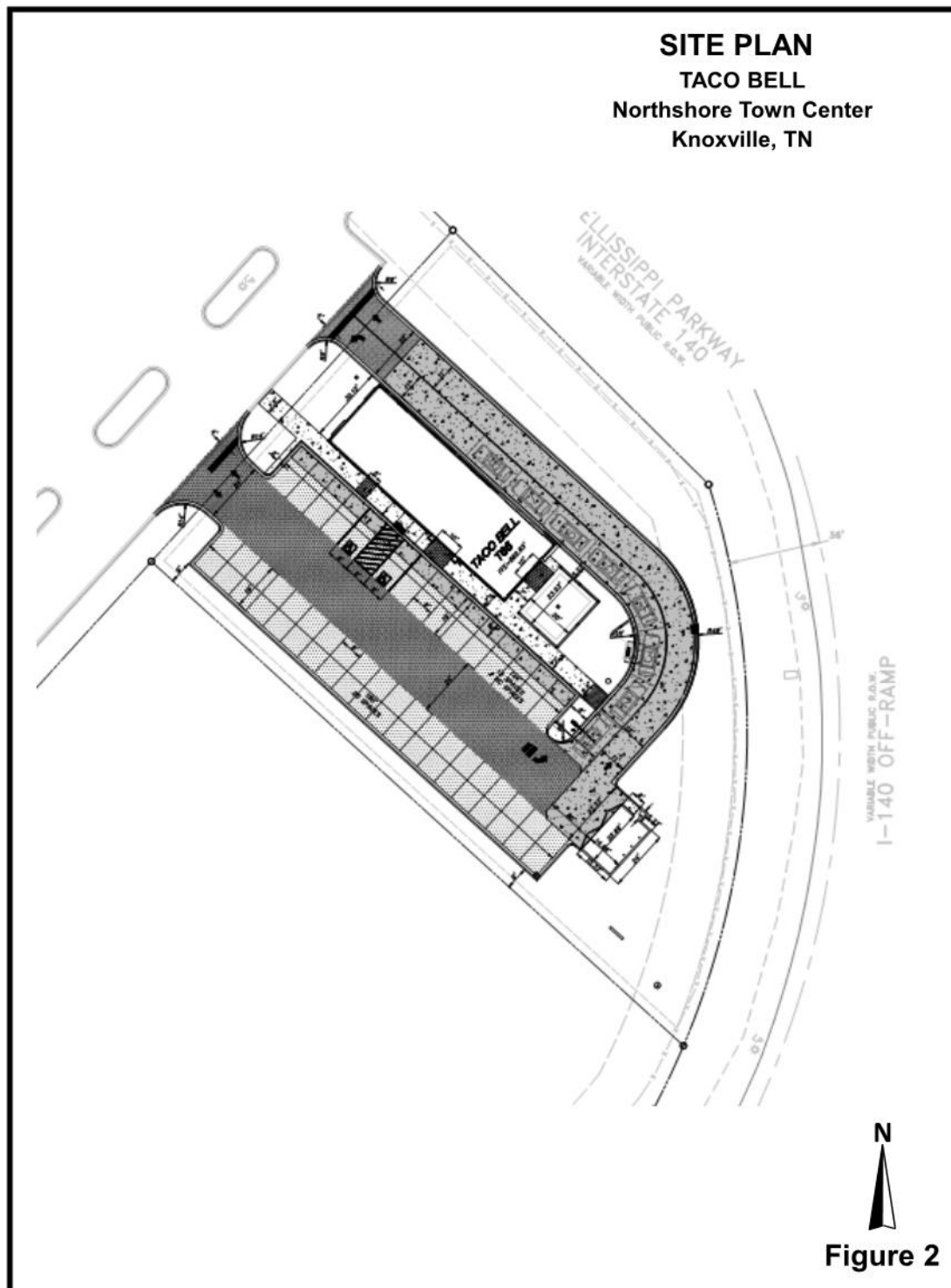
Taco Bell is a fast-food land use (LUC 934) which differs from the originally assumed sit-down restaurant. Fast-food restaurants have a higher pass-by rate than sit-down restaurants, thereby intercepting more trips from the adjacent traffic flow. A pass-by rate of 30-percent is assumed for the bank and fast-food uses for this update. The updated trip generation is presented in the **Table 1**. This trip generation is compared to the trip generation updated in the April 2018 study prepared for the GI for Kids medical office; this trip generation is presented in **Table 2**. The comparison of the updated trip generation for Northshore Town Center with the trip generation from the 2018 study is provided in **Table 3**.



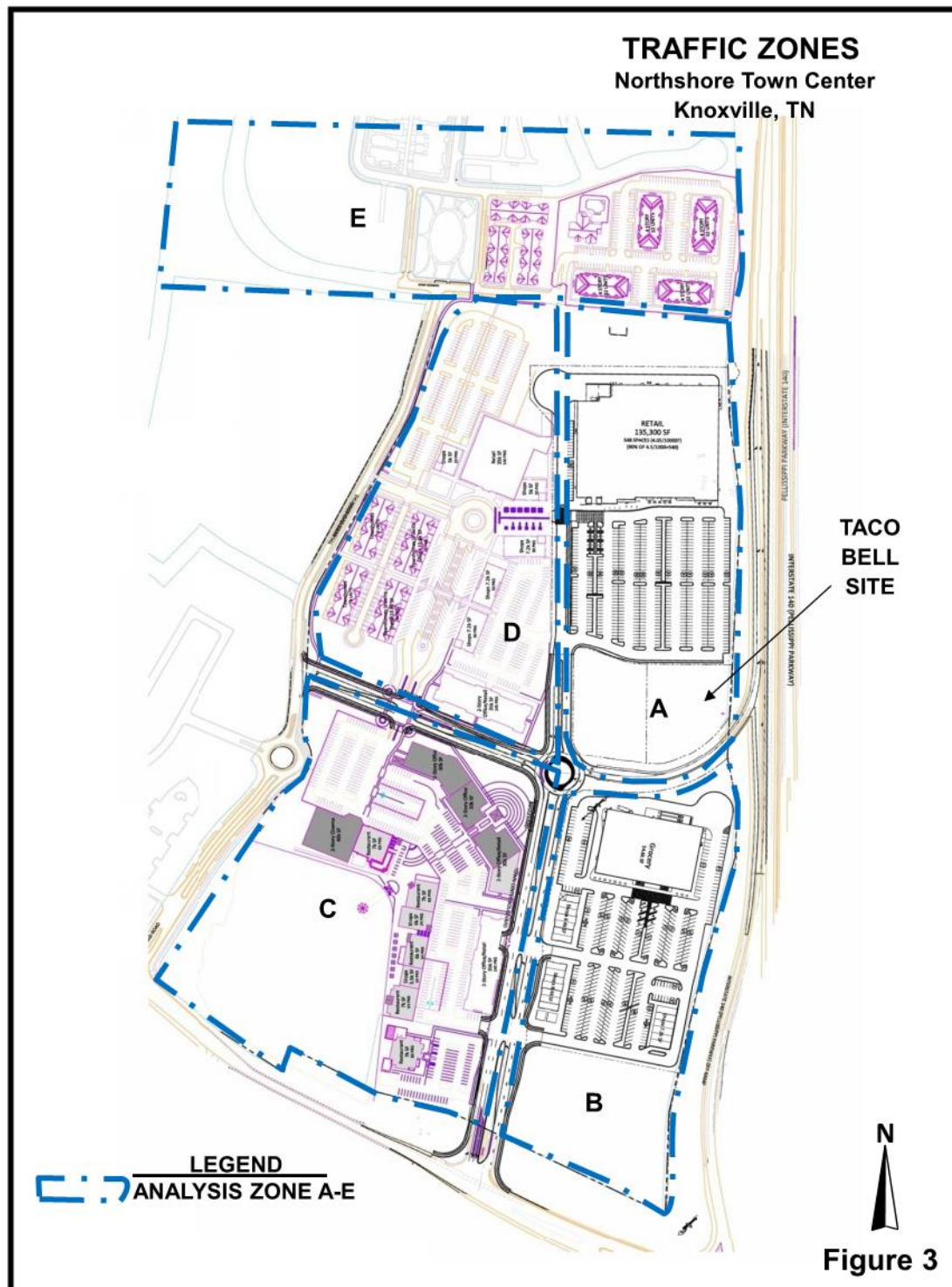
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TABLE 1
NORTHSHORE TOWN CENTER
Trip Generation-September 2019

ZONE	LAND USE	L.U.C	SIZE	DAILY TRAFFIC	ENTER	AM PEAK EXIT	TOTAL	PM PEAK ENTER	PM PEAK EXIT	TOTAL
A	DISCOUNT STORE ¹	815	135,320			EXISTING TRAFFIC				
	FASTFOOD REST. (w. drive thru) ²	934	2,900	1,366	59	57	117	49	45	95
	DRIVE-IN BANK ³	912	5,500	573	30	22	52	56	56	112
	SUB-TOTAL		143,720	1,939	90	79	169	106	102	207
	Internal Trips	10%		194	9	8	17	11	10	21
	Pass-By Trips	30%		582	27	24	51	32	31	62
	Primary Trips			1,163	54	47	101	63	61	124
B	SUPERMARKET ¹	850	54,000			EXISTING TRAFFIC				
	SPECIAL RETAIL ¹	814	25,900			EXISTING TRAFFIC				
	FASTFOOD RESTAURANT	934	4,992	2,477	116	111	227	85	78	163
	DRIVE-IN BANK	912	4,500			EXISTING TRAFFIC				
	SUB-TOTAL		89,392	2,477	116	111	227	85	78	163
	Internal Trips	10%		248	12	11	23	9	8	16
	Pass-By Trips	20%		495	23	22	45	17	16	33
	Primary Trips			1,734	81	78	159	60	55	114
C	OFFICE BLDG ¹	710	57,500			EXISTING TRAFFIC				
	SHOPPING CENTER	820	87,000	5,469	121	74	195	235	255	490
	H.T. RESTAURANT	932	14,000	1,571	77	63	139	85	52	137
	MULTIPLEX THEATER	445	8		-	-	-	56	54	110
	SUB-TOTAL		158,500	7,039	198	137	334	376	361	737
	Internal Trips	10%		704	20	14	33	38	36	74
	Pass-By Trips	25%		1,760	49	34	84	94	90	184
	Primary Trips			4,576	128	89	217	244	234	479
D	KNOX CO MULTI-FAMILY	225	24	265	3	11	14	14	12	26
	SHOPPING CENTER	820	79,100	5,831	84	51	135	246	266	512
	MEDICAL OFFICE	720	24,000	834	49	14	63	23	60	83
	SUB-TOTAL		103,100	6,930	136	76	212	284	338	622
	Internal Trips	10%		693	14	8	21	28	34	62
	Pass-By Trips	30%		2,079	41	23	64	85	101	186
	Primary Trips			4,158	82	46	127	170	203	373
E	SINGLE FAMILY	210	120	1,242	23	70	94	78	46	124
	KNOX CO MULTI-FAMILY	225	325	2,753	35	124	159	125	102	227
	SUB-TOTAL		445	3,995	58	194	252	203	148	351
	Internal Trips			-	-	-	-	-	-	-
	Pass-By Trips			-	-	-	-	-	-	-
	Primary Trips			3,995	58	194	252	203	148	351
TOTAL TRIP GENERATION				22,380	598	597	1,195	1,053	1,026	2,080
TOTAL PRIMARY TRIP GENERATION				15,626	403	454	857	741	701	1,442

REFERENCE: Trip Generation, 10th Edition, published by the Institute of Transportation Engineers.

NOTES:

(1) Developed land use reflected in current traffic.

(2) Revised Land Use from the April 2018 Northshore Town Center GI for Kids traffic study.

(3) Revised from the April 2018 Northshore Town Center GI for Kids traffic study. (Revised Land Use July 2019)



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TABLE 2
NORTHSHORE TOWN CENTER
Trip Generation-April 2018

ZONE	LAND USE	L.U.C	SIZE	DAILY TRAFFIC	ENTER	AM PEAK EXIT	TOTAL	PM PEAK ENTER	EXIT	TOTAL
A	DISCOUNT STORE ¹	815	135,320			EXISTING TRAFFIC				
	H.T. RESTAURANT	932	6,500	826	39	32	70	38	26	64
	DRIVE-IN BANK	912	4,500	667	31	23	54	55	55	110
	SUB-TOTAL		146,320	1,493	70	55	124	93	81	174
	Internal Trips	10%		149	7	6	12	9	8	17
	Pass-By Trips	20%		299	14	11	25	19	16	35
	Primary Trips			1,045	49	39	87	65	57	122
B	SUPERMARKET ¹	850	54,000			EXISTING TRAFFIC				
	SPECIAL RETAIL ¹	814	25,900			EXISTING TRAFFIC				
	FASTFOOD RESTAURANT ²	934	4,992	2,477	116	111	227	85	78	163
	DRIVE-IN BANK ¹	912	4,500			EXISTING TRAFFIC				
	SUB-TOTAL		89,392	2,477	116	111	227	85	78	163
	Internal Trips	10%		248	12	11	23	9	8	16
	Pass-By Trips	20%		495	23	22	45	17	16	33
	Primary Trips			1,734	81	78	159	60	55	114
C	OFFICE BLDG. ¹	710	57,500			EXISTING TRAFFIC				
	SHOPPING CENTER	820	87,000	6,203	89	54	143	262	284	546
	H.T. RESTAURANT	932	14,000	1,780	83	68	151	83	55	138
	MULTIPLEX THEATER	445	8		-	-	-	49	60	109
	SUB-TOTAL		158,500	7,983	172	122	294	394	399	793
	Internal Trips	10%		798	17	12	29	39	40	79
	Pass-By Trips	25%		1,996	43	31	74	99	100	198
	Primary Trips			5,189	112	79	191	256	259	516
D	KNOX CO MULTI-FAMILY	225	24	265	3	11	14	14	12	26
	SHOPPING CENTER	820	79,100	5,831	84	51	135	246	266	512
	MEDICAL OFFICE ²	720	24,000	766	45	12	57	23	58	81
	SUB-TOTAL		103,100	6,862	132	74	206	283	336	619
	Internal Trips	10%		686	13	7	21	28	34	62
	Pass-By Trips	30%		2,058	40	22	62	85	101	186
	Primary Trips			4,117	79	44	124	170	201	371
E	SINGLE FAMILY	210	120	1,242	23	70	94	78	46	124
	KNOX CO MULTI-FAMILY	225	325	2,753	35	124	159	125	102	227
	SUB-TOTAL		445	3,995	58	194	252	203	148	351
	Internal Trips			-	-	-	-	-	-	-
	Pass-By Trips			-	-	-	-	-	-	-
	Primary Trips			3,995	58	194	252	203	148	351
TOTAL TRIP GENERATION				22,810	549	556	1,104	1,059	1,042	2,101
TOTAL PRIMARY TRIP GENERATION				16,080	380	434	813	754	720	1,474

REFERENCE: Trip Generation, 9th Edition, published by the Institute of Transportation Engineers.

NOTES:

(1) Developed land use reflected in current traffic.

(2) Revised Land Use from the March 2011 Northshore Town Center traffic study.



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TABLE 3
Northshore Town Center
Trip Generation Comparison

	DATE	DAILY TRAFFIC	AM PEAK			PM PEAK		
			ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
NORTHSHORE TOWN CENTER ⁽¹⁾	Sep-19	22,380	598	597	1,195	1,053	1,026	2,080
Primary Trips		15,626	403	454	857	741	701	1,442
NORTHSHORE TOWN CENTER ⁽²⁾	Apr-18	22,810	549	556	1,104	1,059	1,042	2,101
Primary Trips		16,080	380	434	813	754	720	1,474
Change in Trips Generated		-430	49	41	91	-5	-16	-21
Change in Primary Trips		-455	24	20	44	-13	-19	-33

REFERENCE: Trip Generation, published by the Institute of Transportation Engineers.

(1) Trip Generation, 10th Edition

(2) Trip Generation, 9th Edition from previous Study prepared April 2018

The comparison of the current updated trip generation with the trip generation of 2018 finds that the daily and PM peak-hour trip generation is reduced, and trips are increased approximately 5-percent for the AM peak hour. The PM peak is the more critical peak hour and trips are reduced by 33 trips. This reduction is due to the update to Trip Generation, 10th Edition.

Further review of the trip generation was conducted for the Target site Zone A, as this zone is adjacent to the Town Center Boulevard and Boardwalk Boulevard roundabout, which would be most impacted by any changes in the proposed Taco Bell and its trip generation. **Table 4** presents the comparison of the trips generated for the Target out-lots.

From this table, it is found that there are 27 total added entering trips to the Town Center Boulevard and Boardwalk Boulevard roundabout during the AM peak hour, the less critical peak period, and 16 additional trips during the PM peak hour. Many of these trips are pass-by trips. Approximately 22 and 18 trips would enter from the north during AM and PM peak hours, respectively, and peak-hour entering trips from the off-ramp, Town Center Boulevard, and Boardwalk Boulevard approaches are either reduced or are negligible. Previous studies conducted for the Northshore Town Center determined a LOS A for the Town Center Boulevard and Boardwalk Boulevard roundabout; therefore, the additional 27 AM and 16 PM peak-hour trips entering the roundabout will not adversely impact the roundabout operation. An analysis of the projected PM peak hour, the critical peak hour, with the Taco Bell development determined that a roundabout LOS A is maintained for the intersection.

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TABLE 4
Zone A Trip Generation Comparison

ZONE	LAND USE	L.U.C	SIZE	DAILY TRAFFIC	ENTER	AM PEAK EXIT	TOTAL	ENTER	PM PEAK EXIT	TOTAL
A Sept 2019	<i>DISCOUNT STORE (1)</i>	<i>815</i>	<i>135,320</i>	<i>EXISTING TRAFFIC</i>						
	<i>FASTFOOD REST. (w. drive thru)</i>	<i>934</i>	<i>2,900</i>	<i>1,366</i>	<i>59</i>	<i>57</i>	<i>117</i>	<i>49</i>	<i>45</i>	<i>95</i>
	<i>DRIVE-IN BANK</i>	<i>912</i>	<i>5,500</i>	<i>573</i>	<i>30</i>	<i>22</i>	<i>52</i>	<i>56</i>	<i>56</i>	<i>112</i>
	SUB-TOTAL		143,720	1,939	90	79	169	106	102	207
	<i>Internal Trips</i>	<i>10%</i>		<i>194</i>	<i>9</i>	<i>8</i>	<i>17</i>	<i>11</i>	<i>10</i>	<i>21</i>
	<i>Pass-By Trips</i>	<i>30%</i>		<i>582</i>	<i>27</i>	<i>24</i>	<i>51</i>	<i>32</i>	<i>31</i>	<i>62</i>
	<i>Primary Trips</i>			<i>1,163</i>	<i>54</i>	<i>47</i>	<i>101</i>	<i>63</i>	<i>61</i>	<i>124</i>
A April 2018	<i>DISCOUNT STORE (1)</i>	<i>815</i>	<i>135,320</i>	<i>EXISTING TRAFFIC</i>						
	<i>H.T. RESTAURANT</i>	<i>932</i>	<i>6,500</i>	<i>826</i>	<i>39</i>	<i>32</i>	<i>70</i>	<i>38</i>	<i>26</i>	<i>64</i>
	<i>DRIVE-IN BANK</i>	<i>912</i>	<i>4,500</i>	<i>667</i>	<i>31</i>	<i>23</i>	<i>54</i>	<i>55</i>	<i>55</i>	<i>110</i>
	SUB-TOTAL		146,320	1,493	70	55	124	93	81	174
	<i>Internal Trips</i>	<i>10%</i>		<i>149</i>	<i>7</i>	<i>6</i>	<i>12</i>	<i>9</i>	<i>8</i>	<i>17</i>
	<i>Pass-By Trips</i>	<i>20%</i>		<i>299</i>	<i>14</i>	<i>11</i>	<i>25</i>	<i>19</i>	<i>16</i>	<i>35</i>
	<i>Primary Trips</i>			<i>1,045</i>	<i>49</i>	<i>39</i>	<i>87</i>	<i>65</i>	<i>57</i>	<i>122</i>
HANGE	<i>Trip Generation</i>			445	20	24	45	13	21	33
	<i>Pass-By Trips</i>			283	13	13	26	13	14	27
	<i>Primary Trips</i>			118	5	9	14	(2)	4	3

The proposed Taco Bell may generate 27 additional trips during the AM peak hour, which is the less critical peak period, and may generate 16 additional trip entering the Town Center Boulevard and Boardwalk Boulevard roundabout during the PM peak hour, the critical peak period. A LOS A is maintained for the intersection of Town Center Boulevard at Boardwalk Boulevard with the Taco Bell development. The updated trip generation indicates a reduction of the daily and PM peak hours for the Northshore Town Center. Therefore, the proposed change in the land use to a fast-food restaurant does not result in any greater impact than the previous studied sit-down restaurant. The recommendations of the previous studies remain valid and should mitigate the impacts of the Taco Bell and the Northshore Town Center.



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Should you have any questions, please call me.

Sincerely,
CDM Smith Inc.

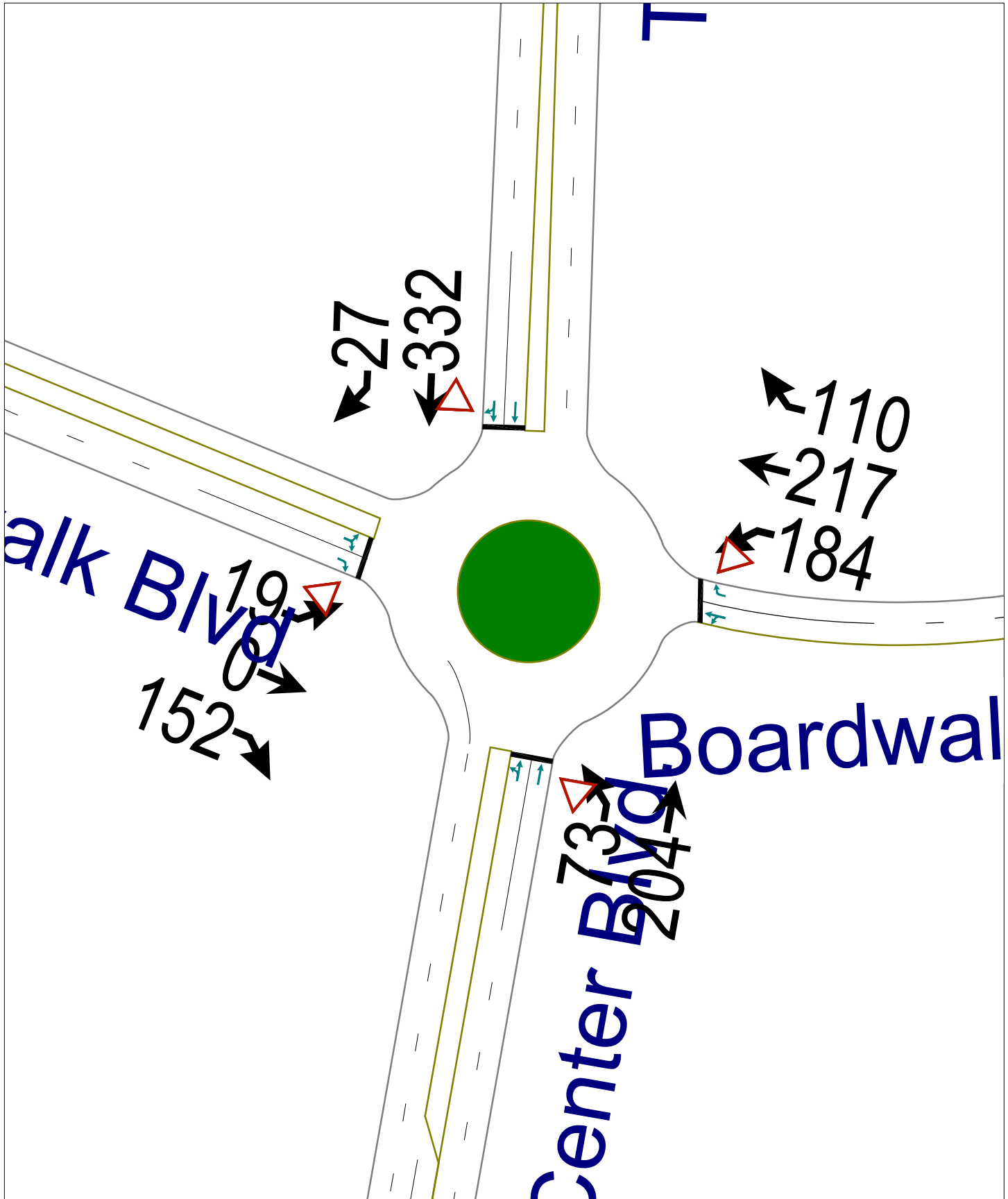


John F. Gould, P.E.
Senior Transportation Engineer

Enclosure: PM Peak hour Roundabout Analysis

Project No. 241226





HCM 6th Roundabout
104: Town Center Blvd. & Boardwalk Blvd

Buildout 2020 PM Peak
Northshore Town Center Taco Bell TIS

Intersection									
Intersection Delay, s/veh	6.3								
Intersection LOS	A								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		2		2		
Adj Approach Flow, veh/h	186		556		301		390		
Demand Flow Rate, veh/h	189		567		307		398		
Vehicles Circulating, veh/h	572		328		21		526		
Vehicles Exiting, veh/h	352		0		740		369		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	5.5		7.9		3.6		6.6		
Approach LOS	A		A		A		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LTR	R	LT	R	LT	TR	LT	TR	
Assumed Moves	LTR	R	LT	R	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.471	0.529	0.785	0.215	0.469	0.531	0.470	0.530	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328	
Entry Flow, veh/h	89	100	445	122	144	163	187	211	
Cap Entry Lane, veh/h	798	873	998	1075	1324	1395	832	908	
Entry HV Adj Factor	0.982	0.986	0.980	0.984	0.981	0.977	0.980	0.979	
Flow Entry, veh/h	87	99	436	120	141	159	183	207	
Cap Entry, veh/h	783	861	979	1057	1299	1363	815	889	
V/C Ratio	0.112	0.115	0.446	0.114	0.109	0.117	0.225	0.232	
Control Delay, s/veh	5.7	5.3	8.8	4.4	3.7	3.6	6.8	6.4	
LOS	A	A	A	A	A	A	A	A	
95th %tile Queue, veh	0	0	2	0	0	0	1	1	