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Trinity Point Project
Fort Worth, Texas

Trinity Uptown Transportation Plan
Draft Report

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Trinity Uptown Transportation Plan

1. Background

The Tarrant Regional Water District, in conjunction with the City of Fort Worth and others, is preparing a Master Plan for redevelopment of a 700 acre area adjacent to the City's downtown known as Trinity Uptown.

The central concept for the Trinity Uptown Plan is the construction of a Bypass Channel that would carry flood waters around the area immediately north of downtown Fort Worth. Implementation of the plan will create an urban lake, provide broad public access to an extended waterfront area and enable development of a range of urban land uses in a central location adjacent to the downtown. This unique combination of features provides an opportunity to focus attention back to the central city and encourage citizens to live, work, play and study in this desirable urban setting.

Over the next twenty years, it is expected that approximately 3,770 residential units will be constructed along with roughly 770,000 SF of retail and other commercial space. In addition another 560,000 SF of institutional and community uses is expected in this period, including a new Tarrant County College campus, other schools and various community facilities. The Plan also includes parks, transportation improvements, water quality management, environmental restoration, and other civic amenities.

The Tarrant Regional Water District retained Gideon Toal Architects in consultation with Bing Thom Architects to prepare a Master Plan for development of the Trinity Uptown site. Bunt & Associates was retained to provide transportation planning advice to the project planners and to prepare a Transportation Concept Plan as one component of the Master Plan.

This report describes the various elements of the Transportation Plan and the assessment of the infrastructure requirements to accommodate the scale of planned development over the next twenty years to a horizon date of 2025. The report also discusses the transportation planning aspects of the proposal and provides commentary on the long term development of the City's transportation system in the Trinity Uptown area.

Air Photo of Trinity Uptown Area

2. Transportation Concept Plan

Travel in Fort Worth today is made predominantly by private cars or trucks, so that the major element of the Transportation Plan for Trinity Uptown is the street network. The proximity of the site to the downtown, however, provides opportunities to promote travel by other modes, particularly walking trips and public transit. One of the primary benefits of intensifying development density at Trinity Uptown is the potential to reduce regional travel demands generally, but particularly by auto. The Transportation Plan, hence, has three key objectives;

1. To provide road and pedestrian infrastructure that connects and integrates Trinity Uptown within the City's established transportation system.
2. To provide sufficient road capacity in the local street network for the expected travel demand produced by full build-out of the planned development
3. To capitalize fully on the opportunities to promote non-auto travel, particularly by walking and by public transit.

2.1 Road Network Concept

Most of the 700 acres of land in the Trinity Uptown neighborhood are currently accessible only via North Main Street. At the south end of the site, the existing four-lane Main Street bridge across the Trinity River connects the site to the Fort Worth downtown. The railway encloses the site to the north with Main Street as the only arterial crossing. Henderson Street also passes through the west portion of the site, but there are no east-west connections either between Henderson and Main or providing external access to the site.

To overcome this relative isolation, and provide sufficient street capacity for trips to and from the site, two new river crossings are proposed, with the City's existing street network extended into and through the site. The Road Network Concept is illustrated in **Exhibit 2.1**.

On the west, White Settlement Road is an existing four-lane arterial street with relatively light traffic volumes. The Plan proposes that White Settlement Road be extended across Henderson Street and through the Trinity Uptown neighborhood to connect to Main Street. This new roadway will provide the primary access route to the southwest portion of the site, with local street connections along its length.

To the northeast, a new roadway crossing the river and extending to East Northside Drive is proposed. This collector street (Road A) would intersect Samuels Avenue near the boundary between the existing residential and industrial uses and follow the existing Samuels alignment to the Northside grade-separated intersection.

As described later in this report, it is estimated that build-out of the site planned development will require that approximately six lanes of road capacity be provided for trips in and out of Trinity Uptown. These new roadway connections will provide roughly half of that capacity. The balance will be provided on existing Main Street and Henderson Street in both the north and south directions.

In conjunction with the land use planners, a network of collector and local streets within the Trinity Uptown neighborhood has been developed that provides access to the potential development properties, and adequate circulation within the area. Connections to the arterial street system are proposed at appropriate spacing to enable traffic signals to be installed at specific locations.

The two key intersections within the neighbourhood will be at Henderson/White Settlement and at Main/White Settlement. Both of these locations will require multi-phase traffic signal control with auxiliary turning lanes to deal with high volumes of through traffic and turning movements. One additional traffic signal is anticipated along White Settlement Road between Henderson and Main. Two additional traffic signals are also expected to be required on Main Street to accommodate traffic turning movements into and out of the neighborhood.

One of the attractions to development on the Trinity Uptown site is expected to be the level of amenity associated with the waterfront parks and trails offered to residents and employees. To encourage both active recreational and passive leisure use of these facilities, and to bring activity along the waters edge, a local roadway (Riverfront Drive) is proposed along the south shoreline at the bottom of the bluff, extending from Henderson Street to Road A.

2.2 Public Transit

Public transit carries generally less than 5% of peak period passenger travel in Fort Worth presently. Improvements in service over the last few years have increased ridership significantly, particularly the commuter rail service now operating between Dallas and Fort Worth. However, growth in public transit's mode share in the Trinity Uptown neighborhood will likely be extended over a long period.

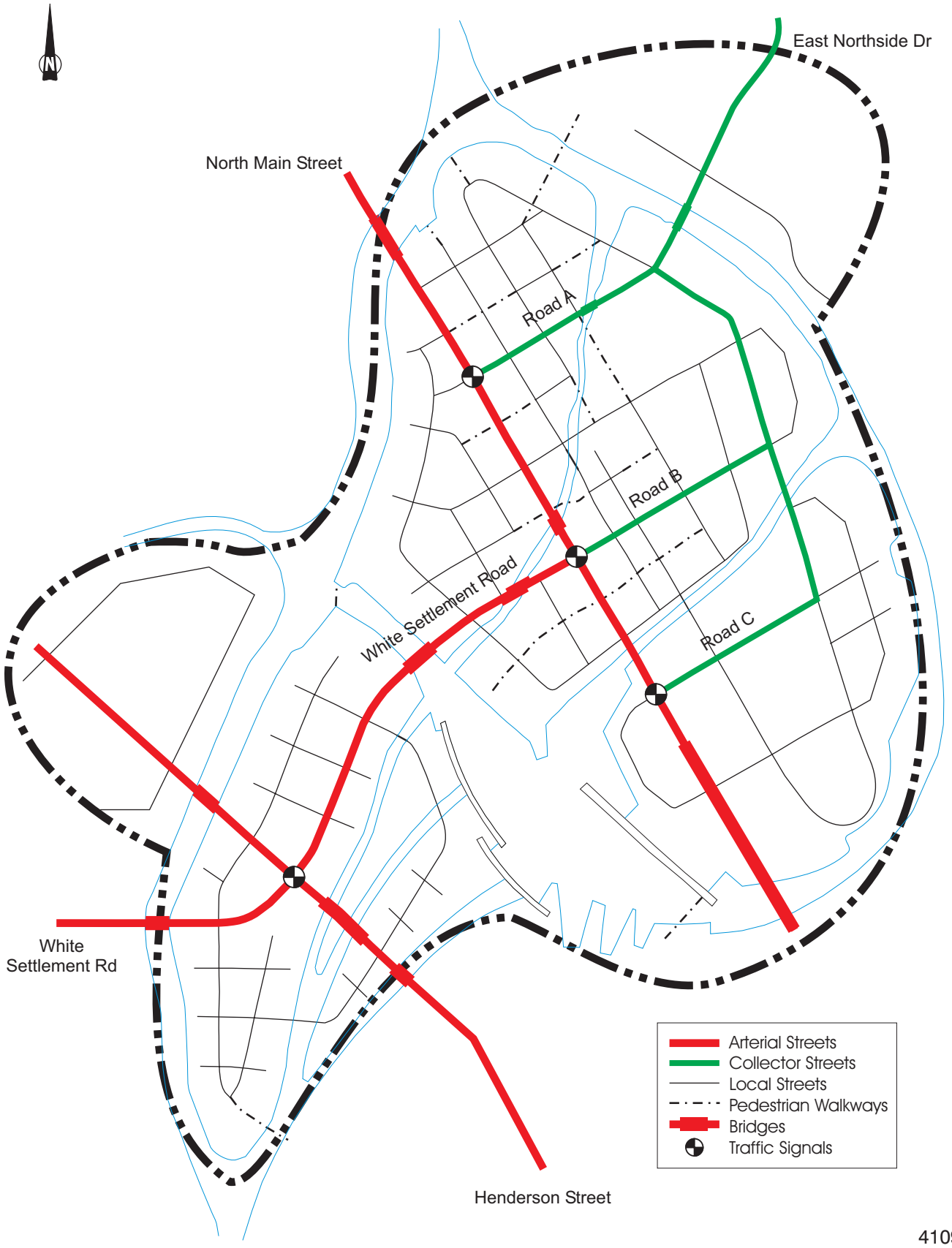
Introduction of higher order service such as Light Rail Transit (LRT) has been considered by City planners. The introduction of LRT service on Main Street north out of the downtown has been identified as a potential future route. While the development of population and employment density in Trinity Uptown will likely create demand that would bring forward the potential implementation of LRT, this type of service is still likely some years away. No other proposals for rail transit that would serve the Trinity Uptown neighborhood have been contemplated.

The primary mode for public transit serving Trinity Uptown for the foreseeable future then will likely be conventional buses. To enable service planning for bus service, the street system needs to make provision for primary through services along the arterial streets, and local services collecting and distributing within the neighborhood that can operate in a continuous loop or a 'through' pattern. Suitable transfer points between the primary and local services should also be provided.

While it is premature to discuss specific transit route provisions, the road network concept plan provides for the expected bus transit requirements. The focus of transit service in the Plan area will likely be at the intersection of Main Street at White Settlement Road, with primary service on Main Street and local services circulating on White Settlement and the planned collector streets.

2.3 Pedestrians and Bicycles

With 3,700 residential dwellings located within walking distance of the downtown, a significant number of Trinity Uptown residents could walk or bicycle to and from work, or alternatively, residents in the downtown may choose to walk to/from employment or education opportunities in Trinity Uptown. To fully capitalize on this potential, the Plan includes separated pedestrian bridges connecting across the river to the downtown that are complementary to the vehicular bridges. The pedestrian bridges are linked to a network of pedestrian/bike paths through the development. Planning in the adjacent neighbourhoods, particularly the downtown, can enhance the connectivity of this supplementary network to encourage use of the pedestrian/bike system.



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Road Network Concept

Trinity Uptown Transportation Plan

Exhibit

2.1

3. Traffic Forecasts

3.1 Methodology

An analysis of the potential traffic loads that development of the Trinity Uptown lands may produce has been undertaken to verify that the proposed infrastructure within the neighborhood is adequate for that purpose. The analysis was also extended to consider the requirements for the existing arterial streets passing through the site, Main Street and Henderson Street. The results from these assessments establish the preliminary road cross-section requirements, location of traffic signals and right-of-way.

The analysis of the site generated traffic has been based on broad assumptions about the type and scale of land uses that may develop over time as provided by the land use planners, and the application of standard trip generation rates for typical uses during peak periods. The trips generated were distributed over the road network based on existing travel patterns, and assumptions about the proportion of internal and external trips.

Background traffic on the regional road network was estimated based on forecasts provided by the North Central Texas Council of Governments (NCTCOG) transportation model, through the City of Fort Worth. These regional forecasts for the streets near Trinity Uptown were then adjusted to reflect the site traffic forecasts for the Trinity Uptown Plan. No network modeling of the revised land use assumptions in Trinity Uptown was undertaken, but this level of preliminary analysis is sufficient to identify the general infrastructure requirements.

The resulting traffic forecasts were subsequently tested for traffic operations performance during a typical weekday PM peak hour which is expected to be the highest traffic period. The PM peak traffic volumes were also simulated using a micro-simulation model to examine Levels of Service, queue lengths and other basic performance measures. These forecasts were also converted to Average Daily Traffic estimates on the major streets to verify that overall traffic service levels are acceptable.

3.2 Land Use Assumptions

The land use planners advise that based on historical absorption rates, and assessment of the potential markets, complete development of the entire Trinity Uptown area at the proposed densities may take as long as 50 years. The long term Land Use Concept Plan is illustrated in **Exhibit 3.1**.

For transportation planning purposes, an analysis of the potential absorption within the next twenty years was identified as a means of testing the Plan in a regional context (in which a 20-year planning horizon is the longest period for travel forecasts), and to indicate how phasing of the development is expected to proceed. The estimated 20-year development schedule to the year 2025 is summarized in **Table 3.1**.

The planning area has been divided into three major sub-areas (North, Southwest and Southeast) for analysis, with smaller development zones for describing specific land uses within each. The potential floor area by use and major sub-area are summarized in **Table 3.1**. Approximately 50% of the overall gross floor space is located in the North sub-area, 30% in the Southwest and the remaining 20% in the Southeast.

Table 3.1: Schedule of Land Uses - 2025 Horizon

Use	Gross Floor Area			
	North	Southwest	Southeast	Total
Residential	1,421,750 sf (1,293 units)	1,764,070 sf (1,604 units)	924,000 sf (840 units)	4,109,820 sf (3,737 units)
Retail / Commercial	418,250 sf	190,000 sf	162,000 sf	770,250 sf
Ball Park, Park	6,000 seats	-	-	6,000 seats
TCC Campus	-	-	250,000 sf	250,000 sf
Community Ctr., Elementary Sch, Civic	-	80,000 sf	230,000 sf	310,000 sf
Total Floor Area	1,840,000 sf	2,034,070 sf	1,566,000 sf	5,440,070 sf

According to this schedule, it is estimated that the entire Trinity Uptown area will be approximately 50% developed within this time frame, and that the Southeast and Southwest areas are expected to proceed at a faster pace during the early years of construction. These estimates correspond to approximately 3,700 residential units plus another 1.3 million square feet of commercial, institutional and other support uses. The anticipated population and employment would be approximately 8,400 residents and 5,200 jobs.

3.3 Site-Generated Traffic

Estimates of the amount of traffic expected to be generated by the land uses within the Trinity Uptown planning area were made in three steps;

- Trip Generation – the volumes of traffic generated from the proposed development in the planning area;
- Trip Distribution – the directional patterns of the site-generated traffic;
- Traffic Assignment – the determination of the travel routes used by the site-generated traffic.

3.3.1 Traffic Generation

To assist in evaluating traffic distribution and turning movements, the Trinity Uptown planning area was divided into 21 traffic zones as illustrated in **Exhibit 3.2**. The boundaries of the traffic zones reflect the road network concept plan, land uses and other physical barriers such as rivers, bridges, etc. The proposed land uses and floor areas were sub-divided corresponding to these traffic zones for the purposes of traffic analysis.

Traffic generation from each traffic zone was estimated based on trip generation rates for similar uses documented in the Institute of Transportation Engineers' Trip Generation Manual (7th Edition). Trip generation during afternoon peak periods was employed to allow detailed trip distribution and assignment over the local road network.

Residential Trip Rates

The amount of traffic generation from residential uses varies with the size and type of development. The residential uses may include townhouses, condominium apartments, high-rise buildings, low-rise buildings, etc. Since the mix of the residential development is unknown at this early planning stage, an average trip rate was developed and applied uniformly across all residential zones.

Commercial / Retail / Office Trip Rates

Trip rates for commercial uses were selected from the ITE Trip Generation Manual. Two land use types were chosen to reflect the potential range in commercial retail uses. (see Appendix A). The rates for 'Small' Retail reflect specialty retail, for example in mixed-use development. The rates for 'Large' Retail represent larger stand-alone retail uses. Trip rates for Office use were taken directly from the ITE manual.

Other Land Uses

Other land uses in Trinity Uptown include parks, community centre, the TCC downtown campus, elementary schools, civic destination, baseball field, etc. Appropriate trip rates for these uses were also selected from the ITE manual.

A summary of the selected trip generation rates is provided in **Table 3.2**. A more complete explanation of the derivation is provided in **Appendix A**.

Table 3.2: Peak Period Trip Generation Rates(1)

Type	PM Peak		
	In	Out	Total
Residential	0.36	0.22	0.58
Small Commercial	1.53	1.94	3.47
Large Commercial	3.00	3.26	6.26
Mixed-Use (Office & Retail/Commercial) (2)	0.68	1.47	2.15
Park & Community Centre	0.18	0.44	0.62
Baseball Park (3)	45	5	50
Civic Destinations	1.44	1.56	3.00
College/University (4)	0.06	0.15	0.21

Notes:
(1) Trip Rates are vehicles per hour per 1,000 sf unless otherwise indicated
(2) Assumes Mixed-Use: 2/3 Office and 1/3 Small Retail
(3) Practice only during peak hours – total vehicle trips per field
(4) Vehicles per hour per enrolled student

Trip generation derived in this manner implicitly assumes that all individual land uses function independently. Since there is a broad mix of residential and commercial uses in the planning area, it is expected that there will be a high degree of local interaction resulting in a general reduction in vehicle travel. Most of this reduction is attributable to walking trip substitution. It is estimated that vehicle trip generation will be reduced by approximately 10% as a result.

The expected site traffic generation for each traffic zone during the PM peak hour upon full development was determined by applying the trip rates to the corresponding level of development, with adjustments as described.

At the twenty-year horizon in 2025, the total amount of traffic generated is forecast to be approximately 5900 vehicle trips (inbound and outbound combined) during the PM peak hour. Details of the trip generation by use and traffic zone are provided in **Appendix A**.

3.3.2 Traffic Distribution

The distribution of the site-generated traffic was evaluated by first estimating the proportion of the trips generated that would have one trip end external to the study area (i.e. internal to external trips) and then dividing these trips among the limited number of entry/exit roadways to Trinity Uptown. Distribution of the internal trips was then estimated on the basis of the relative attractiveness of each zone pair. The internal and external trips were then combined to produce an Origin/Destination trip matrix.

Internal vs. External Trip Destinations

The proportion of the internal versus external travel will depend on the level of 'self-containment' of the proposed development within the project area and the adjacent demographic characteristics. Trinity Uptown is located immediately adjacent to downtown Fort Worth which provides a natural draw for residents in Trinity Uptown to work in the downtown. In addition, the size and mix of uses within Trinity Uptown will also attract a substantial amount of travel within the planning area.

Based on travel characteristics of similar urban developments areas elsewhere, it is estimated that approximately 55% of the inbound trips attracted to the Trinity Uptown in the PM peak hour would be external-to-internal trips with the remaining 45% internal-to-internal. These O-D patterns are shown in **Table 3.3**.

Table 3.3: Internal-External Distribution – 2025 Horizon

	AM Peak Hour			PM Peak Hour		
	External	**Internal**	**Total**	**External**	**Internal**	**Total**
Outbound	1,125 vph (55%)	920 vph (45%)	2,045 vph) (100%)	1,590 vph (54%)	1,370 vph (46%)	2,960 vph (100%)
Inbound	840 vph (48%)	920 vph (52%)	1,760 vph (100%)	1,545 vph (53%)	1,370 vph (47%)	2,915 vph (100%)

External Trips - Directional Distribution

Estimates were made regarding the distribution of the internal/external travel patterns based on a review of the regional road network, the nature of the adjacent areas and expected future growth patterns in Fort Worth. The estimated distribution of these trips via the external entry roadways to Trinity Uptown is as follows:

Road A towards Northside Drive	10%
Main Street to the North	15%
Main Street to the South	25%
Henderson Street to the North	20%
Henderson Street to the South	20%
White Settlement Road	10%
TOTAL	100%

Overall, approximately 45% of the external trips are expected to be oriented to/from the south, 35% to/from the north, and 10% each to/from the east and west.

Internal/Internal Trip Distribution

The distribution of the internal-to-internal origins and destinations depends on several factors such as distance between each pair of traffic zones, land use, and the balance of inbound and outbound trips. The procedures used in deriving the internal/internal patterns generally followed the 'gravity' rule where the interaction between a pair of traffic zones is proportionate to the amount of traffic generated/attracted and inversely proportionate to the distance between them.

The resulting origin-destination trip matrix describes the estimated distribution of the site-generated traffic in detail. The O-D matrix is provided in **Appendix B**.

3.3.3 Traffic Assignment

The trip matrix developed in the distribution analysis provides a measure of the travel demand between each O-D pair. The trips from each pair of internal traffic zones and for the internal-external connections were subsequently assigned manually to the streets in the road network concept plan through a spreadsheet model developed by Bunt & Associates.

A multiple path assignment procedure was adopted whereby the estimated travel demand from one zone to another was assigned to more than one traffic route if multiple, competing, routes are available. The percentage of traffic allocated to each travel route was based on the attractiveness of the route, such as capacity and distance. Where the traffic zone has more than one access point to/from the traffic network, the site-generated traffic was also distributed among the possible entry and exit points, proportional to the expected attractiveness.

Exhibit 3.3 shows the resultant forecasts of the Site-Generated traffic, when loaded onto the traffic network, for the 20-year horizons, corresponding to the year 2025.

3.4 Regional Traffic Forecasts

3.4.1 NCTCOG Transportation Model

The City of Fort Worth provided forecasts of traffic volumes on the regional road network in the City as a basis for identifying the expected levels of external background traffic on the major streets passing through the Trinity Uptown planning area. These traffic forecasts were developed by the NCTCOG Transportation Planners using a regional transportation forecasting model that includes the cities of Fort Worth and Dallas, and the entire surrounding region. The model provides forecasts of traffic based on assumptions about the magnitude and distribution of future population and employment in zones throughout the region. Since forecasts of this nature become increasingly uncertain over longer horizon periods, the NCTCOG maintains forecasts to a twenty year horizon only. The forecasts provided are for the current year 2004 and the twenty-year horizon at the year 2025. (It should be noted that the 2025 NCTCOG model assumes a 2025 road network but with projected 2030 population and employment demographics.) The 2025 NCTCOG forecast of daily two-way traffic volumes is shown in **Appendix C**.

In the vicinity of Trinity Uptown, the regional roads included in the NCTCOG forecasts are Main Street, Henderson Street and White Settlement Road. **Table 3.4** shows a comparison of the daily two-way traffic volumes between 1999 and 2025 on these streets, extracted from the NCTCOG forecasts. The average traffic growth on these three routes over the next twenty years is about 60% over the existing 1999 daily volumes, corresponding to an annual compound growth rate of approximately 2%.

Table 3.4: Summary of NCTCOG Daily Traffic Volumes

Route	Direction	Daily Traffic Volumes		
		1999	2025	Growth Rate
North Main Street	North/South	15,560	29,880	+2.6%
Henderson Street	North/South	22,750	34,450	+1.6%
White Settlement Road	East/West	11,820	18,830	+1.8%

Henderson Street is expected to carry the highest traffic volume with 34,450 vehicles per day (two-way) in 2025. North Main Street will, however, experience the highest growth rate of 92% from a daily volume of 15,560 in 1999 to 29,880 in 2025.

An examination of the demographic forecasts in the NCTCOG model explains the high growth rate on North Main Street. The NCTCOG procedures divide the modeling area into *Traffic Survey Zones* (TSZ). There are 5 TSZ that lie wholly or partly within the Trinity Uptown planning area. The 2025 NCTCOG demographic assumptions for these zones are summarized in **Table 3.5**. The assumed demographic in the Trinity Uptown area is largely employment based. The residential component is negligible in both the existing and 2025 horizons.

Prior to consideration of the Trinity Uptown project, it has been estimated that the existing employment in the project area would increase from approximately 2,100 jobs in 2000 to 4,500 jobs in 2025. Approximately 70% of the expected employment

growth is in TSZ #'s 5201 and 5202, which can only be accessed from North Main Street. This is the primary source of the forecast of higher traffic growth on North Main Street in 2025 identified above.

Table 3.5: NCTCOG Model – Trinity Uptown Demographic Assumptions

TSZ	Connecting Arterial Streets	1999		2025	
		Employment	Population	Employment	Population
5201	North Main Street	288	0	1,575	0
5202		622	0	1,006	3
	Sub-Total	*910*	*0*	*2,581*	*3*
5200	Henderson Street & White Settlement Road	399	0	836	0
5765 *		189	0	189	0
5766		32	0	64	0
5767 *		647	7	877	359
	Sub-Total	*1,267*	*7*	*1,966*	*359*
	Total	***2,177***	***7***	***4,547***	***362***

Notes: Data are for 2030, but referred to the 2025 model year

3.4.2 2025 Background External Traffic Volumes

The projected 2025 external background traffic volumes were based on the above 2025 regional traffic forecasts from the NCTCOG model with the following adjustments/assumptions:

1. **Peak Hour Forecasts**
   Peak hour forecasts of through traffic on the regional roads for the PM peak period were estimated by assuming that the peak hour peak direction volume in the PM peak hour is approximately 9% of the total daily traffic. It was assumed that the peak directional split for the three arterials (North Main Street, Henderson Street and White Settlement Road) is 65%/35% during the peak hours. The peak direction is outbound from downtown Fort Worth in the PM peak.

2. **Removal of Previously Assumed NCTCOG Traffic**
   In order not to double count the traffic generation from the Trinity Uptown planning area when the traffic volumes from the proposed development are added later, the site-generated traffic included in the NCTCOG model forecasts was removed. This process was based on the demographics assumed in the NCTCOG model and an estimate of the associated traffic generation.

3. **Effect of Additional Road Links**
   The proposed Road Network Concept Plan includes an extension of White Settlement Road to North Main Street and a new road link from North Main Street to East Northside Drive. These are significant new links in the regional road network. The forecast traffic volumes in the NCTCOG model will likely

be influenced by these additional arterial connections. Therefore, adjustments were made to allow for the potential diversion effects. Additional traffic volume was also added on the new connections to reflect possible diverted traffic from other routes.

Applying these procedures, a PM peak hour trip matrix for the external background traffic volumes in 2025 was developed as shown in **Table 3.6**. A trip assignment for these origins and destinations was prepared to describe the forecast external traffic flow patterns.

Table 3.6: 2025 PM Peak Hour Background External Traffic Volumes

From	To						
	Main St. North	Road A to Northside	Main St. South	Henderson St. South	White Settlement Road	Henderson St. North	Total
Main St. North		0	950	50	0	0	1000
Road A to Northside	0		50	50	50	0	150
Main St. South	1250	50		0	100	0	1400
Henderson St. South	100	50	0		550	1740	2440
White Settlement Rd.	50	50	50	300		160	610
Henderson St. North	0	0	50	1360	200		1610
Total	1400	150	1100	1760	900	1900	7210

3.5 Total Traffic Volume Forecasts

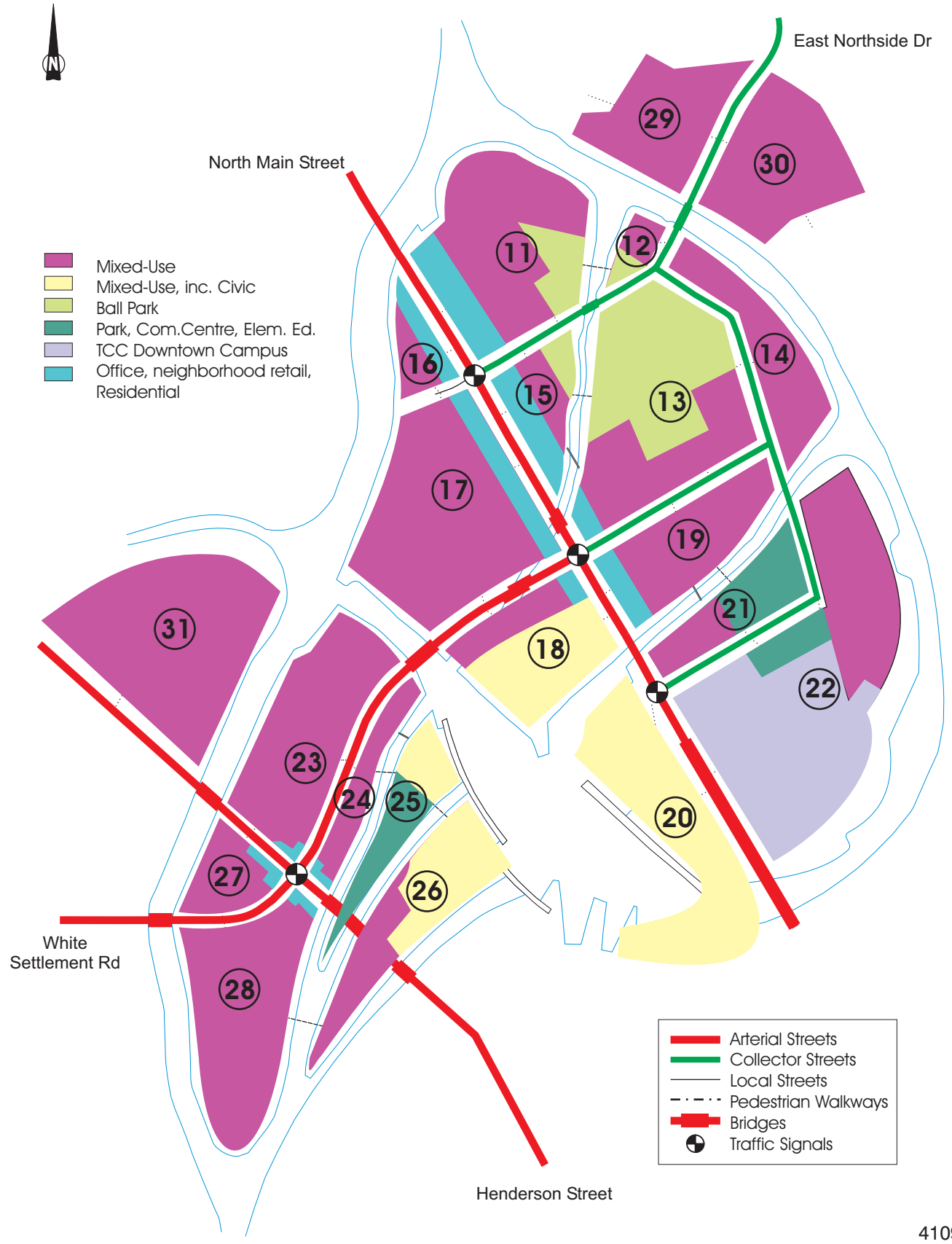
Forecasts for the total combined internal site traffic and external background traffic were prepared by adding the respective trip assignment volumes together. A detailed illustration of the resulting traffic turning movements at the intersections in the area network is provided in **Appendix D**. Estimated total daily traffic volumes were prepared by expanding the peak hour volumes. The forecast 2025 daily traffic volumes are shown in **Exhibit 3.4**.

A comparison of the external versus internal traffic on specific segments of the regional road network is shown in **Table 3.7**. Also shown is a comparison with the traffic volumes previously forecast in the NCTCOG model for the same segments. As indicated, most of the traffic on Main Street and Henderson Street is expected to be external regional traffic that passes through Trinity Uptown. The introduction of the extension of White Settlement Road to Main Street and the new Road A link to Northside Drive also attracts a significant amount of external traffic, particularly Road A.

The reassignment of external traffic on the new network followed by the addition of the new internal traffic generated by Trinity Uptown produces higher traffic volumes on the regional roads than previously forecast by NCTCOG by approximately 12% overall. Note that on Henderson Street the increase in traffic generated locally by Trinity Uptown is essentially offset by the diversion of external traffic allowed by the new road links.

Table 3.7: Summary of 2025 PM Peak Hour Total Traffic Volumes

Road Section	Traffic Volumes (vehicles/hour, two-way)			NCTCOG Model Forecast (Two-Way Total)
	External Background	Site-Generated	Total	
North Main Street (north of White Settlement Road)	2,615 (74%)	940 (26%)	3,555	2,850
Henderson Street (north of White Settlement Road)	3,950 (86%)	635 (14%)	4,585	4,610
White Settlement Road (west of Henderson Street)	1,700 (75%)	575 (25%)	2,275	1,870
White Settlement Road (between Henderson and North Main Street)	920 (37%)	1,550 (63%)	2,470	-
Road A to Northside (east of North Main Street)	480 (62%)	300 (38%)	780	-



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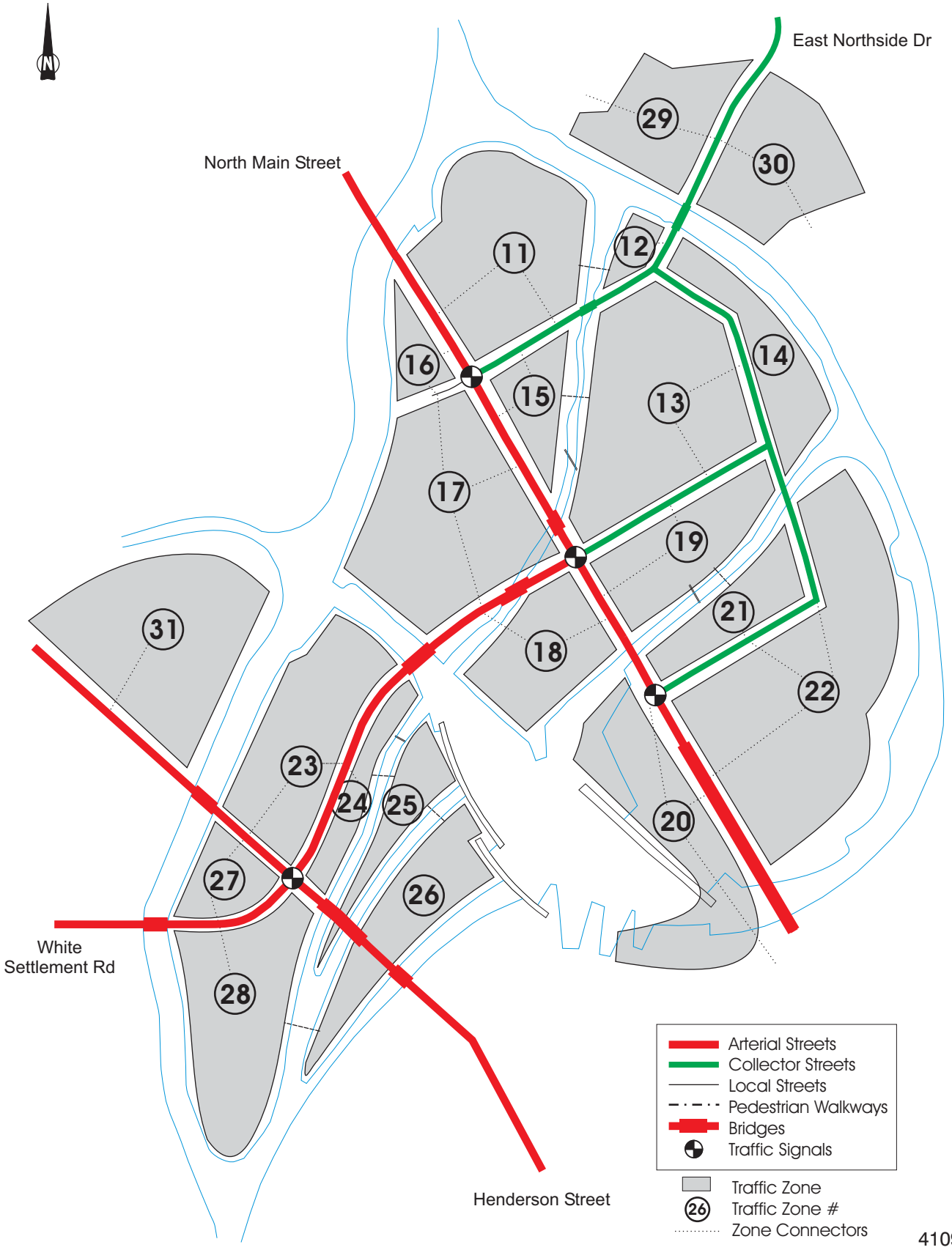
Land Use Map

Trinity Uptown Transportation Plan

Exhibit 3.1



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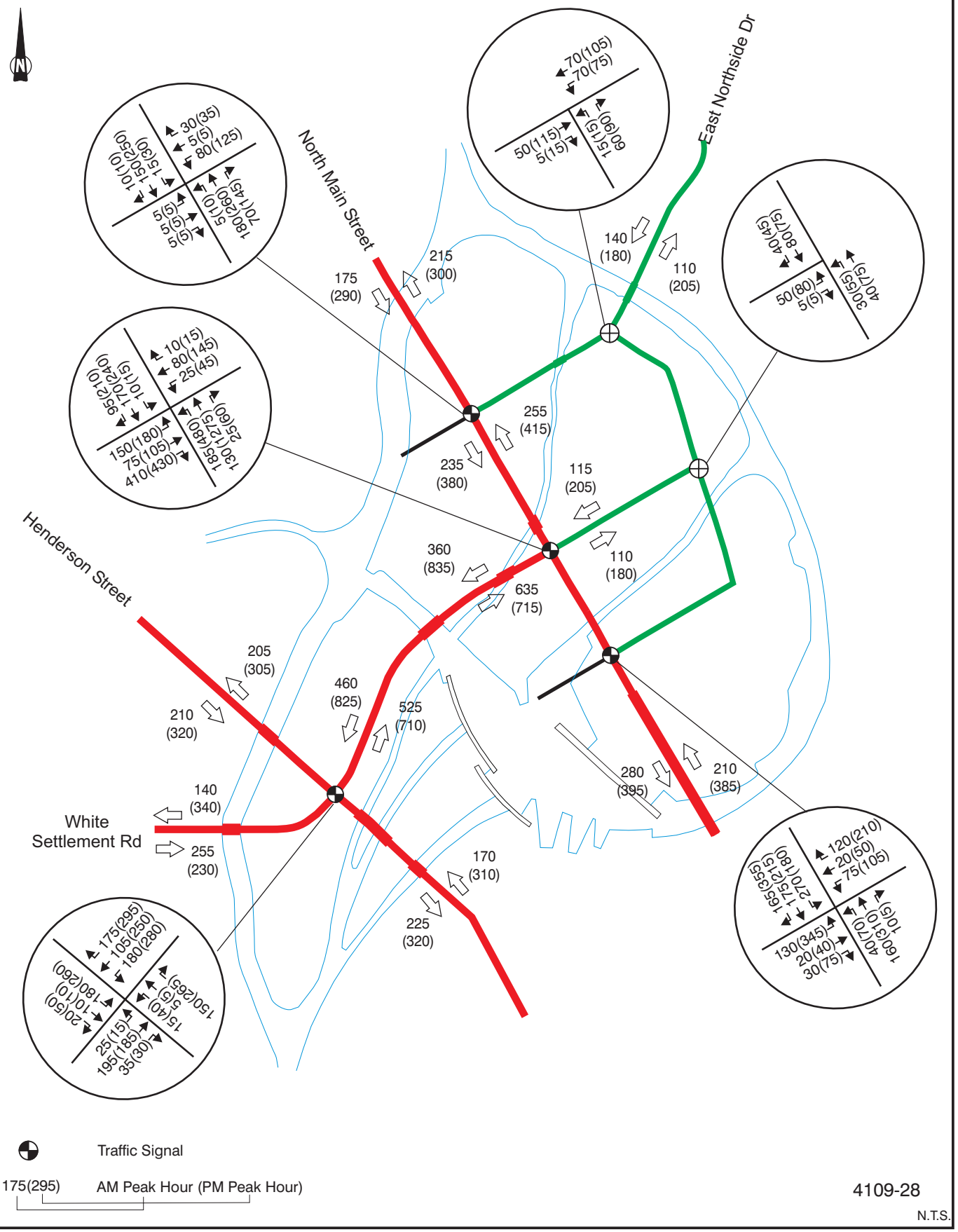
Traffic Zone Map

Trinity Uptown Transportation Plan

Exhibit

3.2



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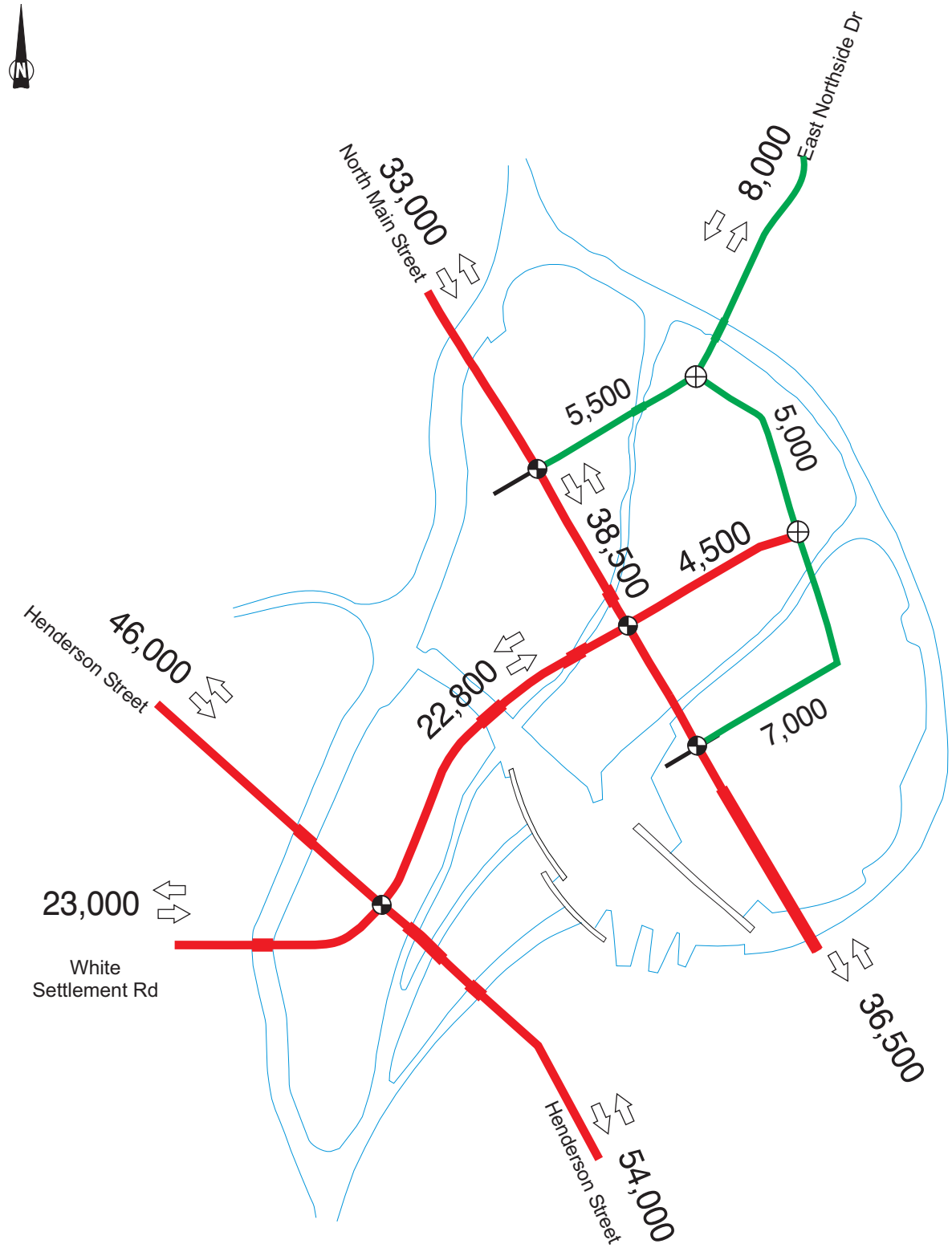
2025 Site-Generated Traffic Volumes

Trinity Uptown Transportation Plan

Exhibit 3.3



Traffic Signal

23,000 - Daily Traffic Volumes (Two-Way)

4109-28
N.T.S.

BUNT & ASSOCIATES

Projected 2025 Daily Total Traffic Volumes

Trinity Uptown Transportation Plan

Exhibit
3.4

4. Assessment of Infrastructure Requirements

To identify the infrastructure requirements for the Trinity Uptown Plan a two-step process was followed. First, the anticipated roadway level of service was assessed based on the forecast daily traffic volumes and the typical capacity of the respective roadway types to determine the basic roadway cross-section required. Second, the operational performance at major intersections on the arterial routes was analyzed to ensure adequate capacity and level of service at these intersections.

4.1 Roadway Service Volumes

In planning urban streets, there are typical service volumes associated with the classification and general cross-section of roadways. **Table 4.1** shows typical service volumes and corresponding roadway cross-sections. Level of Service (LOS) D is generally considered a maximum acceptable level of service for planning purposes. However, LOS C should be provided wherever possible. These service volumes and cross-sections are guidelines with many exceptions depending on specific local circumstances, but they provide a general indication, suitable for planning at the concept stage, of what infrastructure is required in Trinity Uptown.

Table 4.1: Typical Roadway Service Volumes

Basic Roadway Cross-Section	Classification	Daily Traffic Volumes	
		Level of Service C or better	Level of Service D (Max.)
Two Lane	Local	800 - 1,000	1,500
Two-Lane	Collector	4,000 - 5,000	7,000
Two Lane	Collector / Arterial	8,000 – 10,000	15,000
Four Lane Undivided	Arterial	18,000 – 20,000	25,000
Four Lane Divided	Arterial	20,000 – 24,000	30,000
Six Lane Divided	Arterial	30,000 – 35,000	45,000

Based on the forecast daily volumes to the year 2025 shown in Exhibit 3.3, the basic roadway cross-section on North Main Street through the Trinity Uptown area should be a four-lane arterial to maintain an acceptable Level of Service **(see Table 4.2)**. Where access control is necessary, the roadway should also be divided.

Higher volumes on Henderson Street indicate that a six-lane cross-section is required is required. Where access control is necessary, the roadway should also be divided.

White Settlement Road will function at acceptable levels with a basic cross-section of four lanes undivided from west of Henderson to Main Street. Additional turning lanes will likely be required at the two major intersections at either end. East of Main Street, White Settlement Road will function as a collector street that will require a basic two-lane cross-section, with added turning lanes at the Main Street intersection.

The proposed Road A connection towards Northside Drive requires only a two-lane undivided roadway, and will function as a collector street.

Table 4.2: 2025 Road Cross-Sections and Service Levels

Road Section	Estimated Daily Traffic Volumes	Minimum Cross-Section	Level of Service Condition
North Main Street	27,500	Four Lane Divided	LOS C-D
Henderson Street	34,000	Six Lane Divided	LOS C
White Settlement Road (west of Henderson)	19,500	Four Lane Undivided	LOS C
White Settlement Road (Henderson to Main St.)	20,000	Four Lane Undivided	LOS C
White Settlement (East of Main St.)	5,000	Two Lane	LOS C
Road A to Northside Drive	7,000	Two Lane	LOS C

4.2 Intersection Operational Analysis

Intersection operations analysis was conducted for the 2025 horizon, based on the forecast PM peak hour volumes. The analysis was conducted using Synchro 6, Traffic Signal Coordination Software to test the operational performance of the major signalized intersections within the Trinity Uptown road network in 2025. The Synchro software was set to use the Highway Capacity Manual procedures in performing Capacity and Level of Service evaluation. As a planning exercise, general HCM default values for parameters in the capacity analysis were used. Four intersections were analyzed including:

- Henderson Street / White Settlement Road
- North Main Street / Road A
- North Main Street / White Settlement Road
- North Main Street / Road C.

Lane configuration and traffic signal phasing at intersections were optimized through the Synchro optimization procedures

A summary of the Synchro operational analysis is provided in **Table 4.3**, which indicates the anticipated Volume/Capacity (V/C) ratio, level of service and average delays.

The V/C ratio of the intersection is a composite V/C ratio for the sum of the critical movements within the intersection. A V/C ratio greater than 1.0 indicates that the intersection is expected to operate beyond the available capacity. Level of Service is, however, defined in terms of vehicle delays. The guidelines adopted by the City of Fort Worth indicate that a Level of Service C should be used as a design objective.

Table 4.3: 2025 Intersection Operational Performance

Intersection	PM Peak Hour		
	V/C Ratio	LOS	Avg. Delay (sec)
Henderson St / White Settlement Rd	0.90	D	41.3
North Main Street / Road A	0.70	B	12.7
North Main St / White Settlement Rd	0.81	C	32.7
North Main Street / Road B	0.89	C	27.9

The operations analysis indicates that the intersection on North Main Street at Road B and at Road A will operate satisfactorily during the highest traffic volume period, the PM peak hour. On White Settlement Road at both Main Street and Henderson Street, the intersections are expected to operate within the available capacity but at Level of Service D. Examination of the capacity analysis shows that the primary source of the relatively long delays, and hence Level of Service, is the high volumes of turning traffic. In testing the intersection capacity, default values for lane geometry and basic signal phasing were used as appropriate for a planning exercise. Provision of additional intersection features such as dual left-turn lanes or auxiliary right-turn lanes or priority signal phasing would improve the intersection performance at these locations. Given the long time planning horizon and potential variability in the development pattern and traffic forecasts, it is premature to prescribe those treatments now.

It is also worth noting that most (75% to 85%) of the traffic at these two key intersections is external background traffic as forecast by NCTCOG. These are based on certain assumptions about the distribution of future development and the future road network. The Trinity Uptown project is sufficiently large to potentially alter those assumptions.

The Synchro software also allows a micro-simulation of the forecast traffic volumes to examine queue lengths and general levels of congestion. Examination of the simulation for the forecast PM peak hour showed no apparent operational problems of this nature.

Based on this evaluation, it is concluded that the proposed road network concept plan is generally adequate to accommodate the forecast traffic volumes at acceptable levels of service to the year 2025.

4.3 Long Term Build-Out

While the proposed road network is sufficient to accommodate the 2025 forecast traffic, it is clear that long term development of the Trinity Uptown lands will require additional transportation infrastructure or changes in travel characteristics or both. Since the forecast traffic volumes at 2025 are near to the acceptable limits in service levels with the planned infrastructure, future traffic growth beyond that time period will not likely be accommodated at the same service levels.

Since the time frame for full build out is expected to be as long as 50 years from now, it is unlikely that conditions upon which this analysis is premised will continue to apply. For example, since the Trinity Uptown Plan includes many of the current

best practices in urban mixed-use development, it is likely that trip generation rates, mode splits and other travel characteristics will result is significant reductions in travel demand. The extent of these reductions more than twenty years hence cannot be reasonably estimated now. It is not practical to know what urban transportation conditions in that time frame might be. There are, however, several measures that could be planned that would mitigate the future traffic conditions.

First, additional capacity to and from the Trinity Uptown planning area could be provided by construction of an additional river crossing that connects to the regional road system. One possibility is a link to the east as an extension of White Settlement Road that climbs the bluff and connects to Belknapp. Such a link would provide an alternate route for traffic to/from the south and east that would relieve Main Street and the downtown area. The physical feasibility of such a roadway would require further investigation. Moreover, the link may have undesirable neighborhood impacts in the Samuels area.

Another possibility is to provide for the future widening of Main Street to accommodate six traffic lanes. The cost of replacing the existing bridge from downtown is a major drawback to this prospect. In addition, an expansion of Main Street would work against the urban planning objectives of the Trinity Uptown Plan. Maintaining a small scale and sense of community neighborhood is one of the principles of the Plan.

Future provision of rapid transit in the North Main Street corridor is another potential long term option. Through traffic in the Henderson and Main Street corridors out of the downtown is forecast by NCTCOG to grow by more than 60% within the next twenty years. Continued growth beyond that time frame at similar rates is not sustainable and will require a major intervention such as rapid transit.

5. Conclusions

5.1 Required Infrastructure

Since most of the travel to/from and within the Trinity Uptown planning area will be made by private vehicles, the Road Network Concept Plan provides the primary structure for transportation services. In addition to providing capacity for private traffic, the network is also configured to enable regional and local public transit bus services for Trinity Uptown. The proposed infrastructure also includes multiple pedestrian connections between Trinity Uptown and the adjacent areas to fully capitalize on the potential for walking and bicycle trips.

Analysis of forecast traffic volumes to the year 2025, including both external regional traffic and internally generated traffic, indicates that the proposed road network can accommodate the forecast development over that time period. The road infrastructure required is illustrated in **Exhibit 5.1**.

It is expected that Trinity Uptown will be only partially developed by 2025. Continued development in Trinity Uptown beyond that time frame combined with on-going regional traffic growth on Main Street and Henderson Street is not feasible without a major intervention in new transportation infrastructure. Minor additions to traffic capacity serving Trinity Uptown may be possible, but likely have significant drawbacks, and would not deal with the overall regional traffic growth requirements.

5.2 Transportation Planning Considerations

From the viewpoint of regional transportation planning, the Trinity Uptown concept of developing a significant new housing component near the Fort Worth downtown is an optimal growth strategy. Compared with alternate locations for new housing, Trinity Uptown would reduce overall trip lengths, fill in available capacity in off-peak travel directions, maximize the potential for walking trips and provide sufficient density of development in a location that can be efficiently served by public transit.

The balance of residents and jobs in Trinity Uptown is also desirable since the full potential for self-containment of travel within the community is created.

The development of the Trinity Uptown lands also supports growth in the Fort Worth downtown for both jobs and housing. Continued growth of a mix of uses in the downtown also has regional growth benefits and is located where existing transportation infrastructure is already good.

The Trinity Uptown Concept Plan is a major new development area that will likely affect the overall distribution of trips in and around the Fort Worth downtown. The studies conducted in this report do not fully explore these implications. It is desirable that the NCTCOG model be updated with the new Trinity Uptown demographics and road network to determine these effects on a more global basis and identify any changes to future regional requirements.

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BUNT & ASSOCIATES

2025 Road Network Plan

Trinity Uptown Transportation Plan

Exhibit

5.1

Appendix A:

Trip Rates and Site Traffic Analysis

Residential Component

GFA: 12,554,110 sf

Assumption 1

Type	Area Avg. Size (sf)	% Dwelling Unit	Total GFA (sf)	# dwelling units	Weekday AM Peak						Weekday PM Peak						ITE Land-Use Ref
					In		Out		Total		In		Out		Total		
					Rate	#	*Rate*	#	*Rate*	#	*Rate*	#	*Rate*	#	*Rate*	#	
Single family housing	2,200 sf	5%	627,706 sf	285	0.1875	53	0.5625	160	0.75	214	0.64	183	0.37	106	1.01	288	210
Townhouse	1,500 sf	25%	3,138,528 sf	2092	0.075	157	0.365	764	0.44	921	0.35	732	0.17	356	0.52	1088	230
Low-Rise condominium	1,100 sf	25%	3,138,528 sf	2853	0.1675	478	0.5025	1434	0.67	1912	0.45	1284	0.33	942	0.78	2226	231
High-rise condominium	600 sf	45%	5,649,350 sf	9416	0.065	612	0.275	2589	0.34	3201	0.24	2260	0.14	1318	0.38	3578	232
Total	**1,030 sf**	**100%**	**12,554,110 sf**	**14646**	**0.10**	**1300**	**0.37**	**4947**	**0.47**	**6248**	**0.34**	**4459**	**0.21**	**2721**	**0.55**	**7180**	

Assumption 2

Type	Area Avg. Size (sf)	% Dwelling Unit	Total GFA (sf)	# dwelling units	Weekday AM Peak						Weekday PM Peak						ITE Land-Use Ref
					In		Out		Total		In		Out		Total		
					Rate	#	*Rate*	#	*Rate*	#	*Rate*	#	*Rate*	#	*Rate*	#	
Single family housing	2,200 sf	5%	627,706 sf	285	0.1875	53	0.5625	160	0.75	214	0.64	183	0.37	106	1.01	288	210
Townhouse	1,500 sf	25%	3,138,528 sf	2092	0.075	157	0.365	764	0.44	921	0.35	732	0.17	356	0.52	1088	230
Low-Rise condominium	1,100 sf	40%	5,021,644 sf	4565	0.1675	765	0.5025	2294	0.67	3059	0.45	2054	0.33	1506	0.78	3561	231
High-rise condominium	600 sf	30%	3,766,233 sf	6277	0.065	408	0.275	1726	0.34	2134	0.24	1506	0.14	879	0.38	2385	232
Total	**1,105 sf**	**100%**	**12,554,110 sf**	**13220**	**0.11**	**1383**	**0.40**	**4944**	**0.52**	**6327**	**0.37**	**4476**	**0.24**	**2847**	**0.61**	**7322**	

Assumption 3

Type	Area Avg. Size (sf)	% Dwelling Unit	Total GFA (sf)	# dwelling units	Weekday AM Peak						Weekday PM Peak						ITE Land-Use Ref
					In		Out		Total		In		Out		Total		
					Rate	#	*Rate*	#	*Rate*	#	*Rate*	#	*Rate*	#	*Rate*	#	
Single family housing	2,200 sf	5%	627,706 sf	285	0.1875	53	0.5625	160	0.75	214	0.64	183	0.37	106	1.01	288	210
Townhouse	1,500 sf	40%	5,021,644 sf	3348	0.075	251	0.365	1222	0.44	1473	0.35	1172	0.17	569	0.52	1741	230
Low-Rise condominium	1,100 sf	30%	3,766,233 sf	3424	0.1675	573	0.5025	1720	0.67	3059	0.45	1541	0.33	1130	0.78	2671	231
High-rise condominium	600 sf	25%	3,138,528 sf	5231	0.065	340	0.275	1438	0.34	2134	0.24	1255	0.14	732	0.38	1988	232
Total	**1,190 sf**	**100%**	**12,554,110 sf**	**12288**	**0.11**	**1218**	**0.39**	**4541**	**0.50**	**6880**	**0.37**	**4150**	**0.22**	**2537**	**0.59**	**6687**	

Average Rates

Residential	1,108 sf	0.11	0.39	0.50	0.36	0.22	0.58

Commercial Component

Type	Weekday AM Peak			Weekday PM Peak			ITE Land-Use Ref.	
	Rate			Rate				
	In	*Out*	*Total*	*In*	*Out*	*Total*		
Specialty Retail Centre	0.85	0.65	1.50	1.53	1.94	3.47	814	(1)
Shopping Centre	0.95	0.61	1.56	3.00	3.26	6.26	820	(2)
General Office Building	1.36	0.19	1.55	0.25	1.24	1.49	710	

Note:
(1) Rates are based on ITE's Fitted Curved Equation assuming an average floor area of 20,000 sf
(2) Rates are based on ITE's Fitted Curved Equation assuming an average floor area of 100,000 sf

Other Uses

Land-Use	Weekday AM Peak						Weekday PM Peak						ITE Land-Use Ref.	
	In		Out		Total		In		Out		Total			
	Rate	#	*Rate*	#	*Rate*	#	*Rate*	#	*Rate*	#	*Rate*	#		
Park	0.018	1	0.005	0	0.023	1	0.023	1	0.033	2	0.056	3	412	(1)
Recreational Community Centre	0.99	30	0.63	19	1.62	49	0.48	14	1.16	35	1.64	49	495	(1)
Elementary School	2.53	127	2.16	108	4.69	235	1.34	67	1.79	90	3.13	157	520	(1)
College/University	0.17	425	0.04	100	0.21	525	0.06	150	0.15	375	0.21	525	550	(2)
Ball Park (Baseball Field)		10		5	0	15		45		5	0	50	488	(3)
Civic	1.40	210	0.60	90	2.00	300	1.44	216	1.56	234	3.00	450	-	(1)

Note:
(1) Rates per 1,000 sf
(2) Rates per student (assume 1 student per 100 sf)
(3) Rates per field (assume practice only, no game during street peak hours)

Trip Generation
2025 Build-Out

Traffic Zone	Land-Use	# units / Floor Area	Weekday AM Peak Hour						Weekday PM Peak Hour					
			In		Out		Total		In		Out		Total	
			Rate	#	*Rate*	#	*Rate*	#	*Rate*	#	*Rate*	#	*Rate*	#
11	Residential	281 units	*0.11*	30	*0.39*	109	*0.50*	139	0.36	101	*0.22*	62	*0.58*	163
	Commercial	21,537 sf	*0.85*	18	*0.65*	14	*1.50*	32	*1.53*	33	*1.94*	42	*3.47*	75
	Office/commercial	63,003 sf	*1.19*	75	*0.34*	22	*1.53*	97	0.68	43	*1.47*	93	*2.15*	135
	Disc. Commercial			*-10%*		*-10%*		*-10%*		*-10%*		*-10%*		*-10%*
	Disc. Office/commercial			*-10%*		*-10%*		*-10%*		*-10%*		*-10%*		*-10%*
	Subtotal			**114**		**141**		**255**		**169**		**183**		**352**
12	Residential	36 units	*0.11*	4	*0.39*	14	*0.50*	18	0.36	13	*0.22*	8	*0.58*	21
	Commercial	9,338 sf	*0.85*	8	*0.65*	6	*1.50*	14	*1.53*	14	*1.94*	18	*3.47*	32
	Disc. Commercial			*-10%*		*-10%*		*-10%*		*-10%*		*-10%*		*-10%*
	Subtotal			**11**		**19**		**30**		**26**		**24**		**50**
13	Residential	114 units	*0.11*	12	*0.39*	44	*0.50*	57	0.36	41	*0.22*	25	*0.58*	66
	Commercial	27,371 sf	*0.85*	23	*0.65*	18	*1.50*	41	*1.53*	42	*1.94*	53	*3.47*	95
	Office/commercial	31,501 sf	*1.19*	37	*0.34*	11	*1.53*	48	0.68	21	*1.47*	46	*2.15*	68
	Ball Park (6,000 seats)	1 field	*10*	10	*5*	5	*15*	15	45	45	*5*	5	*50*	50
	Disc. Commercial			*-10%*		*-10%*		*-10%*		*-10%*		*-10%*		*-10%*
	Disc. Office/commercial			*-10%*		*-10%*		*-10%*		*-10%*		*-10%*		*-10%*
	Subtotal			**77**		**75**		**152**		**143**		**120**		**263**
14	Residential	131 units	*0.11*	14	*0.39*	51	*0.50*	65	0.36	47	*0.22*	29	*0.58*	76
	Commercial	3,745 sf	*0.85*	3	*0.65*	2	*1.50*	6	*1.53*	6	*1.94*	7	*3.47*	13
	Disc. Commercial			*-10%*		*-10%*		*-10%*		*-10%*		*-10%*		*-10%*
	Subtotal			**17**		**53**		**70**		**52**		**36**		**88**
15	Residential	51 units	*0.11*	5	*0.39*	20	*0.50*	25	0.36	18	*0.22*	11	*0.58*	29
	Commercial	1,768 sf	*0.85*	2	*0.65*	1	*1.50*	3	*1.53*	3	*1.94*	3	*3.47*	6
	Office/commercial	63,003 sf	*1.19*	75	*0.34*	22	*1.53*	97	0.68	43	*1.47*	93	*2.15*	135
	Disc. Commercial			*-10%*		*-10%*		*-10%*		*-10%*		*-10%*		*-10%*
	Disc. Office/commercial			*-10%*		*-10%*		*-10%*		*-10%*		*-10%*		*-10%*
	Subtotal			**74**		**40**		**114**		**59**		**98**		**157**
16	Residential	69 units	*0.11*	7	*0.39*	27	*0.50*	34	0.36	25	*0.22*	15	*0.58*	40
	Commercial	0 sf	*0.85*	0	*0.65*	0	*1.50*	0	*1.53*	0	*1.94*	0	*3.47*	0
	Office/commercial	31,515 sf	*1.19*	38	*0.34*	11	*1.53*	48	0.68	21	*1.47*	46	*2.15*	68
	Disc. Commercial			*-10%*		*-10%*		*-10%*		*-10%*		*-10%*		*-10%*
	Disc. Office/commercial			*-10%*		*-10%*		*-10%*		*-10%*		*-10%*		*-10%*
	Subtotal			**41**		**37**		**78**		**44**		**57**		**101**
17	Residential	256 units	*0.11*	27	*0.39*	99	*0.50*	127	0.36	92	*0.22*	56	*0.58*	148
	Commercial	1,155 sf	*0.85*	1	*0.65*	1	*1.50*	2	*1.53*	2	*1.94*	2	*3.47*	4
	Office/commercial	78,760 sf	*1.19*	94	*0.34*	27	*1.53*	121	0.68	53	*1.47*	116	*2.15*	169
	Disc. Commercial			*-10%*		*-10%*		*-10%*		*-10%*		*-10%*		*-10%*
	Disc. Office/commercial			*-10%*		*-10%*		*-10%*		*-10%*		*-10%*		*-10%*
	Subtotal			**112**		**124**		**237**		**141**		**163**		**304**
18	Residential	161 units	*0.11*	17	*0.39*	62	*0.50*	79	0.36	58	*0.22*	35	*0.58*	93
	Commercial	40,798 sf	*0.85*	35	*0.65*	27	*1.50*	61	*1.53*	62	*1.94*	79	*3.47*	142
	Office/commercial	29,519 sf	*1.19*	35	*0.34*	10	*1.53*	45	0.68	20	*1.47*	43	*2.15*	63
	Civic	33,750 sf	*1.40*	47	*0.6*	20	*2.00*	68	1.44	49	*1.56*	53	*3.00*	101
	Disc. Commercial			*-10%*		*-10%*		*-10%*		*-10%*		*-10%*		*-10%*
	Disc. Office/commercial			*-10%*		*-10%*		*-10%*		*-10%*		*-10%*		*-10%*
	Subtotal			**127**		**116**		**243**		**180**		**198**		**379**
19	Residential	104 units	*0.11*	11	*0.39*	40	*0.50*	51	0.36	37	*0.22*	23	*0.58*	60
	Commercial	49,200 sf	*0.85*	42	*0.65*	32	*1.50*	74	*1.53*	75	*1.94*	95	*3.47*	171
	Office/commercial	2,492 sf	*1.19*	3	*0.34*	1	*1.53*	4	0.68	2	*1.47*	4	*2.15*	5
	Disc. Commercial			*-10%*		*-10%*		*-10%*		*-10%*		*-10%*		*-10%*
	Disc. Office/commercial			*-10%*		*-10%*		*-10%*		*-10%*		*-10%*		*-10%*
	Subtotal			**51**		**70**		**121**		**107**		**112**		**219**
29	Residential	72 units	*0.11*	8	*0.39*	28	*0.50*	36	0.36	26	*0.22*	16	*0.58*	42
	Commercial	1,200 sf	*0.85*	1	*0.65*	1	*1.50*	2	*1.53*	2	*1.94*	2	*3.47*	4
	Disc. Commercial			*-10%*		*-10%*		*-10%*		*-10%*		*-10%*		*-10%*
	Subtotal			**9**		**29**		**37**		**28**		**18**		**46**
30	Residential	108 units	*0.11*	12	*0.39*	42	*0.50*	53	0.36	39	*0.22*	24	*0.58*	63
	Commercial	1,800 sf	*0.85*	2	*0.65*	1	*1.50*	3	*1.53*	3	*1.94*	3	*3.47*	6
	Disc. Commercial			*-10%*		*-10%*		*-10%*		*-10%*		*-10%*		*-10%*
	Subtotal			**13**		**43**		**56**		**41**		**27**		**68**
	Total	**1,383 units 491,453 sf**		**646**		**747**		**1,394**		**991**		**1,036**		**2,027**
20	Residential	270 units	*0.11*	29	*0.39*	105	*0.50*	134	0.36	97	*0.22*	60	*0.58*	157
	Commercial	121,500 sf	*0.95*	115	*0.61*	74	*1.56*	190	*3.00*	365	*3.26*	396	*6.26*	761
	Civic	101,250 sf	*1.40*	142	*0.6*	61	*2.00*	203	1.44	146	*1.56*	158	*3.00*	304
	Disc. Commercial			*-10%*		*-10%*		*-10%*		*-10%*		*-10%*		*-10%*
	Subtotal			**274**		**232**		**507**		**571**		**574**		**1145**
21	College/University	25,000 sf	*0.17*	43	*0.04*	10	*0.21*	53	0.06	15	*0.15*	38	*0.21*	53
	Park & CC	50,000 sf	*0.37*	19	*0.24*	12	*0.61*	30	*0.18*	9	*0.44*	22	*0.62*	31
	Residential	10 units	*0.11*	1	*0.39*	4	*0.50*	5	0.36	4	*0.22*	2	*0.58*	6
	Subtotal			**62**		**26**		**88**		**28**		**61**		**89**
22	College/University	225,000 sf	*0.17*	383	*0.04*	90	*0.21*	473	0.06	135	*0.15*	338	*0.21*	473
	Park & CC	30,000 sf	*0.37*	11	*0.24*	7	*0.61*	18	*0.18*	5	*0.44*	13	*0.62*	18
	Residential	570 units	*0.11*	61	*0.39*	221	*0.50*	282	0.36	205	*0.22*	126	*0.58*	331
	Subtotal			**454**		**318**		**773**		**345**		**476**		**822**
	Total	**850 units 552,750 sf**		**791**		**577**		**1,367**		**944**		**1,112**		**2,056**

23	Residential	336 units	*0.11*	36	*0.39*	130	*0.50*	166	0.36	121	*0.22*	74	*0.58*	195
24	Residential	112 units	*0.11*	12	*0.39*	44	*0.50*	56	0.36	40	*0.22*	25	*0.58*	65
25	Residential	128 units	*0.11*	14	*0.39*	50	*0.50*	63	0.36	46	*0.22*	28	*0.58*	74
	Commercial	63,750 sf	*0.95*	61	*0.61*	39	*1.56*	99	*3.00*	191	*3.26*	208	*6.26*	399
	Park & CC	68,000 sf	*0.37*	25	*0.24*	16	*0.61*	41	*0.18*	12	*0.44*	30	*0.62*	42
	Disc. Commercial			*-10%*		*-10%*		*-10%*		*-10%*		*-10%*		*-10%*
	Subtotal			**93**		**101**		**194**		**230**		**245**		**475**
26	Residential	285 units	*0.11*	30	*0.39*	111	*0.50*	141	0.36	102	*0.22*	63	*0.58*	165
	Commercial	72,250 sf	*0.95*	69	*0.61*	44	*1.56*	113	*3.00*	217	*3.26*	236	*6.26*	452
	Disc. Commercial			*-10%*		*-10%*		*-10%*		*-10%*		*-10%*		*-10%*
	Subtotal			**92**		**150**		**242**		**297**		**275**		**572**
27	Residential	144 units	*0.11*	15	*0.39*	56	*0.50*	71	0.36	52	*0.22*	32	*0.58*	84
28	Residential	600 units	*0.11*	64	*0.39*	233	*0.50*	297	0.36	216	*0.22*	132	*0.58*	348
	Commercial	18,000 sf	*0.85*	15	*0.65*	12	*1.50*	27	*1.53*	28	*1.94*	35	*3.47*	62
	Disc. Commercial			*-10%*		*-10%*		*-10%*		*-10%*		*-10%*		*-10%*
	Subtotal			**78**		**244**		**321**		**240**		**164**		**404**
31	Residential	0 units	*0.11*	0	*0.39*	0	*0.50*	0	0.36	0	*0.22*	0	*0.58*	0
	Total	**1,604 units** **222,000 sf**		**326**		**724**		**1,050**		**981**		**814**		**1,795**
	Grand Total	**3,836 units** **1,266,203 sf**		**1,764**		**2,048**		**3,812**		**2,915**		**2,962**		**5,877**

Appendix B:

2025 O-D Matrix

O-D Percentage
2025 PM Peak Hour

From \ To		E						Total External	I																Total Internal	Total
		1	2	3	4	5	6		11,12	14	13,15	29	30	16	17	18	19	21	22	20	23	24,25,26	28	27	32		
E	1	0	0	950	50	0	0	1000	23	7	17	0	0	7	23	23	10	6	35	46	8	20	6	0	0	232	1232
	2	0	0	50	50	50	0	150	12	4	11	2	5	2	9	11	8	3	23	31	10	20	4	0	0	155	305
	3	1250	50	0	0	100	0	1400	39	10	39	8	10	14	29	39	19	6	48	70	12	29	17	0	0	386	1786
	4	100	50	0	0	550	1740	2440	14	3	23	3	5	0	9	12	8	0	31	53	9	93	36	11	0	309	2749
	5	50	50	50	300	0	160	610	8	2	8	2	3	0	4	3	4	1	15	25	9	46	19	5	0	155	765
	6	0	0	50	1360	200	0	1610	8	3	9	0	0	0	0	8	8	0	31	77	15	93	46	11	0	309	1919
Total External		1400	150	1100	1760	900	1900	**7210**	103	28	107	15	22	23	75	96	57	15	183	302	64	301	127	27	0	**1545**	**8755**
I	**11,12**	22	11	28	22	17	11	111	19	2	10	2	3	2	5	10	2	1	6	17	2	13	0	1	0	96	207
	14	4	2	6	4	1	3	19	2	1	2	0	1	0	1	1	1	0	1	3	0	2	0	0	0	16	36
	13,15	18	12	35	23	12	18	117	10	3	15	2	4	3	5	8	3	2	7	18	5	17	1	1	0	101	218
	29	1	2	2	2	1	2	10	1	0	1	0	1	0	0	0	0	0	0	1	0	1	0	0	0	8	18
	30	1	3	4	3	1	3	14	2	1	1	0	1	0	1	1	0	0	1	2	0	2	0	0	0	12	27
	16	6	4	8	6	2	5	31	3	1	3	1	1	1	2	2	1	0	2	4	1	4	1	0	0	26	57
	17	18	11	24	18	4	13	88	4	2	8	1	2	2	9	8	4	1	9	11	3	10	2	1	0	75	163
	18	16	13	29	21	11	16	107	5	2	8	1	2	2	5	11	5	1	9	18	4	13	5	1	0	92	198
	19	9	6	18	12	6	9	60	3	2	4	1	1	1	3	5	4	1	5	10	2	9	3	0	0	52	112
	21	7	3	10	5	3	5	33	2	1	1	0	0	1	1	2	1	0	4	6	1	5	1	1	0	28	61
	22	45	19	77	38	13	64	256	15	6	11	2	2	3	11	13	11	3	39	37	11	29	22	4	0	220	476
	20	39	31	77	46	31	85	308	13	5	13	3	3	4	13	13	9	4	46	80	8	36	11	4	0	266	574
	23	3	3	10	12	6	6	40	1	0	2	0	0	0	1	1	1	0	3	8	2	10	6	1	0	34	74
	24,25,26	44	29	51	73	37	58	292	9	0	13	0	0	0	8	8	6	0	23	38	13	88	42	6	0	252	544
	28	4	9	15	26	13	20	88	2	0	3	0	0	0	2	2	2	0	6	13	4	22	17	3	0	76	164
	27	3	2	3	5	3	2	17	0	0	1	0	0	0	0	0	0	0	1	3	0	5	4	0	0	15	32
	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Internal		239	159	398	318	159	319	**1592**	91	25	95	13	19	21	66	85	50	13	162	268	57	267	113	24	0	**1370**	**2962**
Total		1639	309	1498	2078	1059	2219	**8802**	194	53	202	28	41	44	141	181	107	29	346	570	121	567	240	51	0	**2915**	**13087**

Appendix C:

NCTCOG 2025 Daily Traffic Volumes

TRINITY RIVER VISION STUDY
TRAFFIC COUNT DATA

1 inch equals 850 feet

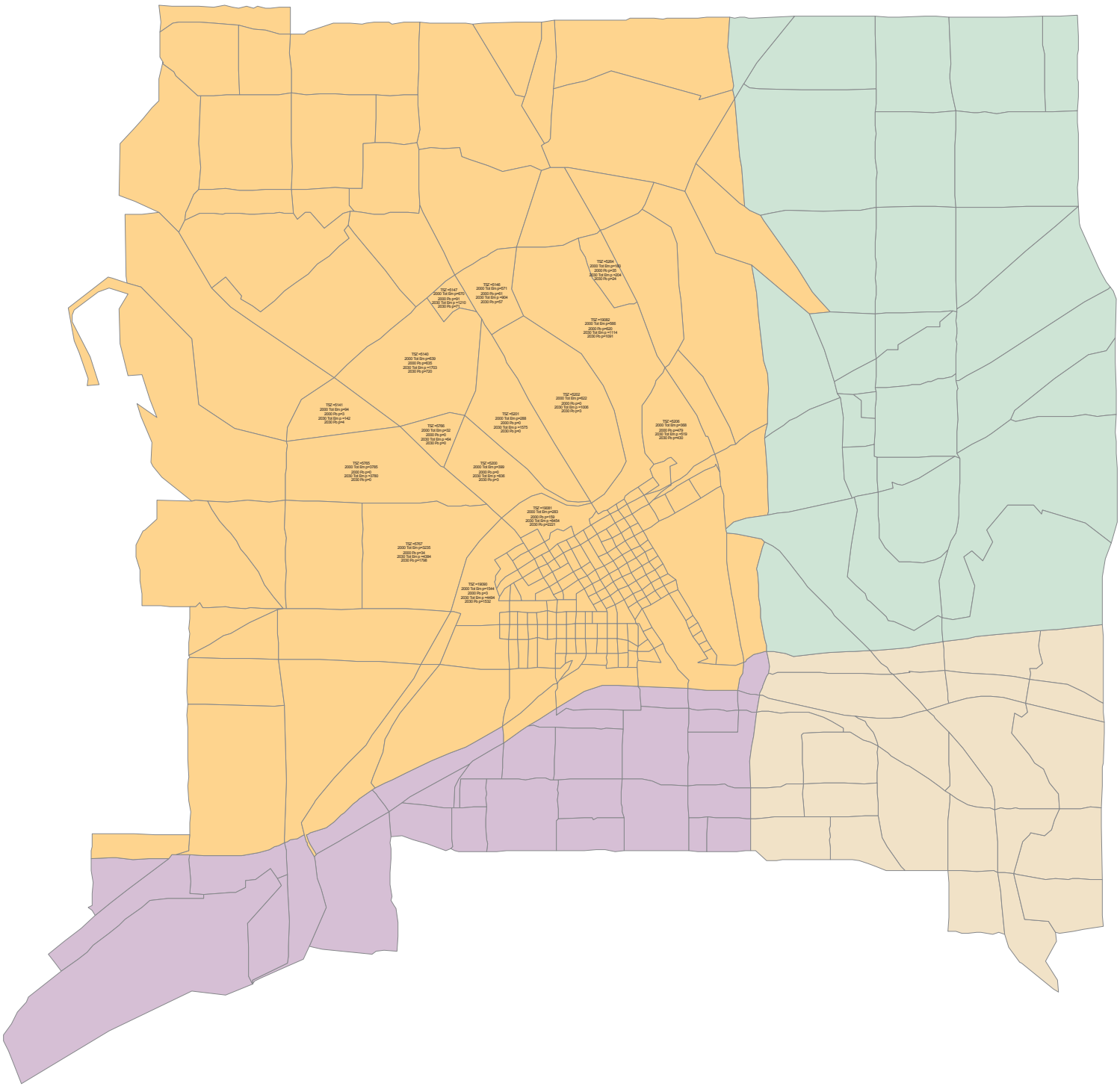
Legend

TXDOT SATURATION COUNTS 1999

- 650

2025 Model Counts

650


Legend
ne_region_TAZs
se_region_TAZs
nw_region_TAZs
sw_region_TAZs

Appendix D:

2025 Peak Hour Traffic Volumes

2025 Total Traffic

Time Period : PM

From: All Zones

To: All Zones