Transportation Design Plan Update

RIVER NORTH

San Antonio, Texas

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STREET NETWORK GUIDELINES

Interdisciplinary approach to street design. Throughout history the street has been one of the primary open spaces of any town or city where one could observe and experience the unfolding of community life. The street serves both individual and collective needs – needs to be together or to have a private moment. Until recently, the primary determinant of their make up has been a continuous facilitation of public life based primarily on pedestrian speed and scale. Streets also serve as primary traffic channels as well as places to run wires, pipes, and infrastructure in general. Their design varies from place to place and changes over time in order to accommodate the changing society, technological advances, different transportation means, climatic conditions, orientation, and so on. It could be said that the street is indeed a complex system serving a complex set of needs.

Sustainable design concerns have created new and multiple demands on the street space. We see these demands as an opportunity to look at the street design from an ever more systemic point of view. Sustainable design concerns and an integrative approach to design at different scales and levels of complexity are beginning to suggest some new roles for the street space.

This Chapter identifies the various street types recommended to assemble the street network for the plan area.

The purpose of these guidelines is to:

a. provide guidelines with which to modify existing streets, if proposed for change,
b. provide guidelines with which to maintain existing streets not proposed to change,
c. provide connections from street level to River Walk level.

PROJECT DESCRIPTION

With the recent completion of the Museum Reach portion of the Riverwalk, the proposed Tax Increment Reinvestment Zone (TIRZ) and proposed zoning changes, the River North District is expected to undergo substantial redevelopment in the coming years. As new developments are constructed in the River North District, it is important that the street network be able to accommodate the expected increase in traffic, as well as be compatible with other modes of transportation such as pedestrians and transit. The River North District Master Plan calls for mixed-use development that encourages pedestrian traffic, use of public transit, and compatible commercial development. These objectives are met through zoning and standards that provide for on-street

parking, minimum building setbacks, higher densities, and pedestrian features such as curb extensions, street trees, and wider sidewalks. Access to public transportation and the encouragement of transit-oriented development are key components of the Master Plan. Street cross-sections were developed to accommodatebus routes, pedestrians, bicyclists, parking, and loading/unloading of passengers or goods. The features of the River North District Master Plan were included in this analysis of the street network following redevelopment. The River North District analyzed in this study consisted of the area generally bounded by IH-37, IH-35, and Lexington in the northeast corner of the Central Business District. Refer to **Figure A**: Study Area.

EXISTING CONDITION

A Synchro model of the existing street network was prepared in 2010 to analyze the impact of the River North Master Plan Development on the area traffic operations. Available existing traffic volumes at signalized intersections were used in the study. The volumes at unsignalized intersections were estimated based on a comparison of traffic volumes at adjacent intersections and the identified volume imbalances. The existing traffic volumes, street geometry, and intersection traffic controls were used to establish the level-of-service (LOS) and capacities for the River North study intersections using Synchro Refer to **Figures 1 – 6 and Table 7.**.

FUTURE CONDITION – SCENARIO 1B DEVELOPMENT

Trip Generation – Scenario 1B

Traffic volumes in the River North District will increase as the area is redeveloped. The source of the traffic generated within the River North District is a combination of existing land uses and proposed developments. The amount of traffic generated by the proposed River North Master Plan is dependent upon the land uses and sizes of each development. The River North District Master Plan appendices contain projections for sizes and types of land uses that are anticipated. The traffic generated by the proposed land uses was calculated using statistical data contained in the *ITE Trip Generation 8th Edition*. Development Scenario 1B from the River North Master Plan was used for this study because it was determined to have the highest total trip generation. **Table 1** provides the trips generated by River North Master Plan Scenario 1B. The total trip generation represents the future volumes anticipated in the River North District once redevelopment is completed.

Table 1: Trip Generation of Scenario 1B – Proposed Development

ITE Code	Land Use	Var.	Size	Trip Generation Rates					Trips				
				AM Pk Hour		PM Pk Hour		Daily	AM Pk Hour		PM Pk Hour		Daily
				Enter	Exit	Enter	Exit		Enter	Exit	Enter	Exit	
223	Mid-Rise Apartment	DU	6172	0.10	0.25	0.26	0.18	4.18	617	1543	1605	1111	**25,799**
710	General Office	TGFA	791.7	1.36	0.19	0.25	1.24	11.01	1077	150	198	982	**8,717**
820	Shopping Center	TGLA	281.4	0.61	0.39	1.83	1.9	42.94	172	110	515	535	**12,083**
310	Hotel	Rooms	400	0.34	0.22	0.31	0.28	14.34	136	88	124	112	**5,736**
	TOTAL								**3893**		**5182**		**52,335**

River North District Master Plan Projected Volumes – Scenario 1B

A number of steps were taken in order to develop the future projected volumes for the River North District:

- The traffic generated by existing properties to be redeveloped was identified, as shown in **Table 2**, and subtracted from the volumes in **Table 1.** The resulting trip generation values in **Table 2** represent the future volumes anticipated in the River North District due to the Scenario 1B Plan.

- Through traffic or trips passing through the River North area were identified and are shown in **Figure 1**. Through traffic was assumed to travel primarily on Broadway, McCullough and Quincy and was assumed to remain at current levels. The through trips were identified by subtracting turning volumes from roadway volumes at the study area boundaries. The through trips were removed from the existing volumes to better represent existing traffic with origins or destinations in the River North District.

- Trip generation was calculated for the existing AT&T office towers, Central Catholic High School, and Providence High School based on the enrollment at the High Schools, and the estimated size of the office towers. The trip generation for these land uses is shown in **Table 3.** These uses are existing major traffic generators located on the west side of the River North District and are not expected to change as part of the River North District Master Plan. Traffic destined to and from these uses typically utilizes McCullough, Brooklyn, St. Mary's, and Quincy. A portion of these trips were subtracted from the existing volumes on the roadways identified above to better represent the River North Area traffic that would be

likely to change due to the Scenario 1B Plan. The trips removed for the High Schools and AT&T offices are shown in **Figures 2 and 3.**

- The remaining traffic volumes represent the existing volumes in the River North District that are most likely to be increased due to the Scenario 1B Plan. These remaining volumes were expanded by applying a growth factor to reach the nominal level of the total inbound and outbound volumes at the River North District boundaries.

- The through traffic and the traffic associated with the existing schools and AT&T Office Towers were combined with the expanded volumes to develop the total projected River North District Redevelopment volumes. These volumes were used in the Synchro model along with street characteristics and transit usage in the corridor. The model was used to evaluate intersection operation and to identify potential issues with the street cross-sections proposed in the River North District Master Plan.

Table 2: Trip Generation of Existing Properties to be Redeveloped

ITE Code	Land Use	Var.	Size	Trip Generation Rates					Trips				
				AM Pk Hour		PM Pk Hour		Daily	AM Pk Hour		PM Pk Hour		Daily
				Enter	Exit	Enter	Exit		Enter	Exit	Enter	Exit	
710	General Office	TGFA	360.6	1.36	0.19	0.25	1.24	11.01	490	69	90	447	**3,971**
820	Shopping Center	TGLA	360.6	0.61	0.39	1.83	1.9	42.94	220	141	660	685	**15,485**
	TOTAL								**920**		**1882**		**19,456**

Table 3: Trip Generation of the Existing High Schools and AT&T Office Towers

ITE Code	Land Use	Var.	Size	Trip Generation Rates					Trips				
				AM Pk Hour		PM Pk Hour		Daily	AM Pk Hour		PM Pk Hour		Daily
				Enter	Exit	Enter	Exit		Enter	Exit	Enter	Exit	
530	High School (Central Catholic)	Students	560	0.29	0.13	0.06	0.07	1.71	162	73	34	39	**958**
530	High School (Providence)	Students	400	0.29	0.13	0.06	0.07	1.71	116	52	24	28	**684**
714	Headquarter Office	TGFA	604.4	1.39	0.10	0.14	1.26	7.98	840	60	85	762	**4,823**
	TOTAL								**1303**		**972**		**6,465**

Traffic Analysis – Scenario 1B

According to the River North Master Plan, the highest density developments are expected to occur along Broadway and Avenue B. Therefore, a large portion of the proposed River North traffic is expected to utilize Broadway. However, Broadway will continue to carry a higher percentage of through traffic compared with the other roadways in the River North District.
As stated previously, the River North District Master Plan also includes changes to the street network such as the addition of on-street parking, lane reductions, and bulb outs at intersections to accommodate pedestrians. These changes were incorporated into the River North Synchro model.

Capacity analyses of the signalized and unsignalized intersections were performed for the AM and PM peak hours for the Existing Condition and the Future Condition which represents the ultimate redevelopment of the River North District based on Scenario 1B. The Levels of Service (LOS) for the signalized intersections in the AM and PM peak hours were analyzed when the River North Master Plan was adopted in 2009 as shown in **Table 4.**

Table 4: Scenario 1B Level of Service Results – Signalized Intersections (2009)

	AM Peak Hour		PM Peak Hour	
Intersection	Existing	Future[1]	Existing	Future[1]
Camden & Lexington	A	A	A	B
Camden & McCullough	A	B	A	B
Camden & Brooklyn	B	C	B	B
Augusta & McCullough	B	A	A	B
St Mary's & Lexington	B	B	A	B
St Mary's & McCullough	B	C	B	C
St Mary's & Brooklyn	C	C	C	C
Quincy & St Mary's	A	A	A	A
Camden & St Mary's	C	C	C	C
4th & Broadway	A	B	B	C
McCullough & Broadway	**E**	C*	**D**	**D***
6th & Broadway	A	A	A	A
Brooklyn & Broadway	**D**	**E**	C	B
8th & Broadway	A	A	A	A
9th & Broadway	A	A	A	A
E Jones & Broadway	B	B	B	C
McCullough & Alamo	B	B*	**F**	**F***
Brooklyn & Alamo	B	C	B	B
Quincy & Lexington	B	B	B	B

Quincy & McCullough	B	B	C	**D**
Quincy & Brooklyn	B	B	B	C

[1] River North District Master Plan Scenario 1B

* Analysis was performed with the original recommendation of four lanes without bike lanes

The capacity analysis for the River North redevelopment included retiming of the signalized intersections to optimize the signal operations for the proposed volumes. With signal retiming, the proposed Levels of Service are similar to the Existing Condition results in the AM and PM peak hours. The unsignalized intersections generally operate at acceptable Levels of Service with the proposed volumes. Some intersections do show poor levels of Service on some approaches, such as Dallas at McCullough, but given the high level of connectivity of the street network within the River North District, it is likely traffic would use alternate routes as delays increase at any specific intersection. Refer to **Figures 7A & 7A**.

Mitigation Improvements – Scenario 1B

The intersections of McCullough at Broadway and McCullough at Alamo display poor Levels of Service. Broadway and McCullough are currently the highest volume streets in the River North District, and their traffic volumes will continue to increase with the redevelopment of the area. McCullough and Brooklyn both provide direct access to IH-35 and IH-37 and, as such, will continue to carry high volumes of River North and Downtown destination traffic. Opportunities to provide wayfinding signage to and from the River North District should be investigated to improve circulation. Refer to **Figure 11**.

Currently, on-street parking is allowed along McCullough between Alamo and Broadway. . We recommend that on street parking be prohibited on McCullough between Avenue B, (west of Broadway), and Avenue E (east of Alamo) in order to accommodate bike facilities. This will allow McCullough to be reduced down to three lanes of traffic with bike lanes between Avenue B and Alamo Street. Refer to **Figure 11**.

The intersection of Brooklyn and Broadway will operate at a LOS E in the AM peak hour. The addition of a dedicated westbound left-turn lane on Brooklyn will improve the intersection to LOS C. However, parking will need to be removed on one or both sides of Brooklyn east and west of the intersection with Broadway in order to accommodate the left-turn lane and the transition area. Refer to **Figure 11**.

The intersection of Quincy and McCullough will operate at a LOS D during the PM peak hour. Adding a dedicated northbound left-turn lane on Quincy will improve the operation to a LOS C. However, this improvement would require the

removal of on-street parking on Quincy south of McCullough to provide space for the left-turn lane. Refer to **Figure 11**.

FUTURE CONDITION - ALTERNATIVE DEVELOPMENT SCENARIO

As shown in **Table 1**, the majority of trips generated by the proposed River North District Master Plan Scenario 1B are from residential land uses. The Mid-Rise Apartments land use category (ITE Code 223) was selected as the most appropriate to calculate the residential trip generation based on the high density character assumed and the description of potential land uses provided in the River North Master Plan. The Mid-Rise Apartment land use trip generation rates are approximately 40 percent lower than the rates for the standard Apartment land use (ITE Code 220). According to the *ITE Trip Generation, 8th Ed*, the data used to develop the rates for the Mid-Rise Apartment land use were recorded at locations in Maryland near Washington D.C. This region typically has higher levels of multimodal transportation use compared with San Antonio, and this is a likely reason for the lower trip generation rates. Using trip generation rates for a land use with access to alternative modes of transportation is valid for the River North District given the emphasis on pedestrian and bike features. However, it is not typical for other areas of San Antonio where individual vehicles are the predominant mode of transportation.

To promote alternative modes of transportation within the River North District, the land uses must be compatible with the other forms of transportation. The success of the River North District Master Plan and the public transit system are dependent upon transient-oriented or mixed-use developments. These types of developments are compatible with public transportation and promote walkability and biking. They allow for people to live, work and shop within the River North District and utilize public transit, pedestrian, and bicycle facilities as their modes of transportation instead of relying solely on the automobile. One of the benefits of mixed-use and transit-oriented developments is a reduction in automobile traffic.

Trip Generation – Alternative Development Scenario

An Alternative Development Scenario was evaluated to illustrate the importance of mixed use developments to reduce traffic on the street network. **Table 5** contains the trip generation for the Alternative Development Scenario.

Table 5: Trip Generation – Alternative Development Scenario

ITE Code	Land Use	Var.	Size	Trip Generation Rates					Trips				
				AM Pk Hour		PM Pk Hour		Daily	AM Pk Hour		PM Pk Hour		Daily
				Enter	Exit	Enter	Exit		Enter	Exit	Enter	Exit	
221	Low-Rise Apartment	DU	101	0.1	0.36	0.38	0.2	6.59	10	36	38	20	**666**

223	Mid-Rise Apartment	DU	1528	0.1	0.25	0.26	0.18	4.18	153	382	397	275	**6,387**
710	General Office	TGFA	888.3	1.36	0.19	0.25	1.24	11.01	1208	169	222	1101	**9,780**
820	Shopping Center	TGLA	1567	0.61	0.39	1.83	1.9	42.94	956	611	2867	2977	**67,269**
	TOTAL								**3525**		**7897**		**84,102**

This scenario assumes development of the River North District with a high percentage of commercial land uses rather than a balanced mix with residential. General Office and Retail land uses were assumed with no reductions applied for multimodal transportation. This scenario assumes all trips generated by the new River North developments will be from outside the River North District. The trip generation for the Alternative Development Scenario is 84,102 daily trips. This is over 60% higher than the daily trips for Scenario 1B which incorporates higher density residential use mixed with commercial. If the River North District were developed with primarily commercial uses in the typical manner that relies on automobile transportation, the traffic generated would be significantly higher than what is being proposed.

Traffic Analysis – Alternative Development Scenario

As can be seen in **Table 6**, the traffic generated by this Alternative Development Scenario will result in poor Levels of Service at many River North area intersections in the PM peak hour. This predominantly commercial land use scenario is not identified as a possibility in the River North District Master Plan, but it demonstrates the negative impact associated with developments that rely on automobile transportation. The operation of the street network is directly affected by the type and character of the land uses if they are not compatible with the alternative forms of transportation proposed for the River North District.

Table 6: Alternative Development Scenario Level of Service Results - Signalized Intersections

	PM Peak Hour	
Intersection	Existing	Future
Camden & Lexington	A	B
Camden & McCullough	A	**E**
Camden & Brooklyn	B	**D**
Augusta & McCullough	A	C
St Mary's & Lexington	A	C
St Mary's & McCullough	B	**D**
St Mary's & Brooklyn	C	**D**
Quincy & St Mary's	A	A
Camden & St Mary's	C	C

4th & Broadway	B	**F**
McCullough & Broadway	**D**	**F**
6th & Broadway	A	A
Brooklyn & Broadway	C	**F**
8th & Broadway	A	A
9th & Broadway	A	A
E Jones & Broadway	B	**F**
McCullough & Alamo	**F**	**F**
Brooklyn & Alamo	B	B
Quincy & Lexington	B	B
Quincy & McCullough	C	**F**
Quincy & Brooklyn	B	**F**

CONCLUSIONS AND RECOMMENDATIONS

The traffic generated by the proposed development identified in the River North Master Plan will result in an increase in traffic throughout the River North District. However, the Synchro analysis results for the Future Condition show that with a few exceptions, the signalized intersections will operate at a Level of Service comparable to the Existing Condition by simply retiming the signals. Signal timing studies should be performed in the River North District as redevelopment occurs to maintain efficient signal operation as the traffic volumes increase. Only one intersection will experience a LOS F for the Future Condition – McCullough and Alamo. Improvements can be implemented at this intersection and several others with LOS D or E. The addition of left- or right-turn lanes will result in a LOS C or better but at the expense of on-street parking. These on-street parking restrictions can be implemented, as-needed.

As traffic volumes increase in the River North District due to redevelopment, some unsignalized intersections may require a traffic signal. Signal Warrant Studies should be performed for key unsignalized intersections on an as-needed basis.

The River North Traffic Study should be updated periodically on an as-needed basis as development in the River North District occurs. Changes in traffic patterns and land use assumptions should be incorporated in the analysis and the results evaluated to update or modify key recommendations.

The trip generation was based on the Scenario 1B developments outlined in the Appendices of the River North District Master Plan, which assumes a mix of land uses compatible with alternative modes of transportation such as walking, biking, and utilizing public transit. Developments incompatible with these modes of transportation may result in significantly higher traffic volumes than projected as demonstrated by the results of the Alternative Development Scenario. The success of the River North District Master Plan will be dependent upon the mix of compatible land uses that are developed, in conjunction with the character of the streetscape, convenient access to public transit, and the provision of pedestrian and bicycle features that encourage walking and biking. Mixed Use developments and the use of alternative modes of transportation are necessary for efficient traffic operations in the River North District, and this should be achievable following the guidelines outlined in the River North District Master Plan. Careful consideration of the effects of deviation from the guidelines should be evaluated prior to approval.

Recommended Street Network Guidelines for the street network within the River North Master Plan are defined in **Figures 8 – 10 and Figure 12**. Deviations from the Recommended Street Network Guidelines are only permissible through engineering studies or plans submitted to and approved by TCI.

Variances

The authority to grant a variance to the provisions of the Recommended Street Network Guidelines is hereby delegated to the Board of Adjustment in the manner described herein.

(a) **Applicability.** The provisions of this section apply to any application for a variance from the requirements of the Recommended Street Network Guidelines of this plan. Whenever an entity is able to prove a deviation is warranted through an engineering study, the entity may apply to the Board of Adjustment for a variance from the requirements of the Recommended Street Network Guidelines.

(b) **Initiation**. An application for a variance under this section must:

a. Be in writing;
b. State the name of the applicant and the address of the property, and refer to the River North Street Cross Section in which the property lies;
c. Describe in full detail the basis for the variance request along with any supporting engineering studies or plans if applicable.