FEHR PEERS

Memorandum

Date: February 9, 2022

To: Jim Adams, McCann Adams Studio

From: Anjuli Tapia, PE, Fehr & Peers

Subject: Hensley Field Master Plan Mobility and Access Assessment

DC20-0071

Mobility and Access

This memo summarizes the trip generation analysis and localized capacity assessment for the Hensley Field Master Plan.

Multi-modal Trip Generation

Table 1 summarizes the Master Plan land use program assumed in this analysis.

MainStreet+ is a trip generation tool based on the best available research on mixed-use trip generation. The original tool was developed for the Environmental Protection Agency (EPA) and is based on trip generation analysis of more than 200+ mixed-use sites across the United States. A second iteration of the tool incorporated predictive equations from NCHRP 684 *Enhancing Internal Trip Capture Estimation for Mixed-Use Developments*. Refinement of the tool continued with researchers at the University of Utah, the University of California at Berkeley, and the Institute of Transportation Engineers (ITE). MainStreet+ is currently the most refined mixed-use trip generation tool available today.

Functionally MainStreet+ starts by running the traditional ITE trip generation process, using the latest ITE Trip Generation Handbook. MainStreet+ takes those outputs, and applies filters and variables, refined over time by the previous mentioned work, to predict the total trip generation, internal capture (number of trips captured on-site), and mode share (% of trips in a vehicle, transit, or walking and biking) more accurately at a mixed-use site. Mainstreet+ also estimates total vehicle miles of travel (VMT) for use in sustainability and emissions comparisons.

Table 1: Master Plan Land Use Program

Land Use	Area
Institutional	1,000,000 SF[1]
Office	600,000 SF
Film Studios	400,000 SF
Retail Shops	90,000 SF
Grocery Store	80,000 SF
Personal Services (Banks, Health Clubs, Clinics, etc.)	80,000 SF
Restaurants (Sit Down)	50,000 SF
Restaurants (Casual)	83,000 SF
Cinema	40,000 SF
High Density Residential Mixed Use	1,482 DU[2]
High Density Commercial Mixed Use	538,000 SF
Medium Density Residential Mixed Use	3,272 DU
Medium Density Commercial Mixed Use	792,000 SF
Neighborhood Residential Mixed Uses	2,105 DU

[1] Square Feet
[2] Dwelling Units

For the Hensley Field Master Plan, the ITE trip generation handbook method generally predicted 25% more vehicle trips than MainStreet+. An overestimation of vehicle trip generation at a mixed-use site can exaggerate impacts on land use programming, resulting in overbuilding of roadway cross sections, and allocating more of the total project acreage to the transportation networks.

Table 2 below summarizes the trips, by mode, that the land use program is expected to generate. The mix of land uses proposed is expected to capture approximately 18% of the vehicle demand on site, thereby reducing single occupancy vehicle trips for the region. The site is also expected to generate substantial transit ridership and combined with the density of residential uses, is primed for high-capacity transit.

Table 2: Multi-Modal Trip Generation Results

Performance Measure	Trips	Mode Share
Total Person Trips	122,700	
Vehicle Trips (MainStreet)	91,000	75%
Transit Mode Share	4,100	3%
Walk/Bike Mode Share	5,000	4%
Vehicle Trip Demand Captured On-Site	22,600	18%

Roadway Access & Capacity

The Hensley Field Master Plan land use program is expected to generate 91,000 vehicle trips added to the roadway network. Most of the project traffic is expected to access this site to and from Jefferson Street. There are also key connection points to the west via a bridge at Southwest Drive, and to the southwest via bridges at Lakecrest Drive and Hardy Street. This capacity analysis assumed the following:

- Three major signalized intersections along Jefferson Street – five outbound arterial lanes.
- Two right-in, right-out intersections along Jefferson Street – two outbound collector lanes.
- Two-lane road at Lakecrest Drive – one outbound collector lane.
- Two-lane road at Hardy Road – one outbound collector lane.
- Four-lane bridge connection to Skyline Drive – two outbound collector lanes

Additionally, trip distribution to and from the site (**Figure 1**) was estimated based on regional destinations, such as Arlington and Downtown Dallas, and NCTCOG's mapping of employment and housing.

The 2019 Dallas Street Design Manual was consulted to define road classification and hourly capacity per lane. It was determined that the primary roadway types around the site are six-lane divided arterials, or two-lane undivided local/collectors (**Figure 2**). According to these roadway classifications in a suburban setting, an arterial road has the capacity of 900 vehicles per hour, and a local/collector street has the capacity of 525 vehicles per hour (**Figure 3**).

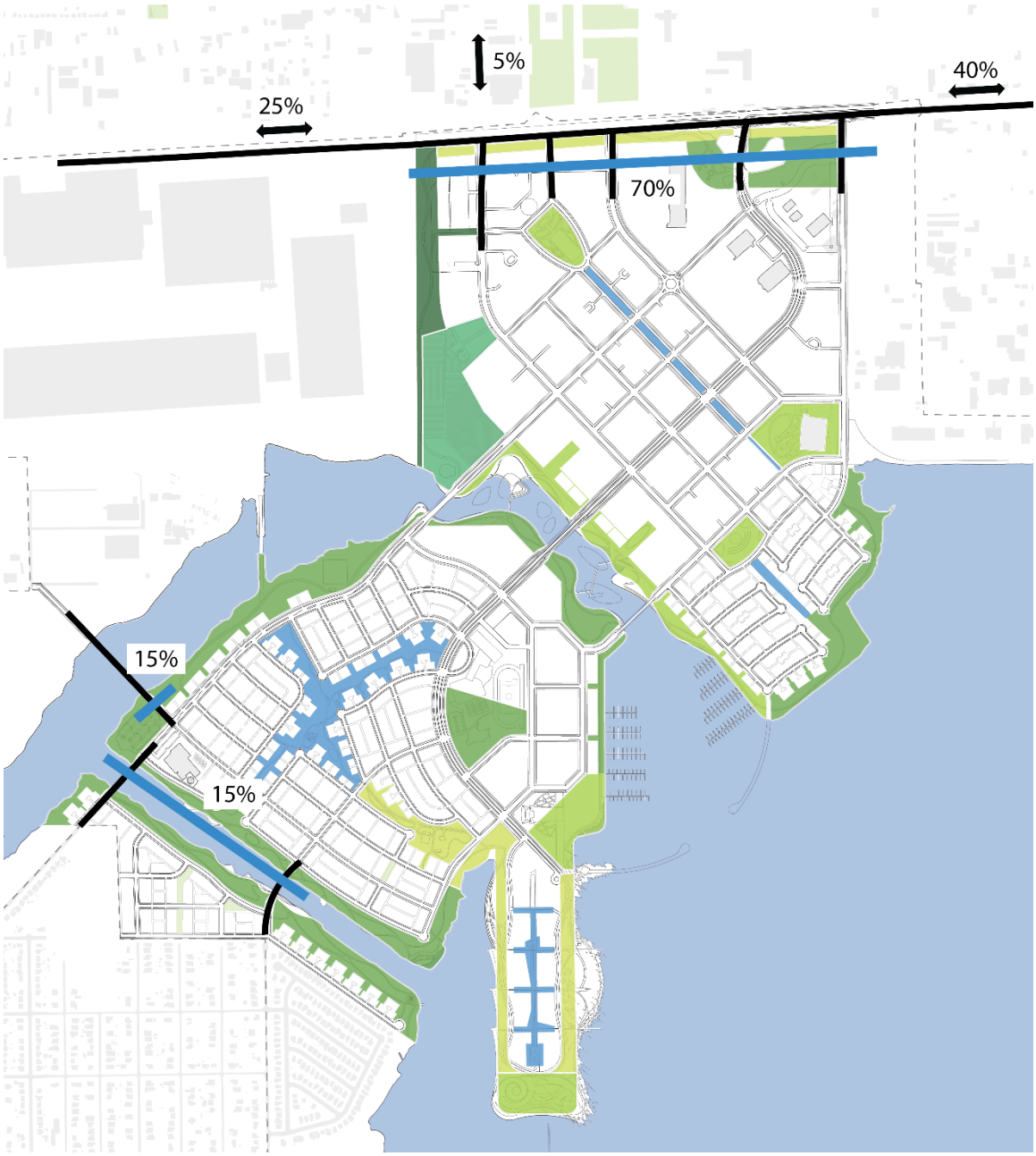
Figure 2: Typical Volumes and Capacities from 2019 Street Design Manual

Roadway Functional Classification	Roadway Configuration	Typical 24 Hour Volume	Typical 24 Hour Capacity
Arterial	6 Lane Divided	22,000 vpd1	42,000 vpd
Arterial, Collector	4 Lane Divided	18,500 vpd	28,000 vpd
Collector	4 Lane Undivided	10,000 vpd	20,000 vpd
Local, Collector	2 Lane Undivided	4,000 vpd	10,000 vpd

Figure 3: Hourly Service Volume Capacity Per Lane by Area Type and Roadway Function (2019 Dallas Street Design Manual)

AREA TYPE	Activity Density Range (per acre)	PRINCIPAL ARTERIAL		MINOR ARTERIAL & FRONTAGE ROAD		COLLECTOR & LOCAL STREET	
		Divided or One-Way	Undivided Two-Way	Divided or One-Way	Undivided Two-Way	Divided or One-Way	Undivided Two-Way
CBD	>125	725	650	725	650	475	425
Outer Business	30-125	775	725	775	725	500	450
Urban Residential	7.5-30	850	775	825	750	525	475
Suburban Residential	1.8-7.5	900	875	900	825	575	525
Rural	<1.8	1,025	925	975	875	600	550

Figure 1: Trip Distribution Assumptions



The evaluation looked at three locations to assess expected vehicular demand against available roadway capacity. This is otherwise known as a volume to capacity ratio. Volume to capacity ratios (V/C) of 0.65 and below are considered level of service A, B, or C and indicate free-flowing vehicle traffic, while V/C of 1.00 is considered D or E by the 2019 Dallas Street Design Manual and indicates congested traffic **(Figure 4).**

An evaluation of the project volumes compared to the capacity on these roadways shows the planned access and circulation will distribute vehicle trips such that they can be sufficiently absorbed by the regional roadway network.

Figure 4: Multi-Modal Trip Generation Results

LOS	UPPER THRESHOLD FOR V/C RATIO
A/B/C	0.65
D/E	1.00

The PM peak hour outbound volumes identified below in **Table 3** represent the peak trip generation for the site, and the more constrained analysis period. These trips were assigned to the roadway network based on the trip distribution assumptions to assess the vehicular demand volumes at these three to four locations.

Table 3: AM and PM Peak Period Vehicle Trips

	Master Plan		
	Total	In	Out
AM	5,300	2,800	2,500
PM	8,300	3,900	4,400

Table 4 summarizes the volume to capacity results at the site's edges. All locations in all scenarios have a V/C ratio less than 1.00 and are not oversaturated.

Table 4: Summary of Volume to Capacity Results at the Site

Scenario	Access	Volumes	Capacity	V/C
Master Plan	**North to Jefferson St**	3,080	6,075	0.55
	South to Lakecrest Dr/Hardy St	660	1,050	0.63
	West to Skyline Dr	660	1,050	0.63

Table 5 summarizes the results for the location on Jefferson St east of the site in the PM outbound direction, eastbound. This analysis does consider existing volumes on Jefferson St and remaining available capacity.

Table 5: Summary of Volume to Capacity Results along Jefferson St

Scenario	Access	Volumes	Capacity	V/C
Master Plan	**East of Site, Jefferson St (2-way)**	4,200	5,400	0.78

Between the three points of access to the North, the Southwest, and the West there is sufficient capacity to meet the project's expected vehicular demand to and from the site. Furthermore, the Master Plan development is not expected to over-saturate the surrounding roadway network based on the assessment of Jefferson Street east of the site. To achieve the transportation goals and maximize mobility with the smallest footprint, increased connectivity is beneficial to the Hensley Field site. Additional access points to the Southwest, to the West, and to the East will serve to distribute traffic to the larger roadway network and contribute to greater accessibility to Hensley Field amenities.