



North Central Texas
Council of Governments



SCENARIO DEVELOPMENT AND EVALUATION TECHNICAL REPORT

NCTCOG Intermodal Transportation Hubs for Colleges and Universities Study

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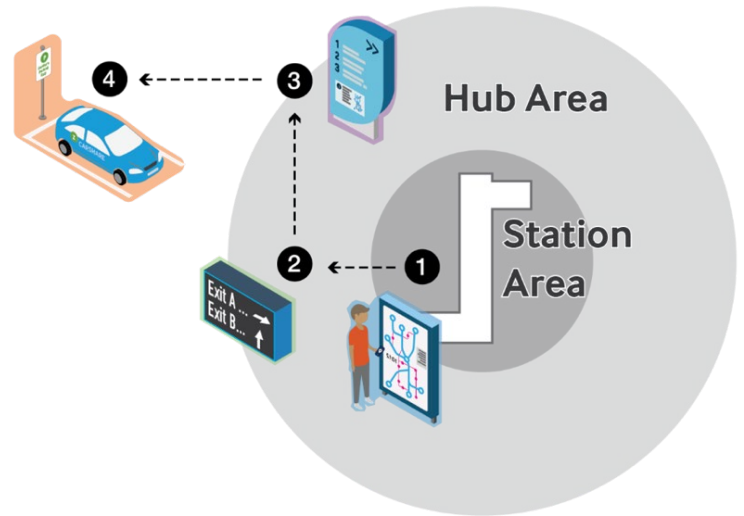
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01 Introduction: From Siting to Investment Scenarios

NCTCOG, university and college campuses, cities, and transit agencies agree that mobility hubs are a critical organizing framework to connect campus affiliates to and from campus and to give campus residents a place to access a range of different multimodal options to meet their mobility needs. The Campus Mobility Trends report clearly indicates the diversity of campus transportation demands, which, in many cases, are underserved by adequate mobility service and multimodal infrastructure supply. More importantly, the report illustrates the incredible complexity that is campus mobility and connections between the “town” and “gown”.



Context-sensitive mobility hub investment is both a planning and policy framework to meet campus mobility needs that are largely served by automobility, as well as a targeted effort to establish attractive, reliable, and diverse connections between public and private mobility services and end-to-end journey supports (as illustrated on the right). While regional stakeholders have harmonized on the concept of campus mobility hubs, several critical questions remain before NCTCOG can offer planning, design, and operation guidance for mobility hub implementation. This memo seeks to answer the following questions:

Where are campus mobility hubs located today?

Hundreds of mobility hubs operate at university and college campuses throughout the North Central Texas region today. Their presence does not guarantee better mobility, nor is mobility provider coordination inherent. Today’s hubs, whether they are recognizable by campus affiliates or not, are generally undersupplied by the mobility services, information, and amenities needed to make multimodal travel more user-friendly for campus affiliates that access campus by transit, and more desirable for affiliates that drive to campus. This memo establishes a methodology to identify mobility hubs, or clusters of multimodal connections on- and immediately off-campus.

What types of campus mobility hubs exist and how might they lead to more nuanced hub implementation?

Mobility hubs operate differently depending on several factors, including level of access, campus and urban context, connectivity, and development trends in the surrounding campus environment. Some hubs are located within campus boundaries, while others are distributed just off-campus. This report establishes six different types of campus mobility hubs seen across the DFW metroplex, and connects these often vastly different mobility contexts to a wide variety of mobility uses cases. These include:

- First- and last-mile to and from campus
- Campus resident access to mobility options and information
- Access to mobility options and multimodal parking to transition affiliates to and from the campus context
- Transit connections between modes

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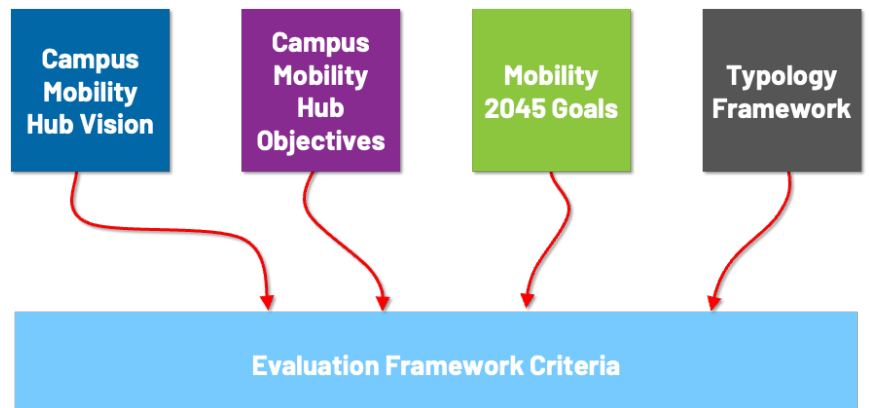
- Access to mobility options that enable on-campus circulation

The typology is a fundamental building block to nuance hub design mobility service design, product market fit, and other implementation guidance featured in the forthcoming Campus Mobility Hub Implementation Catalog. Likewise, the typology is a tool to unlock and tailor shared mobility solutions that are currently unavailable to campus affiliates (see the mobility propensity analysis in the Campus Mobility Trends report for more details).



What are potential investment scenarios and their likely outcomes?

Whether in the campus, urban, or suburban contexts, mobility hubs are rarely funded and implemented at one point in time. Implementation is often layered and phased. This report establishes three investment scenarios for campus mobility hubs and establishes an outcome-based evaluation framework—complete with evaluation criteria tied to Mobility 2045—to assess how hubs will perform with varying degrees of investment. Scenarios are evaluated by campus hub type to illustrate the ability to unlock campus and affiliate outcomes with incremental funding and investment.



This report also asserts how the investment scenarios require better infrastructure and funding coordination. Making this connection stress the importance of town and gown relations and will ensure the mobility hub amenities are supported by quality and safe walking, biking, and transit infrastructure.

02 Siting Campus Mobility Hubs

Where are mobility hubs operating today?

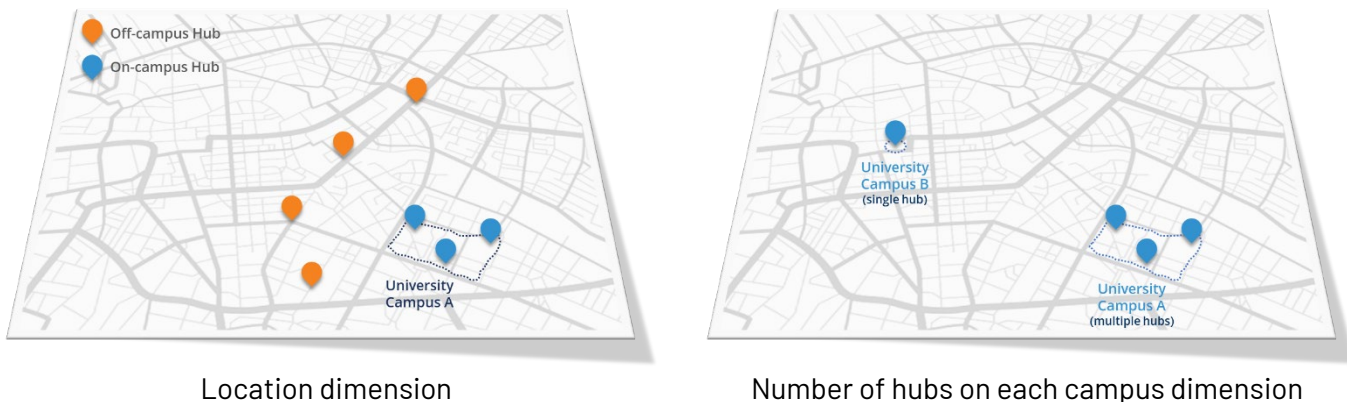
University and colleges campuses, as well as the communities that surround them, are home to a wide variety of on- and off-campus mobility hubs. Hub locations might not be branded as such, or viewed by the region’s campus affiliates as places to gain access to mobility options. Yet, they operate today in varying states of functionality. The question is: where are campus mobility hubs located throughout North Central Texas? The siting analyses described in this chapter identifies two dimensions influencing the specific mobility hub siting approach.

Siting analysis dimensions

The first dimension defines hub locations as either off-campus or on-campus hubs. The two categories result from differing goals for each hub type and the underlying transportation elements available: off-campus university hubs provide first- and last-mile connectivity to access regional transit and other services, while on-campus hubs are those within the university campus aiming at connecting university services efficiently and enhancing the accessibility of campus life by catering to the diverse mobility needs and abilities of students, faculty, staff, and visitors.

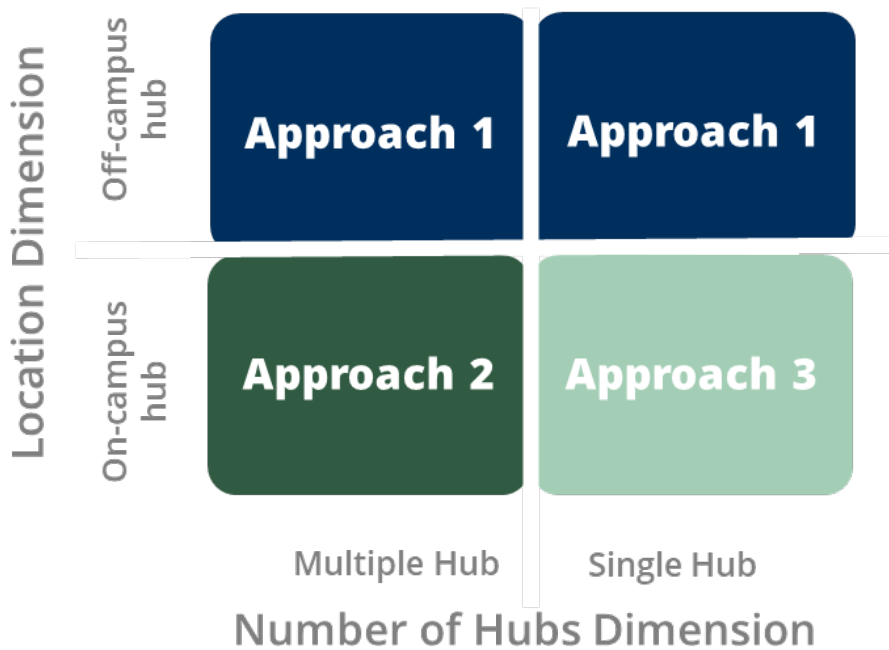
The second dimension is the number of hubs associated with each campus. Given their size and land use, some university campuses will require multiple on-campus mobility hubs to ensure efficient mobility and provide easy access to academic and administrative buildings, recreation areas, and housing, among other services within the campus boundaries. Conversely, other compact campuses comprised of just a few buildings (or a single building) will require only the campus to serve as a gateway to connect the university with the outside regional services. These dimensions also apply to off-campus hubs. Some will be in dense areas with close access to several transit connections and trip generators, while others will be connected to only one key regional transit or activity anchor. Similarly, some off-campus hubs are concentrated in one location, and others are distributed across several blocks.

Figure 1 Location and Number of Hubs on Each Campus Dimensions



The combination of these dimensions creates up to four potential groups to establish specific siting approaches. However, because data needed to identify off-campus hubs is very similar regardless of the number of hubs within the area of influence of a campus, this analysis uses three methodology approaches as summarized by Figure 2.

Figure 2 Summary of Dimensions and Methodology Approaches for Siting Analysis



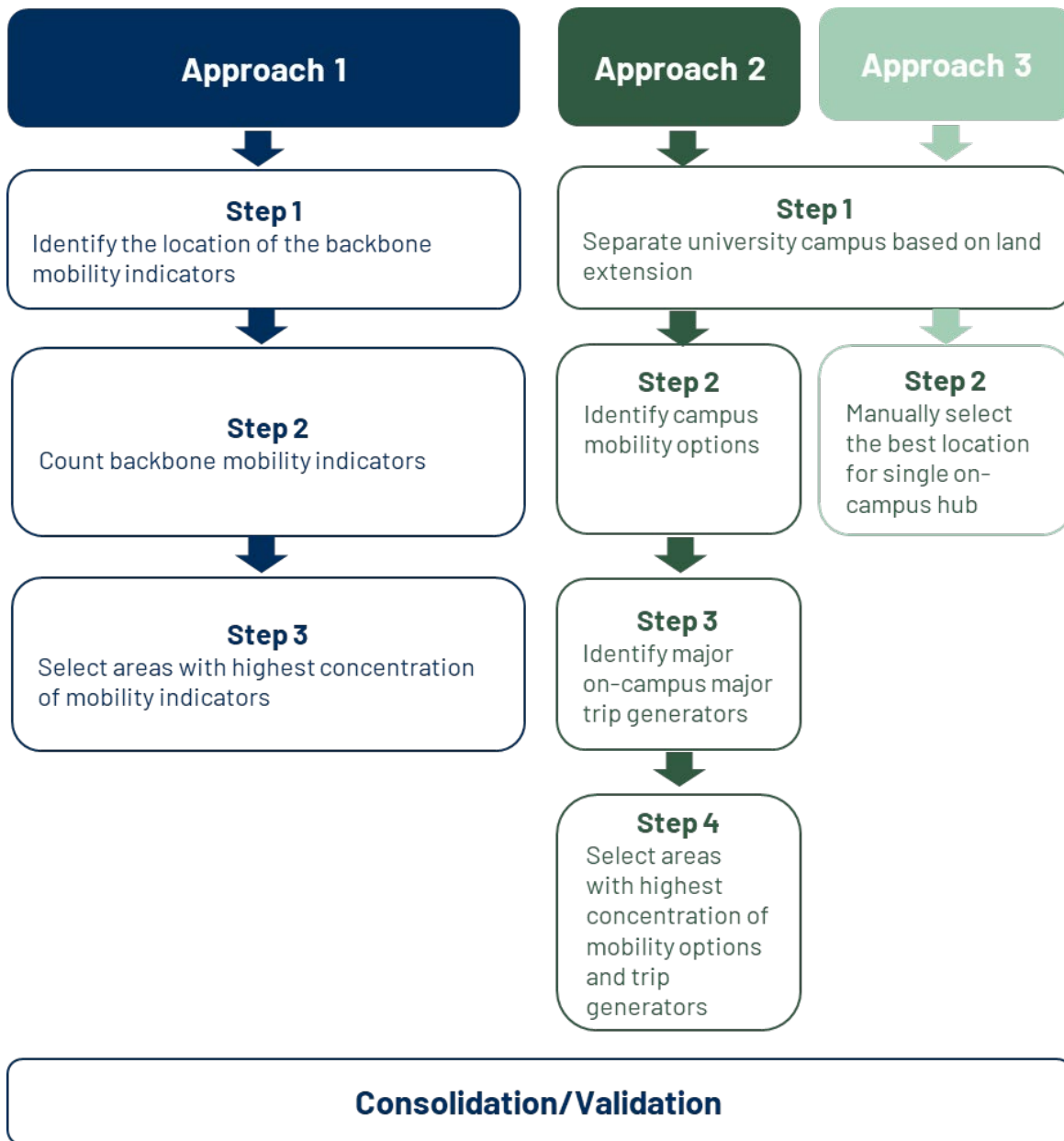
Siting methodology approaches

The project team developed three approaches to identify mobility hubs. The main difference between them is the mobility service or activity center to which the hub is attached and the level of automatization to identify those indicators. Approach 1 for off-campus hubs uses readily available regional data (e.g., population density, high-capacity transit stations, and park and rides). Generally, these data are consistent across the region; as a result, identifying and assessing the concentration of indicators in a given area is more accurate. Approach 2, applicable to on-campus hubs and generally large university campuses, uses a similar approach as Approach 1 but incorporates mobility services and activity centers. Data availability for these indicators is limited and is not consistent across campuses in the region (e.g., campus shuttle stops, bike racks, and parking garages data differ from campus to campus). To improve the accuracy of the automatized siting analysis, the project team validated the results and manually added on-campus hubs using satellite imagery. Lastly, Approach 3 applies to on-campus hubs on smaller campuses with minimal or no data available. This approach used satellite imagery to identify at least one on-campus mobility hub candidate at each university campus.

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Figure 3 Mobility Hubs Siting Methodology Overview



Approach 1 consists of three steps and applies to single and multiple off-campus hubs. This approach intensively uses regional transportation services and infrastructure available to locate hub candidates.

- Step 1. Identify the location of the backbone mobility indicators within two miles of each university campus in North Central Texas. The mobility indicators included:
 - High-capacity transit stations (e.g., DART Light Rail or Trinity Railway Express stations)
 - Transit Centers
 - Park & rides and end-of-line termini
 - Fixed-route transit stops with frequent service (i.e., 10-minute frequency or better)
 - Bike share station

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- Dedicated car share parking
- Step 2. Analyze the concentration of backbone mobility indicators around campus. Specifically, this process counts the number of mobility indicators within a quarter-mile hexagonal area.
- Step 3. Select areas with the highest number of mobility indicators as campus mobility hub candidates.

Approach 2 consists of four steps and applies to on-campus environments with multiple hubs present. This approach uses transportation and campus activity data and manual validation to locate hub candidates.

- Step 1. Identify campuses that will contain multiple hubs within their boundaries. This process primarily uses the campus footprint and the number of buildings within it.
- Step 2. Identify the locations of existing campus mobility options within each campus selected in step 1. Based on available data, the mobility options included:
 - Major bus or campus shuttle stops
 - Areas with highest concentration of bicycle cages and/or racks
 - Bike share station
 - Dedicated car share parking
 - Pick-up/drop-off/kiss-and-ride locations
 - Parking garages and lots (as places to convene mobility)
- Step 3. Map major trip generators; these are the primary entrances of common destinations and the main gateways on each campus. Based on available data, the major trip generators included:
 - Student union
 - Activity/recreation center
 - Stadium/sports arena
 - Major library
 - Residence halls (relatively high density)
 - Primary campus gateway
- Step 4. Identify the areas on each campus with the highest concentration of mobility indicators and trip generator entrances within a 1/8 of a mile hexagonal area.

Approach 3 consists of two qualitative steps and applies to on-campus environments with a single hub present. This approach requires manual selection of a mobility hub in each applicable campus.

- Step 1. Identify campuses that contain a single hub within their boundaries. This process primarily applies to small campuses or campuses located in one building) that do not require multiple hubs within its boundaries to connect people to mobility services.
- Step 2. Manually locate the main entrance or area where the single on-campus mobility hub can provide the best connection between the campus and the regional transit services.

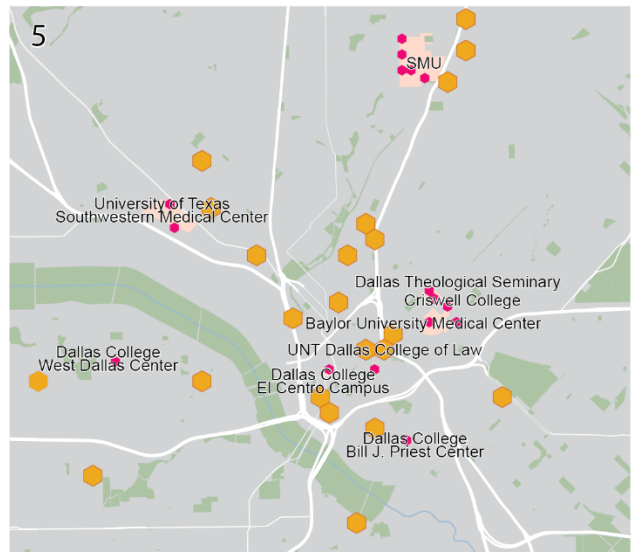
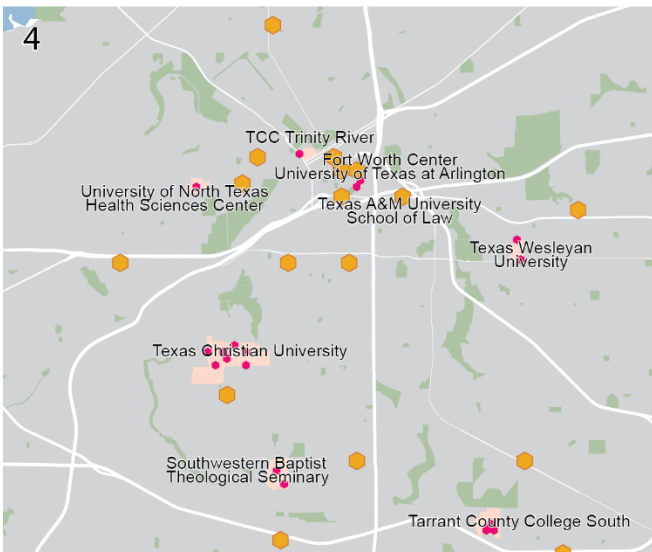
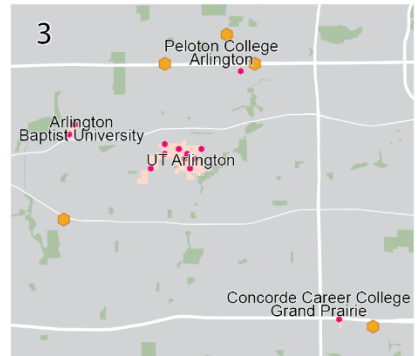
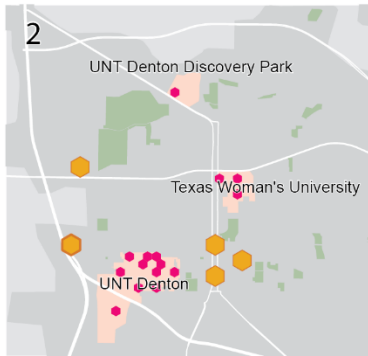
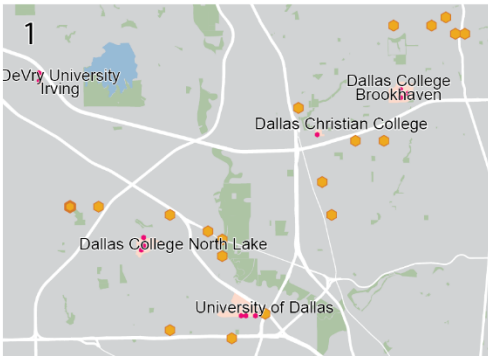
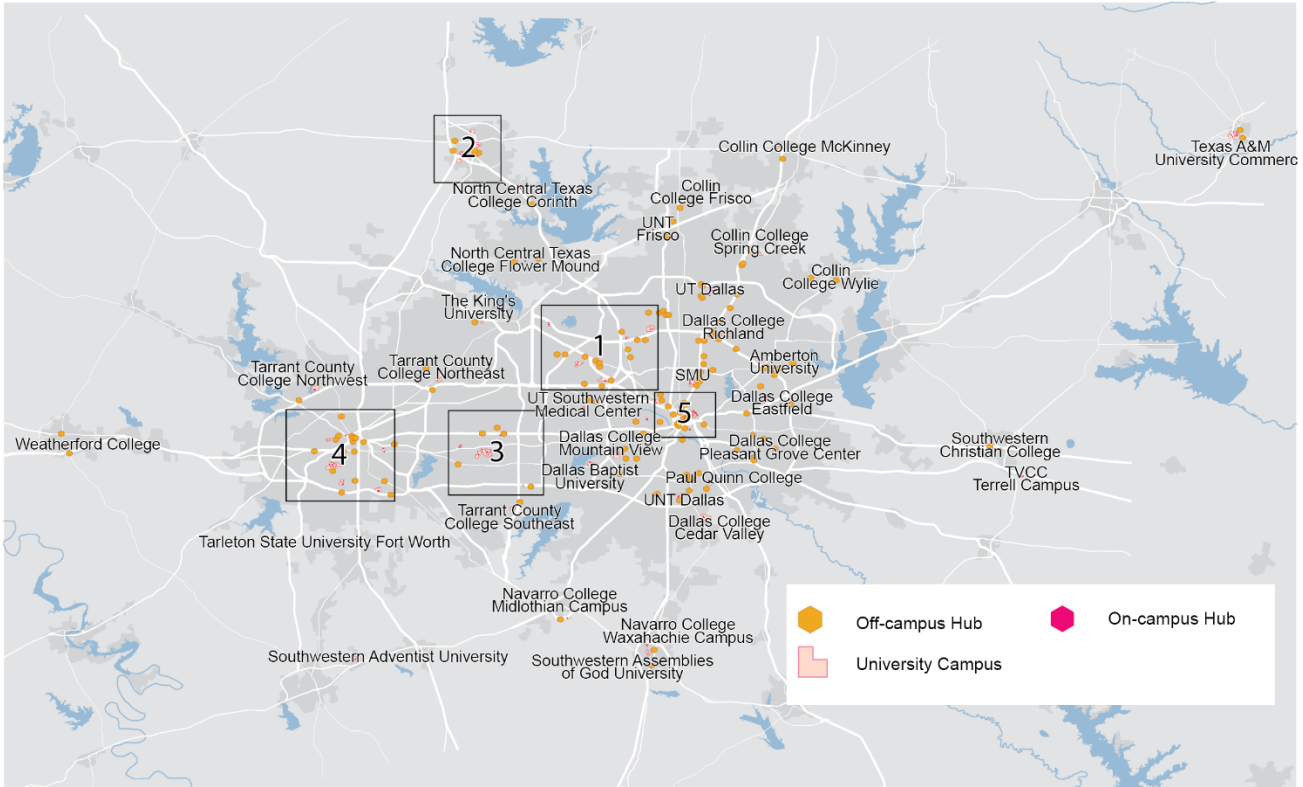
Where are the campus mobility hubs located?

Using the approaches listed above, a full network of on- and off-campus candidate mobility hubs was developed. The number of campus mobility hubs per community and per college campus are entirely dependent on the input data – resulting in some universities and communities seeing multiple mobility hubs and others seeing just one. Figure 4 and Figure 5 below show the full network of candidate mobility hubs. A webmap displaying the full campus mobility hub locations can be found [here](#).

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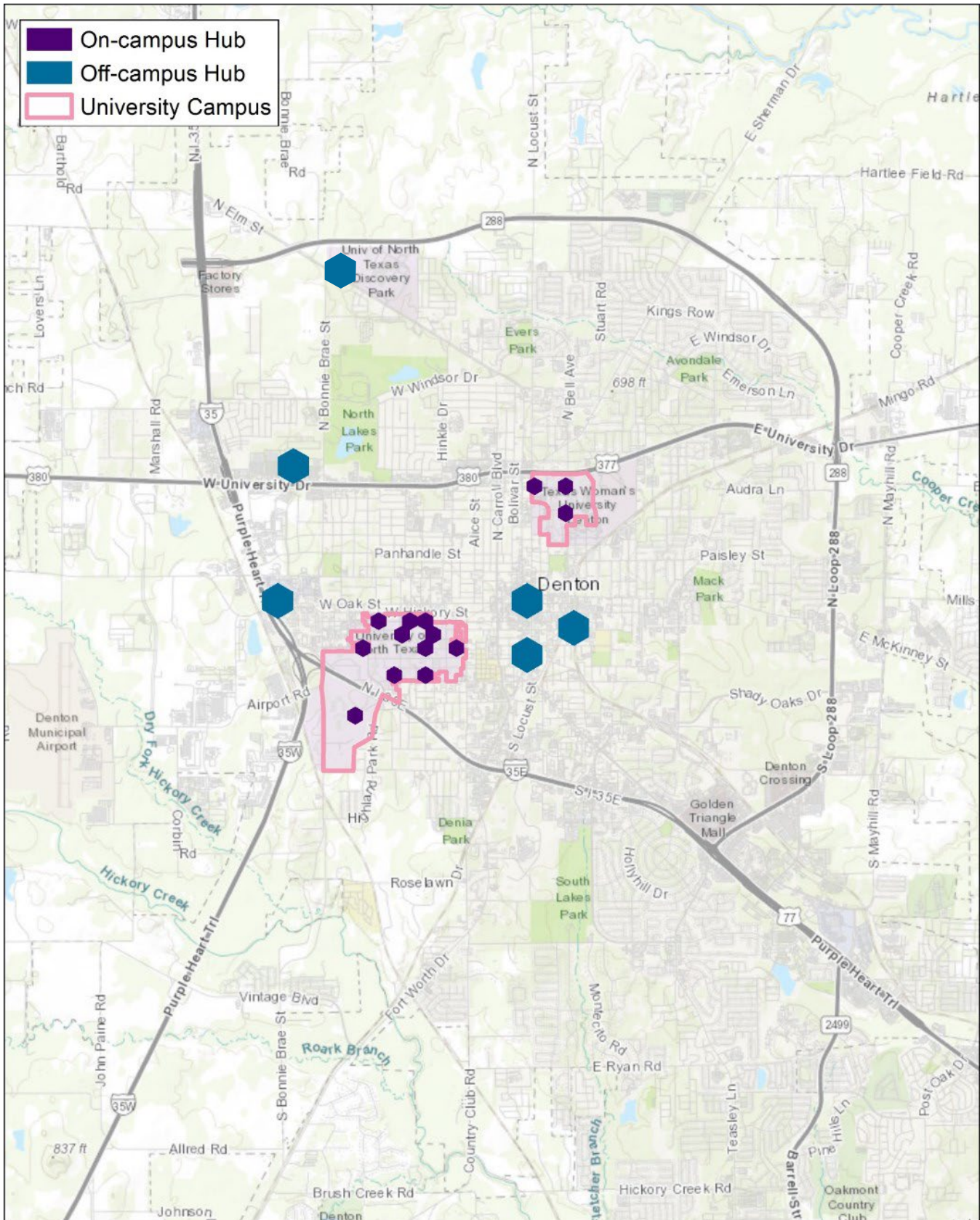
Figure 4 On-Campus and Off-Campus Mobility Hub Locations



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Figure 5 On-Campus and Off-Campus Mobility Hub Locations, UNT Denton



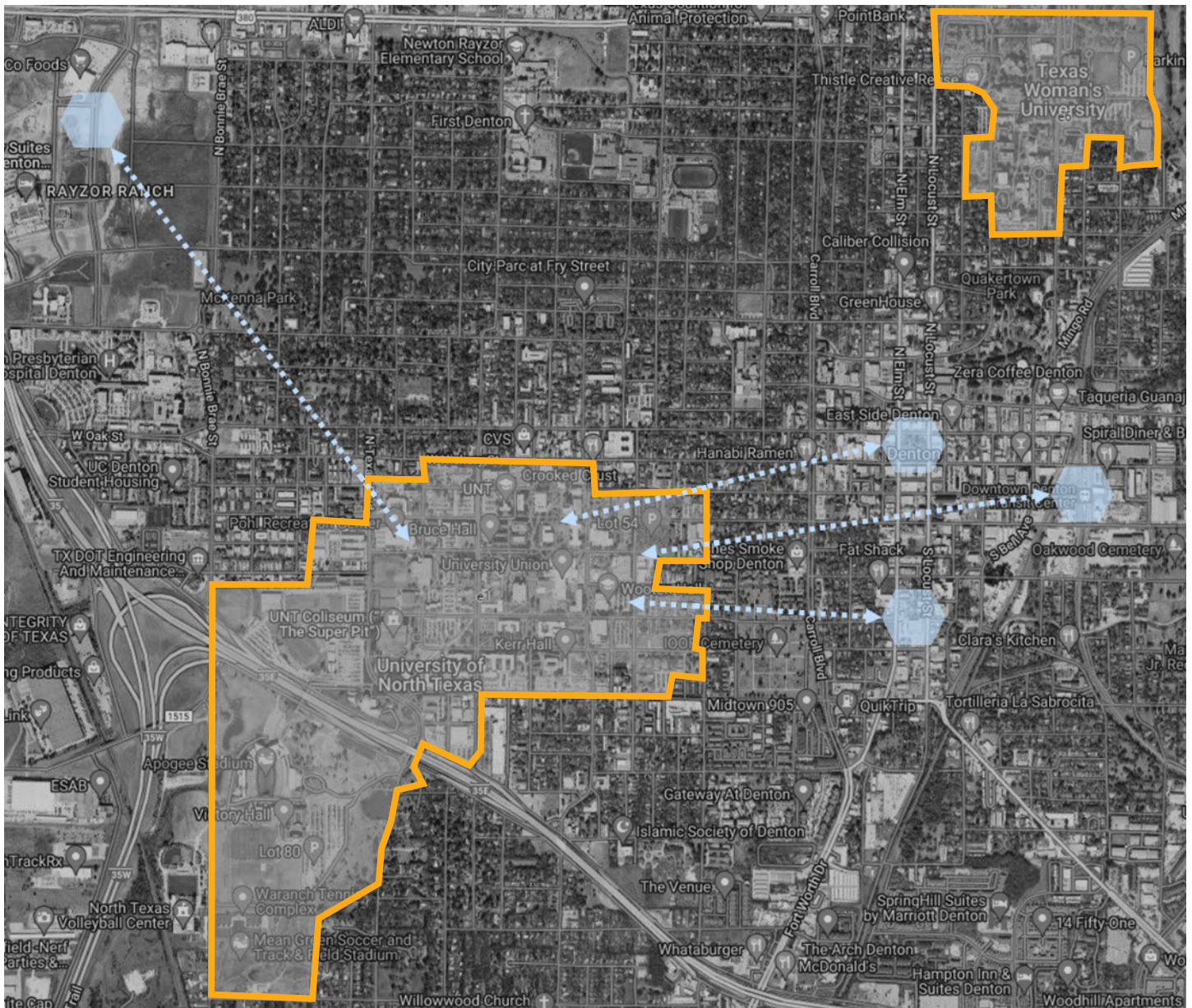
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Town-and-gown relationship

An essential function of off-campus mobility hubs is to enable campus affiliates to access the regional transportation network and destinations in the surrounding community. Campus mobility hubs should reinforce economic and social activity across the campus and the adjacent community. Off-campus hubs are the "door" to access commercial corridors, downtown, off-campus residences, restaurants, and banking, among other services. Therefore, identifying when this relationship exists on a university campus is critical to assess which mobility hub amenities are needed to provide a seamless transition from campus to town. Figure 6 shows an example in Denton, TX where UNT Denton and Texas Women's University can connect affiliates to high-capacity transit (i.e., DCTA A-train), commercial corridors, and Downtown Denton.

Figure 6 Connections between Denton-Area Campuses and nearby Destinations



Intra-campus hub networks

Where students, faculty, visitors, and staff move throughout the day between campuses (e.g., between Dallas College's El Centro Campus and Eastfield Campuses) or between internal campus buildings and facilities, on-

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campus hubs can serve as an internal network to enhance active transportation, micromobility, and shuttle services while minimizing auto trips. Figure 7 illustrates how potential on-campus hubs provide intra-campus connections at the University of Texas at Dallas (UTD). The central mobility hubs provide access to classrooms, offices, and other university services, while the outer mobility hubs connect those facilities with residences, park-
once lots, and carshare.

Figure 7 How On-Campus Hubs Can Facilitate Internal Networks

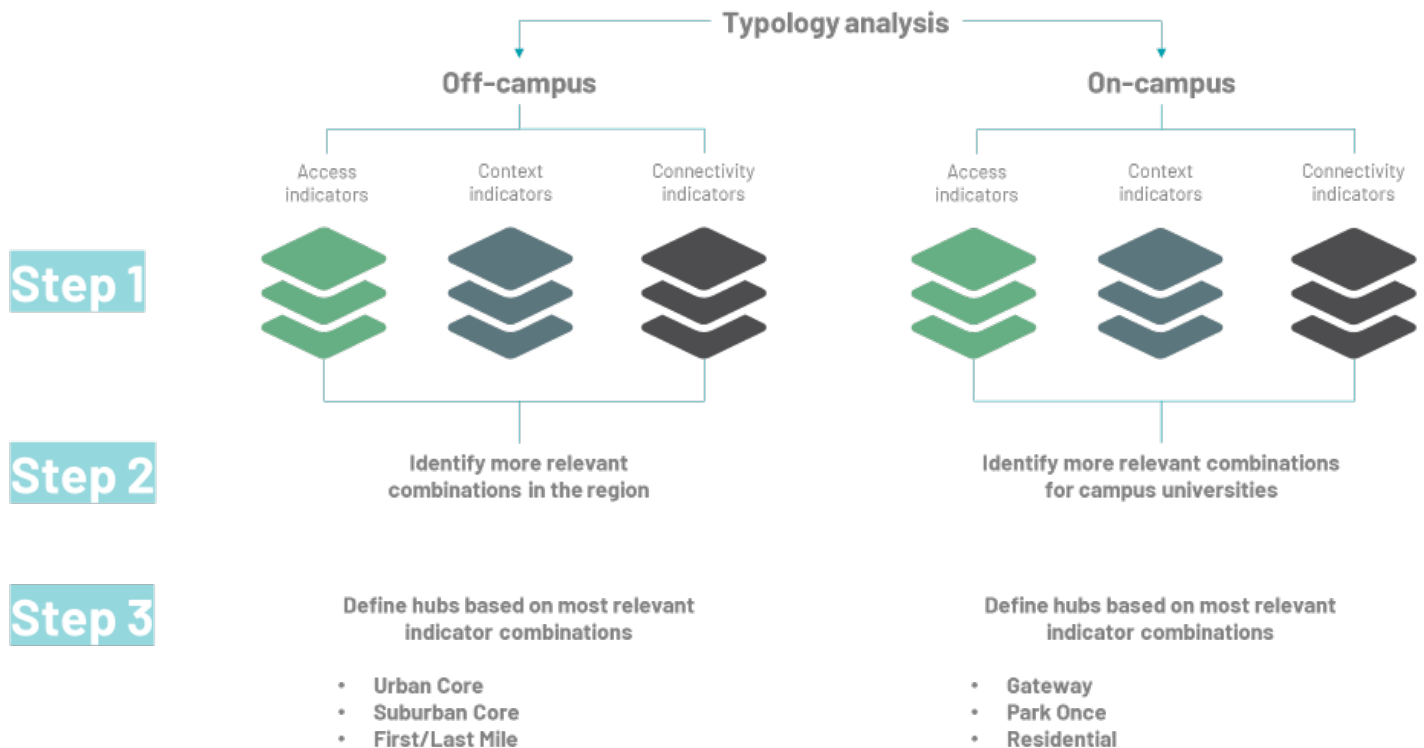


03 Campus Mobility Hub Typology Framework

No two campus mobility hubs will be designed and operated the same. The features, access conditions, and use cases of each campus mobility hub depend on the type of campus, its mix of campus affiliates, its land use context, available multimodal network, and specific transportation needs of campus affiliates and adjacent neighborhoods. The Campus Mobility Hub Typology Framework below organizes how NCTCOG’s mobility hub catalog, and the mobility hubs it will guide, can be best implemented by campus and mobility network context.

After identifying the on-and off-campus mobility hubs, the next phase in the analysis is to assign the campus hub typology. The typology assignment process uses three factors to capture relevant characteristics surrounding hub locations. Ultimately, the typologies will inform the adequate elements, design, and investment process for the mobility hubs in the region. Figure 8 presents an overview of the mobility hub typology framework. The framework uses the same three factors for on-campus and off-campus; nonetheless, the indicators included to evaluate each of those factors are different. The next section describes three steps of the typology framework.

Figure 8 Campus Mobility Hub Typology Framework



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Step 1: Key factors and indicators


Figure 9 below describes the indicators included in each of the three factors used in the typology assessment: Access, Context, and Connectivity. The **Access** factor evaluates the different mobility options to get to/from mobility hubs, some indicators might be present at both on- and off campus like fixed-route transit, while others such as campus shuttle stops are more relevant to describe on-campus hubs. The **Context** factor captures the surrounding characteristics of mobility hubs, as it relates to the concentration of people and students. For example, employment and population density is a better indicator of the activity surrounding off campus hubs, whilst buildings or student housing provides a better understanding of the activity surrounding on-campus hubs. Lastly, the **Connectivity** factor assesses the type of trips that mobility hubs can serve. Transit centers at off-campus hubs connect the campus with the local and/or regional transportation system. Conversely, on-campus hubs next to specific campus anchors (e.g., stadium) will typically generate predictable trip types.

Figure 9 Access, Context, and Connectivity Typology Indicators

Factor	Description	Indicators	Included in off-campus hub assessment	Included in on-campus hub assessment
 <p>Access</p>	Mobility options to get to/from hub	High-capacity transit	Yes	No
		Park and ride	Yes	Yes
		Fixed-route transit	Yes	Yes
		Car share	Yes	No
		Bike share	Yes	Yes
		Campus shuttle	No	Yes
		Bike parking	No	Yes
		Dedicated bike paths	No	Yes
 <p>Context</p>	Surrounding (population/demographic) characteristics of mobility hubs	Population density	Yes	No
		Employment density	Yes	No
		Mixed Use/Transit-Oriented Development	Yes	No
		Other land uses	Yes	No
		Next to student housing	Yes	Yes
		Next to classroom buildings	No	Yes
		Next to stadia/event centers	No	Yes
		Next to plazas/gathering spaces	No	Yes
		Transit center / Transfer stop	Yes	No

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Factor	Description	Indicators	Included in off-campus hub assessment	Included in on-campus hub assessment
 <p>Connections</p>	Connectivity intensity and trip purpose of mobility hubs	Residential area	Yes	No
		Other activity centers (recreation, shopping, etc.)	Yes	No
		Access point	No	Yes
		Close to many amenities	No	Yes
		Close to one amenity	No	Yes

Step 2: Identify indicators' relevant combinations

In this step, each mobility hub identified in the siting analysis gets evaluated against each of the indicators defined in step 1. The objective of this step is to assign all the correspondent indicators values to each hub, for instance an off-campus hub gets a value for each of the 13 indicators applicable to off-campus hubs. This process returns a set of hubs with different access, context, and connectivity characteristics categorized in the last step.

Step 3: Create typology descriptions

With access, context, and connectivity indicators defined and assigned to general on- and off-campus hub typologies, the next step is to create distinct typologies that capture the indicator groupings and provide greater nuance to typology assignments for proposed hubs. The Campus Mobility Hub Typology Framework establishes six hub types – three for on-campus hubs and three for off-campus hubs – that reflect the diversity of campus conditions in the North Central Texas region. Every campus mobility hub is assigned a type that best captures the characteristics and needs of the area specific to that hub. This step tailors the hub design, mobility mix, and investment process – based on the typology assignment, the type of mobility amenities proposed and level of investment needed for each campus hub can be more clearly identified.

This section defines each of the six campus mobility hub typologies, and lays out the access, context, and connectivity indicators that comprise them. The three levels of investment (Basic, Enhanced, and Seamless) will be analyzed for each hub after it is assigned to its respective typology.

On-Campus Mobility Hubs

On-campus mobility hubs are found within the boundaries of colleges and universities. They connect commuters coming into campus or help campus residents and affiliates make short trips on campus or between campus and nearby destinations. The mobility and land use factors that inform on-campus hub amenities will vary from campus to campus – but overall, the context of on-campus hubs will relate to lower-capacity mobility access and campus land uses such as student housing and classrooms. On-campus hubs are divided into the following three typologies: Gateway Hubs, Park Once Hubs, and Residential Hubs.

Gateway Hubs

Gateway Hubs are found on campus near the main campus entrances or access points. Campus amenities, such as housing, classrooms, and public gathering places are nearby. Gateway Hubs are often integrated into signature public spaces and alongside a major landmark (e.g., gateway structure, fountain feature, statue, landscaped entryway, etc.). Mobility amenities offered tend to focus on fixed-route transit, campus shuttles, significant pools of bike parking, bike share and micromobility parking, wayfinding, and other bicycle and pedestrian-related

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offerings. Campus gateways are often well-established, built out locations – as such, growth potential for the areas surrounding the Gateway Hub is static or minimal. Being located near the gateway to campus, these mobility hubs will ideally provide connections to multiple campus destinations and even nearby off-campus amenities.

Examples of Gateway Hubs can be found at Texas Christian University (TCU), Dallas College Cedar Valley, and University of Texas at Arlington (UTA). Figure 10 shows the potential design and amenity opportunities of a sample Gateway Hub.

Figure 10 On-Campus Gateway Hub Sample Design



Park Once Hubs

Park Once Hubs emphasize connecting campus affiliates who drive and park their car to mobility options. Typically, these mobility hubs are located away from the center of campus and major campus amenities. Park Once Hubs center around a parking location that has access to fixed-route transit or a campus shuttle. Except where parking facilities are in built out areas of campus, the potential for growth at Park Once Hubs is high, in part due to the relative lack of density and amenities in the surrounding area. In addition to parking and transit access, these hubs should also offer access to bicycle amenities like bike parking and bike/scooter share. Park Once Hubs are near student housing, classrooms, and public spaces.

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Examples of Park Once Hubs can be found at University of North Texas – Denton (UNT), University of Texas at Dallas (UTD), and Paul Quinn College. Figure 11 shows the potential design and amenity opportunities of a sample Park Once Hub.

Figure 11 On-Campus Park Once Hub Sample Design



Residential Hubs

Residential Hubs are located on campus in close proximity to student housing. These hubs operate in both urban and suburban contexts, but the mix of mobility amenities is likely to be similar at Residential Hubs regardless of context. In urban context, these hubs are typically in pedestrian-heavy locations with a low car presence, whereas in suburban context there is likely to be a lower pedestrian presence. Access to these hubs tends to focus on bike amenities, fixed-route transit, and campus shuttle, with connections to existing or new bike paths on adjacent streets. Two-way car share services serve as vital mobility options for car-free students that need to get off campus for errands, weekend activities, and more. While growth in the surrounding area is likely to be minimal to static with land use context primarily consisting of residential housing and public spaces, campuses with redevelopment plans or with the ability to redevelop parking lots may see additional growth opportunities that will strengthen the mobility hub.

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Examples of Residential Hubs can be found at Southern Methodist University (SMU), Texas Women’s University (TWU), and Dallas Baptist University. Figure 12 shows the potential design and amenity opportunities of a sample Residential Hub.

Figure 12 On-Campus Residential Hub Sample Design



Off-Campus Mobility Hubs

Off-campus mobility hubs are located outside of the boundaries of college and university campuses. Typically, they serve to connect campus affiliates between campus and either an off-campus demand generator or transit connection. Located away from the campus context, off-campus hubs offer a mix of campus affiliate and non-affiliate mobility use cases. Land use and mobility factors that commonly inform off-campus mobility hubs include proximity to high-capacity transit, population and employment density, and activity centers. Off-campus hubs are divided into the following three typologies: Urban Core Hubs, Suburban Core Hubs, and First/Last-Mile Hubs.

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Urban Core Hubs

Urban Core Hubs are located within relatively dense, urban settings, and typically have direct access to high-capacity transit or major transit centers (within 2 miles) and a diverse mix of land uses. These mobility hubs are located in areas with high population and employment density, in a TOD-like setting, with access to mobility options other urban amenities. Potential for growth is high in the area surrounding Urban Core Hubs. Urban Core Hubs complement the land uses in the area with context-sensitive mobility offerings and by providing space for users to relax, play, or comfortably wait for their next bus or train.

Examples of Urban Core Hubs can be found outside University of North Texas – Denton (UNT), UT Southwestern Medical Center, and Dallas College El Centro Campus. Figure 13 shows the potential design and amenity opportunities of a sample Urban Core Hub.

Figure 13 Off-Campus Urban Core Hub Sample Design



Suburban Commuter Hubs

Suburban Commuter Hubs are typically found in areas with low to moderate density and a residential land use focus. A TOD-like land use context may apply to the Suburban Commuter Hub, but the density of the surrounding context will be lower than in the Urban Core Hub. Like Urban Core Hubs, Suburban Commuter Hubs are built on a

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backbone of transit, but the transit capacity may be lower than on transit that serves Urban Core Hubs. In terms of growth, the area surrounding a Suburban Commuter Hub is expected to be static to minimal. With less density than in Urban Core Hubs, there is more space to provide mobility options – Suburban Commuter Hubs can build mobility connections for those who drive through dedicating space to parking infrastructure in the form of a surface lot or garage.

Examples of Suburban Commuter Hubs can be found outside University of Texas at Dallas (UTD), Dallas College North Lake, and UNT Dallas. Figure 14 shows the potential design and amenity opportunities of a sample Suburban Commuter Hub.

Figure 14 Off-Campus Suburban Commuter Hub Sample Design



First/Last-Mile Hubs

First/Last-Mile Hubs are off-campus hubs that bridge the gap between the on-campus setting and off-campus setting. Typically found within a mile of the campus boundary, the land use context of these mobility hubs trends towards commercial activity. Potential for growth at First/Last-Mile Hubs is moderate, and highly dependent on the setting of each individual mobility hub. The mobility amenities provided at First/Last-Mile Hubs are designed to help make short-trips to access the campus setting, usually from an anchor transit service. These hubs include

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options like bike share and micromobility, fixed-route transit and shuttles, and a connection to nearby bicycle and pedestrian infrastructure.

Examples of First/Last-Mile Hubs can be found outside Carrington College, University of Texas at Dallas (UTD), and Texas A&M University – Commerce. Figure 15 shows the potential design and amenity opportunities of a sample First/Last-Mile Hub.

Figure 15 Off-Campus First/Last Mile Hub Sample Design



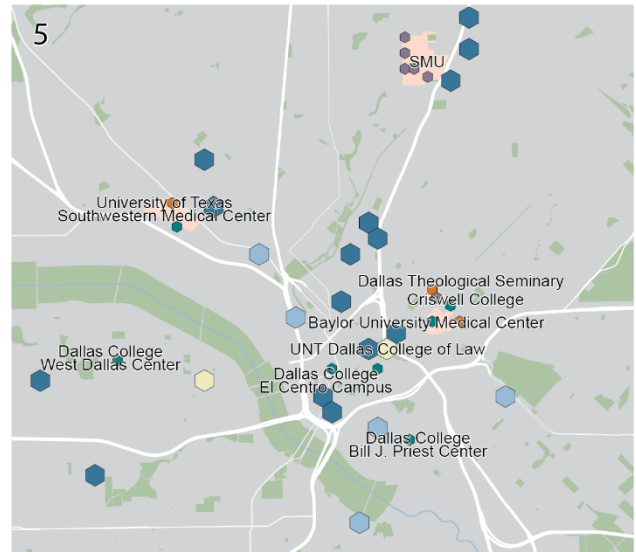
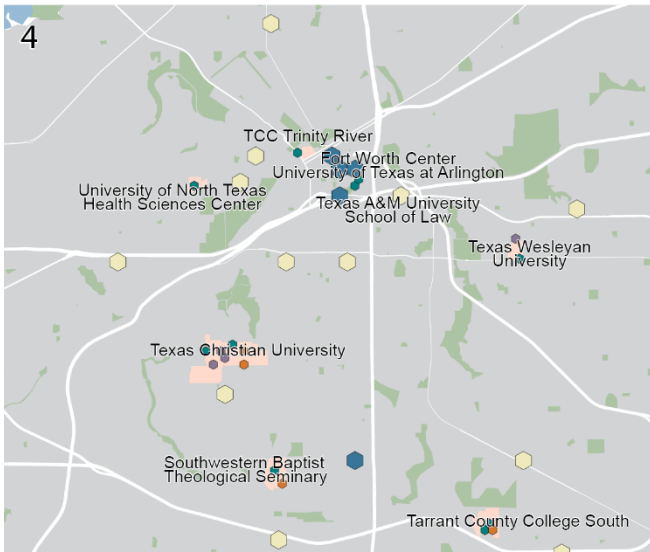
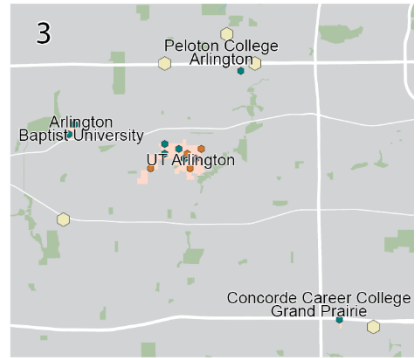
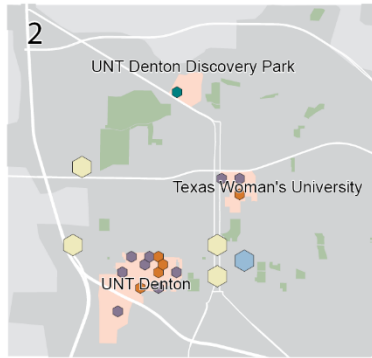
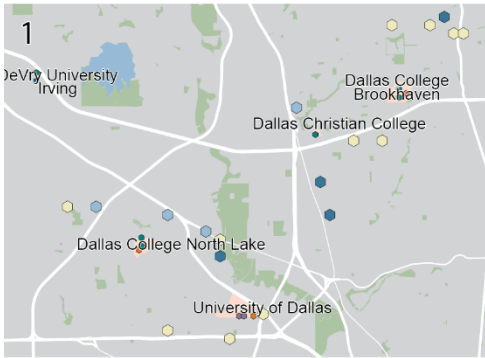
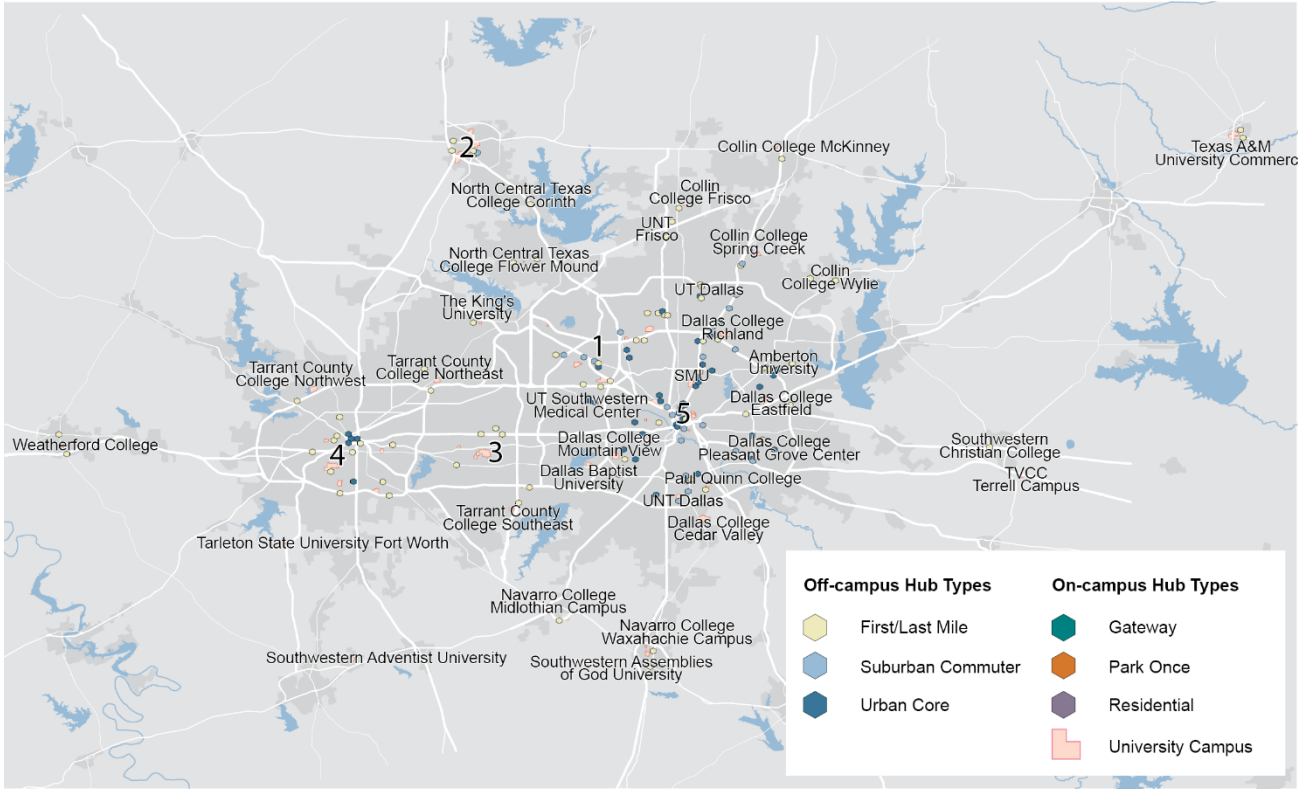
Where are campus hub types located?

Figure 16 below takes the campus mobility hub network shown in Figure 4 through Figure 8 and assigns the campus mobility hub typology to the entire on- and off-campus hub network. A full table identifying each hub's geographic coordinates and affiliated college or university is included in Appendix A and Appendix B.

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Figure 16 On-Campus and Off-Campus Mobility Hub Network by Hub Type



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Other considerations

The Dallas Fort-Worth metroplex contains a wide variety of campus types – from single-building community college campuses to large university campuses that span hundreds of acres. Some campuses exhibit enrollments primarily made up of commuters, while other campuses house thousands of students each year. The typologies in this section capture the nuances of all types of college and university campuses in this region.

Campus Types

In particular, residential campuses (those that have a high resident student population) and commuter campuses with little to no student housing can have different needs despite being in a similar location within an urban or suburban area. The development of the access, context, connections, and growth context indicators described in the previous section aims to capture the unique and specific context of each campus mobility hub location.

Propensity Indices

In order to identify and site campus mobility hub candidates, the project team analyzed demographic propensity towards Mobility On-Demand/shared passenger mobility, shared micromobility, and transit. Initially, propensity towards shared mobility and transit was included as an indicator to help refine each campus typology. Ultimately, the project team decided to keep the propensity factors out of the typology definitions, because the typologies would run the risk of oversampling propensity – the demographic propensity is already factored into each campus mobility hub through the initial siting process.

The propensity indices can, however, be used for future shared mobility services planning. A location with a high propensity for shared micromobility would be a prime location for a docked bike share location, micromobility drop zones or corrals, or infrastructure that supports micromobility such as bike lanes or shared use paths. The shared passenger mobility index results can similarly identify new pick-up and drop-off locations for microtransit and TNC, as well as potential signage for wayfinding, if applicable.

04 Scenario Development and Evaluation

Scenario Development

Much like typical development and infrastructure investment cycles at university and college campuses, mobility hub investments will occur in phased tranches. As investments are layered in over time, mobility hubs will progressively achieve the desired outcomes and objectives established in this memo's introduction. The project team has developed a set of three scenarios to illustrate the degree to which mobility hubs satisfy their intended objectives and realize campus affiliate mobility outcomes.

The core component considered in the mobility hub scenarios is level of investment—also expressed as level of amenity, functionality, and utility. Each mobility hub type is evaluated according to three tiered investment scenarios: **Basic**, **Enhanced**, and **Seamless**. The different levels of investment will result in different amenities being offered at each mobility hub. Similarly, the project team assumes varying degrees of:

- Active transportation network infrastructure investment in the vicinity of the mobility hub; and
- Different municipal policy commitments that support shared mobility.

The **Basic** investment scenario assumes that only minor mobility hub amenities and core mobility options are built into the hub. The amenities included would support commuters and campus affiliates in connecting between transportation modes, but may lack amenities that support longer term stays, or have minimal technology integration.

The **Enhanced** investment scenario features more foundational mobility supports that begin the cultural shift toward multimodal travel. The amenities offered at the mobility hub are more developed and of a wider variety than in the Basic investment scenario, including additional shared mobility options to meet diverse mobility needs. Transportation network infrastructure in the mobility hub area is fairly developed in the Enhanced investment scenario, but could be lacking key elements such as signage, separated bicycle facilities, or shared-use paths.

The **Seamless** investment scenario contains a full array of mobility hub amenities and supportive transportation infrastructure, leading to transit orientation and lasting mode shift to shared mobility and active transportation. Mobility options are integrated physically and, to the extent possible, digitally. The specific amenities offered will vary by hub type, but a hub at the Seamless investment level will provide a full offering of amenities, infrastructure, information, urban design, and supportive transportation policy.

Figure 17 below details options for mobility hub amenities and their order-of-magnitude cost estimate. Please note that hub type applicability depends on site context and the results of the transit, Mobility On-Demand/shared passenger mobility, and shared micromobility propensity analyses presented in the Campus Mobility Trends report.

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Figure 17 Infrastructure and Amenities Cost Estimate and Hub Applicability

Infrastructure Category	Amenities	Cost Estimate	Applicable Hub Typology					
			V = Vital R = Recommend O = Optional					
			Urban Core	Suburban Commuter	First/Last Mile	Gateway	Park-Once	Residential
Access & Mobility	Transit Shelter & Waiting Area Covered structures and places to sit at transit stops that provide a safe and comfortable place to wait for transit.	\$\$	V	V	V	V	V	V
	Sidewalk Connectivity High-quality sidewalks that are connected, continuous, and wide enough to accommodate pedestrian flows are critical mobility infrastructure to and from the mobility hub.	\$\$-\$\$\$	V	V	V	V	V	V
	Safe Intersections High visibility painted crosswalks, stop bars with adequate distance from the crosswalk, daylighting parking, curb bulbouts/extensions, and leading pedestrian intervals provide safe walking conditions to and from the mobility hub.	\$\$-\$\$\$	V	V	V	V	V	V
	Short-Term Bike Parking/Bike Racks Bike racks that are conveniently placed and easy for users to secure their bikes provide an essential end-of-trip facility.	\$	V	V	V	V	V	V
	Bike Stations with End-of-Trip Facilities Staffed secure bike parking areas, usually outfitted with changing rooms, maintenance tools, light retail, and other supportive end-of-trip facilities.	\$\$	R	O	O	R	O	R
	Bike Share	\$-\$	V	O	V	V	R	V

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Public bike share enables intra-campus mobility, neighborhood connectivity, and first/last-mile connections for transit riders.								
<p>Bike Network Connectivity</p> <p>A gap-free bike network that seamlessly connects affiliates to mobility hubs provide an essential first/last mile connection. High comfort bike facilities, which include protected bike lanes and/or off-street bike paths, provide the safest and most user-friendly experience.</p>	\$-\$\$\$	V	R	V	V	R	V	
<p>Long- Term Secure Bike Parking</p> <p>Bicycle infrastructure that provides a convenient and secure place to park and repair bikes. Consists of bike lockers, bike cages, or indoor bike parking that provides covered long-term parking.</p>	\$\$	V	V	V	V	V	V	
<p>Micromobility Stations and Drop Zones</p> <p>Designated areas for users to pickup and drop-off shared bikes, scooters, mopeds, and other small vehicles.</p>	\$	V	O	R	V	O	V	
<p>Loading Zones</p> <p>Curbspace used for active freight and passenger loading and unloading of ride-hail, shuttles, micro/on-demand transit, and urban freight.</p>	\$	R	R	R	R	R	R	
<p>Dedicated Car Share Parking</p> <p>Parking that has been marked and designated for car share vehicles.</p>	\$	R	R	R	R	R	R	
<p>EV Charging Stations for Shared Vehicles and Micromobility</p> <p>Clearly marked and signed charging infrastructure that allows for fast charging of</p>	\$\$	R	R	R	R	R	R	

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	shared mobility vehicles and micromobility devices.							
	<p>Common Carrier Package Pickup and Other Efficient Delivery Services</p> <p>Secure, self-service kiosks for affiliate to retrieve packages and other goods at any given time. Eliminates delivery drive time and loading conflicts.</p>	\$-\$\$	R	O	O	R	O	R
Public Realm	<p>Pedestrian-Scale Lighting</p> <p>Street lighting that illuminates the sidewalk and is positioned lower and spaced closer together than roadway lighting, located in areas with high pedestrian activity to improve safety and visibility.</p>	\$\$	V	V	V	V	V	V
	<p>Permanent and Mobile Vending/Retail Space</p> <p>A mix of dedicated space for permanent retail services that are anchored to a physical location (e.g., restaurant) and flexible space for mobile vending/retail services (e.g., food trucks, florists, coffee stands) that can share the same space at different times.</p>	\$-\$\$\$	R	O	O	R	O	R
	<p>Street Furniture</p> <p>Objects placed or fixed in the public right-of-way that activate sidewalks and establish a sense of place (e.g., benches, planters).</p>	\$-\$\$	R	O	R	R	O	R
	<p>Community-Driven Design Elements/Tactical Urbanism</p> <p>A community-led approach to community building using simple, temporary, low-cost design interventions that can be altered and scaled up to better serve the community (e.g., curb bulbs, pedestrian enhancements, cultural amenities, and art).</p>	\$	R	O	O	R	O	R

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	<p>Green Space</p> <p>An area that is partly or completely covered with grass, trees, shrubs, or other landscaping.</p>	\$-\$\$	R	O	O	R	O	R
Customer Experience	<p>Digital Mobility Payment for Transit and Shared Mobility</p> <p>Contactless payment systems located near transit stops that allow riders to pre-pay for their trip before boarding or unlocking a ride.</p>	\$\$	R	R	R	R	R	R
	<p>Place Programming</p> <p>Creation of public gathering spaces that extends the community identity outdoors and establishes a sense of place (e.g., parklets).</p>	\$-\$\$	R	O	R	R	O	R
	<p>Public Bathroom</p> <p>Bathrooms that are accessible to the public provide a basic and respectable amenity for mobility hub users.</p>	\$\$	R	R	R	R	R	R
	<p>Digital screens for booking and trip planning</p> <p>Touch screen kiosks that digitally display nearby mobility options and allow users to book and plan their trip.</p>	\$\$	R	O	O	R	R	R
	<p>Public Wi-Fi</p> <p>Free access to Wi-Fi within a specified distance.</p>	\$	R	O	O	R	O	R
	<p>Public Device Charging Outlets</p> <p>Charging stations for cell phones and other devices.</p>	\$	R	O	O	R	O	R
	<p>Real-Time Travel Information</p> <p>Information that shares the current status of nearby mobility options to enable travelers to make informed decisions about their trips (e.g., estimated arrival/departure times, location of services).</p>	\$-\$\$	V	V	V	V	V	V

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	Digital and Physical Wayfinding A guidance system that directs users to nearby mobility services and amenities.	\$\$	V	V	V	V	V	V
	Hub Area Maps, Amenity Information, and Bulletins Physical displays that help orient users and direct them to nearby amenities and relevant announcements.	\$\$	V	V	V	V	V	V

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Mobility hub amenities are just one part of the equation. Any investment in mobility hubs cannot reach its potential without an investment in the surrounding bicycle and pedestrian infrastructure network. As a baseline, the local active transportation network needs to be safe and well-connected for mobility hubs to be truly accessible. The current state of bicycle and pedestrian infrastructure in the greater Dallas-Fort Worth metroplex is generally lacking, with many of the candidate mobility hub locations missing critical bicycle and pedestrian connections.

The Mobility 2045 Metropolitan Transportation Plan recommends 1,285 miles of unfunded regional bicycle connections and 1,918 miles of unfunded on-street bicycle infrastructure, and supports coordination with TxDOT, local governments, and regional organizations to support projects and programs that improve regional pedestrian safety. To achieve a bicycle and pedestrian infrastructure foundation that will support and maximize the benefit of campus mobility hubs, an intentional and coordinated effort is needed among universities, municipal governments, and other transportation agencies across the region.

Scenario Evaluation

The campus mobility hub evaluation criteria are based on three sources:

- The typology framework outlined previously
- The project vision and objectives defined in the Directional Workshop held with the Project Advisory Committee on April 14, 2022
- Mobility 2045 Plan goals¹

To form the five campus mobility hub evaluation criteria, goals and objectives in Mobility 2045 and from the Directional Workshop were summarized into key attributes that informed the criteria. The key attributes identified are themes pulled from goals and objectives and boiled down into words or short phrases, which are then pulled together and organized into groupings to create the evaluation framework criteria. The Mobility 2045 goals and associated attributes are listed below in Figure 18.

Figure 18 Mobility 2045 Goals and Key Attributes

Mobility 2045 Goal	Key Attributes Used in Evaluation Criteria
<p>Mobility</p> <ul style="list-style-type: none"> • Improve the availability of mobility options • Support travel efficiency and congestion reduction • Equity across communities in accessing the planning process and transportation system 	<ul style="list-style-type: none"> • Available • Travel efficiency • Equity • Congestion reduction
<p>Quality of Life</p> <ul style="list-style-type: none"> • Preserve and enhance the natural environment (air quality, promotion of active lifestyles) 	<ul style="list-style-type: none"> • Preserve environment • Sustainable

¹ Mobility 2045 is a vision plan for the multimodal transportation system in the DFW planning area. Adopted by the Regional Transportation Council in June 2018, the plan includes goals to support a robust and multimodal transportation system. The plan's nine goals fall under the following categories: **Mobility, Quality of Life, System Sustainability, and Implementation.**

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Mobility 2045 Goal	Key Attributes Used in Evaluation Criteria
<ul style="list-style-type: none"> Encourage livable communities through sustainability and economic vitality 	<ul style="list-style-type: none"> Economic vitality
<p>System Sustainability</p> <ul style="list-style-type: none"> Adequate maintenance and enhances safety and reliability Long term sustainable revenue sources for regional system needs 	<ul style="list-style-type: none"> Safe Reliable Sustainable revenue
<p>Implementation</p> <ul style="list-style-type: none"> Timely project planning and implementation Cost efficacy, cost reductions associated with construction, operations, and maintenance 	<ul style="list-style-type: none"> Efficient

The primary outcome of this project’s Directional Workshop was the development of a project vision and project objectives with guidance from the Project Advisory Committee. A summary of NCTOG’s vision, objectives, and associated key attributes used for the campus mobility hub evaluation criteria are included in Figure 19.

Figure 19 Directional Workshop Vision/Objectives and Key Attributes

Directional Workshop Vision Statement/Objective	Key Attributes Used in Evaluation Criteria
<p>Project Vision</p> <p>Campus mobility hubs are the physical and digital intersection of mobility options, transportation information, campus life, and social interactions</p> <p>Campus mobility hubs are centralized points both on and off campus where people have on-demand access to a range of shared mobility options and mobility storage solutions</p> <p>Campus mobility hubs enable campus affiliates to access multiple options and amenities that support campus access or connections across modes</p> <p>Campus mobility hubs are built on a backbone of public transit and campus shuttles</p>	<ul style="list-style-type: none"> Physical and digital information Campus integration Social Centralized On-demand access Storage solutions Connections across modes Multiple mobility options Transit backbone

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Directional Workshop Vision Statement/Objective	Key Attributes Used in Evaluation Criteria
Campus mobility hubs offer a safe, comfortable, convenient, and accessible space to seamlessly transfer across different mobility options	<ul style="list-style-type: none"> • Safe • Comfortable • Convenient • Accessible
Project Objectives	
Campus mobility hubs should be highly accessible, convenient, sustainable, and safe, with a wide array of amenities to complement the available mobility offerings	<ul style="list-style-type: none"> • Accessible • Sustainable • Convenient
Campus mobility hubs should seamlessly tie-in to the fabric of the campus or community where they are located, both in terms of aesthetics and the amenities offered	<ul style="list-style-type: none"> • Context-sensitive design
Campus mobility hubs should provide more than just a connection between transportation modes – they should be activated and comfortable enough to spend anywhere from a short stopover to a long stay	<ul style="list-style-type: none"> • Activated • Comfortable • Flexible
Campus mobility hubs should cater to the diverse mobility needs and abilities of students, faculty, staff, and visitors	<ul style="list-style-type: none"> • Diverse mobility offerings
Campus mobility hubs should ensure equitable access to mobility hub features, with a design that matches the racial, gender, and economic diversity of campuses across the region	<ul style="list-style-type: none"> • Equitable • Context-appropriate design

Ultimately, the key attributes from Mobility 2045 and the project vision and objectives were used to develop five campus mobility hub evaluation criteria. Each evaluation criterion is listed below in Figure 20, along with a few relevant questions that can be used to score the campus mobility hub per criterion. The next sections will cover the factors considered to score the campus mobility hub per criterion, and the scoring results for each campus hub type across investment levels.

Figure 20 Evaluation Criteria and Key Attribute Assignment

Evaluation Criteria	Questions to Ask	Key Attributes Considered		
		Project Vision	Project Objectives	Mobility 2045
Amenity Versatility	<p>How varied are the mobility options provided?</p> <p>Is there consideration for different levels of ability?</p>	<ul style="list-style-type: none"> • Physical and digital signage • Storage solutions 	<ul style="list-style-type: none"> • Flexible • Activated 	<ul style="list-style-type: none"> • Available • Reliable

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Evaluation Criteria	Questions to Ask	Key Attributes Considered		
		Project Vision	Project Objectives	Mobility 2045
	Is there informational signage? How easy and convenient is it to transfer between modes?	<ul style="list-style-type: none"> Multiple mobility options Connections across Modes 		
Shared Mobility Integration	How well are shared mobility options integrated with the mobility hub? Is there consideration for shared passenger pickups and drop-offs?	<ul style="list-style-type: none"> On-demand access Campus integration 	<ul style="list-style-type: none"> Context-sensitive design Diverse mobility offerings 	<ul style="list-style-type: none"> Available
Transit Connectivity	Is the hub built on a backbone of existing/planned transit? Is on-demand transit available? Is there a connection to on-street facilities?	<ul style="list-style-type: none"> Transit backbone On-demand access 	<ul style="list-style-type: none"> Accessible 	<ul style="list-style-type: none"> Reliable
Design Quality	Does this hub feel safe and well-lit? Are there places at this hub that feel comfortable for a longer stay? Are there amenities to activate the space?	<ul style="list-style-type: none"> Social Comfortable Safe Centralized 	<ul style="list-style-type: none"> Convenient Equitable Sustainable Context-appropriate design 	<ul style="list-style-type: none"> Economic vitality
Benefit Cost Analysis	How do the benefits of this campus mobility hub stack up against its costs?	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Sustainable revenue Efficient Economic vitality

Scoring Logic

The project team used a series of qualitative factors tied to each criterion to evaluate and score each campus mobility hub type investment scenario. The qualitative factors for each evaluation criterion are shown in Figure 21. While the qualitative factors that lead to scoring results rely on the mobility hub’s components and surrounding infrastructure, there are some external factors that are not within the control of the agency implementing the mobility hub. For example, an Urban Core Hub is typically located in a dense, urban context, where available land may be minimal. As a result, available land for the mobility hub may be limited, resulting in a narrower array of

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amenities offered. Evaluation should take this and other external factors into consideration when scoring campus mobility hubs.

Figure 21 Qualitative Factors for Each Evaluation Criterion

Factors to be Considered						
Amenity Versatility	Mobility options	Physical signage	Digital signage	Uncovered bicycle storage	Covered bicycle storage	Secure bicycle storage
Shared Mobility Integration	Shared micromobility options		Dedicated shared passenger mobility PUDO		Integration with surrounding infrastructure	
Transit Connectivity	Transit type	On-demand transit availability	Transit frequency	Transit schedule	Adjacent sidewalk coverage	Adjacent crosswalk coverage
Design Quality	Lighting coverage	Land use context consideration	Equity context consideration	Non-mobility amenities	Seating coverage	Overall design
Benefit Cost Analysis	Capital costs	Annual (O&M) costs	Safety benefits	Recreation benefits	Mobility benefits	Health benefits

Each evaluation criterion is scored with a rating of Low, Medium, and High. The full scoring outcomes are shown in the section below. In the scoring outcomes for each campus mobility hub, the darkest color indicates the “most likely” scoring result, the lighter color indicates a “possible” scoring result, and a white/grey coloring indicates a scoring result that is “not applicable.” Each type was scored using the qualitative scoring factors across all three investment scenarios. In all cases, the local context helps to inform the level of investment needed.

Basic Investment

Figure 22 Basic Investment Evaluation Results

	Amenity Versatility	Shared Mobility Integration	Transit Connectivity	Design Quality	BCA
Urban Core	Low Medium High	Low Medium High	Low Medium High	Low Medium High	Low Medium High
Suburban Commuter	Low Medium High	Low Medium High	Low Medium High	Low Medium High	Low Medium High
First/Last Mile Hub	Low Medium High	Low Medium High	Low Medium High	Low Medium High	Low Medium High
Gateway Hub	Low Medium High	Low Medium High	Low Medium High	Low Medium High	Low Medium High
Park-Once	Low Medium High	Low Medium High	Low Medium High	Low Medium High	Low Medium High
Residential Hub	Low Medium High	Low Medium High	Low Medium High	Low Medium High	Low Medium High

The Basic investment scenario tends to score low across campus hub types and evaluation criteria. A limited investment in campus mobility hubs will result in low to medium evaluation outcomes, resulting in minimal

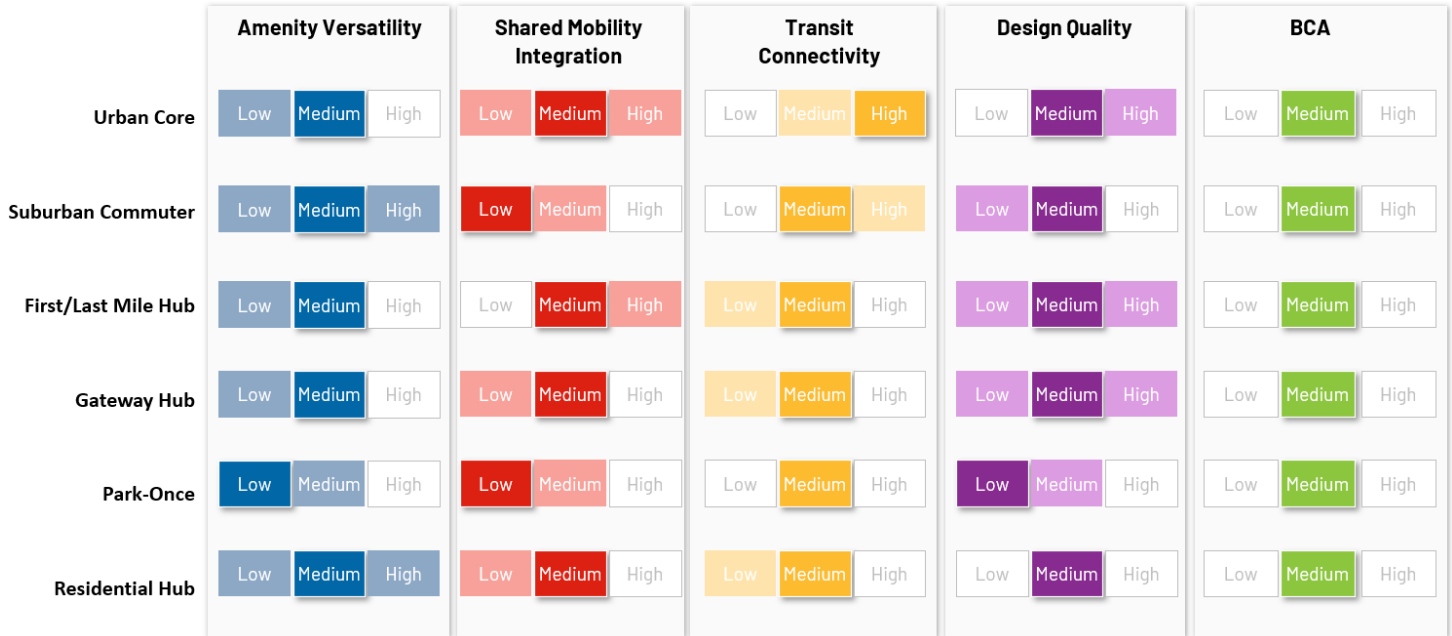
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amenities, mobility integration, connectivity with transit, and overall design. A Basic investment in campus mobility hubs will work best in some contexts and at some university and college locations, but a mixture of investment scenarios across the local and regional mobility hub network is needed to meet the needs of commuters and campus affiliates alike.

Enhanced Investment

Figure 23 Enhanced Investment Evaluation Results



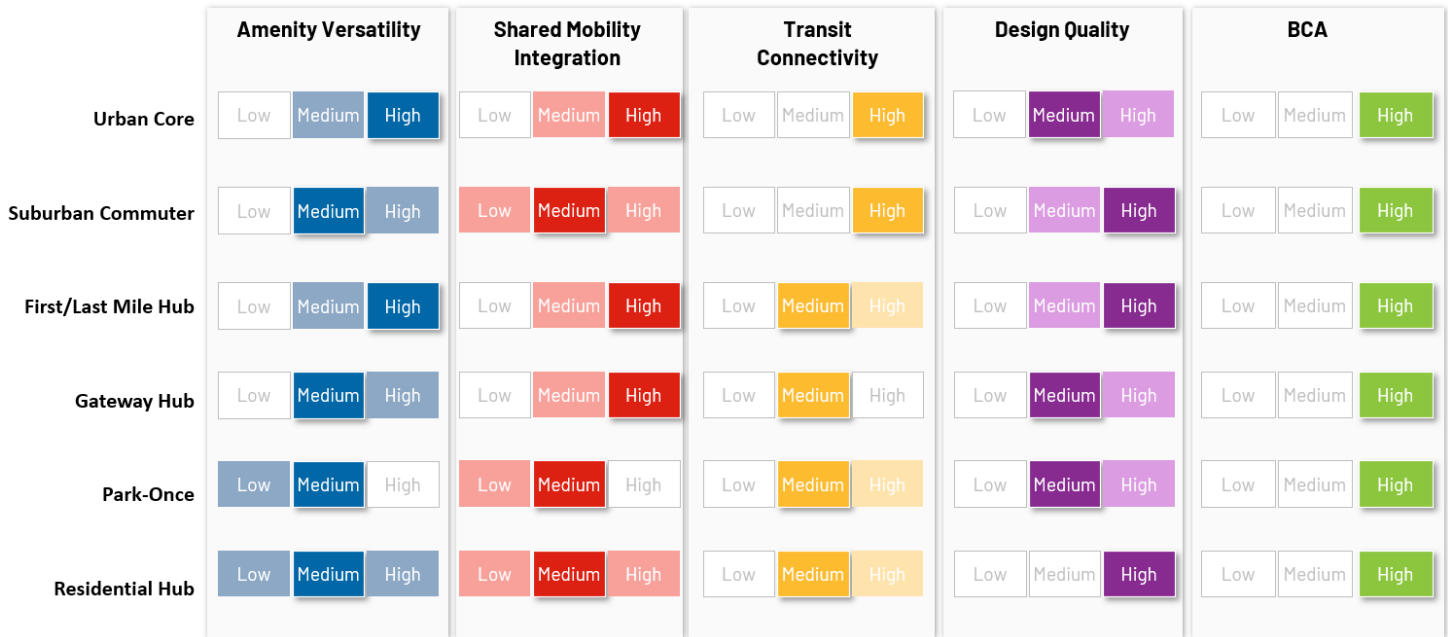
Scores for the Enhanced investment scenario vary across evaluation criteria and campus hub types, primarily falling in the medium range. Campus mobility hubs in an Enhanced investment scenario will not have the full mobility and connectivity potential of those found in the Seamless investment, but will likely serve the needs of the average commuter and campus affiliate. With an Enhanced investment, there will be some user groups who will not be able to utilize all the amenities of mobility hubs, and may be excluded as a result.

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Seamless Investment

Figure 24 Seamless Investment Evaluation Results



A Seamless investment represents a full investment into amenities of the campus mobility hub and its surrounding area. Evaluation criteria scores fall on the high end, with most criteria across mobility hub types resulting in a most likely or possible “high” score. The intent of the Seamless investment scenario is to best meet the needs of the surrounding community and campus affiliates in alignment with the context of the area.

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Appendix A: Off-Campus Mobility Hubs List

City	Hub Type	University Campus Served	Passenger shared mobility propensity score	Shared micro-mobility propensity score	Longitude	Latitude
Addison	First/Last Mile	Dallas College Brookhaven	4	3	-96.8358	32.9546
Addison	Urban Core	Dallas College Brookhaven	5	8	-96.8293	32.9576
Arlington	First/Last Mile	University of Texas at Arlington; Peloton College Arlington	5	7	-97.1207	32.7601
Arlington	First/Last Mile	Peloton College Arlington	2	3	-97.0864	32.7597
Arlington	First/Last Mile	Peloton College Arlington	5	7	-97.097	32.7692
Carrollton	First/Last Mile	Dallas College Brookhaven	5	5	-96.853	32.9548
Cockrell Hill	Urban Core	Dallas College Mountain View	5	8	-96.8914	32.7353
Commerce	First/Last Mile	Texas A&M University Commerce	4	9	-95.8995	33.2497
Commerce	First/Last Mile	Texas A&M University Commerce	3	7	-95.8956	33.2371
Dallas	First/Last Mile	Dallas College North Lake; University of Dallas	6	4	-96.9319	32.8741
Dallas	First/Last Mile	Dallas College Mountain View	5	2	-96.8986	32.6946
Dallas	First/Last Mile	Dallas College Mountain View	5	6	-96.8895	32.7196
Dallas	Urban Core	Dallas Christian College	5	6	-96.8863	32.8955
Dallas	Urban Core	Dallas Christian College	4	5	-96.8823	32.8829
Dallas	Urban Core	Dallas College West Dallas Center	7	4	-96.8734	32.7791
Dallas	First/Last Mile	Dallas College Brookhaven; Dallas Christian College	6	5	-96.871	32.911
Dallas	Urban Core	Dallas College Mountain View	6	6	-96.8724	32.7194
Dallas	Urban Core	Dallas College West Dallas Center	8	7	-96.8609	32.7601
Dallas	First/Last Mile	Dallas College Brookhaven; Dallas Christian College	9	7	-96.8581	32.9109
Dallas	Urban Core	University of North Texas - Dallas	5	7	-96.8391	32.6624
Dallas	First/Last Mile	Dallas College El Centro Campus; University of Texas Southwestern Medical Center; Dallas College West Dallas Center	5	4	-96.8348	32.7786
Dallas	Urban Core	University of Texas Southwestern Medical Center	8	9	-96.834	32.8226
Dallas	Urban Core	University of Texas Southwestern Medical Center	4	6	-96.832	32.8131
Dallas	First/Last Mile	Dallas College Brookhaven	3	4	-96.8251	32.9513
Dallas	First/Last Mile	Dallas College Brookhaven	6	8	-96.8208	32.9512
Dallas	Suburban Commuter	Dallas College El Centro Campus; University of Texas Southwestern Medical Center	3	4	-96.8214	32.8035
Dallas	Suburban Commuter	Dallas College El Centro Campus; University of Texas Southwestern Medical Center; UNT Dallas College of Law; Baylor University Medical	3	4	-96.8131	32.7909

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Dallas	Urban Core	Center; Dallas Theological Seminary; Criswell College Dallas College El Centro Campus; UNT Dallas College of Law; Baylor University Medical Center; Dallas College Bill J. Priest Center; Dallas Theological Seminary; Criswell College	4	7	-96.8069	32.7751
Dallas	Urban Core	Dallas College El Centro Campus; UNT Dallas College of Law; Baylor University Medical Center; Dallas College Bill J. Priest Center; Dallas Theological Seminary; Criswell College	4	7	-96.8048	32.7719
Dallas	Urban Core	Dallas College El Centro Campus; UNT Dallas College of Law; Baylor University Medical Center; Dallas College Bill J. Priest Center; Dallas Theological Seminary; Criswell College	4	7	-96.8023	32.7939
Dallas	Suburban Commuter	University of North Texas - Dallas	3	3	-96.8028	32.6524
Dallas	Urban Core	Dallas College El Centro Campus; University of Texas Southwestern Medical Center; UNT Dallas College of Law; Baylor University Medical Center; Dallas Theological Seminary; Criswell College	5	8	-96.7999	32.8032
Dallas	Suburban Commuter	Dallas College El Centro Campus; Dallas College Bill J. Priest Center	6	4	-96.7988	32.7498
Dallas	Urban Core	Dallas College El Centro Campus; UNT Dallas College of Law; Baylor University Medical Center; Dallas College Bill J. Priest Center; Dallas Theological Seminary; Criswell College	5	7	-96.796	32.7843
Dallas	Urban Core	Southern Methodist University; Dallas College El Centro Campus; UNT Dallas College of Law; Baylor University Medical Center; Dallas Theological Seminary; Criswell College	7	8	-96.7955	32.8095
Dallas	Suburban Commuter	Dallas College El Centro Campus; UNT Dallas College of Law; Baylor University Medical Center; Dallas College Bill J. Priest Center; Dallas Theological Seminary; Criswell College	3	4	-96.7942	32.7686
Dallas	Urban Core	Southern Methodist University; Dallas College El Centro Campus; UNT Dallas College of Law; Baylor University Medical Center; Dallas Theological Seminary; Criswell College	7	8	-96.7934	32.8063
Dallas	Suburban Commuter	Paul Quinn College	2	4	-96.7913	32.6931
Dallas	Urban Core	Dallas College El Centro Campus; UNT Dallas College of Law; Baylor University Medical Center; Dallas College Bill J. Priest Center; Dallas Theological Seminary; Criswell College	4	7	-96.7895	32.7874

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Dallas	Suburban Commuter	University of North Texas - Dallas; Paul Quinn College	3	3	-96.7894	32.6837
Dallas	Suburban Commuter	University of North Texas - Dallas; Paul Quinn College	3	3	-96.7875	32.6679
Dallas	First/Last Mile	University of North Texas - Dallas; Paul Quinn College	4	5	-96.7829	32.6867
Dallas	Urban Core	Concorde Career College Dallas	5	5	-96.7721	32.9097
Dallas	Urban Core	University of Texas at Dallas (UTD)	8	8	-96.7685	32.9819
Dallas	First/Last Mile	University of Texas at Dallas (UTD)	7	4	-96.7682	33.0008
Dallas	Urban Core	Paul Quinn College	4	7	-96.772	32.696
Dallas	First/Last Mile	Southern Methodist University; Peloton College Dallas	8	7	-96.7688	32.8594
Dallas	First/Last Mile	University of Texas at Dallas (UTD)	6	6	-96.7664	32.9788
Dallas	First/Last Mile	University of Texas at Dallas (UTD)	6	3	-96.7661	32.9976
Dallas	Urban Core	Southern Methodist University; Peloton College Dallas	6	8	-96.7642	32.8719
Dallas	Suburban Commuter	Peloton College Dallas	4	4	-96.764	32.8845
Dallas	Suburban Commuter	UNT Dallas College of Law; Baylor University Medical Center; Dallas College Bill J. Priest Center; Dallas Theological Seminary; Criswell College	1	4	-96.764	32.7745
Dallas	First/Last Mile	Paul Quinn College	4	4	-96.7596	32.6707
Dallas	Urban Core	Dallas College Richland; Concorde Career College Dallas	4	6	-96.7525	32.9189
Dallas	Urban Core	Southern Methodist University; Peloton College Dallas	8	6	-96.7494	32.8623
Dallas	Suburban Commuter	Dallas College Richland; Concorde Career College Dallas	3	3	-96.7481	32.9251
Dallas	First/Last Mile	Dallas College Richland; Concorde Career College Dallas	3	5	-96.7398	32.9124
Dallas	Suburban Commuter	Dallas College Richland	3	2	-96.7121	32.8963
Dallas	Suburban Commuter	Dallas College Pleasant Grove Center	3	4	-96.7111	32.7329
Dallas	First/Last Mile	Dallas College Eastfield	8	5	-96.6949	32.7923
Dallas	Urban Core	Dallas College Pleasant Grove Center	4	6	-96.6856	32.7199
Dallas	Urban Core	Dallas College Pleasant Grove Center	5	7	-96.6849	32.7576
Dallas	Suburban Commuter	Dallas College Pleasant Grove Center	3	4	-96.6836	32.7167
Dallas	Urban Core	Dallas College Eastfield; Amberton University; Remington College Dallas Campus	5	8	-96.6725	32.836
Dallas	First/Last Mile	Amberton University; Remington College Dallas Campus	4	4	-96.6698	32.8643
Dallas	First/Last Mile	Dallas College Pleasant Grove Center	4	7	-96.6678	32.7511
Dallas	Urban Core	Dallas College Pleasant Grove Center	4	7	-96.6488	32.7351
Dallas	First/Last Mile	Dallas College El Centro Campus; UNT Dallas College of Law; Baylor University Medical Center; Dallas College Bill J. Priest Center; Dallas	3	5	-96.7917	32.7843

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		Theological Seminary; Criswell College				
Dallas	First/Last Mile	Dallas College Richland; Concorde Career College Dallas	4	4	-96.7635	32.9096
Dallas	First/Last Mile	University of Texas at Arlington; Arlington Baptist University	8	5	-97.1601	32.7102
Denton	First/Last Mile	University of North Texas - Denton	4	8	-97.1675	33.2162
Denton	First/Last Mile	University of North Texas - Denton; Texas Woman's University	6	8	-97.1331	33.2096
Denton	Suburban Commuter	University of North Texas - Denton; Texas Woman's University	6	5	-97.1266	33.2127
Denton	First/Last Mile	University of North Texas - Denton; Texas Woman's University	6	3	-97.1652	33.2319
Denton	First/Last Mile	University of North Texas - Denton; Texas Woman's University	6	8	-97.133	33.2159
Farmers Branch	Suburban Commuter	Dallas Christian College	5	6	-96.8966	32.9239
Flower Mound	First/Last Mile	North Central Texas College Flower Mound	7	5	-97.069	33.036
Forest Hill	First/Last Mile	Tarrant County College South	5	3	-97.2681	32.6611
Fort Worth	First/Last Mile	Texas Christian University; Tarrant County College (TCC) Trinity River; University of North Texas Health Sciences Center; Fort Worth Center - University of Texas at Arlington; Texas A&M University School of Law	3	4	-97.3444	32.7309
Fort Worth	Urban Core	Tarrant County College (TCC) Trinity River; University of North Texas Health Sciences Center; Fort Worth Center - University of Texas at Arlington; Texas A&M University School of Law	4	5	-97.3312	32.756
Fort Worth	Urban Core	Tarrant County College (TCC) Trinity River; Fort Worth Center - University of Texas at Arlington; Texas A&M University School of Law	4	5	-97.3292	32.7465
Fort Worth	Urban Core	Tarrant County College (TCC) Trinity River; Fort Worth Center - University of Texas at Arlington; Texas A&M University School of Law	4	5	-97.3291	32.7528
Fort Worth	First/Last Mile	Texas Christian University; Tarrant County College (TCC) Trinity River; Fort Worth Center - University of Texas at Arlington; Texas A&M University School of Law	3	4	-97.3272	32.7308
Fort Worth	Urban Core	Texas Christian University; Tarrant County College South; Southwestern Baptist Theological Seminary	8	6	-97.3257	32.6836
Fort Worth	Urban Core	Tarrant County College (TCC) Trinity River; Fort Worth Center - University of Texas at Arlington; Texas A&M University School of Law	4	5	-97.3248	32.7527
Fort Worth	First/Last Mile	Tarrant County College (TCC) Trinity River; Texas Wesleyan University; Fort Worth Center - University of Texas at Arlington; Texas A&M University School of Law	7	4	-97.312	32.7463
Fort Worth	First/Last Mile	Texas Wesleyan University	7	7	-97.2627	32.7427

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Fort Worth	First/Last Mile	Texas Christian University; University of North Texas Health Sciences Center	8	6	-97.3916	32.7314
Fort Worth	First/Last Mile	Tarrant County College (TCC) Trinity River; University of North Texas Health Sciences Center; Fort Worth Center - University of Texas at Arlington; Texas A&M University School of Law	4	4	-97.357	32.7499
Fort Worth	First/Last Mile	Tarrant County College (TCC) Trinity River; University of North Texas Health Sciences Center; Fort Worth Center - University of Texas at Arlington; Texas A&M University School of Law	5	4	-97.3527	32.7562
Fort Worth	First/Last Mile	Tarrant County College (TCC) Trinity River	3	3	-97.348	32.7875
Fort Worth	First/Last Mile	Southwestern Baptist Theological Seminary	8	6	-97.3474	32.665
Fort Worth	First/Last Mile	Texas Christian University; Southwestern Baptist Theological Seminary	8	7	-97.362	32.6997
Fort Worth	First/Last Mile	Tarrant County College South	6	7	-97.2785	32.6832
Frisco	First/Last Mile	UNT at Frisco	6	5	-96.8136	33.102
Frisco	First/Last Mile	Collin College Frisco; UNT at Frisco	6	6	-96.8024	33.1238
Garland	First/Last Mile	Amberton University; Remington College Dallas Campus	5	3	-96.6633	32.8673
Garland	First/Last Mile	Amberton University; Remington College Dallas Campus	5	3	-96.6569	32.8641
Garland	Urban Core	Amberton University; Remington College Dallas Campus	8	6	-96.6506	32.8545
Garland	Urban Core	Amberton University; Remington College Dallas Campus	7	7	-96.644	32.8639
Garland	First/Last Mile	Amberton University; Remington College Dallas Campus	6	7	-96.6201	32.8729
Grand Prairie	First/Last Mile	Tarrant County College Southeast; Concorde Career College Grand Prairie	7	6	-97.0602	32.6494
Grand Prairie	First/Last Mile	Concorde Career College Grand Prairie	7	5	-97.0427	32.6743
Hickory Creek	First/Last Mile	North Central Texas College Corinth	5	5	-97.0416	33.13
Hurst	First/Last Mile	Tarrant County College Northeast	6	4	-97.2013	32.8301
Irving	First/Last Mile	Dallas College North Lake	1	1	-97.0005	32.8875
Irving	Suburban Commuter	Dallas College North Lake	1	1	-96.9876	32.8874
Irving	First/Last Mile	Dallas College North Lake; University of Dallas	7	8	-96.9561	32.8399
Irving	Suburban Commuter	Dallas College North Lake	4	4	-96.9554	32.8838
Irving	Urban Core	Dallas College Irving Center	5	7	-96.948	32.8146
Irving	Suburban Commuter	Dallas College North Lake; University of Dallas	3	4	-96.9383	32.8773
Irving	Urban Core	Dallas College Irving Center	5	7	-96.9373	32.8113
Irving	Urban Core	Dallas College North Lake; University of Dallas	6	5	-96.932	32.8678

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Irving	First/Last Mile	University of Dallas	8	6	-96.9283	32.8364
Irving	First/Last Mile	University of Dallas	2	3	-96.913	32.8456
Lake Worth	First/Last Mile	Tarrant County College Northwest	5	4	-97.4164	32.8133
Lewisville	First/Last Mile	North Central Texas College Flower Mound	8	9	-97.0302	33.0419
McKinney	First/Last Mile	Collin College McKinney	4	7	-96.6369	33.2032
Mesquite	First/Last Mile	Dallas College Eastfield	7	6	-96.6237	32.807
Midlothian	First/Last Mile	Navarro College Midlothian Campus	4	2	-96.9948	32.4601
North Richland Hills	First/Last Mile	Tarrant County College Northeast	6	6	-97.2115	32.8648
Plano	First/Last Mile	UNT at Frisco	7	6	-96.8227	33.077
Plano	First/Last Mile	Collin College Spring Creek	3	4	-96.7029	33.0313
Plano	Suburban Commuter	Collin College Spring Creek	3	4	-96.7007	33.0344
Plano	First/Last Mile	Collin College Spring Creek	7	5	-96.6895	33.0562
Richardson	Suburban Commuter	Dallas College Richland; Concorde Career College Dallas	6	5	-96.7371	32.9406
Richardson	Suburban Commuter	University of Texas at Dallas (UTD)	3	3	-96.7216	32.9624
Richardson	Suburban Commuter	University of Texas at Dallas (UTD)	3	3	-96.7104	32.9843
Southlake	First/Last Mile	The King's University	5	4	-97.133	32.9393
Terrell	First/Last Mile	Southwestern Christian College	2	4	-96.3031	32.7389
University Park	Urban Core	Southern Methodist University; Peloton College Dallas	7	7	-96.7756	32.8375
University Park	Urban Core	Southern Methodist University; Peloton College Dallas	7	7	-96.7712	32.8437
University Park	Urban Core	Southern Methodist University; Peloton College Dallas	7	8	-96.7711	32.85
Waxahachie	First/Last Mile	Southwestern Assemblies of God University	4	3	-96.8485	32.3859
Waxahachie	First/Last Mile	Southwestern Assemblies of God University; Navarro College Waxahachie Campus	4	7	-96.8438	32.411
Weatherford	First/Last Mile	Weatherford College	2	6	-97.7992	32.7595
Weatherford	First/Last Mile	Weatherford College	3	2	-97.7866	32.728
Wylie	First/Last Mile	Collin College Wylie	7	4	-96.5914	33.0108
Wylie	First/Last Mile	Collin College Wylie	7	6	-96.5505	33.007

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Appendix B: On-Campus Mobility Hubs List

University Campus	Hub Type	Longitude	Latitude
Amberton University	Gateway	-96.6527	32.8601
Arlington Baptist University	Gateway	-97.1576	32.7377
Arlington Baptist University	Gateway	-97.1554	32.7408
Baylor University Medical Center	Gateway	-96.7809	32.7896
Baylor University Medical Center	Gateway	-96.7766	32.7927
Baylor University Medical Center	Park Once	-96.7745	32.7895
Collin College Frisco	Park Once	-96.7937	33.1323
Collin College McKinney	Park Once	-96.6419	33.2229
Collin College Spring Creek	Residential	-96.68	33.0506
Collin College Spring Creek	Park Once	-96.6757	33.0505
Collin College Wylie	Park Once	-96.5719	33.0191
Concorde Career College Dallas	Gateway	-96.7419	32.9179
Concorde Career College Grand Prairie	Gateway	-97.0556	32.6768
Dallas Baptist University	Residential	-96.9445	32.7085
Dallas Baptist University	Park Once	-96.951	32.7086
Dallas Baptist University	Residential	-96.9477	32.7133
Dallas Baptist University	Residential	-96.9456	32.7069
Dallas Christian College	Gateway	-96.8882	32.9136
Dallas College Bill J. Priest Center	Gateway	-96.7867	32.7661
Dallas College Brookhaven	Gateway	-96.8503	32.9273
Dallas College Brookhaven	Gateway	-96.8503	32.9304
Dallas College Brookhaven	Park Once	-96.8471	32.9288
Dallas College Cedar Valley	Gateway	-96.7648	32.626
Dallas College Cedar Valley	Park Once	-96.7637	32.6244
Dallas College Eastfield	Gateway	-96.6612	32.8146
Dallas College El Centro Campus	Gateway	-96.8047	32.7805
Dallas College Irving Center	Gateway	-96.959	32.8014
Dallas College Mountain View	Gateway	-96.9013	32.7268
Dallas College North Lake	Gateway	-96.9674	32.8753
Dallas College North Lake	Park Once	-96.9686	32.8706
Dallas College North Lake	Gateway	-96.9674	32.8722
Dallas College Pleasant Grove Center	Gateway	-96.6834	32.7254
Dallas College Richland	Park Once	-96.7321	32.9225
Dallas College West Dallas Center	Gateway	-96.8552	32.7828
Dallas Theological Seminary	Park Once	-96.7808	32.7959
Dallas Theological Seminary	Residential	-96.7798	32.7943
DeVry University Irving	Gateway	-97.0137	32.9356
Fort Worth Center - University of Texas at Arlington	Gateway	-97.3249	32.7488
Fort Worth Center - University of Texas at Arlington	Gateway	-97.3238	32.7504
Navarro College Midlothian Campus	Gateway	-96.9841	32.4623
Navarro College Waxahachie Campus	Gateway	-96.8555	32.4182
North Central Texas College Corinth	Park Once	-97.0596	33.1561

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North Central Texas College Flower Mound	Park Once	-97.0518	33.0382
Paul Quinn College	Park Once	-96.7552	32.6793
Peloton College Arlington	Gateway	-97.0918	32.7574
Peloton College Dallas	Gateway	-96.7698	32.8633
Southern Methodist University	Residential	-96.7864	32.84
Southern Methodist University	Residential	-96.7863	32.8431
Southern Methodist University	Residential	-96.7863	32.8463
Southern Methodist University	Residential	-96.7842	32.84
Southern Methodist University	Residential	-96.7811	32.8383
Southwestern Adventist University	Gateway	-97.3285	32.3985
Southwestern Adventist University	Park Once	-97.3264	32.3953
Southwestern Assemblies of God University	Residential	-96.8536	32.4056
Southwestern Baptist Theological Seminary	Gateway	-97.3483	32.6815
Southwestern Baptist Theological Seminary	Park Once	-97.3462	32.6783
Southwestern Christian College	Park Once	-96.285	32.7362
Tarleton State University Fort Worth	Park Once	-97.4332	32.5817
Tarrant County College (TCC) Trinity River	Gateway	-97.3409	32.7568
Tarrant County College Northeast	Gateway	-97.1925	32.8449
Tarrant County College Northeast	Park Once	-97.1903	32.848
Tarrant County College Northwest	Gateway	-97.3926	32.8311
Tarrant County College Northwest	Park Once	-97.3915	32.8296
Tarrant County College Northwest	Gateway	-97.3904	32.8311
Tarrant County College South	Gateway	-97.2895	32.6668
Tarrant County College South	Gateway	-97.2884	32.6683
Tarrant County College South	Park Once	-97.2874	32.6668
Tarrant County College Southeast	Gateway	-97.0733	32.6393
Texas A&M University Commerce	Residential	-95.9138	33.2414
Texas A&M University Commerce	Residential	-95.9118	33.2382
Texas A&M University Commerce	Gateway	-95.9105	33.246
Texas A&M University Commerce	Residential	-95.9051	33.2443
Texas A&M University Commerce	Gateway	-95.9084	33.2428
Texas A&M University Commerce	Park Once	-95.9052	33.2412
Texas Christian University	Residential	-97.363	32.7099
Texas Christian University	Residential	-97.3619	32.7083
Texas Christian University	Gateway	-97.3673	32.7099
Texas Christian University	Residential	-97.3652	32.7068
Texas Christian University	Gateway	-97.3597	32.7114
Texas Christian University	Park Once	-97.3566	32.7067
Texas Christian University	Park Once	-97.3565	32.7098
Texas Wesleyan University	Residential	-97.28	32.7358
Texas Wesleyan University	Gateway	-97.279	32.7311
Texas Woman's University	Residential	-97.1318	33.2292
Texas Woman's University	Park Once	-97.1275	33.226
Texas Woman's University	Residential	-97.1275	33.2292
Trinity Valley Community College Terrell Campus	Gateway	-96.2496	32.6916

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Universal Technical Institute of Texas	Gateway	-97.0136	32.9388
University of Dallas	Residential	-96.9239	32.8449
University of Dallas	Residential	-96.9217	32.8449
University of Dallas	Park Once	-96.9174	32.8449
University of North Texas - Dallas	Park Once	-96.8049	32.658
University of North Texas - Dallas	Gateway	-96.8038	32.6595
University of North Texas - Denton	Residential	-97.157	33.2028
University of North Texas - Denton	Residential	-97.1558	33.2106
University of North Texas - Denton	Residential	-97.1536	33.2137
University of North Texas - Denton	Park Once	-97.1515	33.2074
University of North Texas - Denton	Residential	-97.1504	33.2121
University of North Texas - Denton	Residential	-97.1493	33.2137
University of North Texas - Denton	Residential	-97.1472	33.2074
University of North Texas - Denton	Park Once	-97.1472	33.2105
University of North Texas - Denton	Park Once	-97.1471	33.2137
University of North Texas - Denton	Park Once	-97.1461	33.2121
University of North Texas - Denton	Residential	-97.1429	33.2105
University of North Texas Health Sciences Center	Gateway	-97.37	32.7492
University of Texas at Arlington	Gateway	-97.1212	32.731
University of Texas at Arlington	Gateway	-97.1212	32.7342
University of Texas at Arlington	Gateway	-97.1158	32.7325
University of Texas at Arlington	Gateway	-97.1137	32.7294
University of Texas at Arlington	Park Once	-97.1126	32.7309
University of Texas at Arlington	Residential	-97.1094	32.7293
University of Texas at Arlington	Park Once	-97.1072	32.7324
University of Texas at Arlington	Park Once	-97.1267	32.7264
University of Texas at Arlington	Park Once	-97.1116	32.7262
University of Texas at Dallas (UTD)	Residential	-96.7544	32.992
University of Texas at Dallas (UTD)	Residential	-96.7533	32.9904
University of Texas at Dallas (UTD)	Residential	-96.7522	32.9919
University of Texas at Dallas (UTD)	Residential	-96.7512	32.9903
University of Texas at Dallas (UTD)	Residential	-96.7546	32.9825
University of Texas at Dallas (UTD)	Residential	-96.7545	32.9857
University of Texas at Dallas (UTD)	Residential	-96.75	32.995
University of Texas at Dallas (UTD)	Park Once	-96.7447	32.9903
University of Texas Southwestern Medical Center	Gateway	-96.8407	32.8093
University of Texas Southwestern Medical Center	Park Once	-96.8417	32.814
UNT at Frisco	Park Once	-96.8298	33.103
UNT Dallas College of Law	Gateway	-96.794	32.7804
Weatherford College	Residential	-97.7876	32.7413
Weatherford College	Gateway	-97.793	32.7398
Weatherford College	Gateway	-97.7919	32.7414