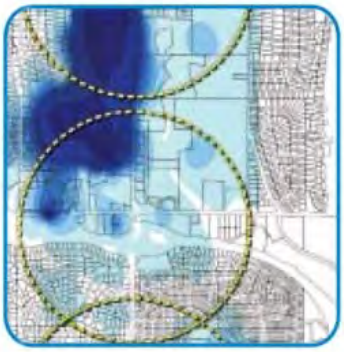
OLSSON ASSOCIATES | CONFLUENCE

North Oak Corridor Study

Final Report

May 3rd, 2013





MARC Mid-America Regional Council

North Kansas City — Tradition of Progress

City of Gladstone Missouri

Kansas City Missouri

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Executive Summary

This transportation-focused corridor assessment along North Oak Trafficway and Burlington Street was completed as part of the Creating Sustainable Places Corridor Planning program. This study examined how transit can be a catalyst for and can support a renewed and sustainable corridor. This corridor assessment identifies options to enhance transit service along the corridor and will describe options for sustainable development that would, in turn, support higher-level transit service. This corridor assessment examines bicycle and pedestrian movement and how land use changes around nodal locations would help support future transit service.

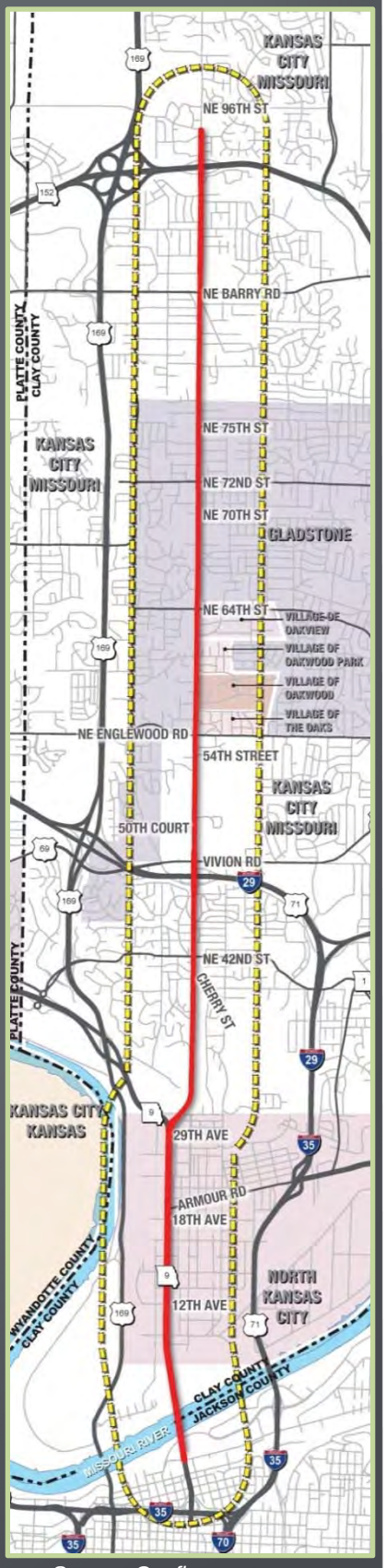
This study builds upon a vision that the Mid-America Regional Council (MARC) and its partners in the Kansas City region share of achieving sustainability through the creation of vibrant, green, and connected centers and corridors. This framework reflects the region's long-range transportation plan, *Transportation Outlook 2040,* and the achievement of a broad set of community goals, specifically the triple bottom line of equity, environment, and economy.

What is the study area?

Consistent with the corridor defined in the regional transit plan, *Smart Moves,* the North Oak corridor in Figure ES.1 generally extends from the River Market in downtown Kansas City, Missouri, and north along Burlington Street and North Oak Trafficway to Highway 152. The primary study area focuses on a 1-mile-wide corridor north of the Missouri River to Highway 152 and includes portions of Kansas City, North Kansas City, and Gladstone, all in Missouri. The corridor is reflective of a half-mile walk area to transit. The study also considers portions outside this corridor to provide an awareness of areas from where people could bike or drive to the corridor.

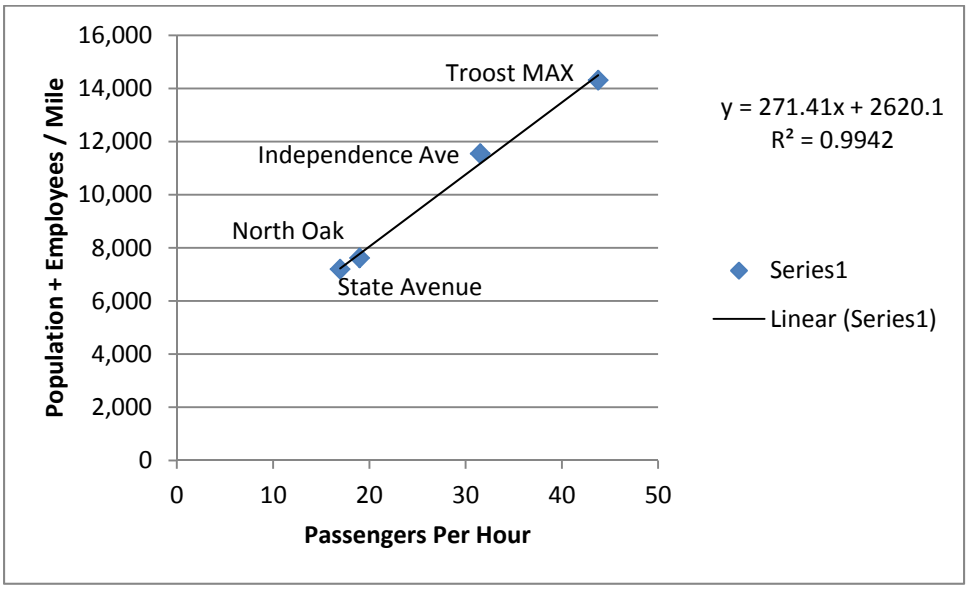
This project assumes a correlation between mobility and activity along the corridor. This correlation was substantiated through an analysis of the relationship between transit ridership and employment and population density along four representative corridors in the metropolitan area. These include Troost Avenue, Independence Avenue, State Avenue, and North Oak Trafficway. The result of the analysis is illustrated Figure ES.2. The resulting strong correlation was then used as a basis for projecting employment and population density requirements necessary to yield assumed levels of transit ridership associated with different levels of transit investment.

Figure ES.1 North Oak Corridor Study Area



Source: Confluence

Figure ES.2: Correlation between Ridership and Land Use Density



What transit modes are being studied?

Three modes were evaluated and range from comparatively less expensive to comparatively more expensive. The modes evaluated include a baseline alternative that brings transit supply up to meet current demand; a mixed-traffic bus rapid transit (BRT) alternative, which may include peak-period bus-only lanes; and a streetcar alternative that would serve as the guideway option.

Table ES.1 illustrates the differences between each mode in respect to these three descriptors.

Table ES.1: Comparison of Modes

Mode	Service Span	Weekday Service Period	Weekday Service Frequency			Approximate Annual O&M Costs	Approximate Construction Cost/Mile
			Peak	Off-Peak	Night		
Base Line	M-Sun	6:00am to 10:00pm	15 Minutes	30 Minutes	60 Minutes	$1,500,000	$800,000
Mixed-Traffic BRT	M-Sun	5:30am to 11:30pm	10 Minutes	15 Minutes	30 Minutes	$2,800,000	$3,000,000
Streetcar	M-Sun	5:30am to 11:30pm	10 Minutes	15 Minutes	30 Minutes	$3,200,000	$50,000,000

What locations are being studied for activity nodes?

Six locations have been identified in previous planning studies as potential locations for higher-level transit stops or transit stations. These locations along the Burlington Avenue or North Oak Trafficway are Armour Road, North Cherry Street, Vivion Road,

Englewood Road, 70th Street, and Barry Road. Three of these locations – Armour Road, 70th Street, and Barry Road – are being evaluated in further detail as illustrative examples of concentrating density appropriate to each level of transit.

Future Growth

This transit-focused planning study analyzes the relationship between various modes of transit and the surrounding development intensity that would be necessary to create a self-sustaining transit system. Future ridership projections for the entire North Oak corridor were generated for three alternative future modes of transit: base bus service, BRT, and streetcar. A model was also created to calculate the amount of ridership generated from future population and employment growth to determine the total number of additional residents and jobs needed to effectively support each transit mode.

For planning purposes, the total existing employment and population (EMPOP) along the entire corridor was determined to be 93,710 residents/jobs. This includes the northern portion of Kansas City's central business district (CBD), which will be connected via transit in all scenarios. The existing EMPOP in each node was determined by using the 1-mile-diameter planning areas around each of the six identified nodes (Table ES.2). The total projected EMPOP needed for each transit mode is as follows:

- Base Bus Service: 101,254 total EMPOP (addition of 7,544)
- BRT: 152,409 total EMPOP (addition of 51,155)
- Streetcar: 245,237 total EMPOP (addition of 92,828)

These growth projections were then attributed to the corridor utilizing a methodology that recognizes significant growth in Kansas City's transit network is anticipated to result in significant CBD growth. This study attributes 25 percent of the projected future growth to occur in the northern portion of the CBD, with the remaining 75 percent of growth designated to occur along the remaining portions of the North Oak corridor study area.

Table ES.2: Current and Needed EMPOP Totals

CURRENT EMPLOYMENT + POPULATION (EMPOP): 93,710			
EMPOP FOR TRRANSIT MODES	**101,254 (BASE)**	**52,409 (BRT)**	**245,237 (STREETCAR)**
Additional EMPOP Needed	7,544	51,155	92,828
10% of EMPOP between Nodes	754	5,116	9,283
25% of EMPOP in CBD	1,886	12,789	23,207
EMPOP AT CORRIDOR LOCATIONS	**4,904**	**33,251**	**60,338**
Barry Road	1,226	8,313	15,085
70th Street	932	6,318	11,464
Englewood Road	638	4,322	7,844
I-29/Vivion Road	736	4,987	9,051
Cherry Street	392	2,660	4,827
Armour Road	981	6,650	12,068
TOTAL	**4,904**	**33,251**	**60,338**

How can bicycle and pedestrian use integrate with transit?

As transportation and infrastructure improvements are planned and implemented, policies and elements accommodating pedestrians and bicyclists should be followed. Improving the bicycle and pedestrian facilities throughout the corridor should include facilitating movement and access to transit. In general, this improvement would focus on the area surrounding each stop and the areas along the corridor between the stops. This would allow bicyclists and pedestrians to not only travel safely to a transit station to access transit, but would also allow safe bicycle and pedestrian usage along the corridor.

Findings and Conclusions

This effort focused on the potential impact that transit would have on mobility; it did not focus on the economic development potential of specific transit modes. Improving mobility over existing levels can be achieved for relatively low cost by making improvements into the existing underlying transit system, and the pedestrian and bicycle connections to that system. In addition, efforts can be undertaken to coordinate and optimize development codes and land use plans along North Oak corridor to increase density, the form of land use, and the mobility network. This would move the corridor effort toward achieving the triple bottom line of equity, environment, and economy.

Local funding strategies can be utilized in combination with federal programs to identify a successful funding mechanism for higher-quality transit. The federal program for these types of transit projects is Small Starts. The most recent transportation bill, MAP-21, eliminated the need for alternatives analysis. Eligible projects are new fixed guideway systems such as streetcars and BRT projects operating in mixed traffic that represent a substantial investment in the corridor. Small Starts projects are evaluated and rated based on project justification and local financial commitment and must have a total net capital cost of less than $250 million, with a federal share of less than $75 million. The federal portion for this project has a maximum share of 80 percent of the project cost.

What are the next steps?

The land use scenarios were based solely on improving mobility in the corridor via these different transit scenarios. The scope and scale of this study effort did not take into account the economic development potential of the corridor, including potential short- and long-term market demand projections, anticipated fiscal analysis of implementing certain growth strategies, and analyzing the potential long-term economic benefits of promoting increased development opportunities related to future transit improvements. The scope of this study and the results of these initial planning scenarios provide an initial illustration of the relative density of residential and employment population necessary to support various modes of transit in a self-sustaining manner. In many cases, the streetcar scenarios indicate a more compact and densely populated development pattern than what exists today.

Future planning efforts should consider real estate market analysis and development projections for the corridor in association with the various transit scenarios and should be based on relevant local, regional, and national examples. A more in-depth understanding of the relationship between transit investment and real estate development could be achieved through further study. If the corridor is to achieve its potential from a transit-oriented development standpoint, future land use and development plans at the local level may also need to be further evaluated and revised to more closely align with the growth projections and development densities outlined in this initial study. As with most urban districts like those anticipated in the streetcar scenarios, the use of public-private partnerships to provide convenient shared use parking as well as incentives to offset infrastructure upgrades and improvements will need to be further evaluated and implemented in order to further support adjacent redevelopment and revitalization efforts.

While this plan studied the potential growth scenarios at three of the identified nodes, further planning work is needed at the remaining nodes to illustrate their capability in accommodating the projected growth of housing and employment as outlined in this study. Through evaluating the results of those efforts, minor adjustments throughout the entire corridor might need to be made to better understand the entire system's growth potential.

The ability of pedestrians and bicyclists to safely and conveniently be provided improved access to areas of commerce as well as the transit system will assist in improving the quality of life along the entire corridor. Through the provision of new sidewalks, bicycle lanes, and off-street trails, the network of transportation choices should be expanded as soon as practical to encourage better connection and integration between the neighborhoods and surrounding uses and opportunities.

The visibility and identification of transit service throughout the Northland, including the North Oak corridor, is not commensurate

with transit service in other parts of the metropolitan area. Part of this is likely due to lower levels of ridership and to the lower availability of transit routes to adequately serve the community. Transit shelters and amenities encourage ridership, but many of these amenities do not currently exist or are poorly connected to the sidewalk network in the Northland. By improving these areas in the short term, a stronger and more connected system of transit and transportation opportunities can be established, which will continue laying the groundwork for future transit enhancements over the long term.

The previous Northland transit plan is more than 15 years old. While the Kansas City Area Transportation Authority's (KCATA) recent Comprehensive Service Analysis (CSA) reviewed the Northland system, the resulting recommendations were based from KCATA's fiscal constraint. A new Northland transit plan would further develop the vision for transit's role in the greater Northland. This would include defining in more detail the future projects identified in Smart Moves as occurring in the Northland. The Smart Moves plan does identify the role of Burlington Street and North Oak Trafficway as a spine, but it does not determine the specific costs or integration of this spine into the optimization of the Northland system.

Recommendations

- The North Oak corridor is currently served by bus-based fixed-route transit service. Current conditions in the corridor will support enhancing the level of this existing transit service. The enhanced service could represent an incremental step toward the eventual development of higher-level transit services such as BRT or streetcar. Enhancing the existing service would require additional resources; thus, the development of funding strategies to support and allow for enhanced transit service in the corridor should be undertaken.
- Opportunities for higher-level transit investment in the corridor should continue to be explored. The economic development impacts of constructing BRT and/or streetcar in the corridor should be thoroughly evaluated, and area plans and development codes along the corridor should be aligned to facilitate the type of growth necessary to support higher-level transit investments. Right-of-way implications and preservation requirements that would facilitate future transit investments should be considered now.
- Policies and plans should be developed and designed to focus sidewalk and bicycle network improvements in the corridor around transit stops. These improvements should support connectivity to nearby destinations and, where

possible, include the width and separation from automobile traffic necessary to make walking or biking in the corridor safer and more pleasant.

- The Northland transit plan should be updated to reflect existing and planned development in the Northland. This plan should also reflect the vision for future transit service in the Northland desired by Northland communities, employers, and residents.

Chapter 1 Introduction

As the Kansas City metropolitan area developed in the early automobile era, the Northland area of Kansas City was connected by U.S. highways such as US-71, US-69, and US-169. These highways brought travelers through centralized community corridors such as North Oak Trafficway or Burlington Street. The development of the interstate system shifted travel and cars to routes such as I-29 and I-35; it also shifted existing and new development energy to further edges of the urban area. Subsequently, new investments and reinvestments in these older U.S. highway corridors declined.

There is some indication that this trend may be changing or slowing down. Changing demographic trends suggest that a growing portion of the population is moving away from the suburban growth model. This trend emphasizes smaller houses, a greater awareness of quality of life, a desire to minimize the time spent commuting in a car, a greater sensitivity to energy prices, and a sentiment against instigating new taxes in order to build new infrastructure. Demographers and market researchers note that more investment and creativity are being shifted away from the metropolitan edges and are being refocused into the historical urban communities and first- and second-ring suburbs.

This new awareness is resulting in greater interest in high-quality transit connections, such as Kansas City Area Transportation Authority's (KCATA) Metro Area Express (MAX) routes, and renewed exploration of streetcars. The Mid-America Regional Council (MARC), the metropolitan's planning organization and association of city and council governments serving the bi-state Kansas City metropolitan region, has identified a series of corridors along which it wants to determine options for sustainable growth. The North Oak / Burlington Corridor is one corridor being studied.

What is this project about?

This transportation-focused corridor assessment along North Oak Trafficway and Burlington Street was completed as part of the Creating Sustainable Places Corridor Planning program. This study looks at how transit can be a catalyst for and can support a renewed and sustainable corridor. This corridor assessment will identify options to enhance transit service along the corridor and will describe options for sustainable development that would, in turn, support higher-level transit service. This corridor assessment also examined bicycle and pedestrian movement and how land use changes around nodal locations would help support future transit service.

This study builds upon a vision MARC and its partners in the Kansas City region share of achieving sustainability through the

creation of vibrant, green, and connected centers and corridors. This framework reflects the region's long-range transportation plan, *Transportation Outlook 2040,* and the achievement of a broad set of community goals, specifically the triple bottom line of equity, environment, and economy.

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What process will this study follow?

This assessment of the North Oak corridor:

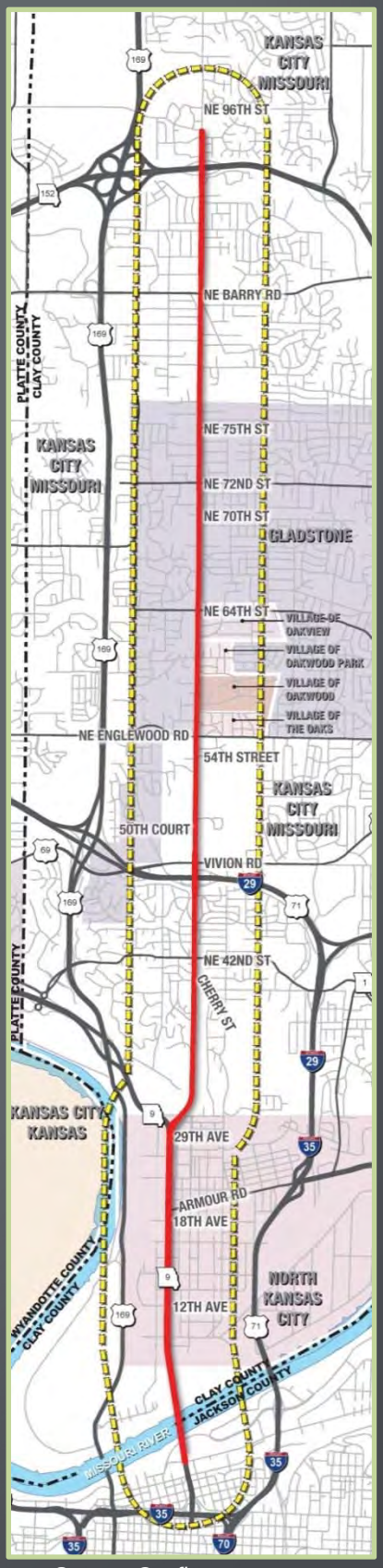
- Describes existing development characteristics based on studies and land use plans previously prepared for the corridor
- Describes the existing transit, bicycle, and pedestrian infrastructure and services
- Defines corridor goals and measurements
- Examines future transportation options with a focus on transit
- Identifies key transit features including nodal points, Park & Ride lots, and the northern transit terminus
- Describes how land use might be transformed (consistent with focus on reinvestment) and how it might further support transit

Who's participating?

This study's steering team includes government, business, and community leaders from MARC, KCATA, the cities of North Kansas City, Kansas City, and Gladstone, Missouri, and community organizations such as More[2] ("More Squared"). This study team directs a consulting team, which is led by Olsson Associates and joined by Confluence and Shockey Consulting Services.

The public was engaged in the study through public meetings at the beginning and at the conclusion of the study.

Figure 1.1 North Oak Corridor Study Area



Source: Confluence

How is this report structured?

Following this introduction chapter, the subjects of previous studies, existing transit, bicycle and pedestrian infrastructure, and existing land use patterns are discussed in Chapter Two. Chapter Three reviews how the community and stakeholders were engaged in the process. Chapter Four discusses the corridor goals and metrics. Chapter Five explores future transit concepts assessed for the corridor, including modes, service types, and nodes. Chapter Six analyzes different future land-use scenarios that could support various types and levels of transit service, and how that would pertain to the existing North Oak corridor. Chapter Seven outlines the study's findings, conclusions and recommendations that can help stakeholders in the corridor move toward developing a sustainable and accessible corridor.

Chapter 2 Baseline and Existing Conditions

Examining existing and future land use and transportation plans that have been previously developed are an important component of this corridor study. This review includes examining existing and desired future land use and the transit system, bicycle, and pedestrian infrastructure. The baseline includes review of the guiding principles of the Creating Sustainable Places program; previous studies; existing transit, bicycle, and pedestrian infrastructure; TIGER (Transportation Investment Generating Economic Recovery) projects; current land use; and future land use.

What information from previous studies can help describe this corridor?

Previous studies and regional plans for the corridor provide a context for analyzing and developing transit strategies. Many previous studies identify potential locations for future Bus Rapid Transit (BRT), Light Rail Transit (LRT), or significant transit stops. Other studies identified opportunities for in-fill development; possible changes in density, land use, or the urban form are particularly relevant to supporting future transit service and infrastructure.

These previous studies were examined:

- *North Oak Corridor Streetscape Plan (2011)*
- *Bike KC (2003)*
- *North Oak Corridor Land Use and Development Plan (2006)*
- *Briarcliff Winnwood Area Plan (2009)*
- *City of North Kansas City, Missouri, Master Plan (2003, last amended 2009)*
- *Burlington Corridor Study (2009)*
- *Gladstone Comprehensive Plan (2008)*
- *Gladstone Downtown Village Center Master Plan (2006)*
- *North/South Corridor Alternatives Analysis (2009)*
- *Smart Moves (2002; updated in 2008)*

City of Kansas City, Missouri, previous plans

The *North Oak Corridor Streetscape Master Plan* (2011) describes visual aesthetics and includes design guidelines for a section of the North Oak corridor between NE 32nd Avenue and NW Englewood Road. Specific recommendations include:

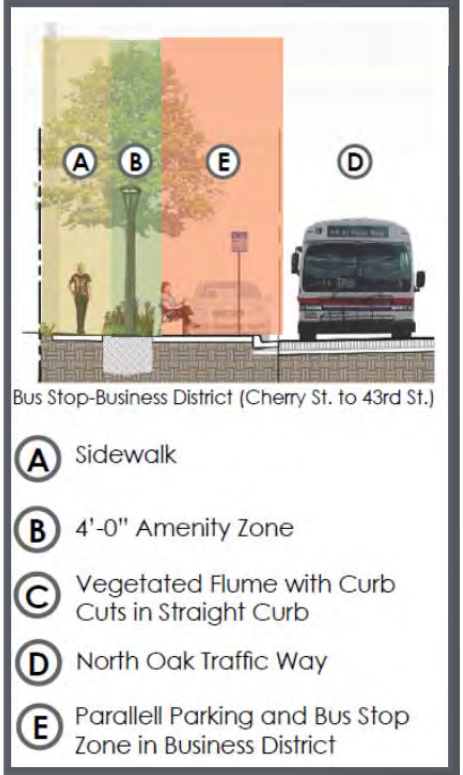
- Design guidelines and layouts for transit stops
- A sidewalk throughout most of the corridor from 32nd Avenue to Englewood Road, with a sidewalk in the business district at Evansdale Drive
- An asphalt multiuse trail from 46th Street to Anita B. Gorman Park on the east side of the street

A sidewalk on both sides of North Oak and a bike lane between I-29 North to NE Englewood Road Recommendations for reconstructing the southern portion of the I-29 and North Oak Interchange were also provided. This reconstruction would create an opportunity for a major transit center or other redevelopment to occur on the southeast quadrant of the interchange with direct access onto I-29.

The *KC Bike Plan* (2003) builds upon the *Major Street Plan of Kansas City*. The *Bike KC* map identifies most of North Oak Trafficway as a future bike route, with a section between Barry Road and 96th Street as a current bike route. The plan requires the "dedication of additional right-of-way width along designated bicycle routes" made by the developer at the time of platting. The ordinance specified that construction of bicycle facilities is the city's responsibility and is dependent on funding availability.

The *North Oak Corridor Land Use and Development Plan* (2006) focuses future commercial economic development/redevelopment toward nodes along North Oak Trafficway at Vivion Road and at Cherry Street. The plan promotes a multimodal transportation environment. The plan also says "additional density, improved internal multimodal circulation, provision for a quality transit stop…should be pursued at Vivion and North Oak" adjacent to the I-29 intersection. It states that the Cherry and North Oak area "should be encouraged (to) include small neighborhood-oriented businesses and higher density residential users that will benefit from a dense, walkable environment served by transit, including specialty groceries, residential over retail / office, 2-3 story townhouses, and condominiums." Regarding transit, the plan recommends incorporating BRT without purchasing additional right-of-way (ROW), mixed-traffic vehicle operations, and acceleration/deceleration lanes at transit stations where ROW permits. On North Oak Trafficway, the plan identifies major transit stops at 50th Court and at 41st Street, and minor transit stops at Englewood, south of 54th Street, and at Water Works Park. The entire corridor (from Englewood to Highway 9) is identified for transit routes with pedestrian improvements and for bicycle routes along the corridor from Englewood to 47th Street and along Briarcliff Parkway and Cherry Street.

Figure 2.1: Bus Stop Business District



Source: *North Oak Corridor Streetscape Plan*, page 20

The *Briarcliff Winnwood Area Plan* (2009) is a Kansas City, Missouri, area plan that focuses on Kansas City between North Kansas City and Gladstone and includes North Oak Trafficway from just north of its divergence with Burlington Street to Englewood Road. The plan's future land use map identifies priority zones for revitalization and reinvestment. A priority zone is identified along North Oak Trafficway between 32nd Avenue and 44th Street, and another priority zone is identified at the Vivion Road / I-29 vicinity. Highlights of future use on North Oak at the Vivion Road / I-29 area include multimodal design and BRT / local bus hub, elimination of pedestrian and bicycle barriers at the I-29 interchange, higher-intensity commercial and office uses, and higher-density residential and mixed uses. Connectivity to surrounding neighborhoods was stressed. Highlights of future use on North Oak between 32nd Avenue and 44th Street include a mix of two- to three-story neighborhood-scale retail and office and residential uses with sensitive transitions to adjacent existing neighborhoods. It strongly discourages auto-oriented businesses such as big-box stores. The plan also includes discussion about improving the area around North Oak Trafficway and Cherry Street with "significant emphasis upon pedestrian and transit supportive design."

City of North Kansas City previous plans

The *City of North Kansas City, Missouri, Master Plan* (adopted 2003, last amended in 2009) includes discussion regarding planning areas and corridors within the North Oak study area. The plan recognizes the North Burlington Planning Area that was the outcome of the *Burlington Corridor Study* (2009). The *Burlington Corridor Study* identified the general area of 29th Avenue as a potential for a light rail stop. In addition, it stated that, "A BRT stop should be considered here or somewhere else in this planning area."

The city of North Kansas City's *Burlington Corridor Study* (2009) focused on Burlington Street and identifies areas that could be developed at higher densities, examined parking demand, and provided input for major transit stops. The plan recognizes that parking supply exceeds demand throughout the corridor. The document summarizes transit and identifies three locations along Burlington Street under consideration for light rail stops: 12th Avenue, 18th Avenue, and 29th Avenue. The plan recommendations include improving pedestrian and bike facilities and developing the corridor as supportive of both local and regional transit use, including higher-density development near transit stops. Goals in the master plan encourage greater density along the corridor, such as increasing building height limit to five stories, encouraging buildings to be closer to the street, and implementing the design guidelines in the *Burlington Corridor Study*. The Central Burlington Planning Area, as defined by the *Burlington Corridor Study* (between 23rd Avenue and 16th Avenue), allows residences on the second floor or above of buildings, has a two-story minimum height, with maximums limited only to flight

patterns. The study goes on to say that parking supply exceeds parking demand in the area, and sidewalks should be constructed or improved to a minimum of five feet wide. It also specifies that setbacks could be from zero to no more than ten feet. For the Burlington corridor itself, the plan's vision is to "Transform Burlington Street to serve as an entry, a destination and a mixed–use center that represents the safe, amiable, walkable character of greater North Kansas City." The plan provides input and identifies preferences for major transit stops for a future high-capacity system and recommends six traffic lanes throughout the corridor, with BRT or light rail sharing two of the traffic lanes. BRT would be on the outside, LRT would share inside lanes.

City of Gladstone previous plans

Future land use and transit were addressed in the *Gladstone Comprehensive Plan* (2008). The plan identifies several transit centers along North Oak Trafficway, including a primary transit center at NE 70th Street and secondary transit centers at NE 75th Street, NE 63rd Street, NE 64th Street, and NE Englewood. The plan defines a Transit Oriented Development (TOD) core area for each transit center as the area within a five-minute walk of the center that has up to 15 dwelling units per acre in two- to five-story buildings. The TOD periphery area would be located between a five-minute and a ten-minute walk to a transit center and would provide a transition from the very high densities of the core to lower densities. Residential uses could include up to 12 dwelling units per acre, in typically one- to three- story buildings.

The *Gladstone Downtown Village Center Master Plan* (2006) recommended sidewalk reconstruction along the entire length of North Oak Trafficway, installation of medians, landscaping, and protected pedestrian crossings. The final master plan recommends separating the existing North Oak corridor into two one-way pairs. The northbound lanes would be diverted one block east to Locust Street from south of 69th Street to north of 71st Street. Southbound lanes would be reconfigured to be centered within the existing ROW. A new east-west parkway would intersect North Oak Trafficway and transition into 70th Street, where the parkway would end at a new community center / natatorium at Holmes.

Previous transit plans

The *North/South Corridor Alternatives Analysis* (2009) examines how best to improve transit service in the main north-south corridor from the Northland, through the downtown area, and to south of the Country Club Plaza. This study evaluated LRT and BRT alternatives. An alternative to the vicinity of Vivion Road—a North Oak MAX with a Park & Ride at the north terminus within North Kansas City—was evaluated. . Queue jumps were discussed for "key intersections such as Burlington Street, North Oak Trafficway, and Route 9." MAX stops were identified along North Oak Trafficway at Vivion Road, at 42nd Street, and at Farmland Drive. Stops were identified along Burlington Street at

29th Street, 18th Street, and 12th Street. For LRT, Northland stakeholders preferred an alignment on North Oak Trafficway as opposed to one using Route 9 and US 169. Two northern terminus variations were identified at the northwest quadrant of I-29 and North Oak Trafficway and at the southeast quadrant of the same area. Property acquisition would be required for both areas. Due to fewer negative impacts, more development potential, and shorter travel times compared with alternative alignments, a Burlington Street alignment was preferred once LRT enters North Kansas City. Opportunities for LRT stations were identified at Vivion Road, 42nd Street, 29th Avenue, 19th Avenue, Armour Road, and 12th Avenue.

Smart Moves (2002; updated in 2008) is the transit strategic plan for the Kansas City metropolitan area. Three implementation plans were completed in 2010 that respectively focused on a regional BRT corridor, a regional rail network, and how those two networks would interact with each other (Figure 2.2). These plans identify a BRT along Burlington Street and North Oak Trafficway, with more-frequent service between downtown and Barry Road or Highway 152 and less-frequent service north of Barry Road or Highway 152 to I-435. The study recommends a Park & Ride in the Barry Road area and in Smithville and a transit center at Cherry Street.

What types of roadway, transit service, and bicycle and pedestrian infrastructure currently exist?

The North Oak corridor has a network of a variety of transit routes, including local, peak-only, and general public demand response. Many of these routes tie into the central regional transit hub at 10th and Main in downtown Kansas City, Missouri. The corridor also includes a developing bicycle and pedestrian network.

Roadway

Burlington Street and North Oak Trafficway are the central roadway facilities of the North Oak corridor.

The corridor centers on Burlington Street from the Heart of America Bridge to 29th Avenue. The roadway at this portion is a median-separated major arterial. Three traffic lanes operate in each direction along with dedicated left-turn lanes at cross streets and intersections. On-street parking is provided along the northbound and southbound directions along most locations in the corridor.

Regional transit context

As previously mentioned, the North Oak Trafficway / Burlington Street corridor was identified as a potential BRT route in *Smart Moves*, the regional transit vision. This BRT corridor would tie into a future regional rapid transit system in the vicinity of downtown Kansas City, Missouri. From there, transferring passengers could

Figure 2.2: Regional Transit Context

Source: Regional Transit Implementation Plan, Phase III

connect to a future regional rapid transit network. Figure 2.2 displays the future regional network.

Current transit service

Transit service in the Northland area is radial service oriented toward the central business district (CBD). Many existing routes proceed south using the North Oak corridor crossing the Heart of America Bridge, or using the Broadway Corridor (US 169) crossing the Broadway Bridge, connecting to the KCATA 10th and Main Transit Center. From there, transit passengers can connect with the majority of the KCATA route system and connections to the transit systems in Johnson County, Kansas; Kansas City, Kansas; and Independence, Missouri.

Burlington Street is the primary alignment used by transit to travel from the Northland to the CBD. The primary route serving the North Oak corridor is Route 142. The routes listed below serve other portions of the Northland, but then utilize Burlington Street to access downtown Kansas City, Missouri:

- *Route 132, Gracemoor*
- *Route 135, Winnwood*
- *Route 133, Vivion/Antioch*
- *Route 37, Gladstone*
- *Route 37XX, North Broadway Express*
- *Route 38, Meadowbrook*
- *Route 38X, Meadowbrook Express*

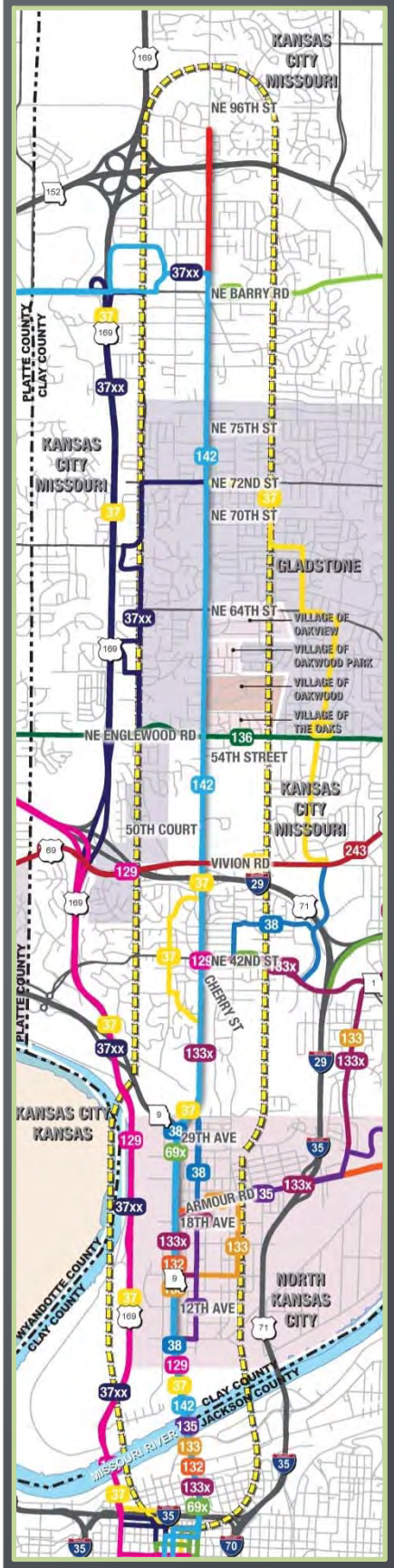
Most routes connect to Burlington Street at Armour Road.

Route 142, North Oak is the primary route that serves the study corridor on North Oak Trafficway and on Burlington Street. The route connects Zona Rosa, Boardwalk Square Metro Center, Metro North Mall, and the cities of Gladstone and North Kansas City with downtown Kansas City, Missouri. The route operates primarily on Barry Road, North Oak Trafficway, Burlington Street, and the Heart of America Bridge. The route has a 20- to 30-minute peak frequency and an hour off-peak frequency. It operates from 5:00 AM to 11:30 PM. The average daily ridership is 924.

Route 37, Gladstone is a peak-only route connecting Metro North Mall to downtown Kansas City, Missouri, generally using North Oak Trafficway, Shady Lane Drive, Flora, Vivion, Main Street, and Burlington. The route has a 39-minute peak frequency. Trips in the off-peak direction only serve downtown and Metro North Mall. The route operates from 6:25 AM to 8:22 AM and from 4:01 PM to 6:03 PM. The average daily ridership is 79.

Route 37XX, North Broadway Express is a peak-only commuter service operating from Metro North Mall to downtown Kansas City, Missouri. The route has a 31- to 40-minute peak frequency, and operates generally along North Oak Trafficway and Broadway Avenue before transitioning to US 169 at Englewood Road. Trips in the off-peak direction only serve downtown and Metro North

Figure 2.3 Existing Transit Service



Source: Confluence

Mall. The route operates from 6:30 AM to 8:30 AM and from 4:15 PM to 6:30 PM. The average daily ridership is 82.

Route 38, Meadowbrook is a local route that connects the Antioch Shopping Center at Vivion and Antioch in North Kansas City, and the Prospect Plaza at North Prospect and 64th Street in Gladstone, with downtown Kansas City, Missouri. The route operates on North Oak Trafficway or Burlington Road south of 42nd Street. The route has a 32-minute peak frequency. The route operates from 6:01 AM to 9:42 AM and from 2:04 PM to 6:53 PM. The route also operates on Sunday. The average daily ridership is 243.

Route 38X, Meadowbrook Express is a peak-only, limited stop service that follows an alignment similar to *Route 38 Meadowbrook*. The route has two morning round trips, and two afternoon round trips. The average daily ridership is 58.

Route 129, I-29 Express is a limited stop service operating on I-29 and on Prairie View Road, connecting the Kansas City International airport to downtown Kansas City, Missouri, using the Broadway Bridge. The route has a 15- to 30-minute peak frequency and an hour off-peak frequency. The route operates from 5:30 AM to 7:15 PM. The average daily ridership is 608.

Route 132, Gracemoor operates in a portion of the corridor on Armour Road and Burlington Street, and connects the Worlds of Fun amusement park to downtown Kansas City, Missouri, using the Heart of America Bridge. The route has two morning and two afternoon peak-directional-only trips. There is also one reverse commuter morning trip. The average daily ridership is 45.

Route 133, Vivion/Antioch is a local route that connects Antioch Center, downtown North Kansas City, and downtown Kansas City, Missouri, using Antioch, Armour Road, Burlington Road, and the Heart of America Bridge. The route has a 30- to 40-minute peak frequency, and a 70-minute off-peak frequency. The route operates from 5:45 AM to 7:00 PM. The average daily ridership is 296.

Route 133X, Vivion/Antioch Express is a limited-stop express route that connects Antioch Center to downtown Kansas City, Missouri, using Antioch Road, Parvin, North Oak Trafficway, Burlington Road, and the Heart of America Bridge. The route has one morning and one afternoon peak-directional trip. The average daily ridership is 16.

Route 135, Winnwood connects the Park & Ride at Eugene Field Drive and Highway 69 at the Claycomo city limits, North Kansas City Hospital, downtown North Kansas City, and downtown Kansas City, Missouri. The route operates generally along Vivion Road, Winn Road, Armour Road, Swift Avenue, Burlington Street, and the Heart of America Bridge. The route has two morning and two afternoon round trips and operates from 5:30 AM to 8:00 PM and from 3:00 PM to 5:15 PM. The average daily ridership is 50.

Route 237, Gladstone/Antioch MetroFlex provides general public, demand-response service in an area roughly bounded by

Broadway, 72nd Avenue, Antioch Road, Brighton Avenue, Parvin Road, Chouteau Trafficway, Vivion Road, Troost Road, and Englewood Road. The route operates from 8:00 AM to 3:30 PM and requires passengers to make reservations 24 hours in advance. Passengers can also make a standing order for regular interval trips. The average daily ridership is 19.

Route 244 North Kansas City MetroFlex provides general public, demand-response service in an area roughly bounded by 32nd Avenue, Armour Road, 16th Avenue, and Burlington Street. The route operates from 6:15 AM to 9:00 PM on weekdays, and requires passenger to make reservations 24 hours in advance. Passengers can also make a standing order for regular interval trips. Saturday and Sunday service is offered. The average daily ridership is 64.

Park & Ride lots and transfer locations

The major transit capital investment in the North Oak corridor is the Metro North Mall Park & Ride, located on the corridor's north end. The Park & Ride serves KCATA routes 37, 37XX, 137, and 142. The Park & Ride has approximately 40 dedicated Park & Ride spaces and features a basic shelter and transit signage. Figure 2.4 displays the Park & Ride.

Figure 2.4: Metro Mall North Park & Ride

Source: Olsson Associates

TIGER (Transportation Investment Generating Economic Recovery) projects

The North Oak corridor received approximately $600,000 in TIGER grant funding. This funding is being used to make basic bus stop improvements throughout the corridor, including new concrete bus pads in the street, concrete pads at the bus stop waiting area, sidewalk improvements at key locations, retaining walls where applicable, and access improvements. These improvements are being made at locations throughout the corridor. The northbound and southbound stops are being improved at each location identified below on Burlington Street or on North Oak Trafficway:

- 10th Street
- Armour Road
- 26th Street
- 42nd Street
- Vivion Road
- 5036 North Oak
- 52nd Terrace (Salvation Army)
- Englewood
- NE 70th Street
- 79th Terrace
- Barry Road

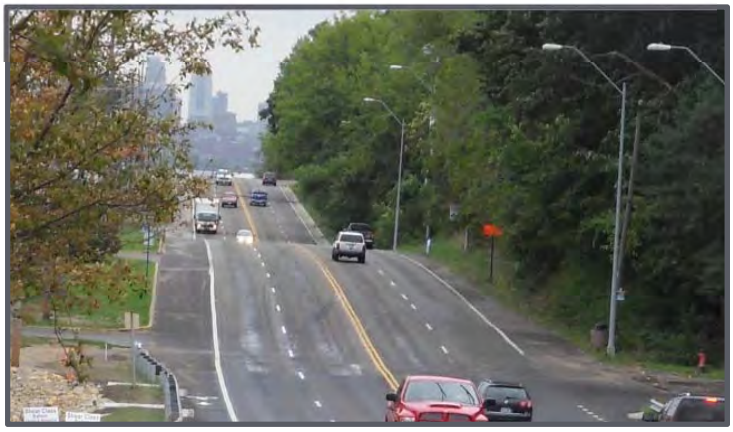
At 70th Street, these improvements also include an upgraded shelter and an identity marker.

Location of current bicycle and pedestrian infrastructure

Figure 2.5 shows the locations of the current designated bike routes. Any bike lanes on North Oak are designated lanes within the roadway and are marked by stripes and stencils. Figure 2.7 shows an example of designated bike lanes on North Oak.

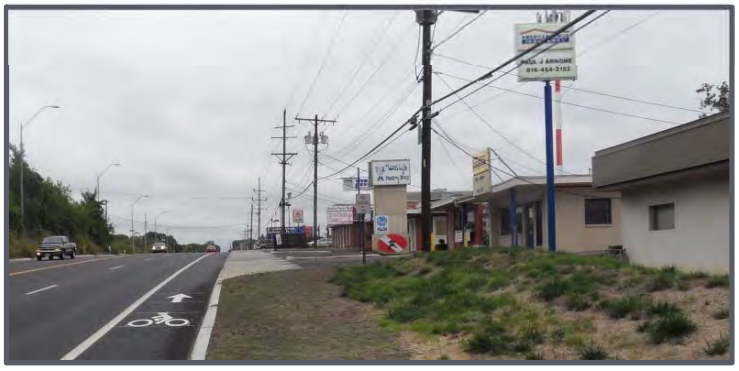
The presence and condition of sidewalk infrastructure varies throughout the corridor. Sidewalk is present along North Oak Trafficway or Burlington Street for most of the corridor, although gaps, accessibility issues, and limited availability of crosswalks are an issue at certain segments and locations. Figure 2.6 shows an example of a sidewalk gap along the corridor. Sidewalk exists north of this location (Figure 2.7) but is not present south, despite leading to Cerner Corporation, a major area employer.

Figure 2.6: North Oak at Park Drive, southbound



Source: Olsson Associates

Figure 2.7: North Oak and Park Drive, northbound



Source: Olsson Associates

Figure 2.5: Existing Bike Lanes and TIGER Projects

Source: Confluence

To better understand specific conditions along the corridor and their relationship to pedestrian activity and mobility, two additional factors were considered and analyzed as part of this study effort:

- The availability of existing sidewalks
- The degree of slope for existing sidewalks

For purposes of providing a general understanding of the varied range of existing conditions, six intersection areas were selected for further study throughout the corridor (listed from north to south):

- Barry Road (Kansas City, Missouri [KCMO])
- 70th Street (Gladstone)
- Englewood Road (Gladstone/KCMO)
- I-29/Vivion Road (KCMO)
- Cherry Street (KCMO)
- Armour Road (North Kansas City)

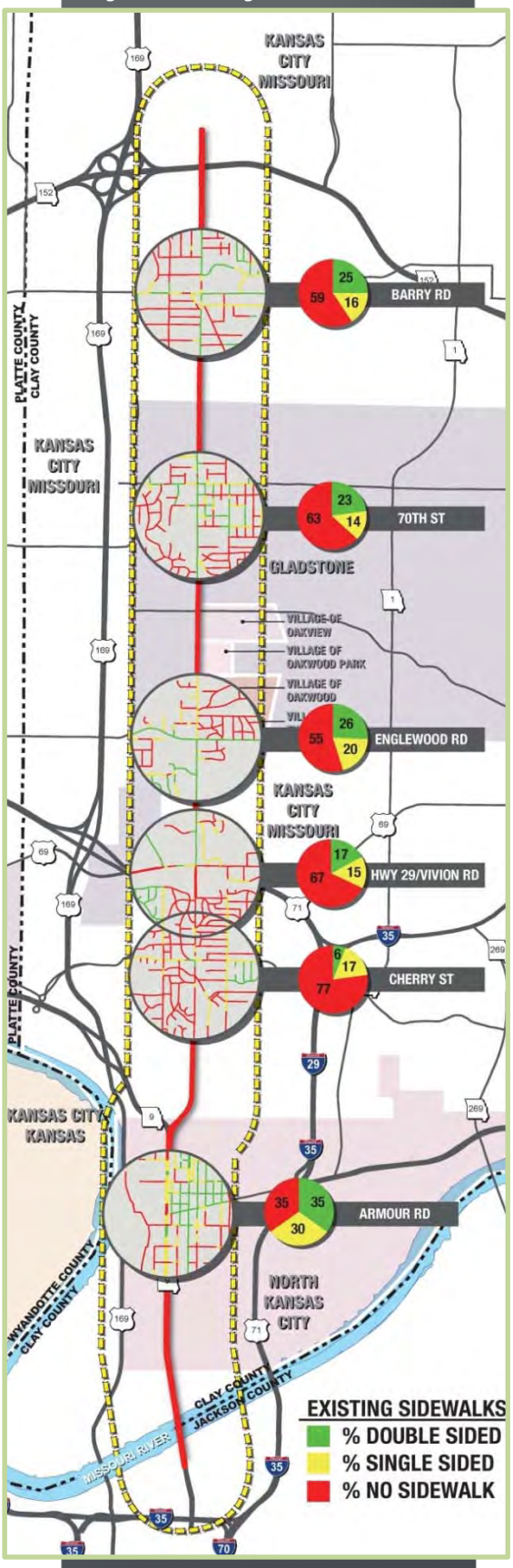
Figure 2.6 illustrates the relative percentage of available sidewalk network in each of the identified intersection locations. This analysis measured the extent of sidewalks available on each side of all public streets located within a half-mile radius of each intersection.

The sidewalk conditions vary widely, ranging from relatively low levels of available sidewalk infrastructure around the Cherry Street intersection (77 percent no sidewalks, 17 percent single-sided, and 6 percent double-sided) to relatively high levels of sidewalk infrastructure around the Armour Road intersection (35 percent no sidewalks, 30 percent single-sided, and 35 percent double-sided).

Figure 5.9 illustrates the relative slope of this sidewalk network in each of the identified intersection locations. This analysis measured the wide range of existing terrain conditions throughout these locations along the corridor. These terrain conditions can have an impact on the relative ease at which pedestrians can navigate sidewalks in each area.

The slope conditions also vary widely, ranging from fairly gentle conditions around the Armour Road intersection (85 percent of sidewalks at less than a 5-percent slope) and Barry Road intersection (61 percent of sidewalks at less than a 5-percent slope), to more challenging terrain around the 70th Street intersection (10 percent of sidewalks at less than a 5-percent slope; 78 percent of sidewalks at more than a 10-percent slope).

Figure 2.6 Existing Sidewalks



Source: Confluence

What's the current corridor land use?

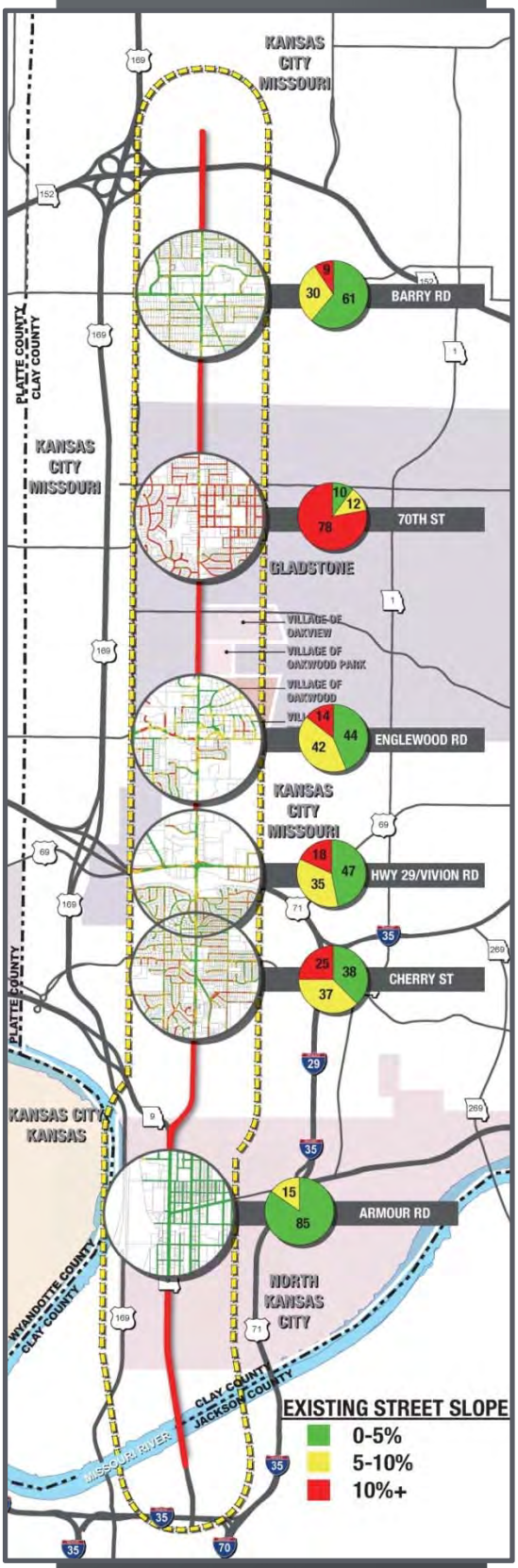
Approximately 13 miles in length from south to north, the North Oak corridor serves as an important linkage in the Northland, connecting Downtown Kansas City to North Kansas City, Gladstone, four smaller villages (Village of the Oaks, Village of Oakwood, Village of Oakwood Park, and Village of Oakview), and northern portions of Kansas City, Missouri. The overall study area includes an area 1 mile wide that stretches from the northern bank of the Missouri River (adjacent to Downtown Kansas City) to approximately NE 96th Street, altogether comprising approximately 6,900 acres of land.

Existing land use patterns

Single-family detached residential uses comprise the largest portion of land use within the corridor study area, accounting for approximately 2,277 acres (±33 percent of the study area). The vast majority of single-family housing stock in the corridor was built in conjunction with the post-World War II housing boom. Multifamily residential uses (both high and medium density) account for much less of the land area composing only roughly 345 acres of land (±5 percent of the study area). Relatively few apartment complexes are located along the corridor. Most are aging and don't support higher-market rents associated with newer construction containing more-modern amenities. A concentration of higher-density modern townhome/condominium, apartment, and senior housing facilities was recently constructed as part of North Kansas City's "Northgate Village" redevelopment project. This area was planned as part of a mixed-use pedestrian-friendly traditional community design that could serve as an example for other portions of the corridor seeking infill and redevelopment. Figure 2.8 displays existing land use.

Commercial retail/office uses comprise the next largest portion of land uses within the corridor study area, accounting for approximately 759 acres in size (±11 percent of the study area). A fairly diverse mixture of small- to medium-sized commercial shopping centers is located throughout the study area, ranging from small single-tenant and multitenant strip commercial properties, conventional suburban neighborhood retail developments such as North Oak Village, Creekwood Oaks, and Gladstone Plaza, to Metro North, which is a traditional enclosed retail mall that has struggled for years and is currently being planned as a major redevelopment project by its owner.

Figure 2.7: Sidewalk Slopes



Source: Confluence

Industrial development uses account for approximately 483 acres of land (±7 percent of the study area) and are primarily concentrated on the southern portion of the study area located within North Kansas City. This area provides a wide range of existing industries and facilities, providing a diverse employment base while affording opportunities to be located in close proximity to freight/shipments via nearby highway corridors, railroads, the Missouri River, and use of the Charles B. Wheeler Downtown Airport.

Properties owned by public entities and private institutions account for approximately 2,277 acres of land (±33 percent of the study area). Of this fairly large overall percentage of the study area, approximately two-thirds of this land is dedicated to public ROWs for streets, highways, and railroad corridors and facilities. The remaining one-third of this land is dedicated for civic and institutional uses such as municipal police/fire stations, private and public schools, religious and quasi-public facilities, and other lands owned by municipalities.

Park land and dedicated open-space areas account for approximately 759 acres (±11 percent of the study area). These areas contribute significantly to improving the quality of life for area residents while also providing recreational opportunities. They incorporate areas ranging from larger park facilities such as Oak Grove Park and Central Park in Gladstone, to smaller park spaces such as Anita B. Gorman Park and Water Works Park in Kansas City, Missouri, which encompasses steep and wooded terrain while also providing dramatic views overlooking North Kansas City.

Multimodal Analysis

A pedestrian and bicycle Level of Service (LOS) analysis was performed along the corridor, providing an evaluation of how each of the primary travel modes operates in the corridor. This type of analysis is one tool to help determine whether a particular facility is a “complete street.” Complete streets are designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists and transit riders of all ages and abilities are able to safely move along and across a complete street.

Multimodal Level of Service (LOS)

Multimodal LOS uses *Highway Capacity Manual (HCS) 2010* methodologies to simultaneously determine the LOS for each of the four primary modes along an urban street: auto, transit, pedestrian, and bicycle. LOS ranges from LOS A to LOS F. The letter A represents the best quality of service, and the letter F represents the worst quality of service. The best and worst are left undefined, allowing the respondents to identify the best and worst conditions on the basis of their traveling experience and perception of the service quality. Various designs can be quickly tested to find how well they provide improvement in the service

Figure 2.8 Existing Land Use

Source: Confluence

quality. The multimodal nature of modeling software makes it a great tool for evaluating complete streets, context-sensitive design alternatives, and smart growth from the perspective of all users of the street.

HCS defined the urban street LOS according to the average travel speed of through traffic. Demand, capacity, posted speed limit, number of lanes, median type, signal timing, coordination, and interference from other users (bus, bike, pedestrian) all influence the driver's perspective of the urban street. Reference tables based on HCS methodology were used for the generalized planning analysis.

Bicycle LOS is based on the bicyclist's perspective of the safety of sharing the roadway environment with motor vehicle traffic. The bicycle LOS is based on the following five variables: average effective width of the outside through lane, motorized vehicle volumes, motorized vehicle speeds, heavy vehicle volumes, and pavement condition.

The pedestrian LOS model was developed in a manner similar to that for the bicycle model. The pedestrian LOS model reflects the perspective of pedestrians sharing the roadside environment with motor vehicles. The pedestrian LOS is based on the following variables: existence of a sidewalk, lateral separation of pedestrians from motorized vehicles, motorized vehicle volumes, and motorized vehicle speeds.

The transit LOS method and thresholds are designed to be applied only to a fixed-route, fixed-schedule bus service. The bus LOS thresholds are keyed to the adjusted service frequency, which is the actual service frequency adjusted by the difficulty of crossing the street on foot and the difficulty of walking the length of the street segment.

Six locations have been checked for multimodal LOS. The existing roadway condition and multimodal LOS for those six locations is described below. Existing LOS for the four different modes is summarized in Table 2.1

Burlington Street south of Armour Road

Burlington Street south of Armour Road is a six-lane arterial with a middle turn lane and median. The typical roadway cross-section is a 4-foot sidewalk, a 9-foot shoulder/parking lane, three 12-foot southbound travel lanes, a 12-foot southbound left-turn lane, an 8-foot median, three 12-foot northbound travel lanes, a 14-foot shoulder/parking lane, and a 6-foot sidewalk. A bicycle-exclusive lane does not exist at this section. The LOS for Auto is C; for Bike is D; for Pedestrian is E; and Transit is D. The pedestrian LOS E designation at Armour is due to incomplete sidewalk coverage.

North Oak north of N. Cherry Street

North Oak north of N. Cherry Street is a four-lane arterial. The typical road cross-section at this location is a 5.5-foot sidewalk (not continuous), a 4-foot vegetation strip, a 5-foot northbound

bike lane, a 10-foot northbound travel lane, a 9.5-foot northbound travel lane, a 9.5-foot southbound travel lane, a 10-foot southbound travel lane, and a 9-foot drainage gutter. The LOS for Auto is C; for Bike is C; for Pedestrian is D/E; and for Transit is C. The pedestrian LOS E designation is due to incomplete sidewalks at that location, and it also influences the transit LOS.

North Oak Trafficway north of Vivion

North Oak Trafficway north of Vivion Road is a four-lane arterial with a single turn lane and sidewalks on both sides of the road. The typical cross-section is a 3.5-foot sidewalk, a 3-foot vegetation strip, two 12-foot southbound traffic lanes, a 4- to 6-foot median, a 10-foot turn lane, two 12-foot northbound traffic lanes, a 6-foot vegetation strip, and a 5-foot sidewalk. The LOS for Auto is C; for Bike is D; for Pedestrian is C; and Transit is C. The LOS D designation for bicycles is due to lack of a dedicated bike lane.

North Oak south of NE 64th Street

North Oak south of NE 64th Street is a four-lane arterial with a northbound left turn lane. The typical cross-section is a 4.5-foot sidewalk, a 1-foot curb and gutter, two 12-foot northbound travel lanes, an 11-foot northbound left-turn lane, two 12-foot northbound travel lanes, a 1-foot curb and gutter, and a 6.5-foot sidewalk. The LOS for Auto is C; for Bike is D; for Pedestrian is D; and Transit is D. The LOS D for bicycles is due to lack of a dedicated bike lane. Transit LOS is influenced by this location being served by only one route.

North Oak south of NE 70th Street

North Oak Trafficway south of NE 70th Street is a four-lane arterial with no middle turn lanes, and sidewalks on both sides. The road profile is a 4-foot sidewalk, a 2-foot curb and gutter, two 10-foot southbound travel lanes, two 10-foot northbound travel lanes, a 2-foot curb and gutter, and a 5-foot sidewalk. The LOS for Auto is C; for Bike is D; for Pedestrian is C; and Transit is D. The LOS D for bicycles is due to lack of a dedicated bike lane. Transit LOS is influenced by this location being served by only one route.

Table 2.1: LOS Results for Existing Conditions

Location at Burlington / North Oak	Level of Service			
	Bicycle	Pedestrian	Auto	Transit
Armour	D	E	C	D
Cherry	C	D-E	C	C
Vivion	D	C	C	C
64th	D	D	C	D
North of 70th	D	C	C	D

Chapter 3 Community and Stakeholder Involvement

As is illustrated in the plethora of previous studies that have been completed for the North Oak corridor, it is apparent that stakeholders along it are no strangers to being asked to describe the issues along the corridor and identify their preferred solutions. In consideration of that fact, a conscious effort was made to be selective in this outreach, ensuring that a variety of perspectives was represented during the process but also recognizing potential public participation fatigue.

To that end, the engagement for the North Oak Corridor Study was kept simple.

Who was engaged, and what did they say?

Study Team

Leadership for the process was provided by the study team. The team was comprised of representatives from the Missouri cities of Gladstone, Kansas City, and North Kansas City; MARC; More Squared, and representatives of the consulting team. The team met four times over the course of the project, including twice in conjunction with the Stakeholder Advisory Panel (SAP). The membership of the study team can be found in Appendix A.

Stakeholder Advisory Panel

An SAP was formed, comprised of a group of informed stakeholders and decision-makers representing various interests. The panel was responsible for providing input and feedback during the assessment process as well as supporting the community outreach in general.

Specifically, the SAP:

- Provided advice and assistance in getting interests and groups to participate in the engagement activities and events
- Established goals for future transit along North Oak
- Commented on the deliverables for the project, ensuring that community needs and values are integrated in them

The SAP met three times over the course of the project, including twice with the study team. The membership of the panel and summaries of its meetings can be found starting on in Appendix A.

General public outreach

Two open houses were hosted for the general public.

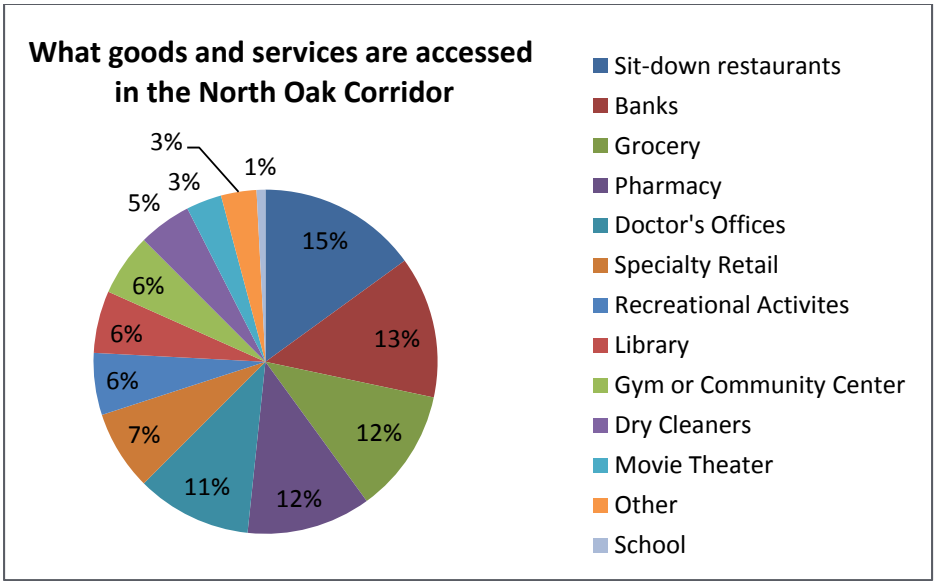
Open House No. 1

The first open house was designed to provide an overview of the Creating Sustainable Places program and review what makes a community sustainable (vibrant, connected, and green). But its primary purpose was to determine how stakeholders use the corridor, whether they use transit and why or why not, and what improvements they'd like along the corridor.

A full summary of the feedback can be found in Appendix B.

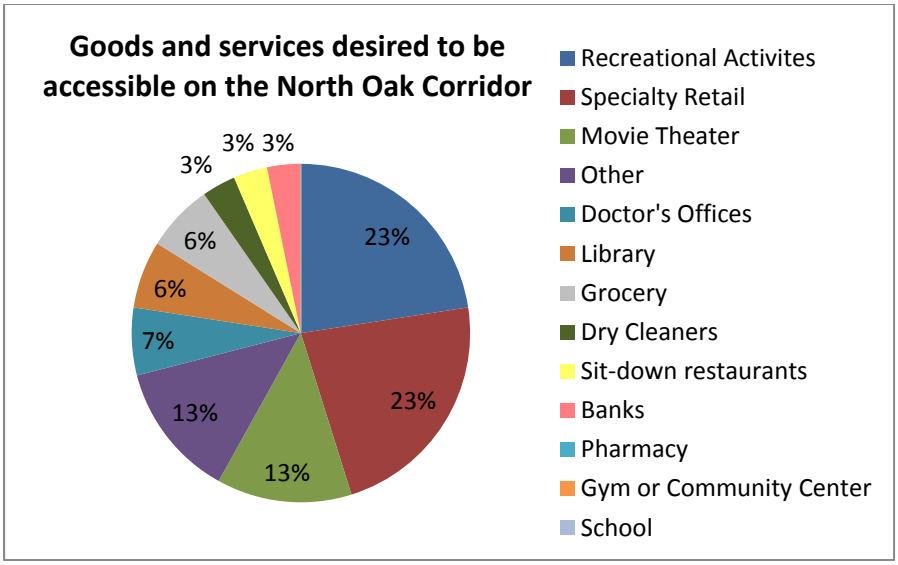
Stakeholders indicated their service needs and goods are currently met along the corridor, with the top services frequented being banks and sit-down restaurants.

Figure 3.1: What goods and services are accessed in the North Oak Corridor?



When asked to indicate which goods and services stakeholders would like to access that aren't currently along the North Oak corridor, 23 percent indicated they wanted access to recreational activities, specialty retail, and a movie theater. The "other" in this section was indicated as the following: Wal-Mart, K-Mart, diverse restaurants (Latin bistros), and more businesses in general.

Figure 3.2: Goods and services desired to be accessible on the North Oak Corridor.



In addition, there appeared to be support for increased transit services along the corridor. A majority of stakeholders indicated their community should budget more for transit and that more transit availability would:

- Increase customer traffic for businesses along the corridor as well as support neighborhoods
- Reduce dependence on automobiles
- Support a healthier environment

At the same time, a majority indicated that it was difficult to cross North Oak by foot or on bike and that sidewalks were in disrepair.

Using this information, the study team and SAP crafted scenarios for three nodes along North Oak Trafficway. The second (and final) public meeting focused on that topic.

Open House No. 2

The second, and final, open house was designed to inform stakeholders about the relationship between population and employment density and possible transit options. About 25 people attended.

The information focused on the intersections of North Oak with Barry Road, 70th Street and Armour Road. For each node, the study considered:

- Options for enhanced bus service, bus rapid transit, or fixed guideway such as streetcar;
- The population/employment density needed to support those transit options; and
- The development needed to foster that population/employment density.

Three stations were established—one for each of the three nodes. At those stations, stakeholders could learn about existing conditions and view redevelopment scenarios that would result in the population and employment density necessary to support each of the three transit options.

In addition, the consultant team made a formal presentation, providing an overview of the study, the methodology used; and the key findings.

The consultant team stressed that the study focused specifically on mobility and the relationship between transit usage and the combination of employment and population density. In other words, it did not identify potential redevelopment scenarios for the corridor. Those redevelopment scenarios depicted on the displays were simply examples of many possible redevelopment scenarios.

Stakeholders were pleased to have an opportunity to ask questions following the presentation. They asked general questions regarding the City of Gladstone's development plans along North Oak; whether the population of Downtown Kansas City, Mo. population was considered for the population/employment density model; and what next steps were to consider the economic development potential along the corridor.

Chapter 4 Corridor Goals and Metrics

What are the guiding principles of the Creating Sustainable Places Program?

The North Oak Corridor Study followed the principles defined in Creating Sustainable Places that lead to a sustainable community. These principles include promoting equity, economy, environment, places, and processes These principles could be followed by reinvesting in existing community and neighborhoods, providing travel choices that reduce transportation costs, supporting a variety of housing choices, and using existing public and private assets to develop vibrant corridors that provide increased lifestyle choices. Other objectives include transportation and land use strategies that would promote for healthier lifestyles, preserve historical and cultural assets and create distinctive communities that increase the region's vibrancy and contribute to its overall health. The North Oak Corridor study also investigated investment options that would conserve resources for future generations, while simultaneously reducing costs and increasing economic and fiscal efficiency.

The strategies developed for this corridor have included consideration of the "Equity Lens," a set of principles to be considered that help make projects and communities more equitable. These are the priorities adopted by the Creating Sustainable Places Equity Partners and endorsed by the Creating Sustainable Places Coordinating Committee. The social equity priorities include:

- Ensuring access to educational opportunities
- Including local participants in the planning process
- Ensuring that no single population group or geographic area bears a disproportionate environmental burden of any project impact
- Fostering economic development impacts that generate a broad array of job opportunities
- Encouraging redevelopment efforts to include a wide range of housing types that also match employment opportunities
- Developing a transportation system that provides a wide range of choices that enhance access to jobs, services, and other opportunities
- Supporting healthy lifestyles and access to health services
- Encouraging reinvestment in existing neighborhoods

Which metrics apply to this corridor?

This project is primarily focused on developing a transportation system that provides a wide range of choices that enhance access to jobs, services, and other opportunities. It assumes a correlation between mobility and activity along the corridor. This correlation was substantiated through an analysis of the relationship between transit ridership and employment/population density along four representative corridors in the metropolitan area. These include Troost Avenue, Independence Avenue, State Avenue, and North Oak Trafficway. The result of the analysis is illustrated in Figure 4.1. The resulting strong correlation was then used as a basis for projecting employment and population density requirements necessary to yield assumed levels of transit ridership associated with different levels of transit investment. More detail about this connection is presented in Appendix C.

Figure 4.1: Correlation between Ridership and Land Use Density

The projected density requirements were then expressed in the form of representative land use patterns at selected nodes along the corridor. These land use patterns were developed with the goal of accomplishing the following:

- Promote a strong mix of uses
- Promote higher-density development
- Induce development located closer to transit routes
- Promote bicycle and pedestrian connections
- Foster economic development
- Enhance mobility choice

- Support healthy lifestyles and access to health services
- Ensure access to educational opportunities
- Encourage reinvestment in existing neighborhoods

Chapter 5 Transit Concepts

This chapter presents a comparative evaluation of different transit alternatives that could be implemented in the corridor. The characteristics of both the operating and physical elements of each alternative will impact the land-use scenario developed to support that mode. Typically, higher-frequency service and more-expensive vehicles, stations, or track costs are associated with higher density or intensity of land use.

What transit modes are being studied?

Three modes were evaluated and range from comparatively less expensive to comparatively more expensive. The modes evaluated include a baseline alternative that brings transit supply up to meet current demand; a mixed-traffic BRT alternative, which may include peak-period bus-only lanes; and a streetcar alternative that would serve as the guideway option.

Baseline

This option represents improvements to existing bus service and is an alternative that could be implemented without the extensive capital investment associated with the other alternatives. This alternative includes:

- Increase the service span on Route 142 North Oak to seven days a week, including a 16-hour service span, a 15-minute peak frequency, and a 30-minute off-peak frequency
- Modify the route to decrease travel time, decrease travel length, and increase travel directness
- Improve transit amenities such as additional shelters and benches, integrated bike lockers, and improved pedestrian infrastructure associated with transit stops as well as actions that would improve transit's visibility within the corridor

The enhanced bus service would link the existing stops that are currently serviced by other, existing routes. Headways evaluated are 15 minutes at peak and 30 minutes during off-peak periods. These peak headways would address current demand.

Modifications to the rest of the fix route network in the Northland would be minimal if additional improvements are made to Route 142.

Bus Rapid Transit (BRT) in mixed traffic

BRT can be defined as a flexible, rubber-tired rapid-transit model that combines stations, vehicles, services, guideways, and Intelligent Transportation Systems (ITS) elements into an integrated transit system with a strong positive identity that evokes a unique image.

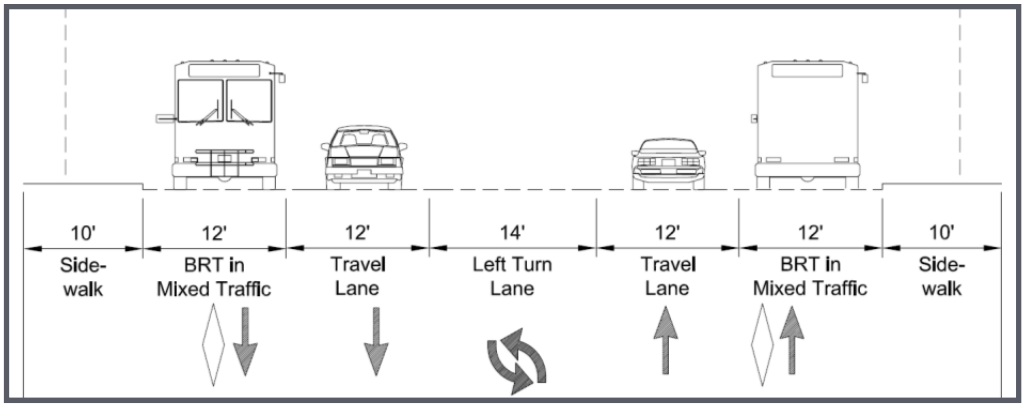
Many BRT projects were developed through the Federal Transit Administration's (FTA) Small Starts or New Start program. The previous FTA criteria considered a minimum of 3,000 existing daily transit riders as a threshold for considering a Small Start or Very Small Start project. Specific project evaluation criteria has not been identified; however, to go into an engineering phase, projects generally have to be justified based on a review of mobility improvements, environmental benefits, congestion relief, economic development effects, capacity needs of the corridor, and the project's cost-effectiveness as measured by cost per rider.

BRT service can include a wide range of features: simplified fare payment methods, special branded vehicles, and passenger stations with increased amenities. A mixed traffic BRT can also use Transit Signal Priority (TSP) strategies, which would include modifying existing signals with extended green time and queue jumps to optimize and reduce transit travel time, improving transit system reliability, and increasing services to transit markets.

In some instances, BRT vehicles use queue jumps. Queue jumps are limited portions of travel lanes that are restricted to BRT use near signalized intersections. A queue jump allows BRT vehicles to jump ahead of stopped vehicles and move to the front of traffic. A typical profile for BRT mixed traffic is shown in Figure 5.1

Modifications of the existing bus routes would need to occur to take advantage of the BRT's increased service and amenity levels.

Figure 5.1: BRT Mixed Traffic Typical Street Profile



Modern streetcar

A streetcar is a rail vehicle of lighter weight and construction than a train, designed for transporting passengers within cities on tracks running primarily on streets. Street railways were common throughout the industrialized world in the early 20th century, but they disappeared from many U.S. cities in the mid-20th century. In recent years, they have made a comeback in many U.S. cities. Many newer LRT systems share features with streetcars, including obtaining operating energy from overhead catenary contact wires. A distinction can be made between the two modes because most light rail systems operate off-street.

The streetcar is a form of urban rail public transportation that generally has a lower capacity and lower speed than heavy rail and metro systems. The term is typically used to refer to modern streetcar/tram systems that usually use electric rail vehicles operating mostly on-street mixed with other street traffic. An example of a modern streetcar is shown in Figure 5.2. Streetcar lines are operated by electrically powered vehicles propelled by overhead catenary contact wire providing current to the electric motors. The average cost of a modern street car line is approaching $50 million per mile. A typical street profile for a modern streetcar line is shown in Figure 5.3 and in Figure 5.4.

Figure 5.2: Streetcar, Portland, Oregon

Streetcar projects are often developed through the FTA New Starts program. The New Starts project development process is extensive and includes a rating process for financial and project justification. New Starts funding is very competitive and requires substantial efforts in developing technical traffic models and a demonstration of financial commitment.

Figure 5.3: Light Rail Typical Street Profile A

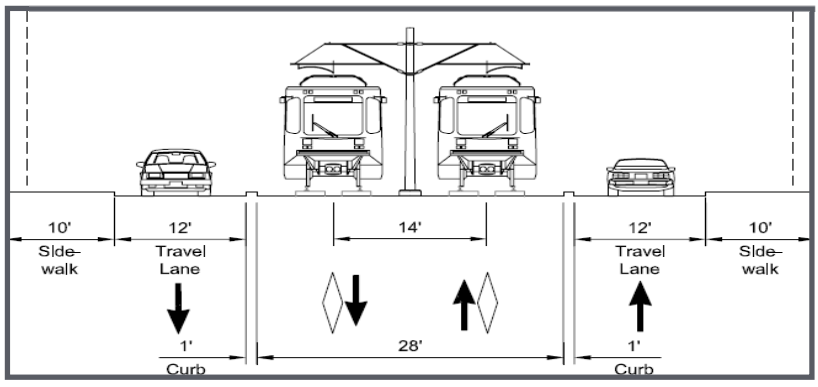
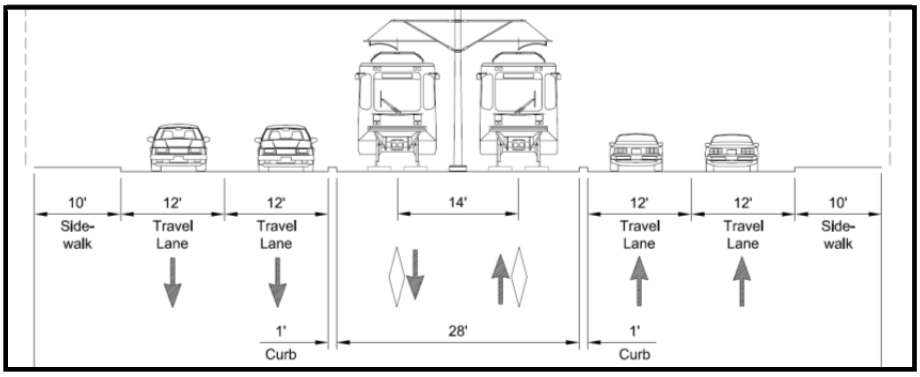


Figure 5.4: Light Rail Typical Street Profile B



Modifications to the bus network in the Northland would need to occur if a streetcar mode is introduced in there. These network modifications may include moving the route termination point for Northland routes from downtown Kansas City, Missouri, to somewhere north of the river.

Comparison of Modes

Each of the three transit modes being evaluated can be described in terms of their respective operating characteristics, their cost to build, and their cost to operate and maintain. Table 5.1 illustrates the differences between each mode in respect to these three descriptors.

Table 5.1: Comparison of Modes

Mode	Service Span	Weekday Service Period	Weekday Service Frequency			Approximate Annual O&M Costs	Approximate Construction Cost/Mile
			Peak	Off-Peak	Night		
Base Line	M-Sun	6:00am to 10:00pm	15 Minutes	30 Minutes	60 Minutes	$1,500,000	$800,000
Mixed-Traffic BRT	M-Sun	5:30am to 11:30pm	10 Minutes	15 Minutes	30 Minutes	$2,800,000	$3,000,000
Streetcar	M-Sun	5:30am to 11:30pm	10 Minutes	15 Minutes	30 Minutes	$3,200,000	$50,000,000

What locations are being studied for activity nodes?

Six locations have been identified in previous planning studies as potential locations for higher level transit stops or transit stations. These locations along the Burlington Avenue or North Oak Trafficway are Armour Road, North Cherry Street, Vivion Road, Englewood Road, 70th Street, and Barry Road. Three of these locations – Armour Road, 70th Street, and Barry Road – are being evaluated in further detail as illustrative examples of concentrating density appropriate to each level of transit. This is discussed in Chapter 6.

Generally, industry standards identify quarter-mile spacing for local bus service commensurate with the baseline level of service identified here. The Transit Cooperative Research Program (TCRP) Report 19[1] identifies a spacing range of 500 to 1,200 feet in urban areas, and 600 to 2,500 feet for stops in the suburban environment. The North Oak corridor is approximately 13 miles long, so it would have approximately 52 transit stop pairs. The number of stops would likely be lower, though, as parts of the corridor include river crossings and areas with very low land use densities.

Figure 5.5: North Oak north of Vivion

Source: Olsson Associates

Wider stop spacing is generally assumed for higher-capacity or higher-quality transit such as BRT or streetcar. This is to maintain a higher-average trip speed for on-board riders, recognizing that potential riders will walk longer distances for higher-quality transit modes. TCRP Synthesis 83[2] identifies a suitable minimum spacing for new BRT service as one-half to one mile. Streetcar spacing is generally seen as similar to BRT spacing.

How can bicycle and pedestrian use integrate with transit?

Generally, it was beyond the effort of this project to identify specific bicycle or pedestrian improvements within the corridor. However, as transportation and infrastructure improvements are planned and implemented, policies and elements accommodating pedestrians and bicyclists should be followed.

Improving the bicycle and pedestrian facilities throughout the corridor should be done with the objective to facilitate movement

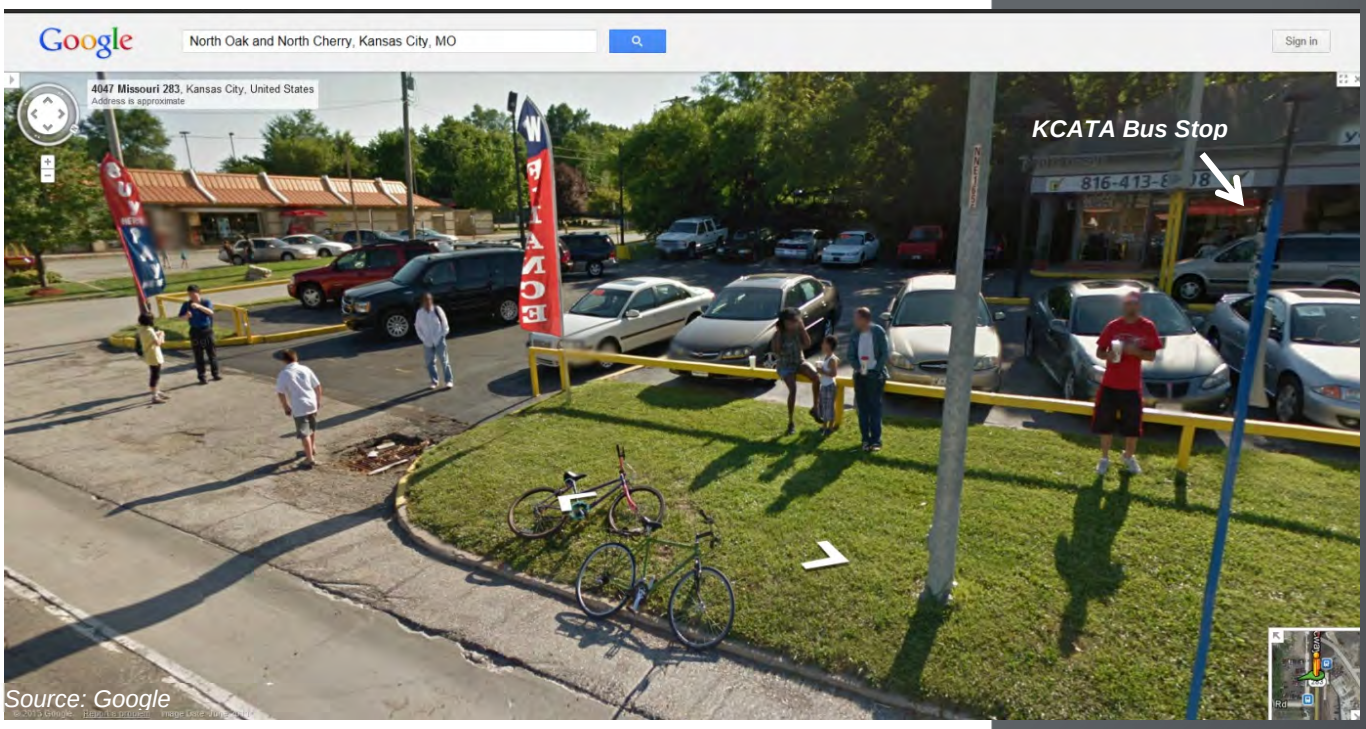
[1] TCRP Report 19 *Guidelines for the Location and Design of Bus Stops*, Transit Cooperative Research Program. National Academy Press. Washington, D.C., 1996. Pg. 18.
[2] TCRP Synthesis 83 *Bus and Rail Preferential Treatments in Mixed Traffic*. Transit Cooperative Research Program. National Academy Press, Washington, D.C., 2010. Pg 9.

and access to transit. In general, this improvement would focus on the area surrounding each stop and the areas along the corridor between the stops. This would allow bicyclists and pedestrians to not only travel safely to a transit station to access transit, but would also allow safe bicycle and pedestrian usage along the corridor.

In general, when evaluating changes to the network around each station and along the corridor, the following should be given consideration.

Balance to transportation, which involves making bicycling and walking more-attractive transportation options. Beyond simply installing sidewalks and bikes, attention should also be given to streetscape improvements and site design considerations that don't create unnecessary barriers for bicyclists or pedestrians.

Figure 5.6: Google Streetview of North Oak at Cherry. Bus stop is blue pole on right.



Paying attention to urban form, design standards, and the linkages between residential, employment, and shopping areas can decrease automobile usage. Appropriate distances are typically one-quarter to one mile for pedestrians, and one-quarter to three miles for bicyclists.

It's important to note that in improving multimodal access to transit, pedestrian improvements and bicycle improvements are two distinct items. Pedestrian improvements would focus on improving sidewalk connections and increasing the number of crosswalks in the vicinity of transit stops. Bicycle improvements

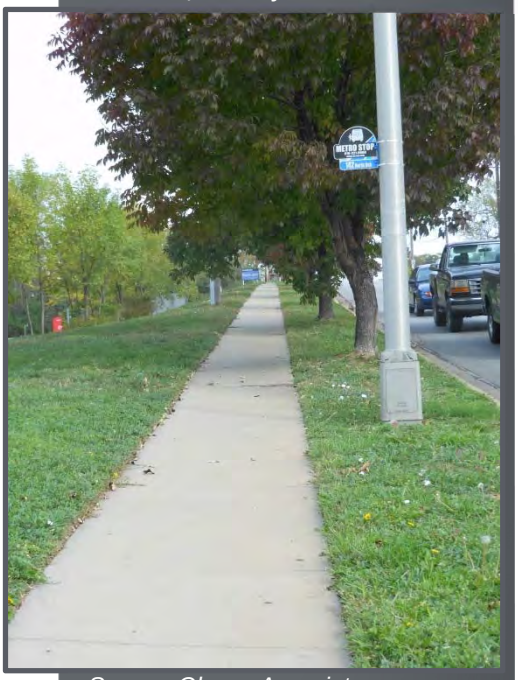
would focus on including bike lanes around a wider radius on the transit stop, securing bike parking facilities, and ensuring that transit vehicles have bike racks.

As noted in section 2.4, bike lanes are present in various portions along and across the corridor. Gaps exist along Burlington Street and north of 54th Street to past the Barry Road area. Many of these gaps are due to limited ROW. As properties in this corridor are redeveloped, efforts should be taken to work with developers to provide sufficient space for constructing bike lanes.

Bike parking and storage is an important component in facilitating both bicycle use in a corridor, and a bicyclist's access to transit. When planning for bicycle parking, the following general location criteria should be considered:

- Bicycle parking facilities immediately near building entrance or transit stop
- Bicycle parking facilities installed on a hard, paved surface
- Bicycle parking facilities within easy viewing distance of both transit stop and pedestrian walk, but situated to avoid pedestrian conflicts (If installed next to a sidewalk, at least five feet of clear sidewalk should remain that would be unimpeded by parked bicycles.)
- Bicycle racks, near walls or buildings, that have at least two feet of clear space between the rack and a parallel wall, and 2.5 feet of clear space between the rack and a perpendicular wall

Figure 5.7: Vegetation strip with street trees separating pedestrians and traffic at North Oak, north of Vivion



Source: Olsson Associates

In addition to the above considerations, the network around each station and along the corridor should be examined for bicycle obstacles and hazards. These include rough railroad crossing such as what may be presented along Burlington Street, manholes that are higher or lower than surrounding pavement, drainage grates that can snag tiers, pedestrian bulb-outs extending into bike lanes, acceleration/deceleration designs, and merge locations.

For pedestrians, the perceived quality of the experience influences the decision to walk just as much as security, safety, and convenience do. Sidewalks are particularly important for linking transit users to and from their origins and destinations, and should be provided on all streets within one-quarter mile of significant transit stops, and into major activity centers along the transit corridor.

Pedestrian facilities should be designed with the following considerations:

- Ensure sufficient width that accommodates anticipated volumes

Figure 5.8: Example of Pedestrian-Scaled Street Features; Downtown Overland Park, Kansas

Source: Olsson Associates

  - At a minimum, sufficient width will allow two adults to walk comfortably, side-by-side (approximately 5 feet).

- Provide pedestrian protection from traffic
  - Traffic speeds higher than 35 miles per hour create uncomfortable and dangerous conditions for pedestrians. Separations can alleviate these concerns, and can be accomplished through a variety of methods including vegetation strips, raised planters, on-street parking, or bicycle lanes.
- Implement use of street trees to enhance the quality of the pedestrian environment
  - Trees break up expanses, provide visual variety and a sense of enclosure, and provide protection from the elements.
- Design for the pedestrian scale
  - Designing for the pedestrian scale reinforces to pedestrians that it is appropriate for them to be there. Signage should be viewable by the pedestrian, and street lighting should be appropriately scaled to the pedestrian level. Street furniture, interesting vegetation, and visual landmarks can be incorporated to make the pedestrian experience more interesting.
- Provide continuous pedestrian networks and facilities
  - Gaps are often present when private developers are not encouraged to link adjacent development to nearby sidewalks or street corners. In the context of the North Oak corridor, this is especially true for direct, non-circuitous pedestrian paths between transit stops and nearby retail or residential developments. Existing gaps in the pedestrian network adjacent to transit stops or along the North Oak corridor should be prioritized.
- Provide for adequate vertical clearance
  - Adequate vertical clearance is important for the comfort and safety of pedestrians and bicyclists and is particularly important for visually impaired persons. Clearance should be at least eight feet for landscaping, trees, and signs.
- Meet the American with Disabilities Act (ADA) standards

Cross walks are an especially important consideration for the North Oak corridor, where high traffic volumes and speeds can make crossing the corridor especially dangerous for pedestrians. Pedestrian safety and experience can be enhanced in a variety of ways at crosswalks.

Figure 5.9: Crosswalk incompliant with Americans with Disabilities Act (ADA) standards at Burlington Street and Armour

Source: Olsson Associates

Figure 5.10: Example of crossing and median refuge island

Source: http://safety.fhwa.dot.gov/intersection/resources/fhwasa06016/chap_6.htm

Curb extensions or bulb-outs extend the sidewalk and curb into the street on both sides of a pedestrian crosswalk, shortening pedestrian crossing distances. The street narrowing also slows down through-traffic and increases the pedestrian's visibility to cars.

Pedestrian refuge areas are important to consider for large, multilane intersections or in intersections with center left-turn lanes or left-turn signals that may not provide sufficient time for pedestrians to cross the entire intersection. These pedestrian refuge areas allow a safe resting place for slower pedestrians.

Mid-block crossing may be considered where the attractor of high amounts of pedestrian traffic is located directly across the street from the source of the pedestrians. An example would be a transit station with high boardings located at mid-block. However, mid-block crossings are more dangerous than crosswalks at signalized intersections and may only be appropriate under the following conditions:

- A high number of mid-block crossings already exist, or are anticipated to exist, even without a designated mid-block crossing.
- Land use makes it unlikely that a pedestrian would continue to an adjacent intersection to cross.
- The adjacent intersection is too dangerous for pedestrians.
- Spacing between adjacent signals is greater than 600 feet.
- Previous measures to encourage pedestrians to cross at designated intersections have been unsuccessful.

Figure 5.11: Pedestrian crossing mid-block on North Oak at Cherry Street.

Source: Olsson Associates

Figure 5.12: Mid-block crossing example with bulb-outs

Source: https://commons.wikimedia.org/wiki/File:Curb_extensions_at_midblock_crosswalk.jpg

What changes would need to occur to integrate with additional service, a new BRT service, or streetcar service on North Oak?

Currently a number of express routes and local routes use Burlington Street to link the Northland to the CBD. Regardless of the new services available in the North Oak corridor, express routes such as Route 37XX (North Broadway Express) and Route 38X (Meadowbrook Express) will likely continue direct service to the CBD. The nature of express routes – long distances with few stops to maintain high travel speed – typically do not accommodate transfers in order for riders to access a CBD.

As the current spine of the Northland transit system, Route 142 (North Oak) would be a likely route to receive additional investment in the baseline concept, or be upgraded with BRT elements in the BRT concept. A streetcar concept may replace or supplement portions of the current Route 142 alignment.

The local route structure can be modified to integrate with a higher-capacity service such as BRT or streetcar. Modifications to evaluate may include terminating local routes at a transit node, such as at Burlington Street and Armour Road, to transfer passengers to a higher-frequency service such as BRT or streetcar. This modification would decrease transit vehicle-relative congestion at CBD transit stations, while also increasing efficiencies related to decreased service duplication and revenue miles. Limiting these modifications to off-peak routes could also be further explored. The following local routes would be affected by these changes:

- *Route 132, Gracemoor*
- *Route 135, Winnwood*
- *Route 133, Vivion/Antioch*
- *Route 37, Gladstone*
- *Route 38, Meadowbrook*

How do the transit scenarios relate to land use?

As discussed previously in Chapter Four, the correlation between transit ridership and employment/population density was used to develop density targets for each of the three transit scenarios described in this chapter. The ridership yield for each scenario is based on a desired performance level. The measure of performance used for this effort was the cost per rider. For the baseline and BRT scenarios, the desired cost per rider was assumed to be $4.00. This is consistent with the performance of existing transit routes in the metropolitan area that are considered to be successful and productive. The cost per rider for the streetcar alternative was assumed to be $8.00. The higher cost per rider for this scenario is largely due to the greater capital cost associated with the development of this mode.

The ridership yield for each scenario that was established by the assumed performance level was then correlated to an associated employment/population density. Table 5.2 shows the density requirements that were used to develop the land use scenarios necessary to support the respective transit scenarios.

Table 5.2: Density Requirements

Mode	Cap Cost/Mile	Total Cap Cost	Op Cost	Annual Op+Cap	Cost/ Passenger	Weekday Riderships	Daily Hours	Pass/Hour	Density
Base	$800,000	$9,840,000	$1,500,000	$2,320,000	$4.00	2,275	110	20.68	8,232
Bus Rapid Transit	$3,000,000	$36,900,000	$2,800,000	$5,875,000	$4.00	5,760	160	36.00	12,391
Streetcar	$50,000,000	$685,000,000	$3,200,000	$26,033,333	$8.00	12,761	200	63.81	19,938

Density = 271.41x + 2620.1
x = Passengers/Hour

As shown in the table, the average combined population/employment density in the corridor necessary for the support of the baseline scenario is 8,232. For the BRT scenario, the average combined population/employment density requirement is 12,391, and for the streetcar scenario the average is 19,938.

The type of illustrative development that would need to occur to reach the densities identified is discussed in Chapter Six.

Chapter 6 Future Land Use

Transit service along the North Oak Corridor is anticipated to evolve over time to compliment and better serve adjacent land use and redevelopment initiatives, the corridor's expanding population and employment, and growth in the Northland as a whole. To begin to understand the connection between various modes of transit and adjacent land use decisions, this study explores several alternative scenarios for future growth and development along the corridor. Each of these scenarios are programmed to achieve future employment and population growth necessary to generate future self-supporting transit ridership.

Designating the North Oak Corridor as a primary north-south transit spine connecting into Downtown Kansas City, Missouri will prove to have long-term growth and development implications. Across the nation and in several of Kansas City's inner-ring suburbs, there is increasing interest in providing expanded housing choices and developing more dense, urban, and walkable mixed-use communities. Transit can become a catalyst and a strong supporting element in promoting a shift in the type of development patterns needed to sustain long-term growth projections and quality of life in these existing areas.

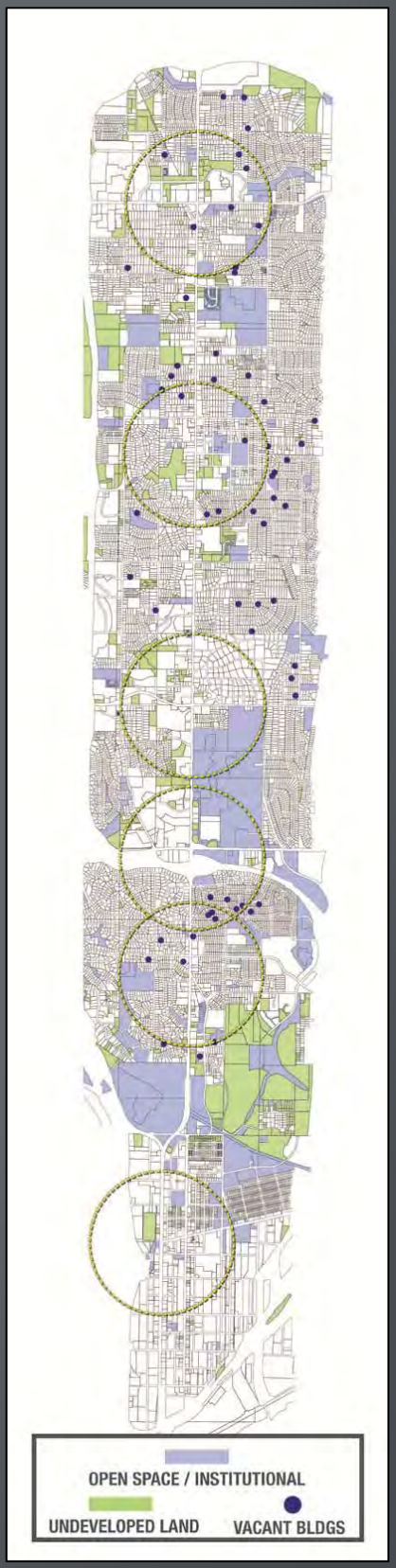
An analysis of several existing conditions along the corridor study area was undertaken to gauge the development potential for future growth and development scenarios. These are further summarized and included as diagrams for reference.

To identify properties that may provide readily available opportunities for infill and redevelopment activity, a review of undeveloped land and vacant buildings was undertaken Figure 6.1. A relatively small portion of these undeveloped parcels have remained unimproved due to existing terrain and site conditions that present development challenges, while a majority of these undeveloped sites have not been improved due to available market demand and other real estate development factors. Properties used for existing open space and institutional uses were also noted as part of this diagram, as these parcels typically indicate land uses which are not likely to change significantly over time, and are not readily available for development activity.

The distribution of existing residential population along the corridor was analyzed to illustrate its concentrations (Figure 6.2). Existing residential densities are fairly low to moderate throughout the central portions of the corridor between North Kansas City and the Englewood Road, generally averaging approximately 2 units per acre. There are relatively low existing residential densities along the corridor in North Kansas City, with pockets of higher densities near Englewood Road and Cherry Street intersections.

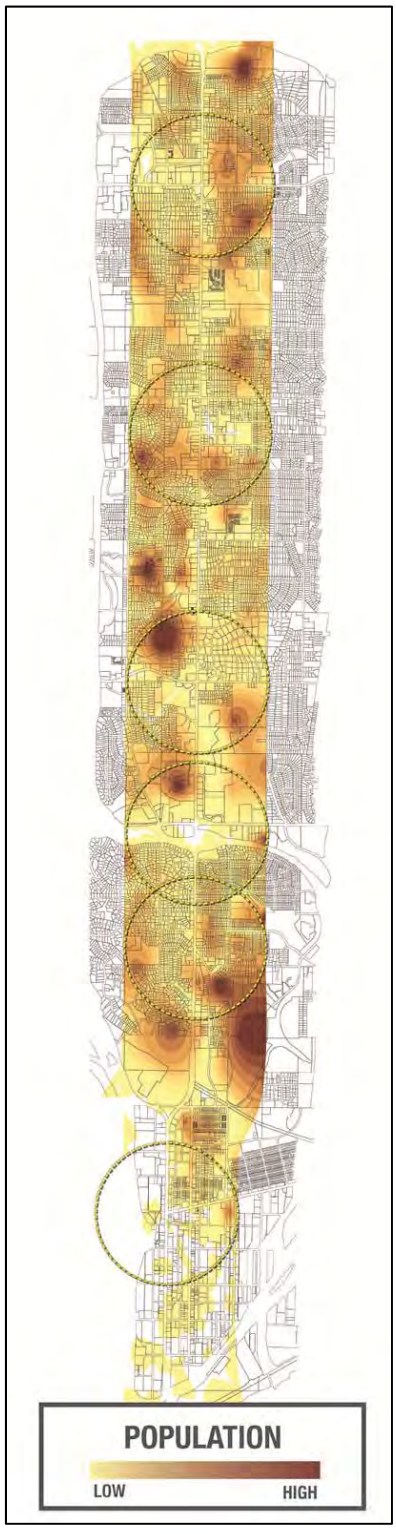
The distribution of existing employment concentrations along the corridor were also analyzed, illustrating more jobs in several areas north of the Interstate 29/Vivion Road area as well as in North Kansas City Figure 6. . The range of job types along the corridor was also further analyzed,

Figure 6.1: Vacant Lots & Buildings; Institutional Land Use & Open Space



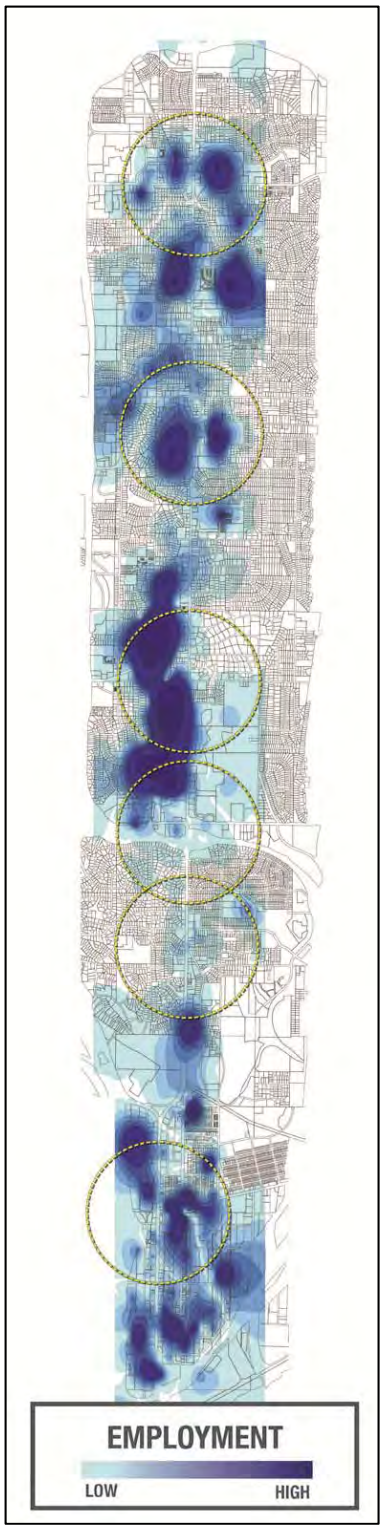
Source: Confluence

Figure 6. 2: Existing Residential Population Density



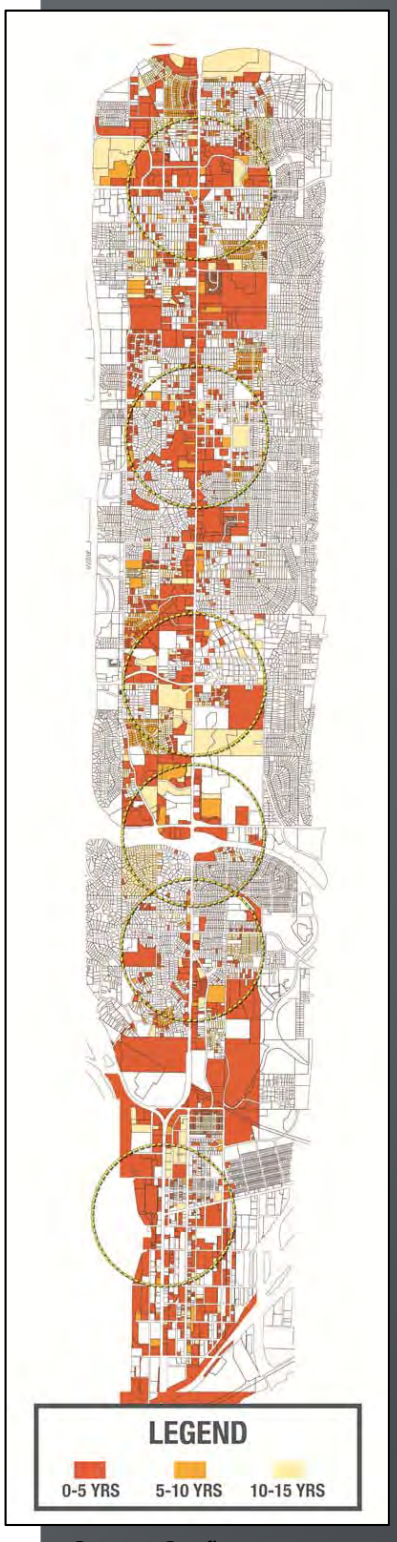
Source: Confluence

Figure 6. 3: Existing Employment



Source: Confluence

Figure 6. 4: Anticipated Redevelopment



Source: Confluence

The corridor was further analyzed with regard to its redevelopment potential (Figure 6.4). An application available through the use of Envision Tomorrow planning software provides an overview of existing commercial properties, taking into account the length of time a property has been improved while evaluating the relative value of structures that have depreciated over time. The relative value of the land upon which these structures are built also has a tendency to increase over time, and is compared to the structure valuation to determine which properties have reached, or will soon reach, the end of their respective investment cycles.

The results are organized into three categories for anticipated redevelopment, ranging from near term potential (0-5 years) to longer term potential (10-15 years). This analysis indicates a relatively large number of existing commercial properties located throughout the entire corridor that have become or are becoming candidates for redevelopment.

These various analyses were then overlaid with each other to create a composite map of existing corridor conditions Figure 6., which further illustrates potential opportunities for redevelopment compared with existing concentrations of residential and employment densities.

Analysis of Existing Nodes

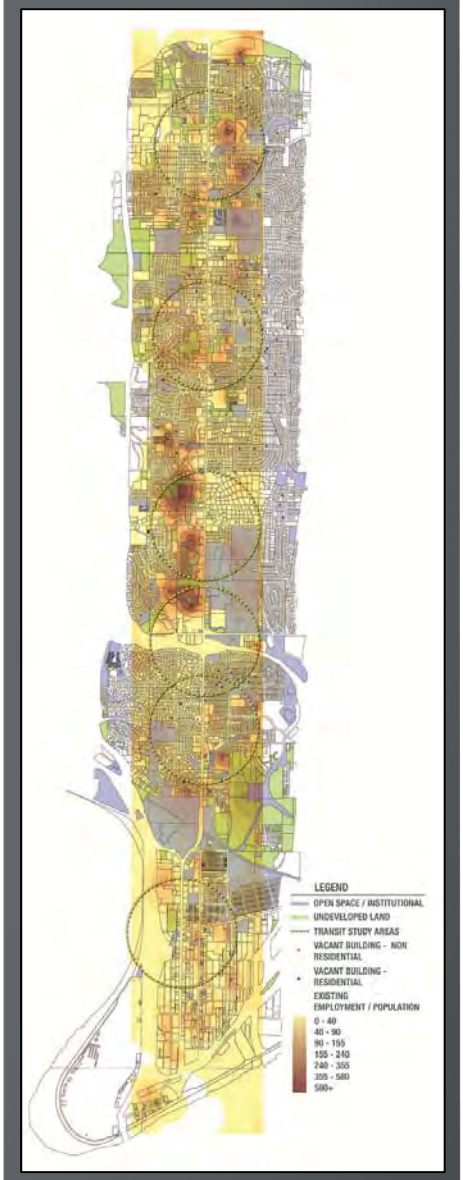
To gain additional insight into the existing conditions along the corridor, and their relative impacts on future growth scenarios, each of the six identified nodes were further analyzed. The character and intensity of existing development varies greatly from node to node throughout the study area. A brief summary of existing conditions at each of these nodes is provided.

A half-mile radius at each intersection was drawn to provide a consistent planning framework for which to study each node. This typically represents a five-minute walk for a pedestrian to access local transit service at the center of the circle. To more readily compare relative development potential, all existing rights-of-way for streets, highways, and railroads were removed from the density calculations.

Each of these six nodes was further evaluated at a conceptual level as to its potential to support future growth and redevelopment activity - specifically as it relates to studying the range of alternative transit service scenarios for the North Oak Corridor.

- *Barry Road (Kansas City)*
- *70th Street (Gladstone)*
- *Englewood Road (Kansas City)*
- *Interstate 29/Vivion Road (Kansas City)*
- *Cherry Street (Kansas City)*
- *Armour Road (North Kansas City)*

Figure 6.5: Composite Map of Existing Corridor Conditions



Source: Confluence

Existing Land Use and Density

Barry Road: Existing Conditions

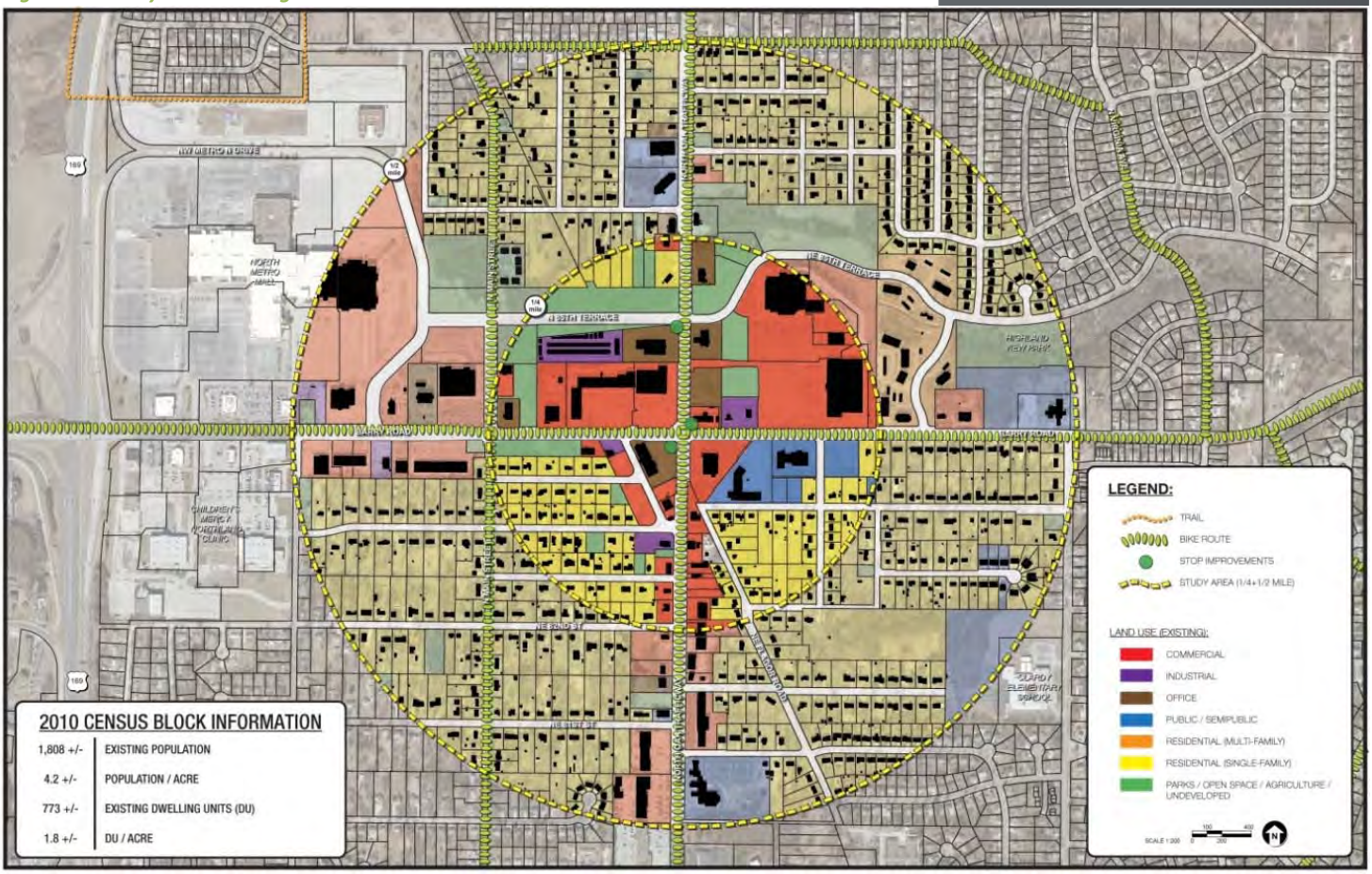
The Barry Road intersection is the northernmost location within the study area. This node represents the largest concentration of big-box retail development along the corridor, primarily located north of the Barry Road intersection. A portion of the existing Metro North Mall is also located within this node in the northwest quadrant. A majority of this aging mall is slated to be razed and redeveloped in the near term, and is anticipated to be replaced with a repositioned indoor retail mall with a modern layout and amenities.

Smaller-scaled neighborhood-oriented commercial uses are typically found adjacent to North Oak south of Barry Road, with numerous instances of residential houses converted for this purpose. A number of strip commercial uses on relatively shallow depth parcels also exists flanking both sides of the corridor. The proximity of existing single-family neighborhoods in close proximity to the North Oak corridor in this area will likely have a limiting effect on future redevelopment potential.

Figure 6.6: Existing Site Conditions

Source: Confluence

Figure 6.2: Barry Road Existing Conditions



Source: Confluence

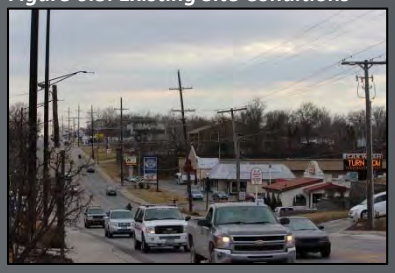
Existing Land Use and Density

70th Street: Existing Conditions

The 70th Street node is located in the heart of Gladstone and encompasses both the 72nd Street intersection (a major east-west connector) well as the city's burgeoning Linden Square located on the east side of North Oak. This area is slated to become a downtown village center to serve the surrounding community, and currently includes City Hall, a new office building, a small amphitheater, and a large City Park containing an outdoor pool complex and a community center.

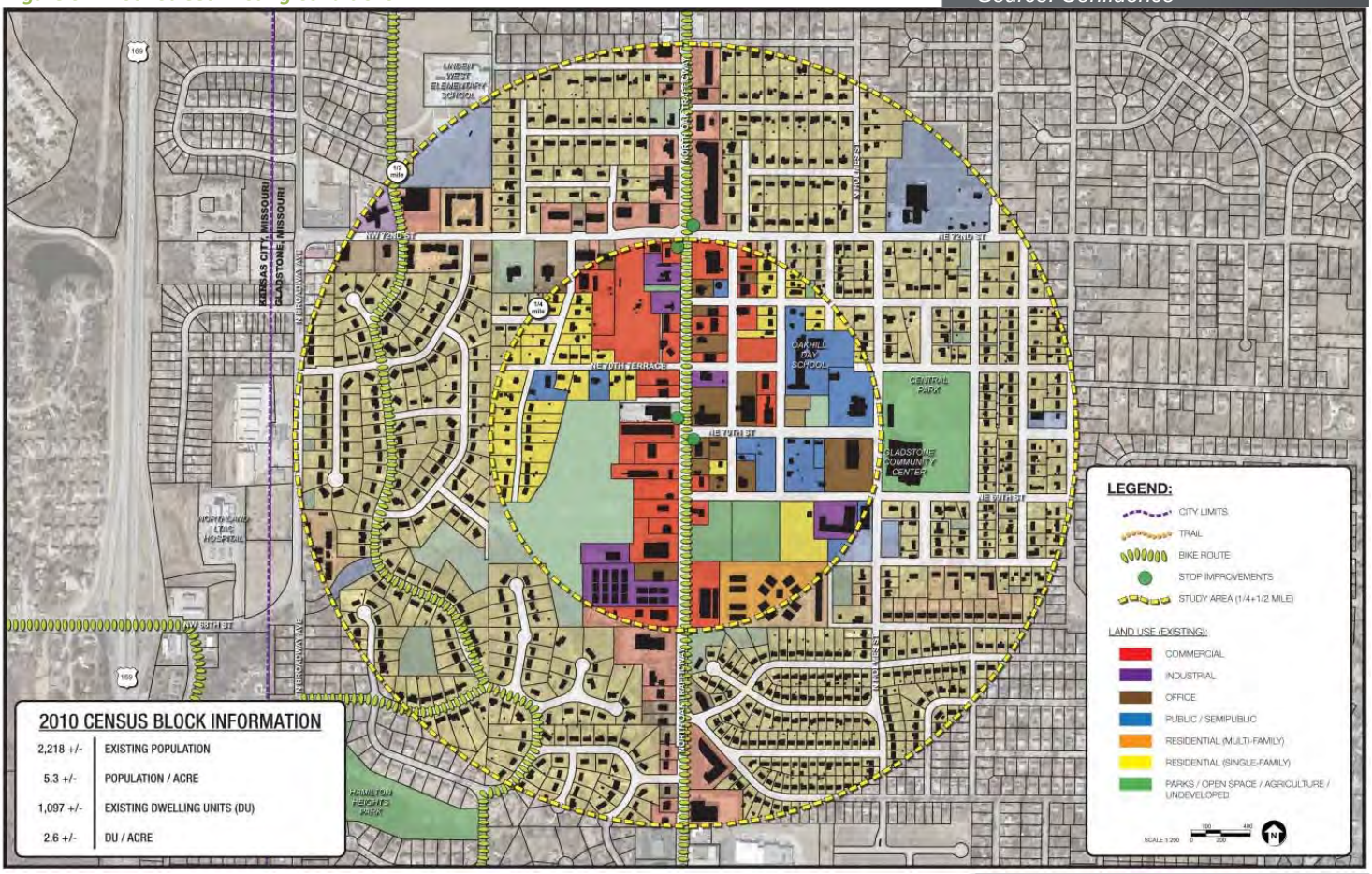
This node offers numerous single-use, small retail uses directly abutting North Oak and 72nd Street - some on deeper lots that may lend themselves to more flexible redevelopment opportunities. A mixture of office and institutional uses are currently found in and around the Linden Square, with single-family neighborhoods surrounding the area.

Figure 6.3: Existing Site Conditions



Source: Confluence

Figure 6.4: 70th Street Existing Conditions



Source: Confluence

Existing Land Use and Density

Englewood Road: Existing Conditions

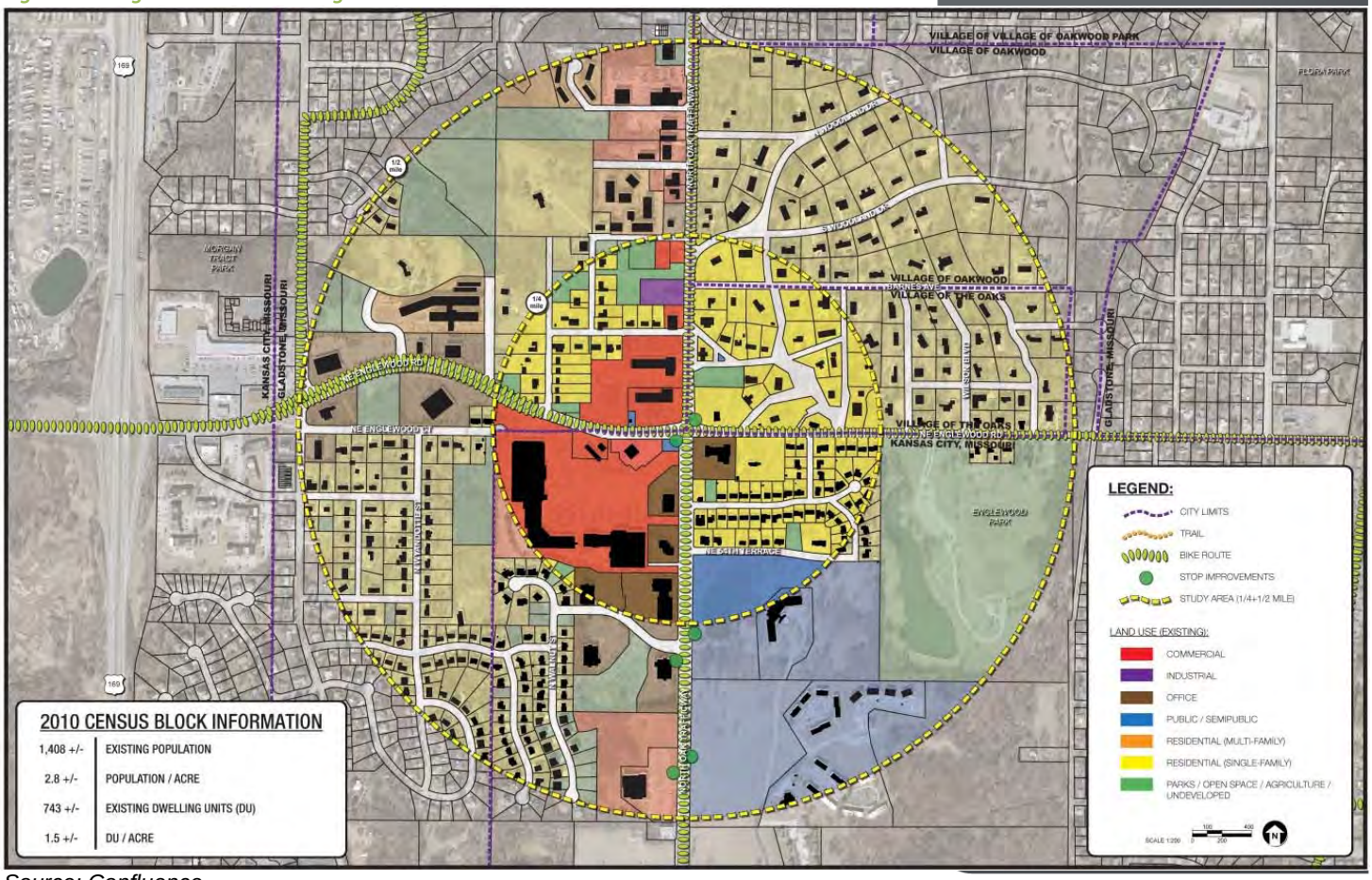
The Englewood Road node includes a wide array of existing uses with a relatively low overall residential density. The southeast quadrant includes small office, residential, and large institutional and park uses. The southwest quadrant includes a large neighborhood retail center, a concentration of medical office space, and single family residential uses. The northwest quadrant includes a large auto dealership surrounded by single family residential, with senior housing and office space along Englewood and large undeveloped parcels with limited access. The northeast quadrant includes larger lot single-family residential uses directly adjacent to the corridor.

This portion of the North Oak Corridor also contains some of the most challenging topography, with the Englewood Road intersection located at a high-point and roads sloping away in each direction. These existing grades will also likely have a limiting effect on the redevelopment potential for a number of these parcels, which may require the use of a combination of retaining walls and multi-level buildings integrated into the existing slopes. An advantage of this location is the relatively close proximity and access to the US 169 Highway corridor to the west via Englewood Road.

Figure 6.5: Existing Site Conditions

Source: Confluence

Figure 6.6: Englewood Road Existing Conditions



Source: Confluence

Existing Land Use and Density

Highway 29/Vivion Road: Existing Conditions

The Highway 29 / Vivion Road node is generally located in the middle of the corridor study area, and contains diverse uses that are distinctly different on each side of the highway corridor.

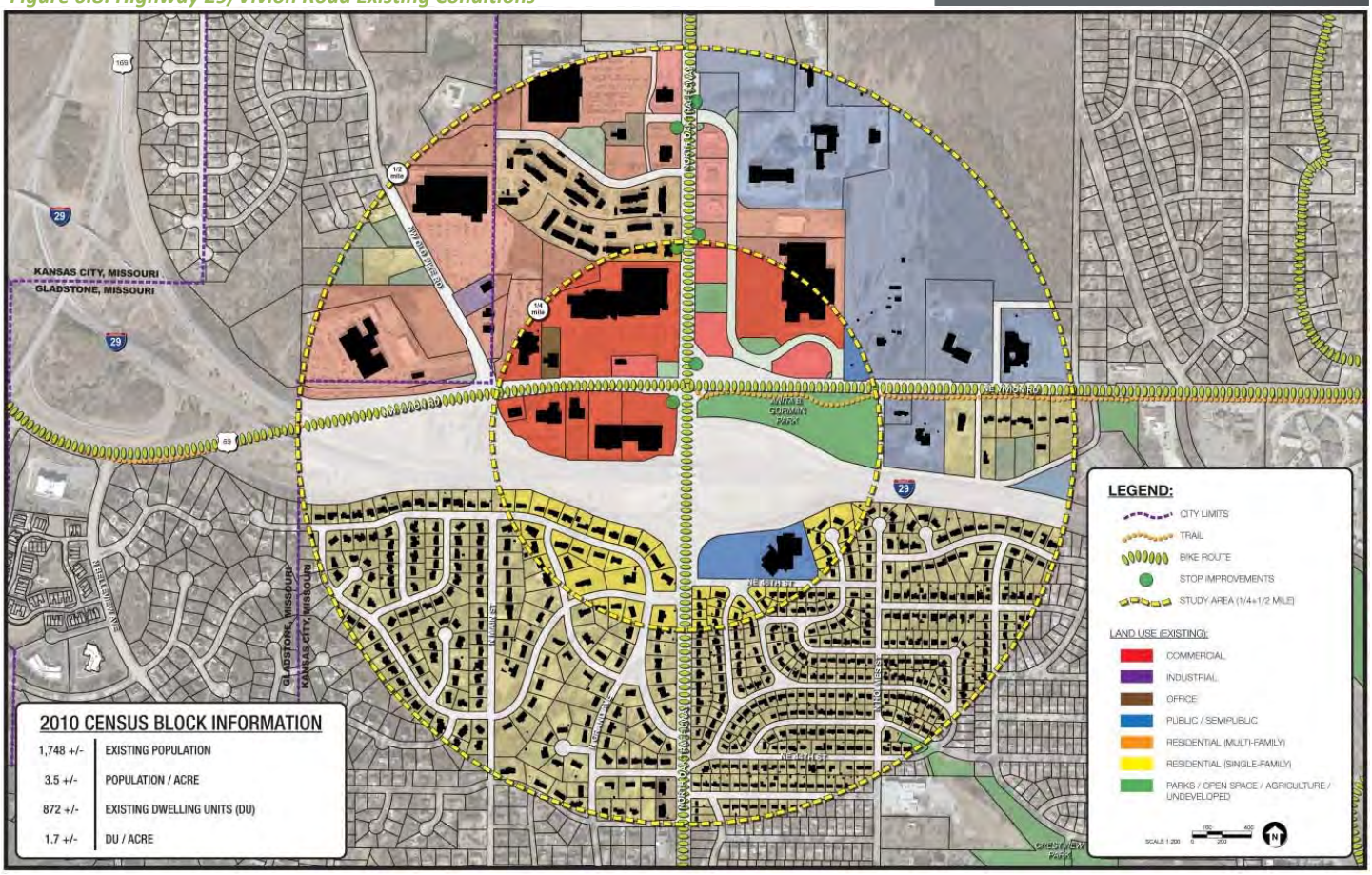
The areas north of the highway on both the east and west sides of North Oak contain several big box retail and strip commercial uses. A theological seminary serves as a large institutional use in the northeast quadrant, which also includes a linear park space, a YMCA, and several large lot single-family uses directly abutting the south side of Vivion Road The northwest quadrant also includes an apartment complex, some limited office space, and a few auto dealerships along the Vivion Road frontage.

The area south of the highway interchange contains an existing church and primarily single-family residential neighborhoods that are directly adjacent to the North Oak Corridor. These existing uses are anticipated to have a significant limiting effect on the redevelopment potential for land south of the interstate.

Figure 6.7: Existing Site Conditions

Source: Confluence

Figure 6.8: Highway 29/Vivion Road Existing Conditions



Source: Confluence

Existing Land Use and Density

Cherry Street: Existing Conditions

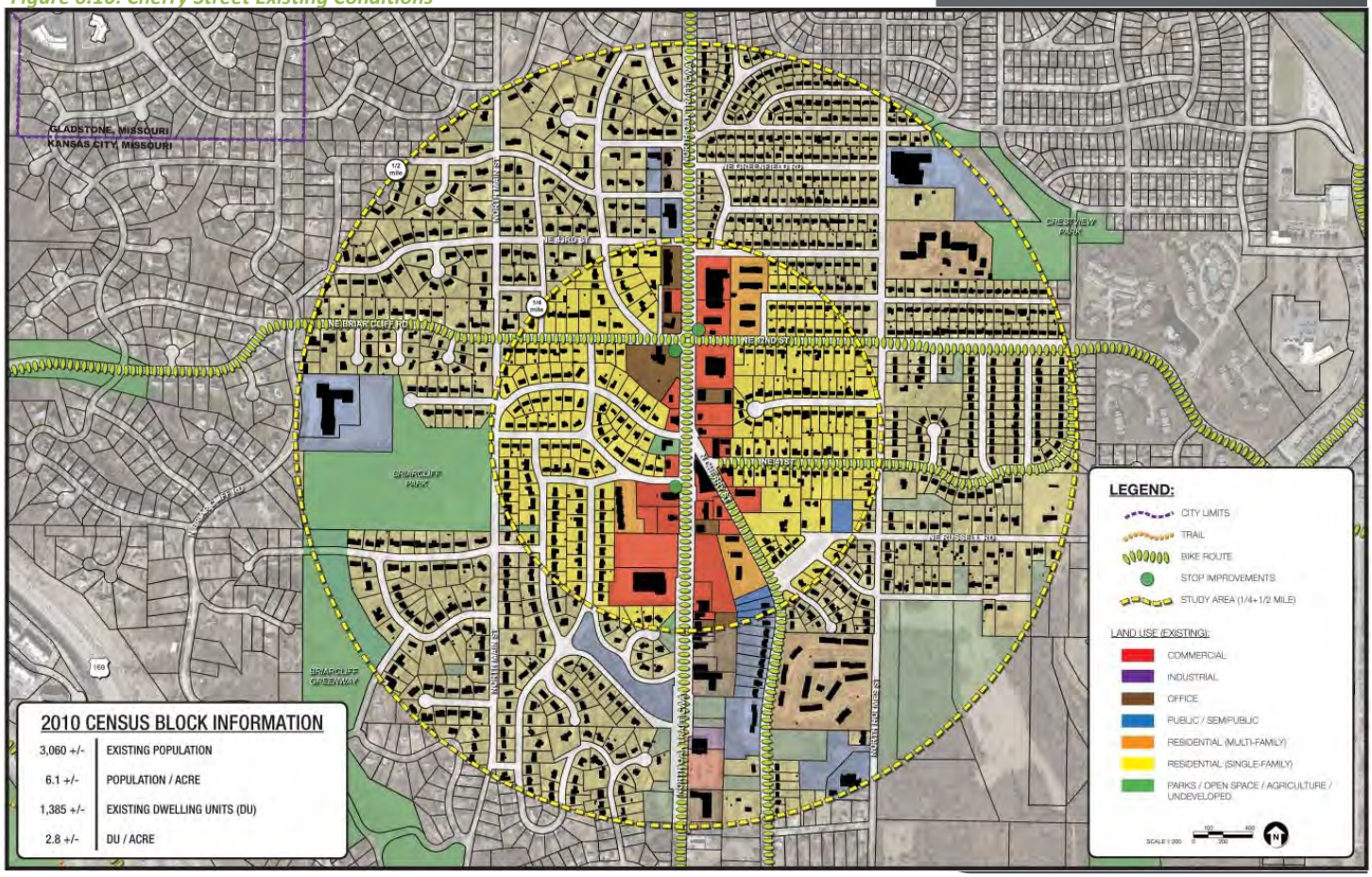
The Cherry Street node has the highest concentration of existing single-family residential density of all nodes in the study area. These neighborhoods are located in relatively close proximity to the North Oak Corridor, with portions of these neighborhoods directly adjacent to the road.

A mixture of office and commercial retail uses on relatively small parcels line the North Oak Corridor on both the east and west sides of the street. A school and a large community park exists on the east side of the study area. Existing multi-family residential uses and park spaces are located in both the northeast and southeast quadrants. The small commercial parcels and proximity of existing residential uses are anticipated to have a limiting effect on the potential for larger redevelopment scenarios in this node.

Figure 6.9: Existing Site Conditions

Source: Confluence

Figure 6.10: Cherry Street Existing Conditions



Source: Confluence

Existing Land Use and Density

Armour Road: Existing Conditions

The Armour Road node includes the study area's largest concentration of industrial uses, as well as the smallest concentration of residential density. The western side of the corridor primarily contains industrial and commercial uses, with a significant portion of land adjacent to the Missouri River Corridor, US 169 highway, and existing railroad rights-of-way.

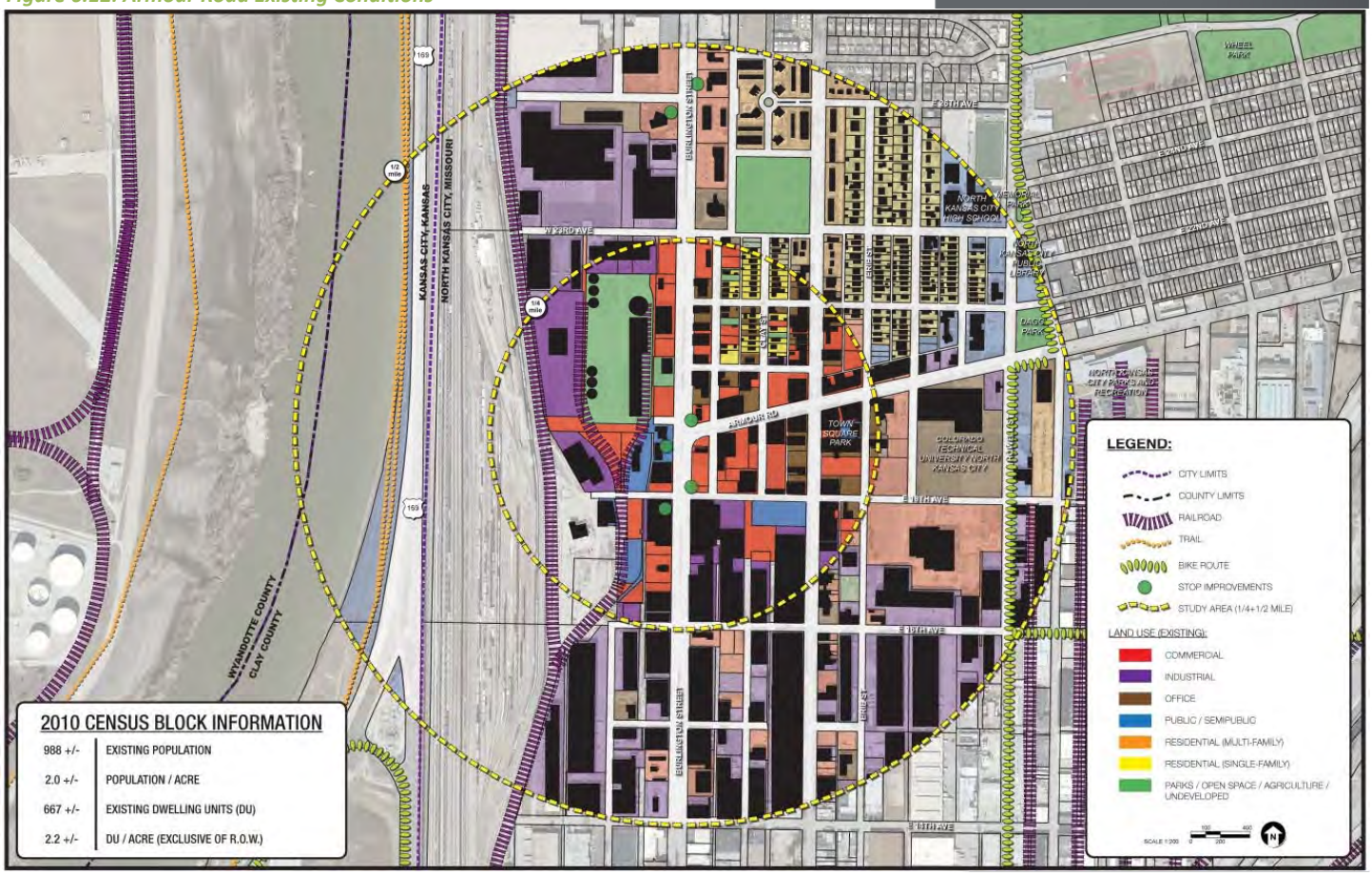
Downtown North Kansas City is located on the east side of the corridor and contains a quaint collection of multi-story and single story retail shops, restaurants, and office uses. Beyond the Downtown area, the southeast quadrant contains primarily industrial and limited commercial uses. The northeast quadrant contains the area's most diverse collection of land uses, including single-family and multi-family residential uses, park space, and limited commercial uses. North Kansas City High School is also located in this quadrant.

This node is particularly conducive to future redevelopment scenarios due to the charming character of this Downtown area and its proximity to Downtown Kansas City; however, this potential is mitigated by the proximity of adjacent industrial uses.

Figure 6.11: Existing Site Conditions

Source: Confluence

Figure 6.12: Armour Road Existing Conditions



Source: Confluence

Future Growth

This transit-focused planning study analyzes the relationship between various modes of transit and the surrounding development intensity that would be necessary to create a self-sustaining transit system. Future ridership projections for the entire North Oak Corridor were generated for three alternative future modes of transit: Base Bus Service, Bus Rapid Transit, and Streetcar. A model was also created to calculate the amount of ridership generated from future population and employment growth to determine the total number of additional residents and jobs needed to effectively support each transit mode.

For planning purposes, the total existing employment and population (EMPOP) along the entire corridor was determined to be 93,710 residents/jobs. This includes the northern portion of Kansas City's Central Business District (CBD), which will be connected via transit in all scenarios. Using the 1-mile diameter planning areas around each of the six identified nodes, the existing EMPOP in each node was determined Figure 6.13. The total projected EMPOP needed for each transit mode is as follows:

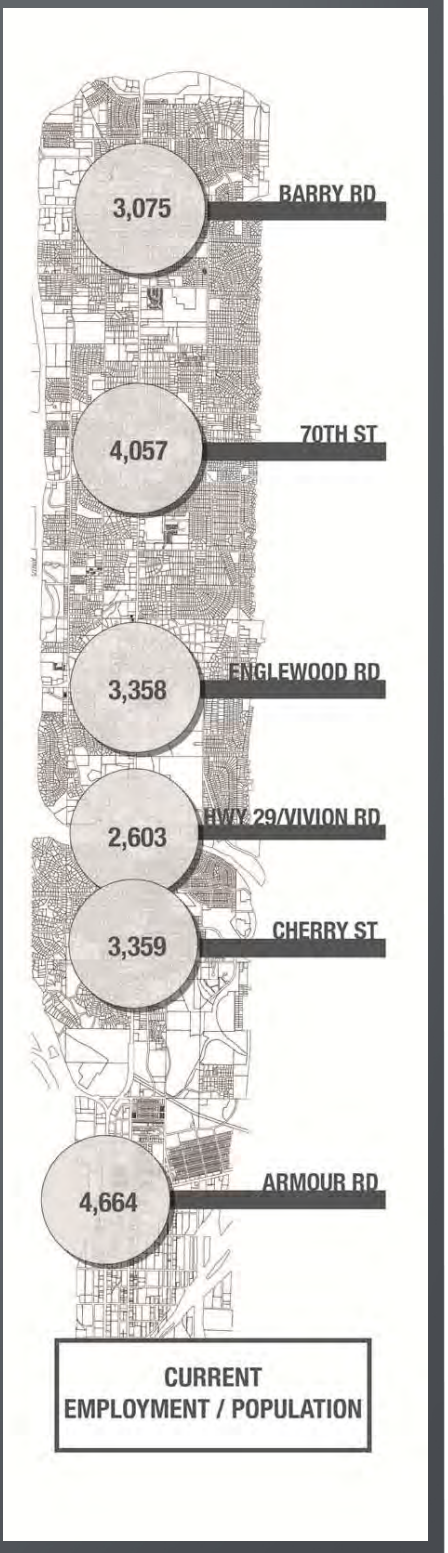
- Base Bus Service: 101,254 total EMPOP (addition of 7,544)
- Bus Rapid Transit: 152,409 total EMPOP (addition of 51,155)
- Streetcar: 245,237 total EMPOP (addition of 92,828)

These growth projections were then attributed to the corridor utilizing a methodology that recognizes significant growth in Kansas City's transit network is anticipated to result in significant CBD growth. This study attributes 25 percent of the projected future growth to occur in the northern portion of the CBD, with the remaining 75 percent of growth designated to occur along the remaining portions of the North Oak Corridor study area.

The planning concept of encouraging compact and densely populated redevelopment has been a growing trend throughout the United States and in the Kansas City metropolitan area, particularly in the inner-ring suburbs. It encourages more efficient use of land, infrastructure, and natural resources while typically creating more walkable and connected patterns of growth and development – which can improve the overall quality of life in these communities. This concept is used as a basis for attributing the remaining 75 percent of growth to the corridor, with 10 percent anticipated to occur in areas located in between the six identified nodes, and the remaining 65 percent of growth attributed to occur within the identified nodes.

Utilizing the existing conditions analysis for each of the six nodes, a methodology for applying the remaining future growth to each of the nodes was developed. Key factors were considered including the availability of undeveloped properties, existing land uses and building vacancies, anticipated future land uses identified in local area/comprehensive plans, proximity to major transportation corridors, and other relevant data. This remaining growth was attributed to each node as follows (Figure 6.16 Figure 6.15 Figure 6.14).

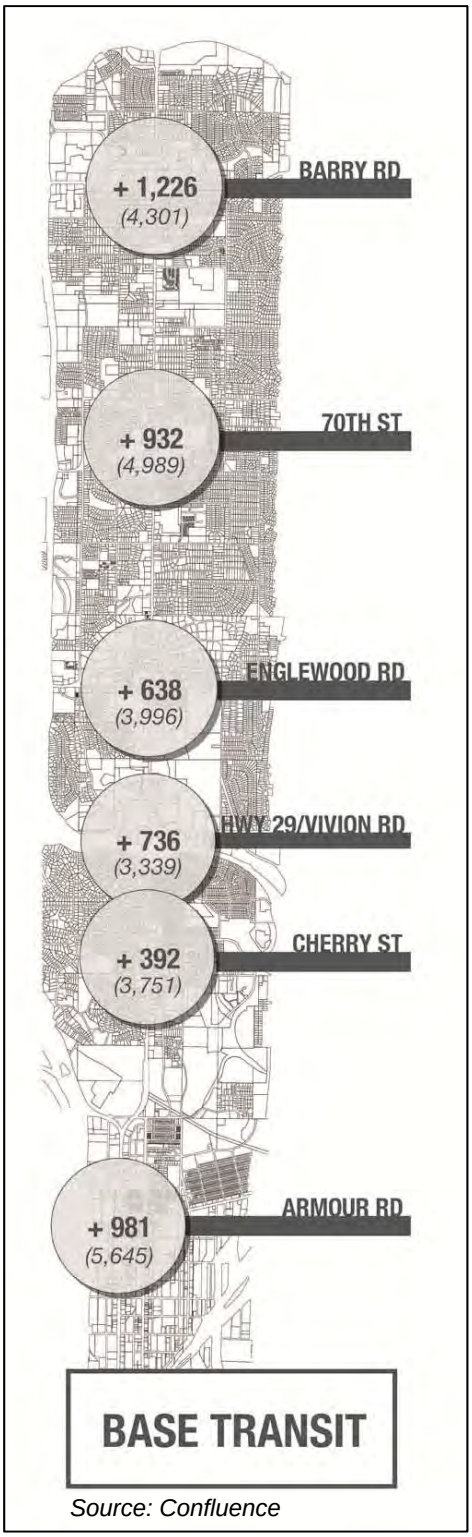
Figure 6.13: Current EMPOP Tools per Node



Source: Confluence

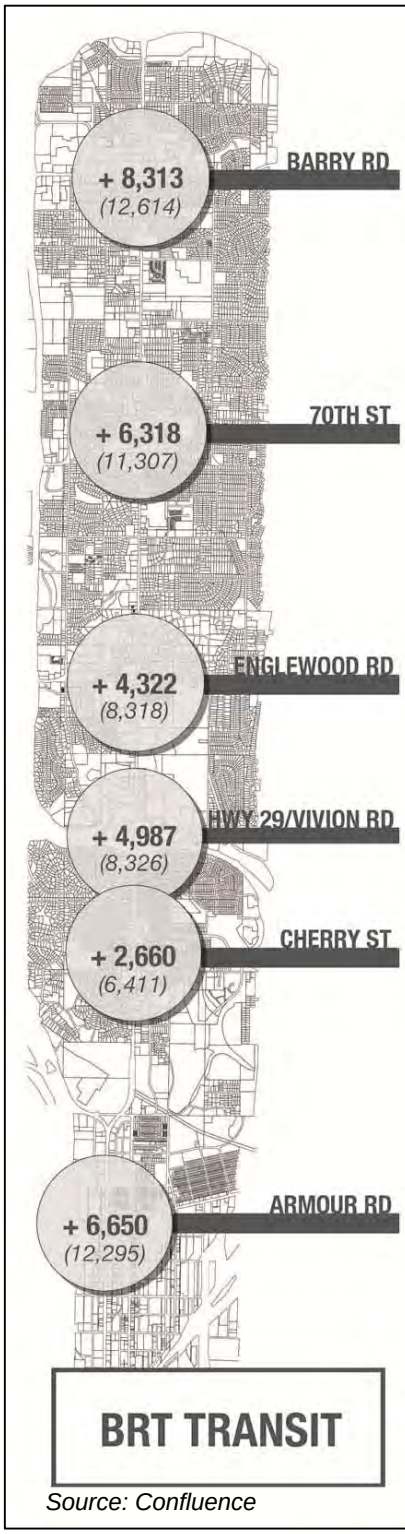
- Barry Road 25 percent
- 70th Street 19 percent
- Englewood 13 percent
- I-29/Vision Road 15 percent
- Cherry Street 8 percent
- Armour Road 20 percent

Figure 6.14: Base Transit EMPOP Additions and Totals per Node:



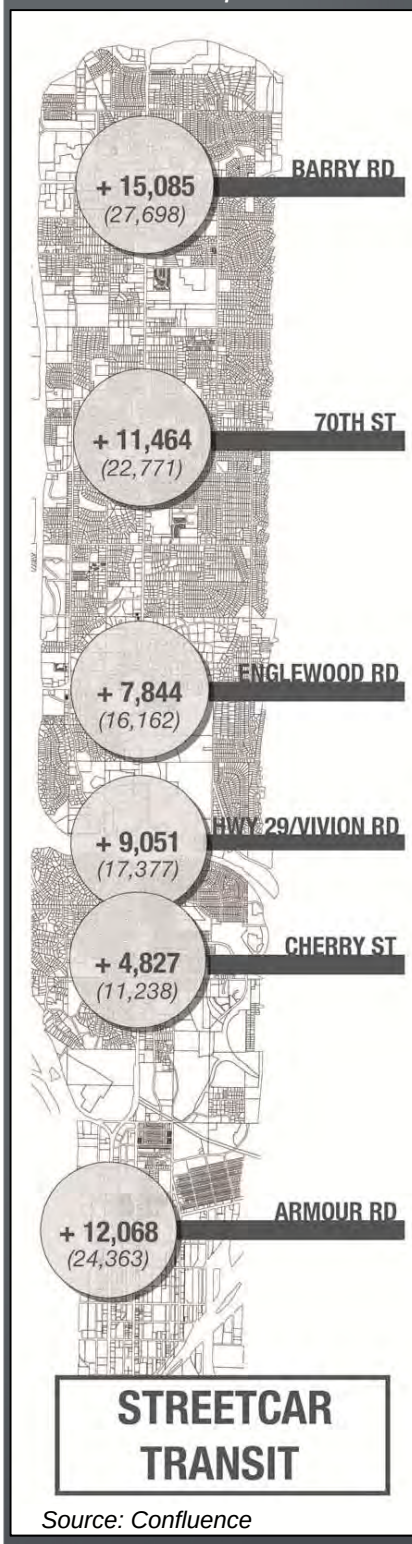
Source: Confluence

Figure 6.15: BRT Transit EMPOP Additions and Tools per Node:



Source: Confluence

Figure 6.16: Streetcar Transit EMPOP Additions and Tools per Node:



Source: Confluence

The three scenarios and ridership growth projections are intended to be sequential in nature, such that the necessary growth identified in the BRT scenario would be in addition to having already achieved the growth identified in the Base scenario. A chart outlining the overall growth projections and how they are attributed to each node along the corridor is provided for reference in Table 6.1.

As indicated in this chart, there is relatively minor growth needed to support base transit service in the North Oak Corridor. Substantial growth and development is needed to achieve the ridership levels indicated to create a self-sustaining bus rapid transit system. To eventually achieve a self-sustaining streetcar system along the corridor, the existing population and employment would need to more than double that of today.

To better understand the land use implications of attributing these future growth projections within the corridor, the Corridor Advisory Committee selected three nodes for further study: Barry Road, 70th Street, and Armour Road. A more detailed series of land use and development alternatives were created for each of these nodes to compare existing conditions with what is needed to support each of the three transit modes. Each of the scenarios for these nodes are intended to build on one another in sequential fashion, such that the growth needed for base transit service will have already been attained as part of the bus rapid transit or streetcar scenarios.

For the purposes of this initial study effort, these scenarios do not currently attribute any significant additional ridership from the surrounding community beyond the 1-mile wide study area along the North Oak Corridor. It is understood that the surrounding community is also anticipated to experience growth over time, and could generate some additional ridership for these scenarios if other transit-supportive improvements were made. These could include improved bus routes serving surrounding areas that connect with the North Oak transit spine, providing park and ride transit stations, or other related enhancements to the transit network. If these are developed and implemented in strategic fashion, these enhancements could mitigate the amount of future growth attributed to each of these nodes.

Table 6.1: Current and Needed EMPOP Totals

CURRENT EMPLOYMENT + POPULATION (EMPOP): 93,710			
EMPOP FOR TRRANSIT MODES	**101,254 (BASE)**	**52,409 (BRT)**	**245,237 (STREETCAR)**
Additional EMPOP Needed	7,544	51,155	92,828
10% of EMPOP between Nodes	754	5,116	9,283
25% of EMPOP in CBD	1,886	12,789	23,207
EMPOP AT CORRIDOR LOCATIONS	**4,904**	**33,251**	**60,338**
Barry Road	1,226	8,313	15,085
70th Street	932	6,318	11,464
Englewood Road	638	4,322	7,844
I-29/Vivion Road	736	4,987	9,051
Cherry Street	392	2,660	4,827
Armour Road	981	6,650	12,068
TOTAL	**4,904**	**33,251**	**60,338**

Barry Road - Planning Context

Area Review + Analysis

Prior to exploring future growth scenarios, the Gashland Nashua Area Plan was reviewed to understand identified future land uses and priority redevelopment areas (Figure 6.23 & Figure 6.18). Existing land uses and age of commercial properties were also reviewed to identify near to long-term redevelopment sites within this node area. At less than 2 units per acre, the existing net residential density is the lowest of the three nodes selected for further analysis.

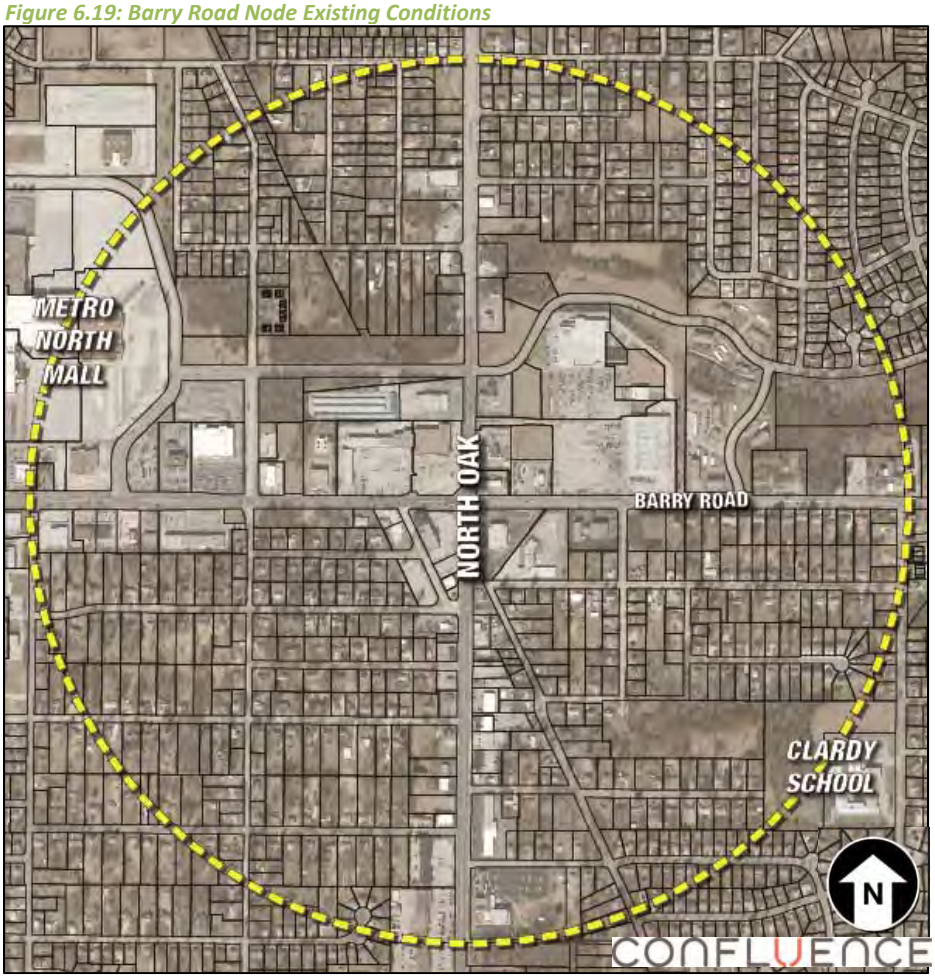
Table 6.23: Future Land Use Plan

Source: Gashland Nashua Area Plan

Figure 6.18: Priority Redevelopment Areas

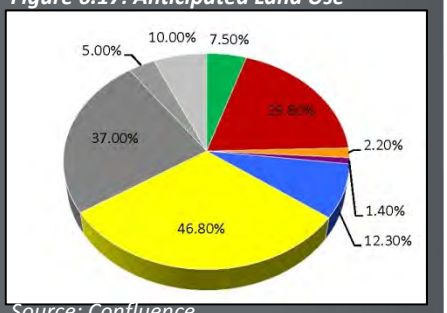
Source: Gashland Nashua Area Plan

Figure 6.19: Barry Road Node Existing Conditions



Source: Confluence

Figure 6.17: Anticipated Land Use



Source: Confluence

LEGEND:

- Commercial/Office
- Industrial
- Open Space/Institutional
- Residential MF
- Residential SF
- Undeveloped Land
- Anticipated Redevelopment (0-5 yrs.)
- Anticipated Redevelopment (5-10 yrs.)
- Anticipated Redevelopment (10-15 yrs.)

DATA (EXISTING)

Net Density (Housing Units/Acre):

1.79

Total Population+Employment:

3,075

Figure 6.20: Anticipated Redevelopment

Source: Confluence

LEGEND:

- 0-5 yrs.
- 5-10 yrs.
- 10-15 yrs.

Barry Road – Scenario Planning Approach

Transit Growth Scenario Overview

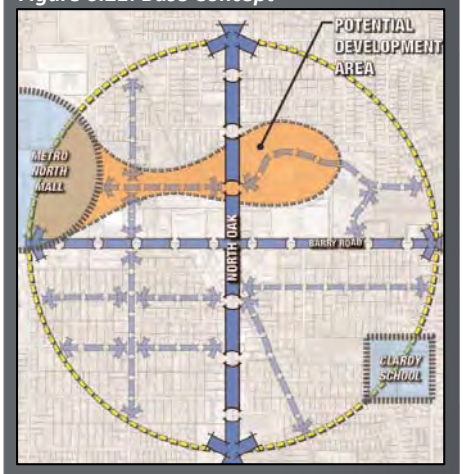
Prior to describing future growth concepts associated with each of the three alternative transit scenarios for the Barry Road node, it is important to understand the intent of this planning exercise and to place it within its proper context. To be clear, the following scenarios are purely hypothetical and are not based on market feasibility, nor do they represent any specific development proposals. They are focused on improving mobility within the corridor through the introduction of each transit mode. The amount and type of future development illustrated in these concepts is solely based on theoretically achieving the necessary ridership identified for each mode of transit to create a self-sustaining system.

Concept diagrams are provided to illustrate the sequential nature of the three transit growth scenarios for the Barry Road node as follows:

- **Base Transit Scenario** (Figure 6.21) - The initial growth necessary to support base bus transit service in this node is generally shown to occur north of the Barry Road.
- **BRT Transit Scenario** (Figure 6.22) - The next wave of growth and redevelopment to support future bus rapid transit service is generally shown to occur adjacent to both the Barry Road and North Oak corridors while also extending to parcels north of the base scenario.
- **Streetcar Transit Scenario** (Figure 6.23) - To attain the ridership levels necessary to support future streetcar transit service, significant growth and redevelopment is generally shown to occur in the southeast quadrant as well as further north along the North Oak corridor.

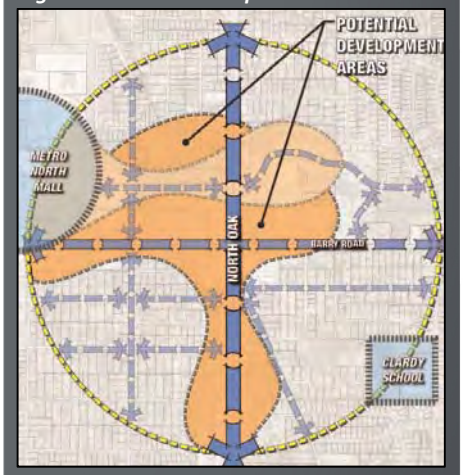
Each of these scenarios is further illustrated with proposed land uses on the following pages.

Figure 6.21: Base Concept



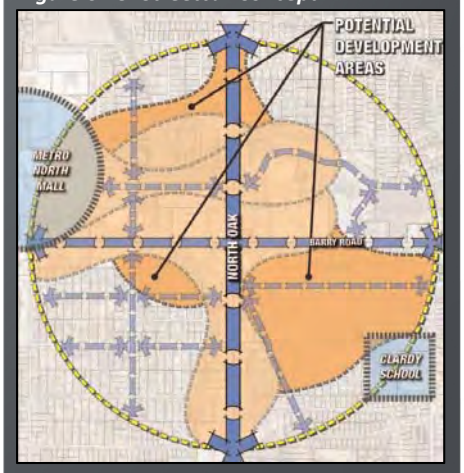
Source: Confluence

Figure 6.22: BRT Concept



Source: Confluence

Figure 6.23: Streetcar Concept



Source: Confluence

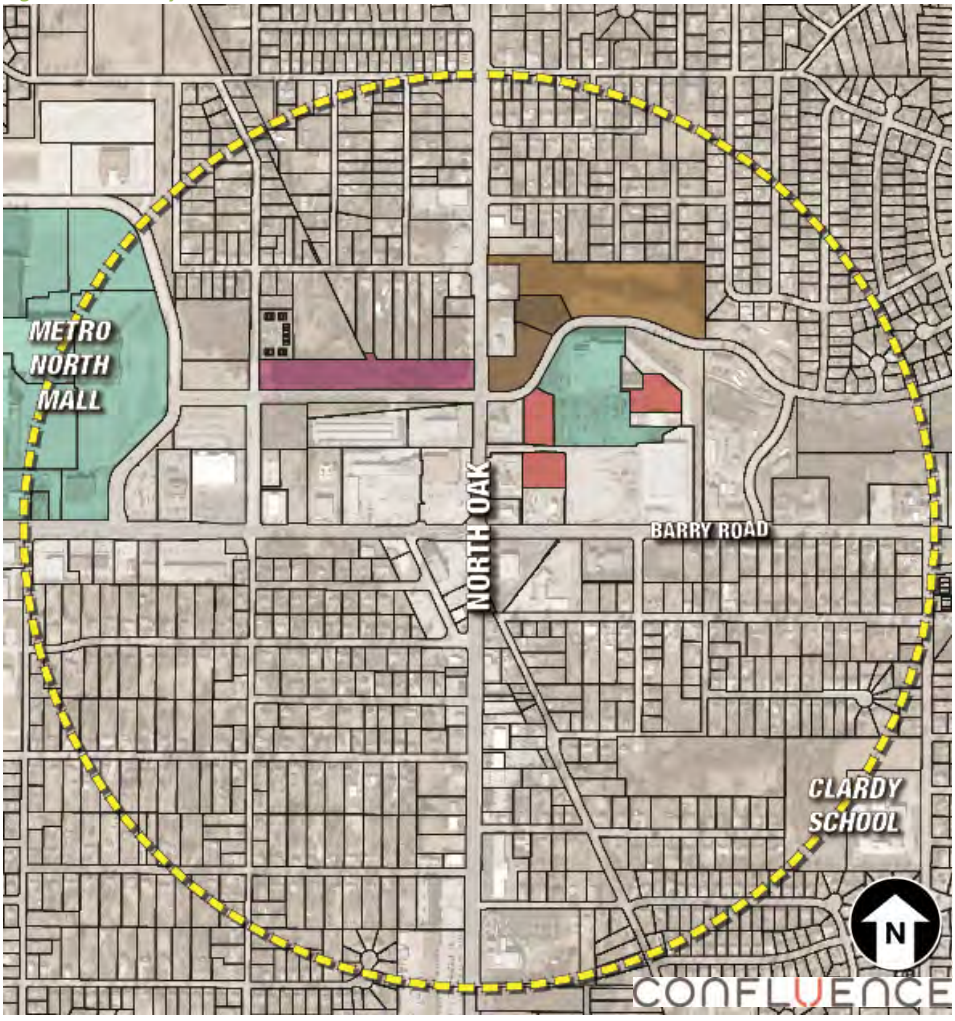
Barry Road – Base Scenario

Growth Scenario Overview

Through a combination of new development on existing unimproved properties and the revitalization of existing commercial properties, which includes the Metro North Mall, this growth scenario supports increasing the existing bus service to a self-sustaining base level of bus service by providing additional housing and commercial retail and office development in this node. This increases the total employment and population from 3,075 to 4,301 (Figure 6.25).

Prototypical land uses and development types utilized in this growth scenario are noted in the legend, and include adaptive re-use of commercial retail space, 2 to 3-story multi-family residential, and 1 to 3-story commercial/office space. With the exception of the adaptive re-use, all new development is shown on parcels that are currently vacant. The overall net residential density in this node increased slightly as a result of this scenario, rising from 1.79 to 2.39 units per acre.

Figure 6.25: Barry Road Node Growth Scenario



Source: Confluence

Figure 6.24: Base Concept

Source: Confluence

NOTE: *This concept is based on achieving ridership to support this transit mode and is not to be considered a redevelopment proposal.*

DATA (BASE)

Net Density (Housing Units/Acre):

2.39

Total Population+Employment:

4,301

LEGEND:

- Commercial/Office - High (3 Stories - 22,211 Comm. SF/BLDG)
- Multifamily - High (2 Stories - 20 DU/Acre)
- Multifamily - Very High (3 Stories - 30 DU/Acre)
- Commercial - High (1 Story - 35,384 Comm. SF/BLDG)
- Adaptive Reuse - Big Box (1-Story - 44,118 Comm. SF/BLDG)

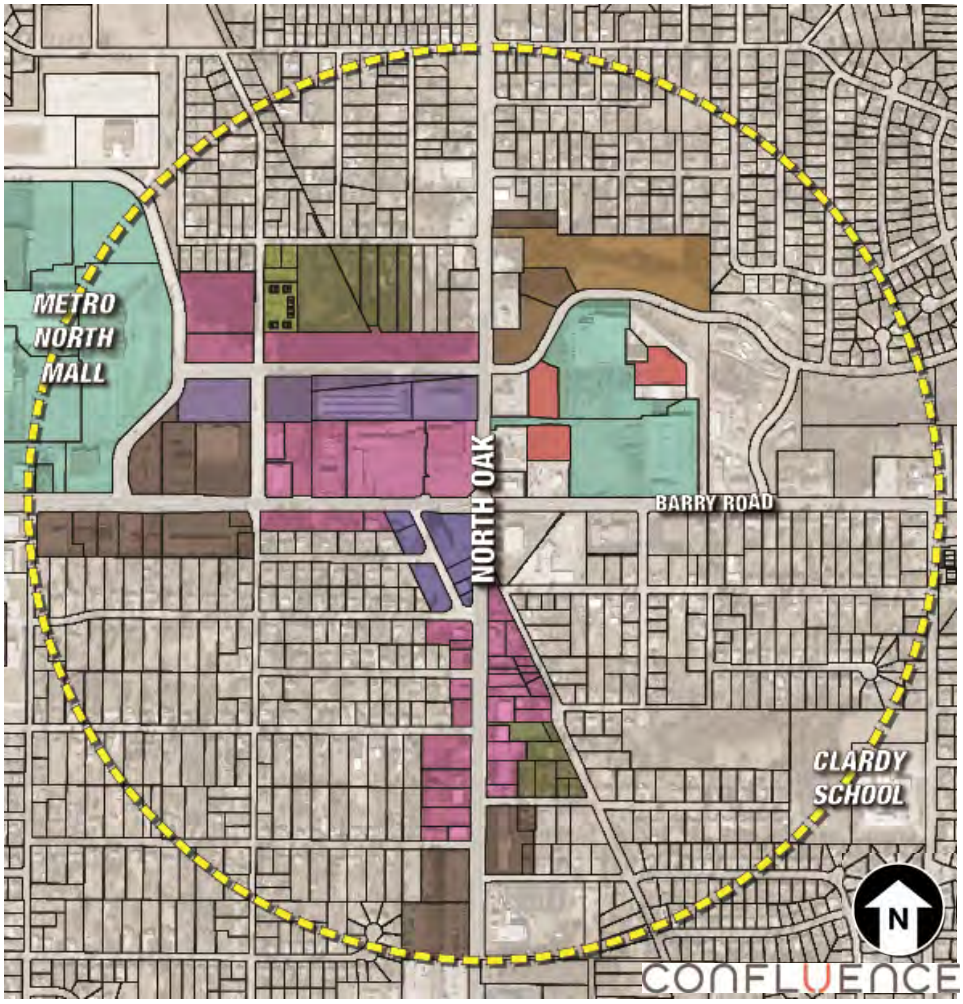
Barry Road – BRT Scenario

Growth Scenario Overview

In addition to the development already provided in the previous growth scenario, this concept transforms the transit mode from base level bus to a self-sustaining bus rapid transit system, and significant commercial and mixed-use redevelopment for areas along the Barry Road corridor between Metro North Mall and North Oak as well as both sides of the North Oak corridor south of Barry Road. This increases the total employment and population from 4,301 to 12,614 (Figure 6.27)

Additional prototypical land uses and development types utilized in this growth scenario are noted in the legend, and include 4 to 5-story residential mixed-use (commercial space on the ground floor with residential units above), 4 to 5-story multi-family residential, and 1 to 3-story commercial office space. A few relatively small areas of existing single-family residential are considered for redevelopment into densely net residential density results in a threefold increase from 2.39 to 7.06 units per acre.

Figure 6.27: Barry Road Node BRT Growth Scenario



Source: Confluence

Figure 6.26: BRT Concept

Source: Confluence

NOTE: *This concept is based on achieving ridership to support this transit mode and is not to be considered a redevelopment proposal.*

DATA (BRT)

Net Density (Housing Units/Acre):

7.06

Total Population+Employment:

12,614

LEGEND:

- Res. Mixed Use - High (4 Stories - 61 DU/Acre - 4,396 Comm. SF)
- Res. Mixed Use - Very High (5 Stories - 87 DU/Acre - 8,349Comm. SF)
- Multifamily - High (2 Stories - 20 DU/Acre)
- Multifamily - Very High (3 Stories - 30 DU/Acre)
- Multifamily - 60 (4 Stories - 60 DU/Acre)
- Multifamily - 80 (5 Stories - 80 DU/Acre)
- Commercial/Office - High (3 Stories - 22,211 Comm. SF/BLDG)
- Commercial - High (1-Story - 35,384 Comm. SF/BLDG)
- Office - Very High (3 Stories - 39,204 Comm. SF/BLDG)
- Adaptive Reuse - Big Box (1-Story - 44,118 SF/BLDG)

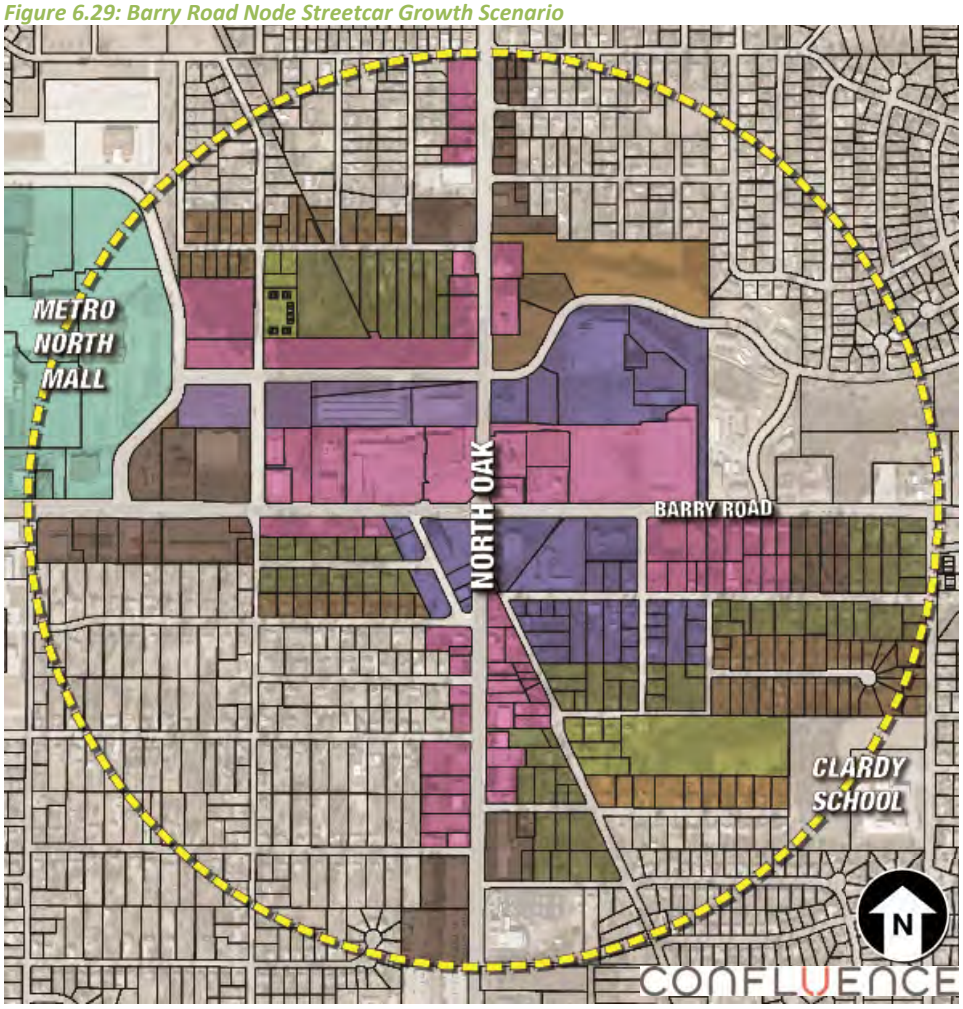
Barry Road – Streetcar Growth

Growth Scenario Overview

In addition to the development already provided in the previous growth scenario, this concept transforms the transit mode from bus rapid transit to a self-sustaining streetcar transit system, and anticipates significant additional commercial and mixed-use redevelopment throughout the Barry Road study area. Portions of the previous commercial development and adaptive re-use shown in the base level growth scenario's northeast quadrant are now shown to be redeveloped into a more densely populated commercial and residential mixed-use "village center" as part of this scenario. This increase more than doubles the total employment and population from 12,614 to 27,699 (Figure 6.29).

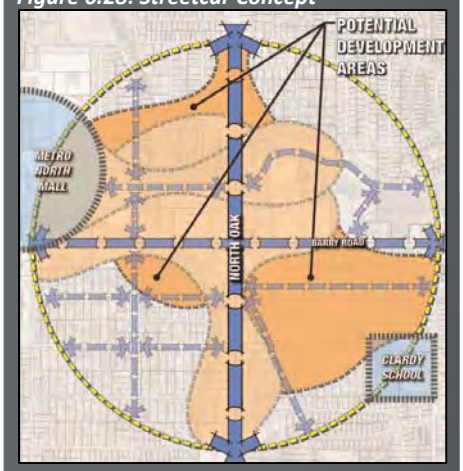
Prototypical land uses and development types utilized in this growth scenario are noted in the legend. In areas generally surrounding the new village center, other nearby blocks of single-family residential properties are considered for redevelopment into more densely populated housing and mixed-use commercial land uses - with significant revitalization in the southeast quadrant. The overall net residential density increases 7.06 to 18.51 units per acre.

Figure 6.29: Barry Road Node Streetcar Growth Scenario



Source: Confluence

Figure 6.28: Streetcar Concept



Source: Confluence

NOTE: *This concept is based on achieving ridership to support this transit mode and is not to be considered a redevelopment proposal.*

DATA (STREETCAR)

Net Density (Housing Units/Acre):

18.51

Total Population+Employment:

27,699

LEGEND:

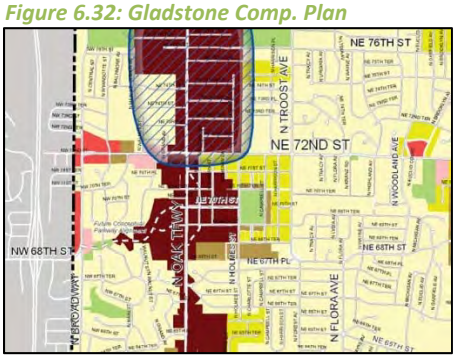
- Res. Mixed Use - High (4 Stories - 61 DU/Acre - 4,396 Comm. SF)
- Res. Mixed Use - Very High (5 Stories - 87 DU/Acre - 8,349Comm. SF)
- Multifamily - High (2 Stories - 20 DU/Acre)
- Multifamily - Very High (3 Stories - 30 DU/Acre)
- Multifamily - 60 (4 Stories - 60 DU/Acre)
- Multifamily - 80 (5 Stories - 80 DU/Acre)
- Commercial/Office - High (3 Stories - 22,211 Comm. SF/BLDG)
- Office - Very High (3 Stories - 39,204 Comm. SF/BLDG)
- Adaptive Reuse - Big Box (1-Story - 44,118 SF/BLDG)

70th Street – Planning Context

Area Review + Analysis

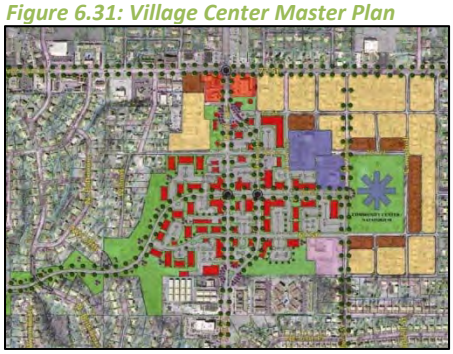
Prior to exploring future growth scenarios, Gladstone's Comprehensive Plan and the Village Center Master Plan were reviewed to understand identified future land use and redevelopment strategies (Figure 6.31, Figure 6.32). Existing land uses and age of commercial properties were also reviewed to identify near to long-term redevelopment sites within this node area. At over 2.5 units per acre, the existing net residential density is the highest of the three nodes selected for further analysis.

Figure 6.32: Gladstone Comp. Plan



Source: Gladstone Comp Plan

Figure 6.31: Village Center Master Plan

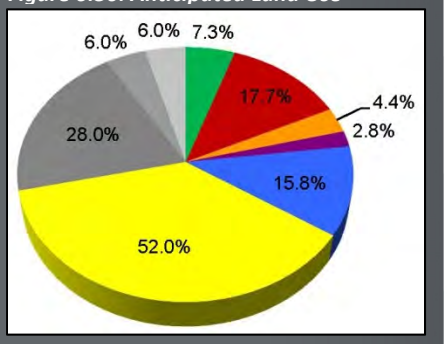


Source: Gladstone Comp Plan

Figure 6.33: 70th Street Node Existing Conditions

Source: Confluence

Figure 6.30: Anticipated Land Use



Source: Confluence

LEGEND:

- Commercial/Office
- Industrial
- Open Space/Institutional
- Residential MF
- Residential SF
- Undeveloped Land
- Anticipated Redevelopment (0-5 yrs.)
- Anticipated Redevelopment (5-10 yrs.)
- Anticipated Redevelopment (10-15 yrs.)

DATA (EXISTING)

Net Density (Housing Units/Acre):

2.59

Total Population+Employment:

4,057

Figure 6.34: Anticipated Redevelopment

Source: Confluence

LEGEND:

- 0-5 yrs.
- 5-10 yrs.
- 10-15 yrs.

70th Street – Scenario Planning Approach

Transit Growth Scenario Overview

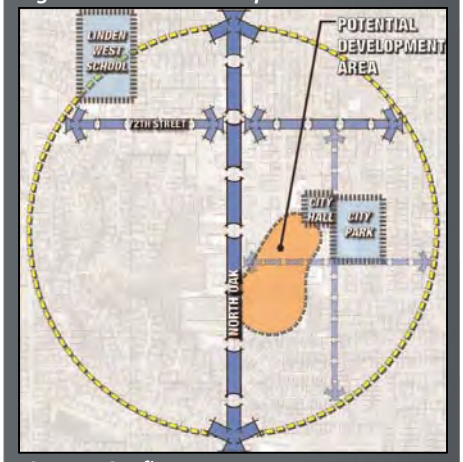
Prior to describing future growth concepts associated with each of the three alternative transit scenarios for the 70th Street node, it is important to understand the intent of this planning exercise and to place it within its proper context. To be clear, the following scenarios are purely hypothetical and are not based on market feasibility, nor do they represent any specific development proposals. They are focused on improving mobility within the corridor through the introduction of each transit mode. The amount and type of future development illustrated in these concepts is solely based on theoretically achieving the necessary ridership identified for each mode of transit to create a self-sustaining system.

Concept diagrams are provided to illustrate the sequential nature of the three transit growth scenarios for the 70th Street node as follows:

- **Base Transit Scenario** (Figure 6.35) - The initial growth necessary to support base bus transit service in this node is generally shown to occur within Gladstone's Village Center, referred to as Linden Square, located on the east side of North Oak.
- **BRT Transit Scenario** (Figure 6.36) - The next wave of growth and redevelopment to support future bus rapid transit service is generally shown to expand Linden Square to the west side of North Oak while also extending to parcels north of the base scenario.
- **Streetcar Transit Scenario** (Figure 6.37) - To attain the ridership levels necessary to support future streetcar transit service, significant growth and redevelopment is generally shown to occur in the northeast quadrant of Linden Square as well as along the North Oak and 72nd Street corridors.

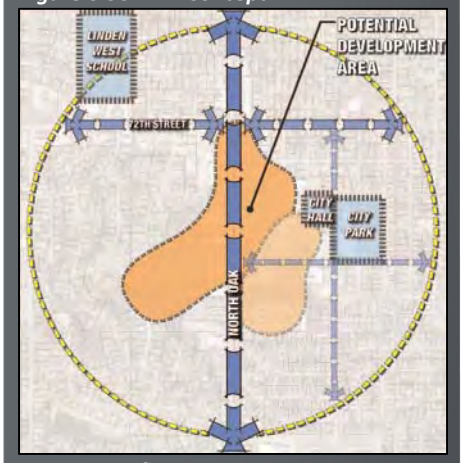
Each of these scenarios is further illustrated with proposed land uses on the following pages.

Figure 6.35: Base Concept



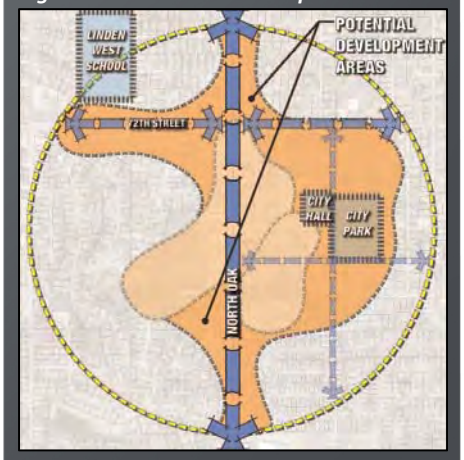
Source: Confluence

Figure 6.36: BRT Concept



Source: Confluence

Figure 6.37: Streetcar Concept



Source: Confluence

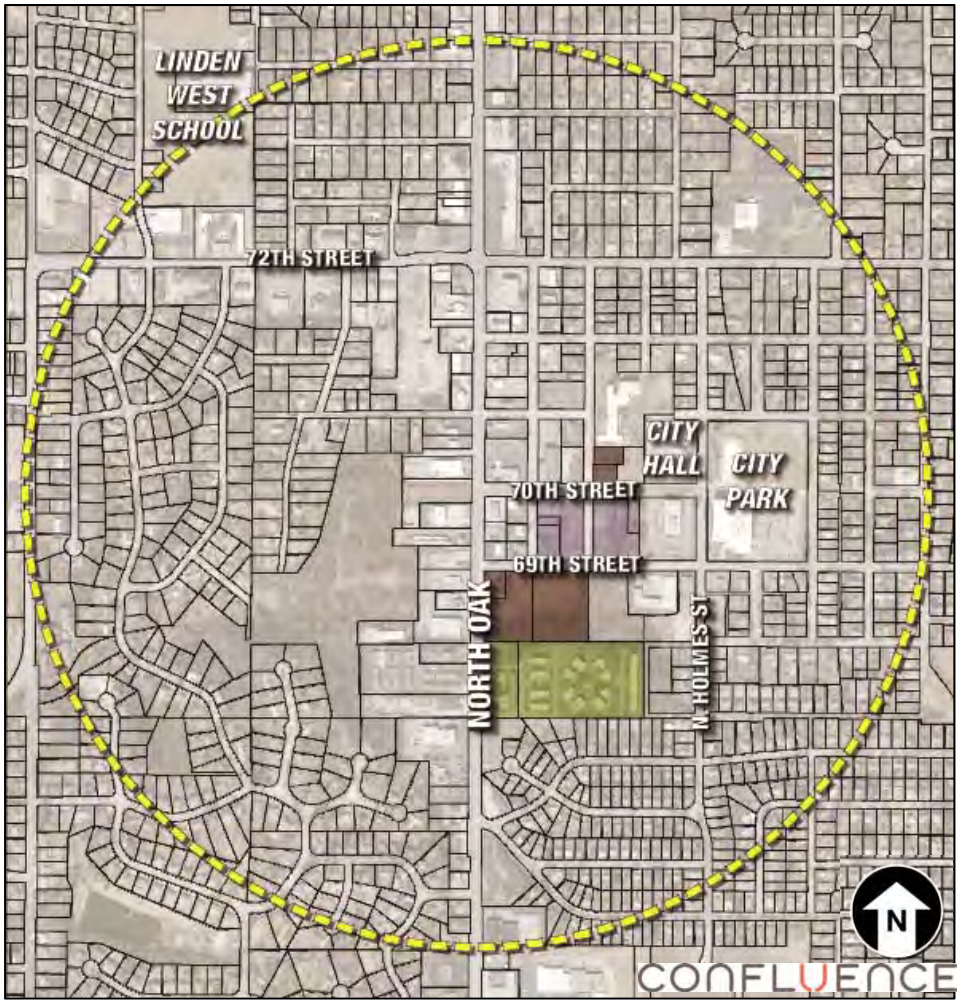
70th Street – Base Scenario

Growth Scenario Overview

Through a combination of new development on existing unimproved properties and the redevelopment of existing retail and multi-family properties to the south of Linden Square area, this growth scenario supports increasing the existing bus service to a self-sustaining base level of bus service by providing additional housing, commercial retail and office development in this node. This increases the total employment and population from 4,057 to 4,989 (Figure 6.39).

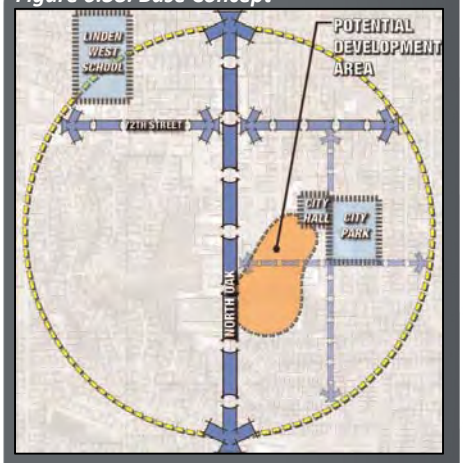
Prototypical land uses and development types utilized in this growth scenario are noted in the legend, and include 2-story office space and 4 to 5-story residential mixed-use (with a portion of the ground floor used for retail space). This growth pattern is consistent with recent development approvals and construction occurring in the area. The overall net residential density in this node increased as a result of this scenario, rising from 2.59 to 4.12 units per acre.

Figure 6.39: 70th Street Node Base Growth Scenario



Source: Confluence

Figure 6.38: Base Concept



Source: Confluence

NOTE: *This concept is based on achieving ridership to support this transit mode and is not to be considered a redevelopment proposal.*

DATA (BASE)

Net Density (Housing Units/Acre):

4.12

Total Population+Employment:

4,989

LEGEND:

- Res. Mixed Use - Med
  (4 Stories - 44 DU/Acre - 11,921 Comm. SF/BLDG)
- Multifamily - 60
  (4 Stories - 60 DU/Acre)
- Office - Very High
  (2 Stories - 24,575 Comm. SF/BLDG)

70th Street –BRT Scenario

Growth Scenario Overview

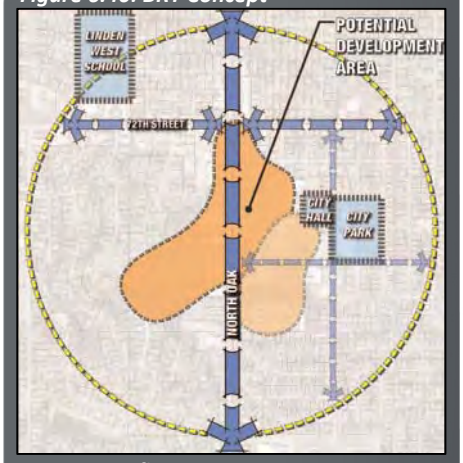
In addition to the development already provided in the previous growth scenario, this concept transforms the transit mode from base level bus to a self-sustaining bus rapid transit system, and anticipates significant commercial and multi-family residential redevelopment on the west side of North Oak adjacent to a future parkway alignment extending west to Broadway. It also includes significant redevelopment to the north along North Oak. This more than doubles the total employment and population from 4,989 to 11,307 (Figure 6.41).

Additional prototypical land uses and development types utilized in this growth scenario are noted in the legend, and include 4 to 5-story multi-family residential, and 2 to 3-story commercial office space. This new growth is anticipated to create a strong pedestrian-friendly and walkable urban village in the heart of the Linden Square area. The overall net residential density in this node results in a sizable increase from 4.12 to 9.64 units per acre.

Figure 6.41: 70th Street Node BRT Growth Scenario

Source: Confluence

Figure 6.40: BRT Concept



Source: Confluence

NOTE: *This concept is based on achieving ridership to support this transit mode and is not to be considered a redevelopment proposal.*

DATA (BRT)

Net Density (Housing Units/Acre):

9.64

Total Population+Employment:

11,307

LEGEND:

- Res. Mixed Use - Med (4 Stories - 44 DU/Acre - 11,921 Comm. SF/BLDG)
- Res. Mixed Use - High (4 Stories - 61 DU/Acre - 4,396 Comm. SF/BLDG)
- Res. Mixed Use - Very High (5 Stories - 87 DU/Acre - 8,349Comm. SF/BLDG)
- Multifamily - 60 (4 Stories - 60 DU/Acre)
- Multifamily - 80 (5 Stories - 80 DU/Acre)
- Commercial/Office - High (3 Stories - 22,211 Comm. SF/BLDG)
- Commercial - Very High (1-Story - 19,602 Comm. SF/BLDG)
- Office - Very High (2 Stories - 24,575 Comm. SF/BLDG)
- Office - Very High (3 Stories - 39,204 Comm. SF/BLDG)

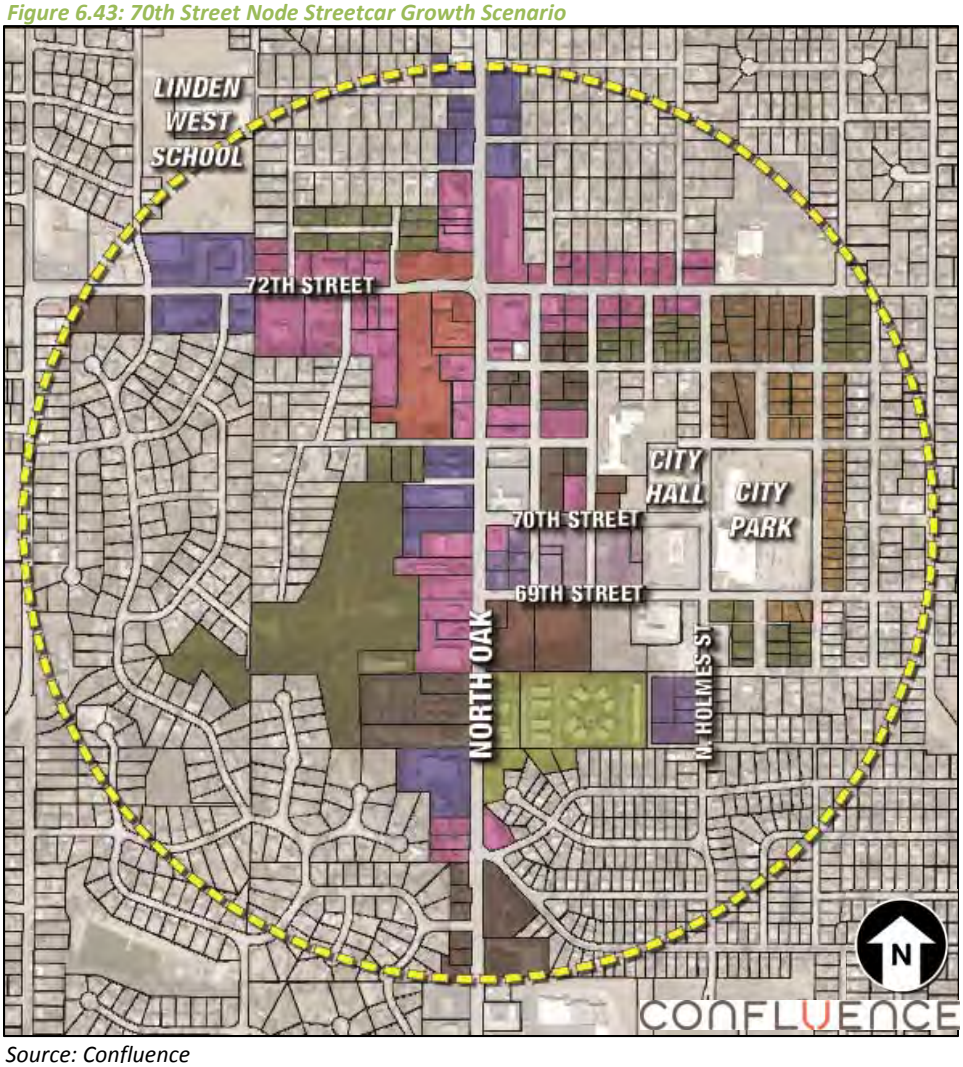
70th Street –Streetcar Scenario

Growth Scenario Overview

In addition to the development already provided in the previous growth scenario, this concept transforms the transit mode from bus rapid transit to a self-sustaining streetcar transit system, and anticipates significant additional commercial and mixed-use redevelopment throughout the Linden Square area. Portions of the existing single-family neighborhoods surrounding the City Park are shown to be redeveloped, as well as a significant portion of the existing North Oak and 72nd Street corridors as part of this scenario. This increase more than doubles the total employment and population from 11,307 to 22,771 (Figure 6.43).

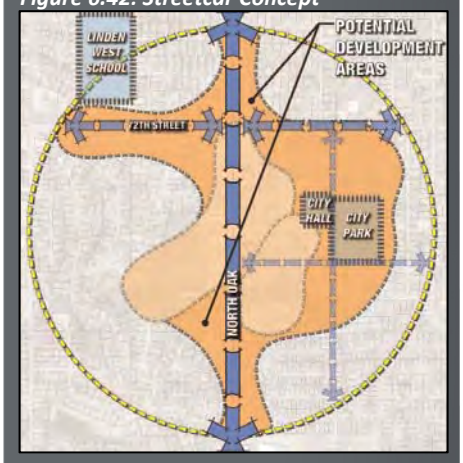
Prototypical land uses and development types utilized in this growth scenario are noted in the legend, and generally include multi-story new housing and mixed-use commercial development - with significant revitalization surrounding the Linden Square village center area. The overall net residential density in this node increases from 9.64 to 16.03 units per acre.

Figure 6.43: 70th Street Node Streetcar Growth Scenario



Source: Confluence

Figure 6.42: Streetcar Concept



Source: Confluence

NOTE: *This concept is based on achieving ridership to support this transit mode and is not to be considered a redevelopment proposal.*

DATA (STREETCAR)

Net Density (Housing Units/Acre):

16.03

Total Population+Employment:

22,771

LEGEND:

- Res. Mixed Use - Med (4.5 Stories - 44 DU/Acre - 11,921 Comm. SF)
- Res. Mixed Use - High (4 Stories - 61 DU/Acre - 4,396 Comm. SF)
- Res. Mixed Use - Very High (5 Stories - 87 DU/Acre - 8,349Comm. SF)
- Multifamily - High (2 Stories - 20 DU/Acre)
- Multifamily - Very High (3 Stories - 30 DU/Acre)
- Multifamily - 60 (4 Stories - 60 DU/Acre)
- Multifamily - 80 (5 Stories - 80 DU/Acre)
- Commercial/Office - High (3 Stories - 22,211Comm. SF)
- Commercial - Very High (3 Stories - 22,211 Comm. SF)
- Office - High (2 Stories - 24,575 Comm. SF)
- Office - Very High (3 Stories - 39,204 Comm. SF)

Armour Road

Existing Conditions

Prior to exploring future growth scenarios, North Kansas City's Master Plan and the Burlington Corridor Plan was reviewed to better understand future land use recommendations and anticipated redevelopment areas that were previously identified (Figure 6.45). Existing land uses and age of commercial properties were also reviewed to identify near to long-term redevelopment sites within this node area. Only 6.5 percent of this area is used for housing currently, and is primarily located in the northeast quadrant.

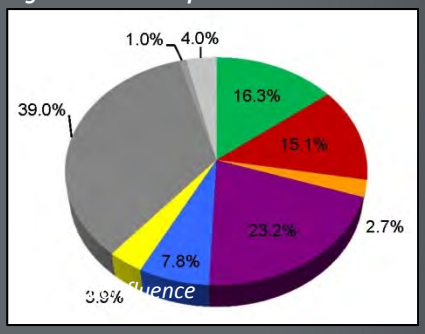
Figure 6.45: North Kansas City Master Plan Map

Source: North Kansas City's Master Plan and Burlington Corridor Plan

Figure 6. 46: Armour Road Node Existing Conditions

Source: Confluence

Figure 6.44: Anticipated Land Use



LEGEND:

- Commercial/Office
- Industrial
- Open Space/Institutional
- Residential MF
- Residential SF
- Undeveloped Land
- Anticipated Redevelopment (0-5 yrs.)
- Anticipated Redevelopment (5-10 yrs.)
- Anticipated Redevelopment (10-15 yrs.)

DATA (EXISTING)

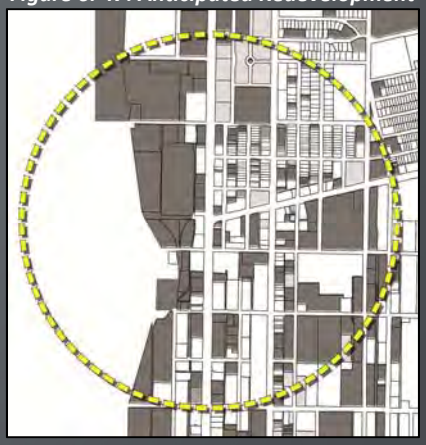
Net Density (Housing Units/Acre):

2.22

Total Population+Employment:

4,664

Figure 6. 47: Anticipated Redevelopment



Source: Confluence

LEGEND:

- 0-5 yrs.
- 5-10 yrs.
- 10-15 yrs.

Armour Road – Scenario Planning Approach

Transit Growth Scenario Overview

Prior to describing future growth concepts associated with each of the three alternative transit scenarios for the Armour Road node, it is important to understand the intent of this planning exercise and to place it within its proper context. To be clear, the following scenarios are purely hypothetical and are not based on market feasibility, nor do they represent any specific development proposals. They are focused on improving mobility within the corridor through the introduction of each transit mode. The amount and type of future development illustrated in these concepts is solely based on theoretically achieving the necessary ridership identified for each mode of transit to create a self-sustaining system.

Concept diagrams are provided to illustrate the sequential nature of the three transit growth scenarios for the Armour Road node as follows:

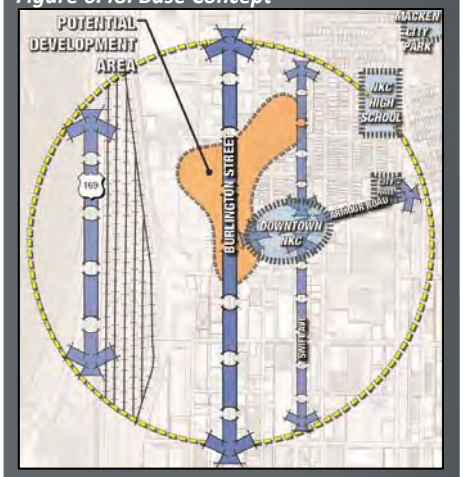
Base Transit Scenario (Figure 6.48) - The initial growth necessary to support base bus transit service in this node is generally shown to occur north and east of Downtown North Kansas City, which is centered on the Swift Avenue and Armour Road intersection.

BRT Transit Scenario (Figure 6.49) - The next wave of growth and redevelopment to support future bus rapid transit service is generally shown to flank both sides of Burlington while also redeveloping other areas surrounding Downtown North Kansas City.

Streetcar Transit Scenario (Figure 6.50) - To attain the ridership levels necessary to support future streetcar transit service, a significant portion of the study area is shown to be redeveloped surrounding the Downtown core area.

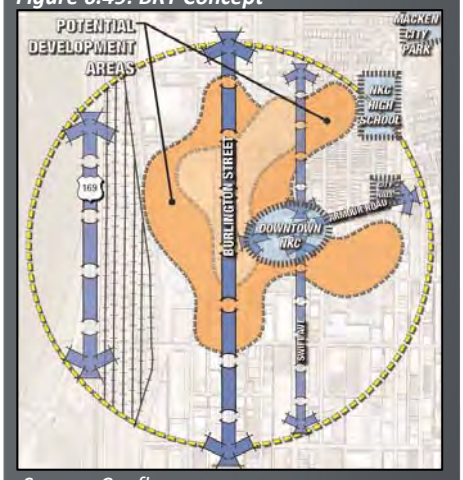
Due to most of existing land in this node already having been developed, the existing quantity of employment and residential population is the largest of the three nodes studied. As such, the extent of redevelopment necessary to achieve a net gain in population and employment is more extensive as compared to other nodes. Each of these scenarios is further illustrated with proposed land uses on the following pages.

Figure 6.48: Base Concept



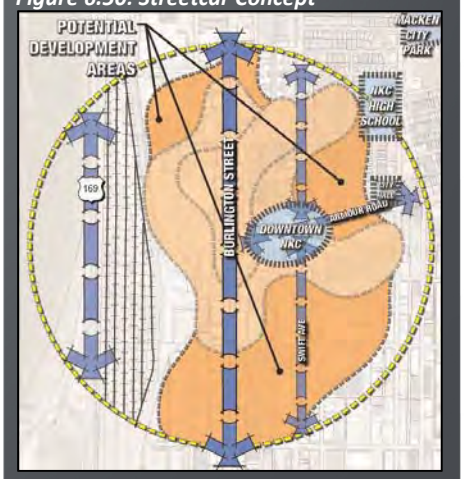
Source: Confluence

Figure 6.49: BRT Concept



Source: Confluence

Figure 6.50: Streetcar Concept



Source: Confluence

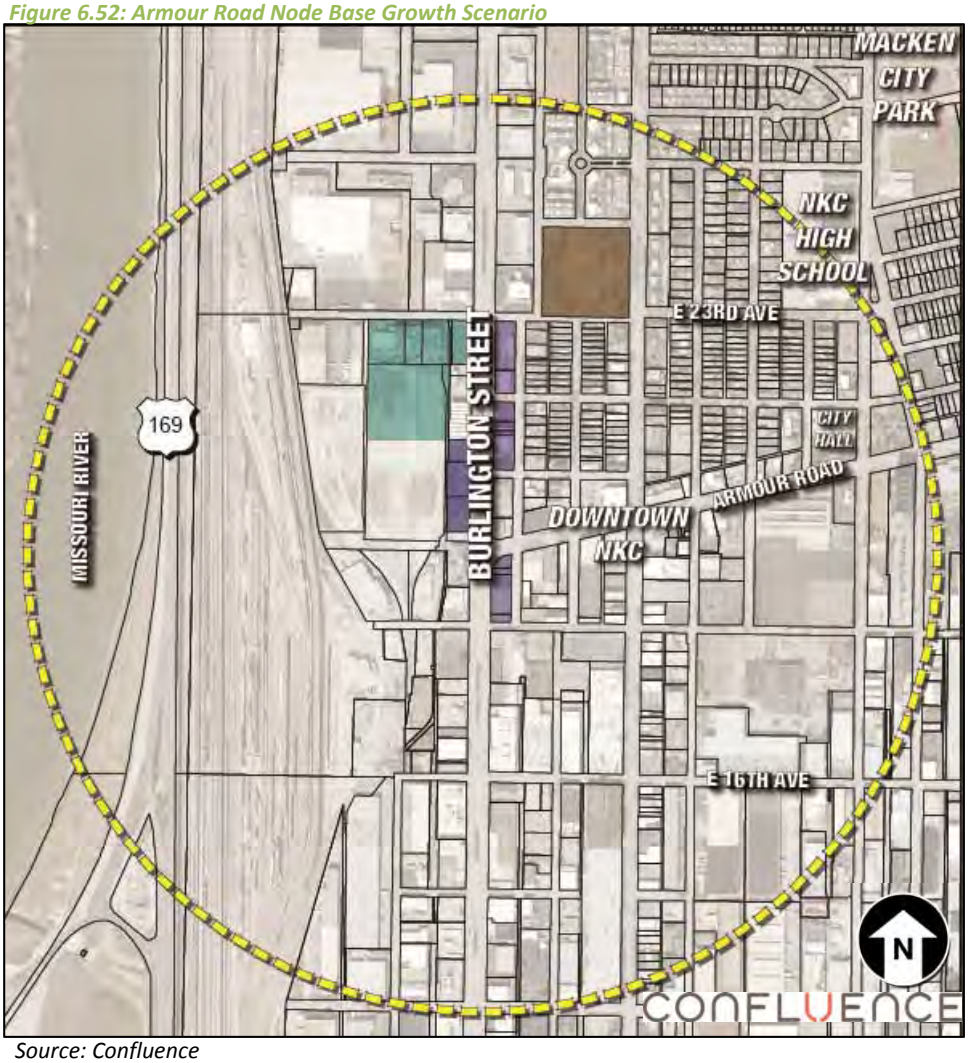
Armour Road -Base Scenario

Growth Scenario Overview

Through a combination of new development on existing unimproved property to the north and the redevelopment of existing commercial and industrial properties near the Burlington and Armour Road intersection, this growth scenario supports increasing the existing bus service to a self-sustaining base level of bus service by providing additional housing and commercial retail uses in this node. This increases the total employment and population from 4,664 to 5,645 (Figure 6.52).

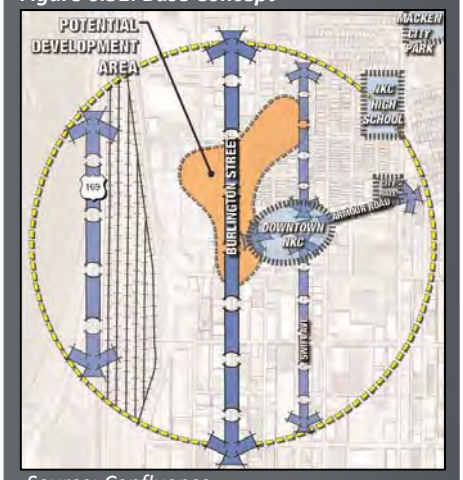
Prototypical land uses and development types utilized in this growth scenario are noted in the legend, and include 2 to 5-story multi-family and mixed-use development (with a portion of the ground floor used for retail space). This growth pattern is consistent with recent redevelopment efforts that have been completed in the northeast quadrant of this node. The overall net residential density in this node increased as a result of this scenario, rising from 2.22 to 4.01 units per acre

Figure 6.52: Armour Road Node Base Growth Scenario



Source: Confluence

Figure 6.51: Base Concept



Source: Confluence

NOTE: *This concept is based on achieving ridership to support this transit mode and is not to be considered a redevelopment proposal.*

DATA (BASE)

Net Density (Housing Units/Acre):

4.01

Total Population+Employment:

5,645

LEGEND:

- Multifamily - Very High (3 Stories - 30 DU/Acre)
- Res. Mixed Use - High (4 Stories - 61 DU/Acre - 4,396 Comm. SF/BLDG)
- Res. Mixed Use - Very High (5 Stories - 87 DU/Acre - 8,349 Comm. SF/BLDG)
- Industriial (1 Story- 16,335 SF/BLDG)

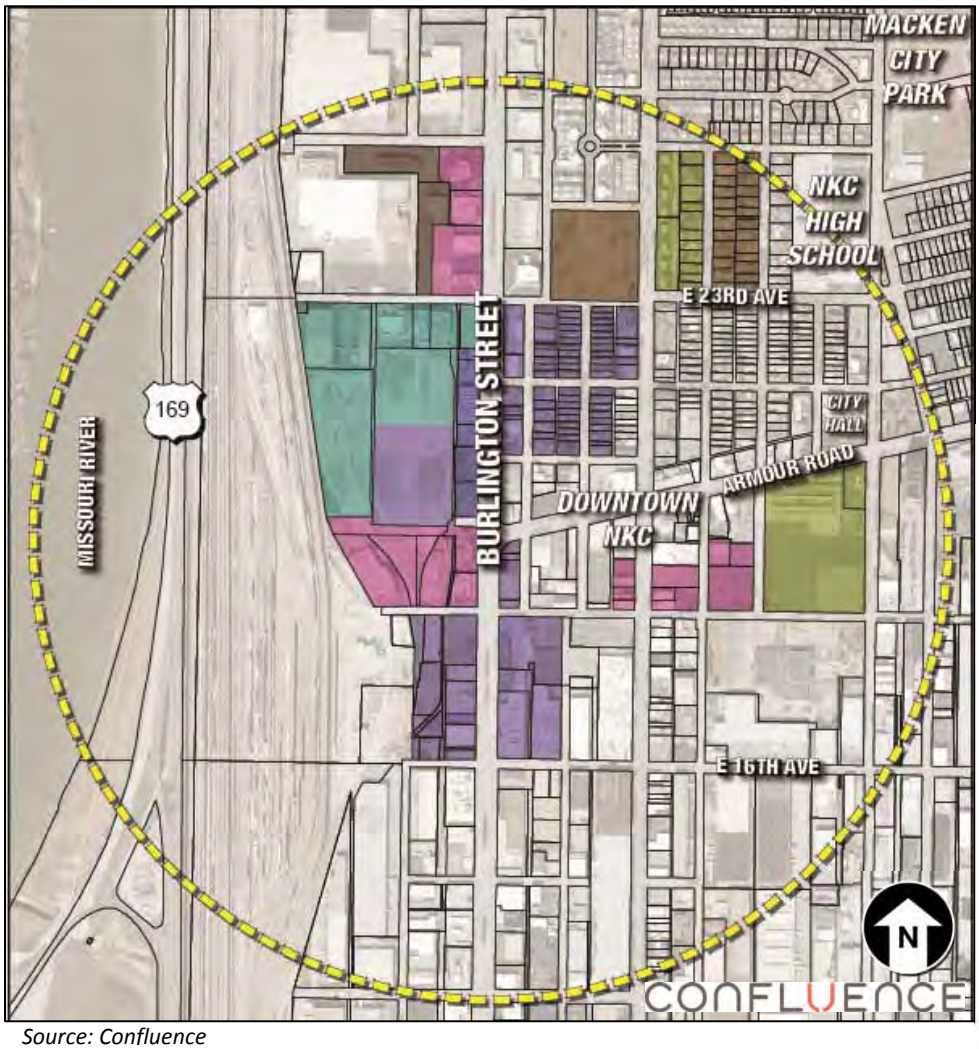
Armour Road - BRT Scenario

Growth Scenario Overview

In addition to the development already provided in the previous growth scenario, this concept transforms the transit mode from base level bus to a self-sustaining bus rapid transit system, and anticipates significant multi-family and mixed-use residential occurring in the northern areas and commercial/office uses expanding along the southern portion of the Burlington corridor. This more than doubles the total employment and population from 5,645 to 12,295 (Figure 6.54).

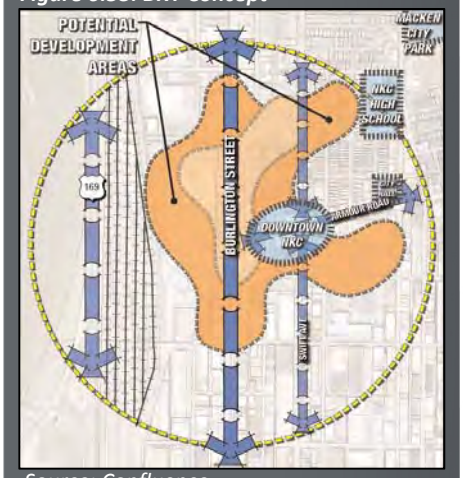
Additional prototypical land uses and development types utilized in this growth scenario are noted in the legend, and include 3 to 5-story multi-family residential, 3 to 5-story residential mixed-use, and 3-story commercial/office uses. This new growth is anticipated to further strengthen and promote an expanded mixed-use district around the core of Downtown North Kansas City. The overall net residential density in this node results almost a threefold increase from 4.01 to 11.38 units per acre.

Figure 6.54: Armour Road Node BRT Growth Scenario



Source: Confluence

Figure 6.53: BRT Concept



Source: Confluence

NOTE: *This concept is based on achieving ridership to support this transit mode and is not to be considered a redevelopment proposal.*

DATA (BRT)

Net Density (Housing Units/Acre):

11.38

Total Population+Employment:

12.295

LEGEND:

- Multifamily - Very High (3 Stories - 30 DU/Acre)
- Multifamily - 60 (4 Stories - 60 DU/Acre)
- Res. Mixed Use - High (4 Stories - 61 DU/Acre - 4,396 Comm. SF)
- Res. Mixed Use - Very High (5 Stories - 87 DU/Acre - 8,349Comm. SF)
- Commercial/Office - High (3 Stories - 22,211 Comm. SF/BLDG)
- Office - Very High (3 Stories - 39,204 Comm. SF/BLDG)
- Industrial (1-Story - 16,335 SF/BLDG)

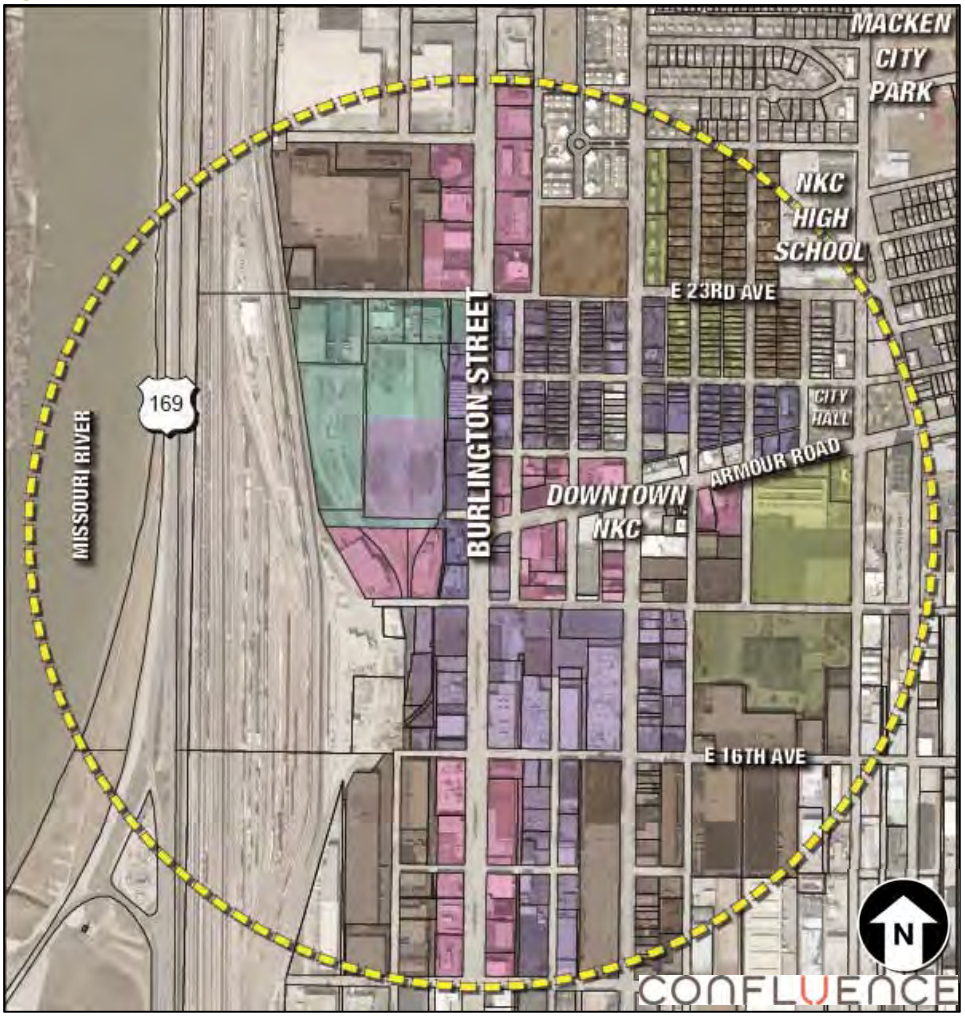
Armour Road - Streetcar Scenario

Growth Scenario Overview

In addition to the development already provided in the previous growth scenario, this concept transforms the transit mode from bus rapid transit to a self-sustaining streetcar transit system, and anticipates significant additional commercial and mixed-use redevelopment that further expands the district surrounding Downtown North Kansas City. This increase almost doubles the total employment and population from 12,295 to 24,363 (Figure 6.56).

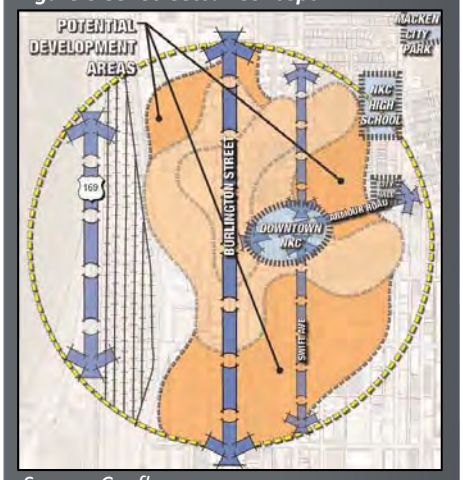
Prototypical land uses and development types utilized in this growth scenario are noted in the legend, and are consistent with the types of uses slated to be developed in prior scenarios while also complimenting the character of the existing Downtown area. The overall net residential density in this node increases from 11.38 to 21.56 units per acre.

Figure 6.56: Armour Road Node Streetcar Growth Scenario



Source: Confluence

Figure 6.55: Streetcar Concept



Source: Confluence

NOTE: *This concept is based on achieving ridership to support this transit mode and is not to be considered a redevelopment proposal.*

DATA (STREETCAR)

Net Density (Housing Units/Acre):

21.56

Total Population+Employment:

24,363

LEGEND:

- Multifamily - Very High *(3 Stories - 30 DU/Acre)*
- Multifamily - 60 *(4 Stories - 60 DU/Acre)*
- Multifamily - 80 *(5 Stories - 80 DU/Acre)*
- Res. Mixed Use - High *(4 Stories - 61 DU/Acre - 4,396 Comm. SF)*
- Res. Mixed Use - Very High *(5 Stories - 87 DU/Acre - 8,349Comm. SF)*
- Commercial/Office - High *(3 Stories - 22,211 Comm. SF/BLDG)*
- Office - Very High *(3 Stories - 39,204 Comm. SF/BLDG)*
- Industrial *(1-Story - 16,335 SF/BLDG)*

Development Examples

Prior to developing future land use and redevelopment scenarios for the various transit alternatives, a review of emerging trends in real estate development was undertaken. A specific focus was placed on identifying and documenting recently constructed or approved project examples from the Kansas City metropolitan area that exhibit urban characteristics similar to what is anticipated to be desirable for use along the North Oak Corridor.

Numerous examples of these projects were shared with study participants, ranging from relatively low density residential townhomes to multi-story mixed-use development types. Figure 6.57 shows a representative range of these projects, as well as an example illustrating the specific project information that was reviewed and utilized as part of this study effort (Figure 6.58). This example also includes a project scale comparison, wherein the specific project site is superimposed over one of the study area nodes – in this case the 70th Street node in Gladstone – to provide a frame of reference for project size and scale relative to the study area.

The details of these specific project types were integrated and calibrated with the anticipated future land use categories utilized in developing future growth scenarios as part of this study effort. A more complete listing of projects is included in the appendix.

Figure 6.58: Rainbow Phase 1, Development Example

Source: Confluence

Figure 6.57: Local Projects

Townhomes at Buckley Court

Village at Mission Farms

The Heights at Linden Square

Mission Farms – Site 1

Northgate Village

Courtyard Marriott

Source: Confluence

Chapter 7 Findings, Conclusions, and Recommendations

This effort focused on potential impact that transit would have on mobility; it did not focus on the economic development potential of specific transit modes. Improving mobility over existing levels can be achieved for relatively low cost by making improvements into the existing underlying transit system and to the pedestrian and bicycle connections to that system. In addition, coordinating and optimizing development codes and land use plans along North Oak corridor can increase density, the form of land use, and the mobility network. This would move the corridor effort toward achieving the triple bottom line of equity, environment, and economy.

As efforts are made to move forward with enhanced bus, opportunities exist to examine higher-quality transit modes such as BRT and streetcar for their impacts on economic development in the Northland.

What local funding strategies exist?

This effort only identifies the need for enhanced transit as a short-term strategy; further evaluation, however, may indicate BRT or streetcar as acceptable medium- or long-term strategies. Should one of these modes be chosen, several funding mechanisms exist to fund capital and operating costs. Dedicated funding includes sales and use taxes, utilities taxes, property taxes, motor fuel taxes, and business taxes. Impact fees, specific assessments, and tax increment finances also raise revenue. Transportation Improvement Districts (TID) have also been successful in raising revenue for higher-quality transit modes such as BRT or streetcar.

Local funding strategies can be utilized in combination with federal programs to identify a successful funding mechanism for higher-quality transit. The federal program for these types of transit projects is Small Starts. The most recent transportation bill, MAP-21, eliminated the need for alternatives analysis. Eligible projects are new fixed guideway systems such as streetcars, and BRT projects operating in mixed traffic that represent a substantial investment in the corridor. Small Starts projects are evaluated and rated based on project justification and local financial commitment, and must have a total net capital cost of less than $250 million, with a federal share less than $75 million. The federal portion has a maximum share of 80 percent of the project cost.

Table 7.1 summarizes the local revenue sources available.

Table 7.1: Summary of Revenue Sources

Revenue Source	Use	Advantages	Disadvantages
Sales Tax	• Operating • Capital	• Generates significant revenue at low rates • Easy to administer • Successfully implemented by many transit agencies	• Requires state action and/or voter approval • Hurts retailers • Can be regressive • Subject to economic cycles
Wage/Income Tax	• Operating • Capital	• Generates significant revenue at low rates • Long-run growth potential • Wage tax can capture commuter beneficiaries	• Unpopular with voters and the business community • Subject to economic cycles • Difficult to administer
Property Tax	• Operating • Capital	• Broad coverage of business and individuals • Easy to administer • Generates significant revenue at low rates	• Requires voter approval • Generally unpopular with taxpayers • Heavy competition from school districts and other beneficiaries of tax
Motor Fuel Tax	• Operating • Capital	• Possible deterrent to driving • Less visible to taxpayers • Significant revenues from small increment • Easy to administer	• Requires state action (constitutional amendment in Missouri) • Revenues subject to decline as fuel economies improve
Vehicle Registration Fee/Tax	• Operating • Capital	• Possible deterrent to driving • Easy to administer	• Requires state action • No direct link to transit • Regressive, depending on structure
Farebox Revenue	• Operating	• Direct users pay • Ease of revenue collection	• Limited revenues • Regressive
Business Tax(es)	• Operating	• Employers pay for labor force mobility	• Unpopular with businesses • Disincentive for business location decisions
Special Assessments	• Capital	• Revenue tied to development • Direct beneficiaries of improvement pay • Small base of opposition	• May counter location incentives • Limited revenues • Complex administration
Impact Fees	• Capital	• Revenues tied to development • Direct users pay • Small base of opposition	• Possible legal challenges • Limited revenues
Tax Increment Financing	• Capital	• Revenue tied to economic development • Can tie to transit development specifically • No direct new effect on taxpayers	• Limited and less-certain revenues • Complex administration • Competition from school and other local governments

What are the next steps?

The land use scenarios were based solely on improving mobility in the corridor via these different transit scenarios. The scope and scale of this study effort did not take into account the economic development potential of the corridor, including potential short- and long-term market demand projections, anticipated fiscal analysis of implementing certain growth strategies, and analyzing the potential long-term economic benefits of promoting increased development opportunities related to future transit improvements. The scope of this study and the results of these initial planning scenarios provide an initial illustration of the relative density of residential and employment population necessary to support various modes of transit in a self-sustaining manner. In many cases, the streetcar scenarios indicate a more compact and densely populated development pattern than what exists today.

Future planning efforts should consider real estate market analysis and development projections for the corridor in association with the various transit scenarios and should be based on relevant local, regional, and national examples. A more in-depth understanding of the relationship between transit investment and real estate development could be achieved through further study. If the corridor is to achieve its potential from a transit-oriented development standpoint, future land use and development plans at the local level may also need to be further evaluated and revised to more closely align with the growth projections and development densities outlined in this initial study. As with most urban districts like those anticipated in the streetcar scenarios, the use of public-private partnerships to provide convenient shared use parking as well as incentives to offset infrastructure upgrades and improvements will need to be further evaluated and implemented in order to further support adjacent redevelopment and revitalization efforts.

While this plan studied the potential growth scenarios at three of the identified nodes, further planning work is needed at the remaining nodes to illustrate their capability in accommodating the projected growth of housing and employment as outlined in this study. Through evaluating the results of those efforts, minor adjustments throughout the entire corridor might need to be made to better understand the entire system's growth potential.

The ability of pedestrians and bicyclists to safely and conveniently be provided improved access to areas of commerce as well as the transit system will assist in improving the quality of life along the entire corridor. Through the provision of new sidewalks, bicycle lanes, and off-street trails, the network of transportation choices should be expanded as soon as practical to encourage better connection and integration between the neighborhoods and surrounding uses and opportunities.

The visibility and identification of transit service throughout the Northland, including the North Oak corridor, is not commensurate

with transit service in other parts of the metropolitan area. Part of this is likely due to lower levels of ridership and to the lower availability of transit routes to adequately serve the community. Transit shelters and amenities encourage ridership, but many of these amenities do not currently exist or are poorly connected to the sidewalk network in the Northland. By improving these areas in the short term, a stronger and more connected system of transit and transportation opportunities can be established, which will continue laying the groundwork for future transit enhancements over the long term.

The previous Northland transit plan is more than 15 years old. While the Kansas City Area Transportation Authority's (KCATA) recent Comprehensive Service Analysis (CSA) reviewed the Northland system, the resulting recommendations were based from KCATA's fiscal constraint. A new Northland transit plan would further develop the vision for transit's role in the greater Northland. This would include defining in more detail the future projects identified in Smart Moves as occurring in the Northland. The Smart Moves plan does identify the role of Burlington Street and North Oak Trafficway as a spine, but it does not determine the specific costs or integration of this spine into the optimization of the Northland system.

Recommendations

- The North Oak corridor is currently served by bus-based fixed-route transit service. Current conditions in the corridor will support enhancing the level of this existing transit service. The enhanced service could represent an incremental step toward the eventual development of higher-level transit services such as BRT or streetcar. Enhancing the existing service would require additional resources; thus, the development of funding strategies to support and allow for enhanced transit service in the corridor should be undertaken.
- Opportunities for higher-level transit investment in the corridor should continue to be explored. The economic development impacts of constructing BRT and/or streetcar in the corridor should be thoroughly evaluated, and area plans and development codes along the corridor should be aligned to facilitate the type of growth necessary to support higher-level transit investments. Right-of-way implications and preservation requirements that would facilitate future transit investments should be considered now.
- Policies and plans should be developed and designed to focus sidewalk and bicycle network improvements in the corridor around transit stops. These improvements should support connectivity to nearby destinations and, where

possible, include the width and separation from automobile traffic necessary to make walking or biking in the corridor safer and more pleasant.

- The Northland transit plan should be updated to reflect existing and planned development in the Northland. This plan should also reflect the vision for future transit service in the Northland desired by Northland communities, employers, and residents.

Appendix A

Advisory Panel and Study Team Composition and Meeting Summaries

North Oak Corridor Stakeholder Advisory Panel

Table A.1

Creating Sustainable Places

VIBRANT CONNECTED GREEN

Last	First	Organization
Burton	Mary Jo	North Kansas City School District
Dalberg	Ted	Salvation Army
Garnos	Bill	Gladstone City Council Member
Groves	Rich	North Kansas City Business Council
Hall	Pete	Builders Development Corp
Hampton	Jim	Clay County EDC
Hermann	Deb	Northland Neighborhoods Inc.
Jones	Ronda	Village of Oaks
Kell	Lee Ann	MODOT - Distric Planning Manager
Krautmann	Joshua	Village of Oakwood Park
Lange	Jesse	NKC resident, transit & bike rider
Lillis	Sheila	City of Gladstone Park & Recreation Director
Maggio	Bob	North Kansas City School District
McQueen	Clyde	Full Employment Council
Medina	Pete	Briarcliff Association
Mumford	Bill	Village of Oakview
Nielsen	Peter	Village of Oaks
Ramirez	Bernardo	Hispanic Economic Development Corporation, & transit rider
Roberts	R. Phillip	Midwestern Baptist Theological Seminary
Rumbaugh	Glen	Cycling Community, KCMO resident, cyclist
Sanders	Bill	North Kansas City Councilmember
Schimdt	Aaron	Hunt Midwest
Shields	J. Jerry	Village of Oakwood
Styron	Sheila	The Whole Person
Tapp	Matt	Clay County
Tracy	Sheila	Northland Chamber
Weber	Crystal	University of Missouri Clay County Extension Center

- Meeting Summaries
  - September 21, 2012
  - February 13, 2013
  - April 9, 2013 (to be provided upon completion)

North Oak Corridor Study Team

Table A.2

Creating Sustainable Places

VIBRANT CONNECTED GREEN

Last	First	Organization
Daniel	Damon	More2
O'Connor	Danny	KCATA
Katerndahl	Dean	Mid-America Regional Council
Ridgway	Deb	City of Kansas City, Missouri
Jarrold	Dick	KCATA
Gulbranson	Jared	KCATA
Harpool	Jim	MD Management
Elliott	Kyle	City of Kansas City, Missouri
McDonald	Lora	More2
Swope	Mark	Olsson Associates
Smith	Mike B.	City of North Kansas City
Wingerson	Scott	City of Gladstone
McIntyre	Sherri	City of Kansas City, Missouri
Means	Tyler	Mid-America Regional Council

Open House No. 1 Summary
Included in body of document

Open House No. 2 Summary
To be included in body of document upon completion

Meeting Summary

North Oak Corridor Study

Stakeholder Advisory Panel and Study Team

1:30 p.m. – 2:30 p.m.

April 9, 2013

City of Gladstone City Hall

Welcome, Introductions and Meeting Objectives

Mark Swope of Olsson Associates welcomed the Stakeholder Advisory Panel (SAP) to the final meeting of the Study Team and SAP for the North Oak Corridor Study. He then asked for self-introductions. The following were in attendance.

Stakeholder Advisory Panel

- Bill Garnos, City of Gladstone Councilmember
- Jesse Lang, KCPS – NKC resident
- Crystal Weber, University of Missouri Clay County Extension
- Bob Maggio, North Kansas City School District
- Shelia Tracy, Northland Regional Chamber of Commerce

Study Team

MARC:	Tom Gerend, Tyler Means
City of Gladstone:	Scott Wingerson
City of Kansas City, Missouri:	Kyle Elliott, Sherri McIntyre
Clay County:	Matt Tapp
Vireo:	Lisa Briscoe
KCATA:	Dick Jarrold, Danny O'Conner
Olsson Associates:	Mark Swope, Tom Worker-Braddock
Confluence:	Chris Cline, Caitlin Henricksen
Shockey Consulting:	Patty Gentrup, Shelby Ferguson
More2:	Lora McDonald, Taylor Ashley

Final Report Overview

Mark Swope gave a brief overview of the final report. The study originally considered six nodes as follows: Barry Road, 70th Street, Englewood, I-29/Vivion Road, Cherry Street and Armour Road. He said that the final report reviews previous studies for existing transit, bicycle and pedestrian infrastructure, and existing land use patterns; addresses public engagement efforts; ; and outlines possible future transit concepts for the corridor; A key chapter is Chapter Six, which analyzes different land-use scenarios that could support various types and levels of transit service. More in-depth analysis was conducted for three identified nodes along the corridor; Barry Road, 70th Street and Armour Road. Overall study findings, conclusions and recommendations are outlined in Chapter Seven. Elements evaluated in the final report are reviewed below:

Mark explained that the team considered different transit alternatives that could be implemented in the corridor. Each alternative considers the employment and population density that would be required for implementation. The modes evaluated included baseline (enhanced bus), Bus Rapid Transit (BRT) and streetcar (fixed guideway). :

- *Enhanced Bus* - enhancing the existing system with increased service frequency, route modification to reduce travel times and improvement of shelters and stops. This would be a relatively low capital investment.
- *BRT* – use of a model such as Main Street MAX with increased service to 18 hours a day, reduced stops and additional features such as improved stop structures and traffic signal priority for peak time services. This would be a relatively mid-level capital investment.
- *Streetcar (fixed guideway)* – construction of a guideway separate from auto traffic with increased service, reduced stops and features similar to the BRT. This would be a relatively high capital investment.

Chris Cline gave an overview of the corridor analysis and land-use scenarios presented in Chapter Six.

- ***Land-Use Scenarios*** – The corridor analysis entailed extensive review of existing land-use, current development, vacant buildings, open space, undeveloped area, institutional development, population and employment along the entire North Oak corridor, with detailed evaluation at each node location. The overall analysis showed there are numerous pockets of underused properties, undeveloped land, and institutional uses along the North Oak Corridor. The nodes at Armour Road, Englewood Road, and Barry Road all currently have the largest areas of employment, while the Cherry Street node currently has the highest amount of population.

In coordination with MARC, the consultant team used *Envision Tomorrow* to better understand and evaluate the economic feasibility and impacts/results of different types of development along the North Oak Corridor. Use of the Envision Tomorrow program also allowed the consultant team to analyze the age of existing building infrastructure along the corridor and to use it as a factor in evaluating the redevelopment potential at various locations. Based on this review, there is a significant portion of the corridor that is poised for redevelopment in the next five to 10 years.

Alternative land use and development scenarios were created for each of these nodes using Envision Tomorrow to illustrate the relationship of various transit modes with associated land use, population, and employment densities. Potential transit growth scenarios for each node and alternative transit mode are as follows:

It is important to note that the concepts were developed to illustrate what is needed to achieve ridership necessary to support each transit mode and are not to be considered redevelopment proposals. The North Oak Corridor Study focused specifically on mobility and the relationship between transit usage and the combination of employment and population.

Barry Road: *Priority redevelopment areas include: Metro North Mall site, parcels to the east of Metro North and north of Barry Road.*

- **Baseline** – Initial growth necessary to support base bus transit service in this node is generally shown to occur north of Barry Road.
- **BRT** – In addition to the redevelopment from the baseline scenario, growth generally should occur adjacent to both the Barry Road and North Oak corridors while extending north of the baseline growth scenario.
- **Streetcar** – Significant growth and redevelopment is generally shown to occur in the southeast quadrant as well as further north along the North Oak corridor.

70th Street: *Priority redevelopment areas include: Intersection of 70th Street and North Oak, and to the north of 70th street on both sides of North Oak to 72nd Street.*

- **Baseline** – Initial growth necessary to support base bus transit service in this node is generally shown to occur within Gladstone's Village Center, referred to as Linden Square, located on the east side of North Oak.
- **BRT** – In addition to the redevelopment from the baseline scenario, growth generally should extend to parcels north of the baseline growth scenario.
- **Streetcar** – Significant growth and redevelopment is generally shown to occur in the northeast quadrant of Linden Square as well as along the North Oak and 72nd Street corridors.

Armour Road: *Priority redevelopment areas include: Both sides of Burlington to the north of Armour Road, and Downtown North Kansas City area.*

- **Baseline** – Initial growth necessary to support base bus transit service in this node is generally shown to occur north and east of Downtown North Kansas City, which is centered on the Swift Avenue and Armour Road intersection.
- **BRT** – In addition to the redevelopment from the baseline scenario, growth generally should boarder both sides of Burlington while also redeveloping other areas surrounding Downtown North Kansas City.
- **Streetcar** – Significant growth and redevelopment is shown surrounding the Downtown core area.

Mark wrapped up with asking the Study Team and SAP to weigh in on specific recommendations for next steps along the corridor. A series of six questions were posed. The Study Team and SAP were asked their "level of importance": very important, somewhat important, neutral, somewhat unimportant, and unimportant.

The results are as follows:

- Develop funding strategies to enhance the existing North Oak bus service to meet the baseline as defined in the study.
  - Very important 53%
  - Somewhat important 43%
  - Neutral 6%
  - Somewhat unimportant 0%
  - Unimportant 0%

- Align area plans and development codes along the corridor to facilitate the type of growth necessary to support higher level transit investments.
  - Very important 53%
  - Somewhat important 29%
  - Neutral 6%
  - Somewhat unimportant 12%
  - Unimportant 0%

- Identify ROW implications and preservation that need to be considered now to accommodate future transit investment.

- Very important 19%
- Somewhat important 38%
- Neutral 19%
- Somewhat unimportant 13%
- Unimportant 13%

- Evaluate economic development impacts of constructing BRT and/or streetcar in the corridor.
  - Very important 29%
  - Somewhat important 35%
  - Neutral 24%
  - Somewhat unimportant 12%
  - Unimportant 0%

- Develop policies and plans designed to focus sidewalk and bicycle network improvements in the corridor around transit stops.
  - Very important 65%
  - Somewhat important 24%
  - Neutral 6%
  - Somewhat unimportant 0%
  - Unimportant 0%

- Update the Northland transit plan to reflect existing and planned development in the Northland.
  - Very important 35%
  - Somewhat important 41%
  - Neutral 12%
  - Somewhat unimportant 6%
  - Unimportant 6%

- ***Findings and Recommendations*** – *The following are final recommendations and findings which are included in the final report.*

  - The North Oak corridor is currently served by a bus-based fixed-route transit service. Existing conditions in the corridor will support enhancing the existing transit service. The enhanced service could represent an incremental step toward the eventual development of higher level transit services such as BRT or streetcar. It would, however, require additional

resources, thus the need to develop funding strategies to support and allow for enhanced transit service in the corridor.

- Opportunities for higher level transit investment in the corridor should continue to be explored. The economic development impacts of constructing BRT and/or streetcar in the corridor should be thoroughly evaluated, and area plans and development codes along the corridor should be aligned to facilitate the type of growth necessary to support higher level transit investments. Right-of-Way (ROW) implications and preservation requirements that would facilitate future transit investments should be considered now.

- Policies and plans should be developed and designed to focus sidewalk and bicycle network improvements in the corridor around transit stops. These improvements should support connectivity to nearby destinations, and, where possible, include the width and separation from automobile traffic necessary to make walking or biking in the corridor safer and more pleasant.

- The transit plan for the Northland to reflect existing and planned development in the Northland. This plan should also reflect the vision for future transit service in the Northland desired by Northland communities, employers, and residents.

Next Steps

- The Study Team will host a final open house April 23, 2013.

Meeting Summary

North Oak Corridor Study

Stakeholder Advisory Panel and Study Team

3:00 a.m. – 4:00 p.m.

February 13, 2013

City of Gladstone City Hall

Welcome, Introductions and Meeting Objectives

Mark Swope of Olsson Associates welcomed the Stakeholder Advisory Panel (SAP) to a joint meeting of the Study Team and Stakeholder Advisory Panel for the North Oak Corridor Study. He then asked for self-introductions. The following were in attendance.

Stakeholder Advisory Panel

- Bill Garnos, City of Gladstone Councilmember
- Jerry Shields, Village of Oakwood
- Crystal Weber, University of Missouri Clay County Extension
- Glen Rumbaugh, Kansas City Bike Ped Community
- Bob Maggio, North Kansas City School District

Study Team

MARC:	Lisa Pool, Tyler Means
City of Gladstone:	Scott Wingerson, Chris Helmer
City of North Kansas City, Missouri:	Mike Smith
KCMO Planning:	Kyle Elliott, Deb Ridgway
Clay County:	Matt Tapp
KCATA:	Jared Gulbranson, Danny O'Conner
Olsson Associates:	Mark Swope, Tom Worker-Braddock
Confluence:	Chris Cline, Caitlin Henricksen
Shockey Consulting:	Shelby Ferguson
More2:	Lora McDonald

Project Process and Overview

Mark Swope gave a brief overview of the technical memo developed in November 2012, which considered six node locations as follows: Barry Road, 70th Street, Englewood, I-29/Vivion Road, Cherry Street and Armour Road. The technical memo examines existing and future land use, previously developed transportation plans, bicycle and pedestrian accessibility and a multi-modal analysis. Elements evaluated in the technical memo are reviewed below:

- *Previous Studies* – identified potential locations for future Bus Rapid Transit (BRT), light rail, or as a significant transit stop. Opportunities for development and changes in density and land use to support future transit services were identified in these studies.
- *Transit* – one primary alignment is along on Burlington, which is used to travel from the Northland to the Central Business District (CBD.
- *Bike and Pedestrian* – existing infrastructure is lacking along North Oak.
- *Land Use* – existing development is as follows; 33 percent single family-housing, 11 percent commercial, 11 percent parkland, 7 percent iIndustrial and 5 percent multi-family.
- *Multi-Modal Analysis* – level of service (LOS) was evaluated for six locations along North Oak, considering bicycle, pedestrian, auto and transit. Each location received a grade from LOS A – LOS F. The letter A represents the best quality of service, and the letter F represents the worst quality of service. Overall the six locations faired an average grading of LOS C – LOS D in all categories except auto, which received a LOS C at all locations.

  Question: Why does the corridor grade out differently at certain nodes, if the same transit route is traveling the corridor?
  Response: There are multiple factors that go into the criteria, which aren't present at each of the six locations.

Development of Density Targets

Mark continued to explain the transit concepts the consultant team developed and the density each would require for implementation. For each transit concept--enhanced bus, BRT and fixed guideway-- the team has developed:

- *scenarios that describe the relationship between each of the enhanced transit levels and the associated land-use/development patterns*
- *strategies aimed at realizing each of the transit/land-use scenarios.*

Mark further explained the details of the transit concept investments as follows:

Enhanced Bus - enhancing the existing system with increased service frequency, route modification to reduce travel times and improvement of shelters and stops. This would be a relatively low capital investment.

BRT – use of a model such as Main Street MAX with increased service to 18 hours a day, reduced stops and additional features such as improved stop structures and traffic signal priority for peak time services. This would be a relatively mid-level capital investment.

Streetcar (fixed guideway) – construction of a guideway separate from auto traffic with increased service, reduced stops and features similar to the BRT. This would be a relatively high capital investment.

The focus of these concepts is to understand what the current density levels are and what they will need to become to support varying levels of service. The consultant team created a forecasting model that looked at what the existing experience of transit is in Kansas City; this current level was used as a predictor to what the density level should be for future transit. The model also took into consideration the correlation between ridership and employment density at each potential transit-oriented development location as these two factors need to connect one another.

The model projected the current level of ridership along North Oak at 1,100 with a density of 7,600 residents and/or jobs per square mile. The model indicated that a density of 8,200 is needed for enhanced bus; 12,300 for BRT, and 19,900 for streetcar.

Question: Where did the existing population and ridership numbers come from?
Response: The 2010 Census at block level with a ½ mile buffer at each node.

Concept Development

Chris Cline gave an overview of the corridor analysis which entailed extensive review of existing land-use, current development, vacant buildings, open space, undeveloped area, institutional development, population and employment along the entire North Oak corridor with detailed evaluation at each node location. The overall analysis showed there numerous pockets of underutilized properties, undeveloped land, and institutional uses along the North Oak Corridor. The nodes at Armour Road, Englewood Road, and Barry Road all currently have the largest areas of employment, while the Cherry Street node currently has the highest amount of population.

In coordination with MARC, the consultant team is using *Envision Tomorrow* to better understand and evaluate the economic feasibility and impacts/results of different types of development along the North Oak Corridor. Use of the Envision Tomorrow program also allows the consultant team to analyze the age of

existing building infrastructure along the corridor, and to use it as a factor in evaluating the redevelopment potential at various locations. Based on this review, there is a significant portion of the corridor that is poised for redevelopment in the next 5 to 10 years.

More in-depth analysis is currently underway for three identified nodes along the corridor; Barry Road, 70th Street, and Armour Road. Alternative land use and development scenarios are being created for each of these nodes using Envision Tomorrow in order to study and illustrate the relationship of various transit modes with associated land use, population, and employment densities. These scenarios are still being developed and will be shared at the next round of meetings.

Next Steps

- The final meeting will be a joint discussion with the Study Team and Stakeholder Advisory Panel in early April 2013.
- The Study Team will host a final open house in early April 2013.

Meeting Summary

North Oak Corridor Study
Stakeholder Advisory Panel
8:00 a.m. – 9:30 a.m.
September 21, 2012
City of Gladstone City Hall

Welcome, Introductions and Meeting Objectives

Mark Swope of Olsson Associates welcomed the Stakeholder Advisory Panel (SAP) to the first meeting for the North Oak Corridor Study. He then asked for self-introductions. The following were in attendance.

Stakeholder Advisory Panel

- Mary Jo Burton, North Kansas City School District
- Jesse Lange, NKC resident, transit rider and cyclist
- Art Gough, Representing North Kansas City Councilmember Bill Sanders
- Bill Granos, City of Gladstone Councilmember
- Rich Groves, North Kansas City Business Council
- Rhonda Jones, Village of Oaks
- Lee Ann Kell, MoDOT
- Matt Tapp, Clay County, Missouri
- Sheila Tracy, Northland Chamber
- Crystal Weber, University of Missouri Clay County Extension

Members of the Study Team, the consulting team and the public also attended.

MARC:	Lisa Pool, Tom Gerend
City of Gladstone:	Scott Wingerson
KCATA:	Jared Gulbranson, Danny O'Conner
Olsson Associates:	Mark Swope
Confluence:	Chris Cline

Shockey Consulting: Patty Gentrup, Shelby Ferguson

More2: Lora McDonald

Project Process and Overview

Mark continued with an overview of the project principles and process. The North Oak Corridor study is part of the Creating Sustainable Places (CSP) initiative supported by the Mid-America Regional Council (MARC). Through the CSP, overall guiding principles for sustainability have been specified and are as follows:

- Equity: Residents of all races, economic means and abilities are welcome and equipped to participate in all aspects of community life.
- Environment: The environment and our natural resources and assets are preserved, protected and restored.
- Economy: A competitive, robust economy is support and promoted by fostering innovation, supporting quality education, and enhancing access to quality jobs.

Within the CSP initiative there are six corridors being studied: They are: North Oak, U.S. 40, Rock Island, Troost, Shawnee Mission/Metcalf, State Avenue.

The purpose of this project is to identify options for enhanced transit service along the corridor development and examine how other modes will support transit services. North Oak has the ability to serve as a catalyst for sustainable development. The study area is from the River Market in downtown Kansas City, Mo., north along Burlington Street and North Oak Trafficway to Highway 152 with a half- mile buffer on each side of the corridor.

In the initial phase of the study, the consultant team outlined objectives for the overall North Oak Corridor Study. The objectives are:

- Develop short-range, mid-range, long-range transit strategies.
- Establish supportive bicycle and pedestrian strategies.
- Address future land use, development types and densities that support the use of the transit; and,
- Identify local funding support strategies and recommendations.

<u>Stakeholder Advisory Panel Role</u>

Patty Gentrup of Shockey Consulting gave a brief overview of the role of the SAP. She explained that the SAP has representation from different entities along the corridor, communities and residents. With engagement of such diverse opinions, Patty encouraged the SAP to be ambassadors for the project and to talk to everyone in the community they come in contact with to be another form of outreach.

In encouraging the SAP to be ambassadors and participants of the project process, Patty outlined that there would be a total of three SAP meetings, one of which would be in conjunction with the Study Team, and two open houses. The study will wrap up in March 2013.

Patty also asked the SAP to visit the mind mixer website, a virtual town hall which is interactive in asking questions to stimulate discussion for the North Oak Corridor. The website is as follows: http://www.creatingsustainableplaces.com/

North Oak: Existing Conditions

Chris Cline of Confluence gave a brief overview of the existing land use of the North Oak Corridor. He explained part of the purpose of the initial process is to bring the study up to speed with other projects and corridors in the city. Although in the past five years there have been a number of studies along North Oak with a substantial amount of input, this study will build on those previous studies. The existing land use maps that have been produced for the CSP North Oak Corridor study reflect what is currently along the corridor regarding land use, bike and trail connections.

He continued to explain that existing conditions evaluation will be used to look at what opportunities there are for pedestrians and transit riders along the corridor. The previous land use plans allow the consultant team to look at potential major nodes with transit and pedestrian centers, where the major stops are located and how the surrounding land uses have responded. Chris made a point that the major nodes that have been indicated are not locked into place, but that the consultant team is aware of the elements and the existing community.

Existing land use plans for the corridor include but not limited to:

- Significant planning and development for the Burlington portion in North Kansas City,
- Potential station locations at Armour, Cherry, Vivion and I-29,
- Gladstone has undertaken many efforts lately with the new amphitheater located behind City Hall,
- Redevelopment of Barry road and the shopping center

Mark wrapped up the existing conditions overview with brief key points of interests and their issues.

- Transit – Regional transit vision, a major component of this vision is North Oak reaching a higher level of service than what exists currently.
    - Lack of infrastructure throughout the corridor (grass or concrete pad, no shelter, etc.)
- Pedestrian & Bicycle– Establish connectivity and accessibility
    - Bus stops are offset in some locations.
    - Pedestrians are forced to cross major intersections to make bus connection.
    - Lack of sidewalks and repair.
    - Limited bike paths throughout the corridor.

Key Issues Discussion

Patty opened up the discussion to the SAP asking what issues need to be addressed.

Question: Is the goal to get people in the Northland to work or people from south of the river to the northland for shopping and other services?
Question: Yes, movement of people and transportation harmony is our goal.

Comment: I know people who use the park and ride. It takes them an hour compared to 20 minutes of driving.
Comment: People don't use transit unless they work at a centrally located building.
Response: We are not only looking at transit, but how can the corridor change and become sustainable in terms of the environment and economics.

Question: What do you mean when you say sustainability?
Response: Sustainability is not just about environmental issues, but also considering financial sustainability. We have to make choices about what costs we are going to incur to develop and maintain infrastructure. We are looking at ways to make better use of our resources; we have and become more efficient.

Question: Do we understand the potential profile of the person, or are we just interested in getting people to work or to shop?
Comment: We need to understand the potential profile of those users. We need to understand how children can walk to school, people to work and the senior citizens of the community.

Comment: We are profiling many different people and most don't stay in one place the entire day, many don't have a car and transit is a necessity for them.

Mark mentioned the consultant team is doing a market analysis which will convey the concerns of the profile of those along the corridor. It was added the findings from the analysis could be shared and we would welcome input.

Comment: Growth projections are set at 70,000 people in the next ten years in the Northland. Who will those people be? Where will the homes be built? Will these people be existing metro area folks? These are all questions we need to consider.
Comment: It's not just a number that is important, but the type of development. Our existing development is based off the 50s, which is very sporadic and not centrally located. This study needs to change our way of development and allow for transit to be a desirable option.

Comment: Zoning is important to look at considering the multi-jurisdiction zoning along the corridor.

Comment: Bike parking needs to be considered, it's very informal currently.

Comment: Sidewalks are critical for people and children to arrive safely to their destination. Schools are developing "international walk to school day." We don't have the proper sidewalk infrastructure in some of these areas for children who will walk to school.
Response: The Northland has developed in the past 20 years with trails and walking.

Comment: Intersection design is necessary, pedestrians need feel safe and have convenient connections to the sidewalk.

Comment: The younger generation is what we need to plan for and consider. Youth today has a differently way of lifestyle and needs.

Comment: North Oak has poor access management; there are too many access points.

Question: How many people have to be on a bus to make it profitable and not terminated?
Response: It's based on the demand and we allocate to those places. Trip and loads determine the amount of busses and size of bus that travel to specific locations.

Adjourn

Next Steps

- The Study Team will host an Open House from 5 – 7 p.m. on October 4 at Harmony Vineyard Church.
- The next Stakeholder Advisory Panel meeting will be in January 2013.

Join a virtual discussion regarding the North Oak Corridor on the following website: http://marc.mindmixer.com/ Register on the site, click on the North Oak Corridor tab, and answer questions about neighborhood improvements and what's most important to you.

Appendix B

Public Meeting Summaries

MEMORANDUM

TO: North Oak Corridor Study Team

FROM: Mark Swope, Olsson Associates

Patty Gentrup, Shockey Consulting Services

DATE: January 7, 2013

RE: Public Comment on transit and node development

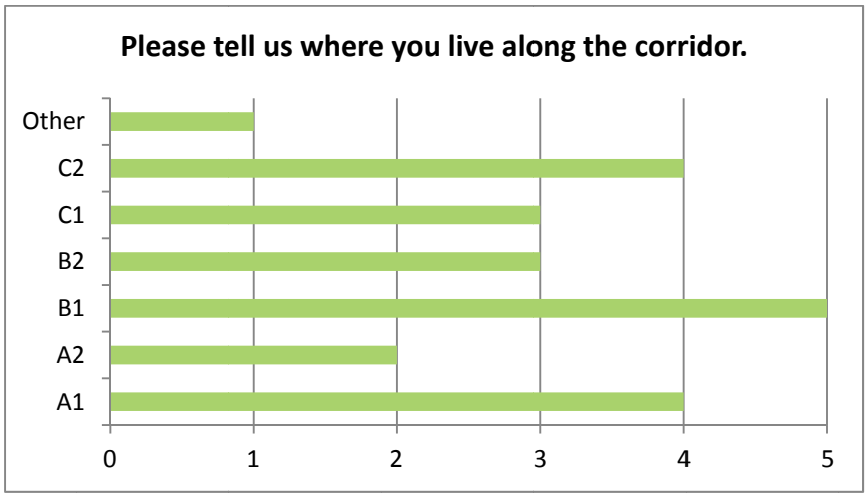
Introduction

To gain public input on how to enhance transit and other modes, the North Oak Corridor Study team hosted an open house from 5 to 7 p.m. October 4, 2012 at Harmony Vineyard Church, Kansas City, Missouri. At the open house, participants were asked to complete a comment card regarding specific nodes along the corridor in which they live or work as well as feedback regarding other activity along the corridor. (The card can be found on pages 9 and 10 of this document.) The form was also available online for members of the Stakeholder Advisory Panel and Study Panel. A total of 22 people completed the comment cards.

Summary

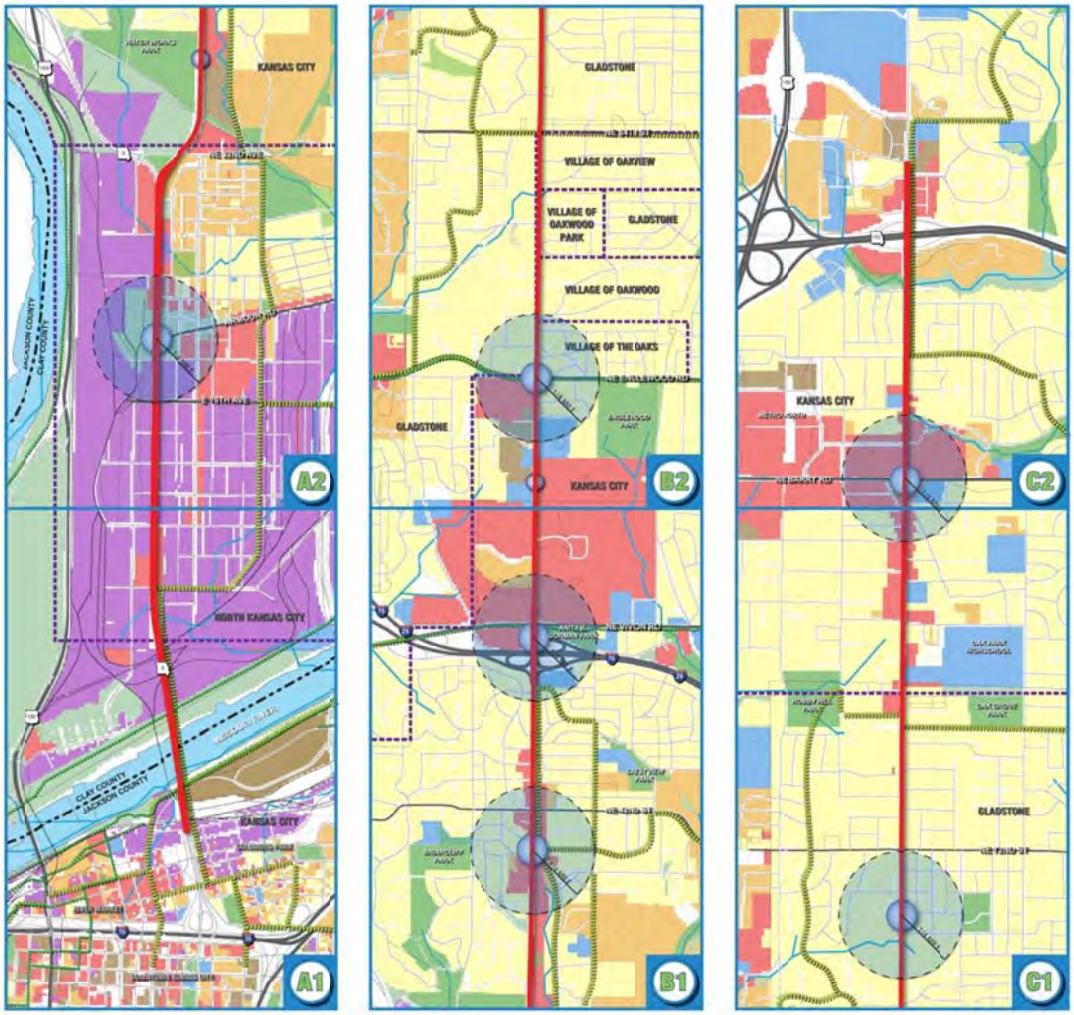
Accessibility to the Corridor

Stakeholders were asked to identify in which section of the corridor they lived or worked, as illustrated in the chart below. The stakeholders who responded represent a mix of all areas along the North Oak Corridor with the largest representation along the corridor in B1 (Water Works Park – 52nd) A1 (River Market – 12th) and C2 (83rd -99th). (The corridor sections can be found on page 2 of this document.)

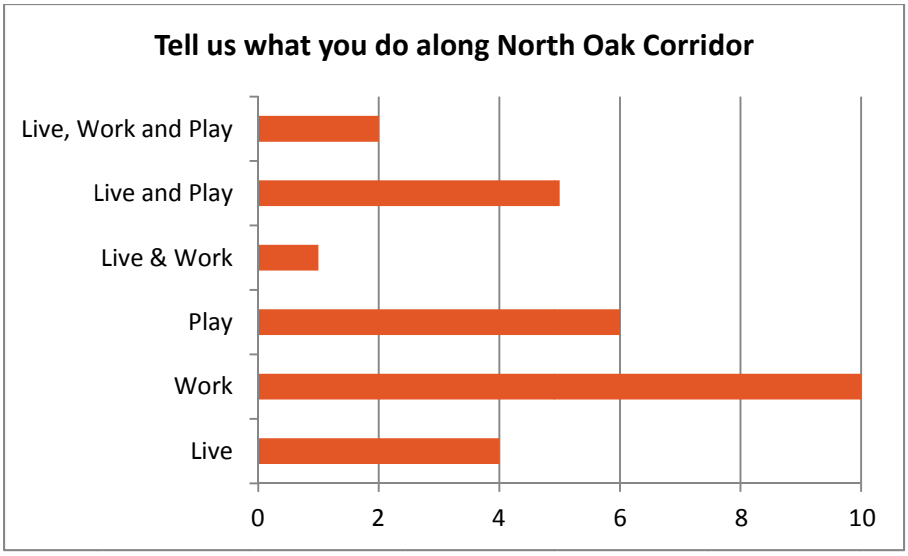


Creating Sustainable Places
VIBRANT CONNECTED GREEN

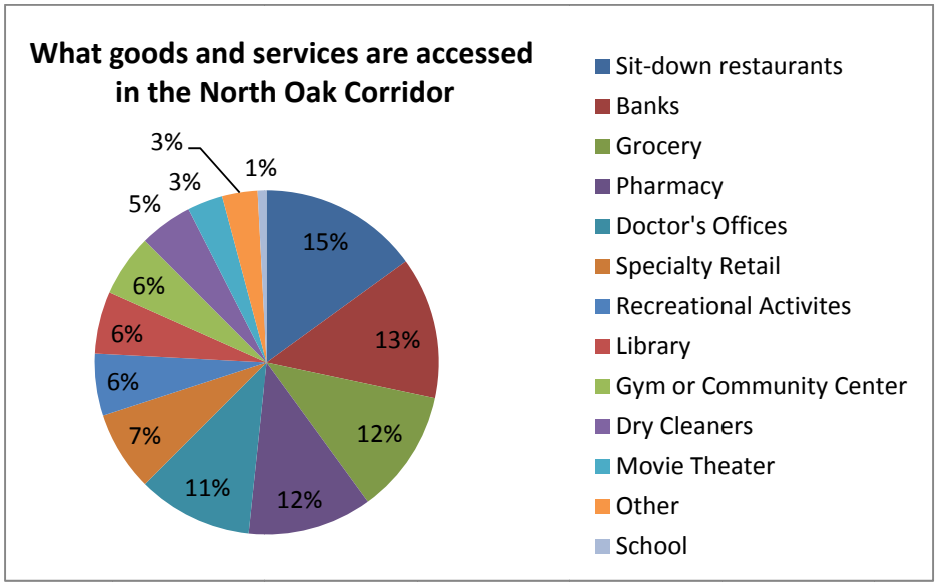
North Oak Corridor Sections: A1: River Market – 12th, A2:12th – Water Works Park B1: Water Works Park – 52nd, B2: 52nd – 68th, C1: 68th – 83rd, C2: 83rd – 99th



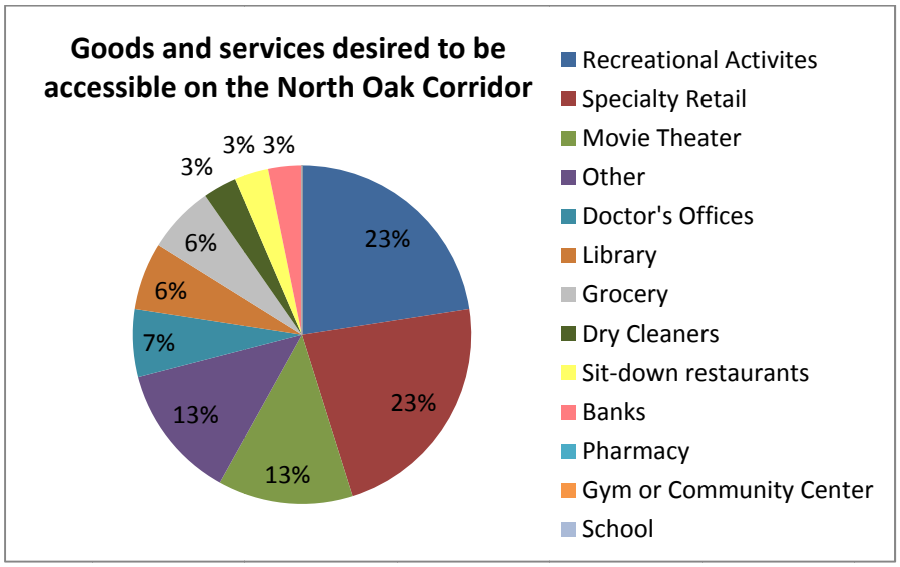
Stakeholders were then asked to tell us if they live, work, play along the corridor. The majority of the respondents work or play along the corridor while a lesser amount actually live along the corridor.



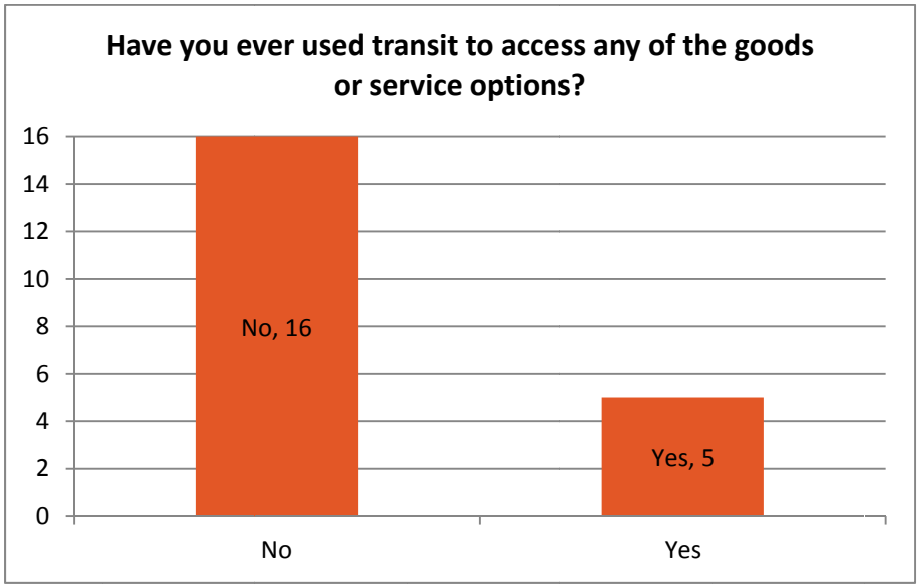
When considering accessibility, the consultant team asked the stakeholders to indicate what types of goods and services they currently access along North Oak. Stakeholders indicated their service needs and goods are currently met along the corridor, but the top services used are sit-down restaurants and banks.



Next, respondents were asked to indicate which goods and services they would like access to that aren't currently along the North Oak corridor. Twenty-three percent indicated they wanted access to recreational activities, along with specialty retail, and a movie theater. The "other" in this section was indicated as the following: Wal-Mart, K-Mart, diverse restaurants (Latin bistros) and more businesses in general.



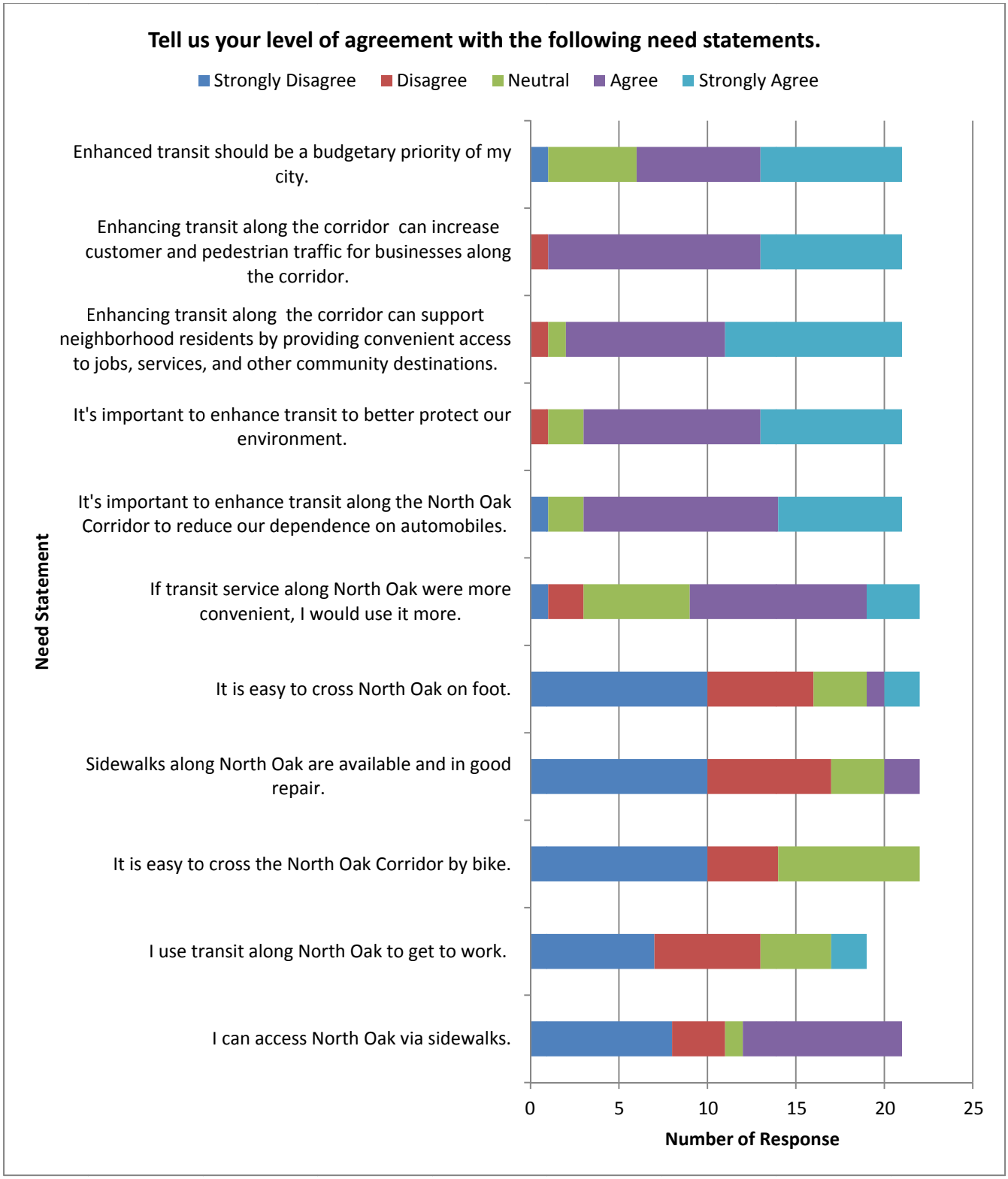
Lastly, stakeholders were asked to indicate if they have ever used transit to access any places along the corridor. The majority of the respondents indicated they have not used transit along the North Oak Corridor to access goods or services. Those who have used transit along North Oak have used para transit or know of social service clients and church members who use it.



After indicating nodes and desired elements for activity centers, the stakeholders were asked to consider the purpose and need of the study which is as follows:

The study will identify options for enhanced transit service along the corridor, providing an organizing spine for transit in the Northland and serving as a catalyst for sustainable development along North Oak Corridor. Bicycle and pedestrian modes will also be a part of the study to determine how they would best support transit service.

Finally, stakeholders were asked to provide their level of agreement with each of 13 statements. As is illustrated in the chart on page 6, stakeholders overwhelmingly strongly agreed or agreed with statements regarding the need for enhancements along North Oak. However, the majority strongly disagreed or disagreed that North Oak Corridor is accessible or in good repair.


Tell us your level of agreement with the following need statements.
Strongly Disagree
Disagree
Neutral
Agree
Strongly Agree
Need Statement
Enhanced transit should be a budgetary priority of my city.
Enhancing transit along the corridor can increase customer and pedestrian traffic for businesses along the corridor.
Enhancing transit along the corridor can support neighborhood residents by providing convenient access to jobs, services, and other community destinations.
It's important to enhance transit to better protect our environment.
It's important to enhance transit along the North Oak Corridor to reduce our dependence on automobiles.
If transit service along North Oak were more convenient, I would use it more.
It is easy to cross North Oak on foot.
Sidewalks along North Oak are available and in good repair.
It is easy to cross the North Oak Corridor by bike.
I use transit along North Oak to get to work.
I can access North Oak via sidewalks.
0
5
10
15
20
25
Number of Response

Stakeholders were also asked what convenience meant to them. The responses follow.

- Longer service hours, more stops.
- Accessibility for the blind and disabled.
- More frequent service, service on weekends and nights.
- Interconnection, access from within the neighborhoods.
- Shelters to protect from all weather conditions.
- Accessible stop locations to activity centers and park and ride capability.
- Transit convenience means efficiency in travel dollars spent, possibly efficiency in transit and decreased spending on roadway infrastructure in a city that is too geographically large and not populated to support its infrastructure.
- Well lit and marked bus stops, with more efficient sidewalk connections.

Stakeholders were asked whether they used transit service along the North Oak Corridor and to explain why or why not. The majority of the stakeholders responded they do not use transit service. For the following reasons:

- Lack of service options and pedestrian connections.
- Not user friendly or convenient for my needs.
- The stops are not efficient for my needs and schedule, while the stops do not have shelters or any amenities; also information of routes is not posted at stop.
- No need at this point, I walk or bike.
- Due to disability of blindness, it's impossible to cross North Oak at Barry. There is also a lack of accessibility and distance to the stop is an issue.

The stakeholders who said they do use the existing transit service along North Oak Corridor responded with the following:

- It's convenient, affordable and punctual. It's very accessible from my front door.
- Less wear on my car and it's also better for the environment.
- Occasionally, but only to work in downtown Kansas City. It is often inconvenient to attempt transit to the north; there are no stops, sidewalks or major activity centers.
- Members and clients of our church services use them daily. Our church provides transportation for members for select activities.

Other Comments

When given the opportunity to provide additional comments regarding the study, a few responded with concerns of pedestrian accessibility. Below are some sample comments.

- We need better sidewalks and bus stops. Bike lanes are needed along ALL of North Oak.
- Enhancement of the corridor to encourage use of bicycles should be a high priority.
- Make it comprehensive and inclusive. Involve more residents.
- Bring more businesses to the corridor and enforce building codes.
- Would like to see the KCATA website be accessible to disabled screen readers. “508 compliant of the ADA.”
- Keep the tree limbs trimmed about sidewalks for accessibility for all pedestrians.
- Make KCATA comply with ADA and train drivers to NOT turn off stop indicators. Have public announcements on the KCATA hold line.
- Would be interesting to see what you would get if worked with HOAs in the area to grow support.
- The lack of adequate public transportation turns those who do not drive away from living in this area.
- Consider beautification of the expressway bridges at I-29 and North Oak as well as at I-29 and Vivion, this would make a difference in the approaches to two key intersections.
- The corridor needs transit and pedestrian improvements, along with redevelopment of specific locations with a multimodal approach.
- The study team could have better utilized the partnerships of the advisory team to gather more information on this area’s desires to use, or not, public transit.

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North Oak Corridor Study

Open House #1- Comment Form

Please indicate the portion of the corridor nearest to where you live or work. (Sections correspond to corridor map board.)

A1	A2	B1	B2	C1	C2	Other
☐	☐	☐	☐	☐	☐	☐ _____

Please answer the following questions according to your experience in the node checked above.

Tell us what goods and services you access in the North Oak Corridor. (Check all that apply)					
☐ Doctor's Offices	☐ Sit-down restaurants	☐ Movie Theater	☐ Pharmacy	☐ School	☐ Grocery
☐ Recreational Activities	☐ Gym or Community Center	☐ Specialty retail	☐ Dry Cleaners	☐ Banks	☐ Library
☐ Other _____					

Have you ever used transit to access any of these places? If yes, how frequently?	
☐ Yes _____	☐ No

Tell us what goods and services you'd like to access that aren't currently located along the corridor. (Check all that apply)					
☐ Doctor's Offices	☐ Sit-down restaurants	☐ Movie Theater	☐ Pharmacy	☐ School	☐ Grocery
☐ Recreational Activities	☐ Gym or Community Center	☐ Specialty retail	☐ Dry Cleaners	☐ Banks	☐ Library
☐ Other _____					

Do you live, work or play along the corridor? (Check all that apply)		
☐ Live	☐ Work	☐ Play

Please mark your level of agreement with the following statements

Need Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I can access North Oak via sidewalks.	❑	❑	❑	❑	❑
I use transt along North Oak to get to work.	❑	❑	❑	❑	❑
It is easy to cross the North Oak Corridor by bike.	❑	❑	❑	❑	❑
Sidewalks along North Oak are available and in good repair.	❑	❑	❑	❑	❑
It is easy to cross the North Oak Corridor on foot.	❑	❑	❑	❑	❑
If transit service along North Oak were more convenient, I would use it more.	❑	❑	❑	❑	❑
What does convenience mean to you? Longer service hours, more stops, etc. please explain.					
It's important to enhance transit along the North Oak Corridor to reduce our dependence on automobiles.	❑	❑	❑	❑	❑
It's important to enhance transit to better protect our environment.	❑	❑	❑	❑	❑
Enhancing transit along the corridor can support neighborhood residents by providing convenient access to jobs, services, and other community destinations.	❑	❑	❑	❑	❑
Enhancing transit along the corridor can increase customer and pedestrian traffic for businesses along the corridor.	❑	❑	❑	❑	❑
Enhanced transit should be a budgetary priority of my city.	❑	❑	❑	❑	❑

Do you use transit service along the North Oak Corridor? Explain why or why not.	
❑ Yes (please explain why)	❑ No (please explain why not)

What other comments do you have about this project?

Submit your comment card by handing it to a project team member today or mail to:

Shockey Consulting Services, LLC 13000 W. 87th Street Parkway #103 Lenexa, KS 66215. Or email to Patty@shockeyconsulting.com

Creating Sustainable Places

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Appendix C

Methodology on Land Use Density Relationship to Transit Ridership

The association between transit ridership and land use density in terms of population and employment is well accepted in the transit industry. Literature exists in the transit industry that specifies the "appropriate" level of density for different transit modes such as regular bus service, Bus Rapid Transit (BRT), light rail, or streetcar. This literature often refers to transit in major urban centers with an extensive legacy of transit such as Chicago or New York. The densities cited often exceed densities found in the Kansas City area, or similar small or mid-size urban areas typical in the mid-west or west.

Kansas City has, or is in the process of developing, several BRT lines such as Main Street MAX or Troost MAX. In addition, several additional lines are being developed that will provide a slightly lower service frequency than a traditional BRT service, while still providing higher quality passenger amenities and vehicles equivalent to the existing BRT lines. The corridors served by these different types of higher quality transit service may not meet the density criteria identified in industry literature to be suitable to higher quality transit, but are identified by the local community as successful transit corridors.

An analysis was performed to evaluate the connection in the Kansas City area between population and employment density, and transit ridership. The purpose of this analysis was to identify the density levels that would be required along the North Oak corridor to support a higher level of transit such as BRT, light rail, or streetcar.

A GIS analysis was performed to evaluate connections between transit ridership and population and employment densities along Troost Avenue, Independence Avenue, State Avenue, and North Oak Trafficway. These corridors were identified as having strong ridership relative to the rest of the Kansas City area, the route type being of similar nature to the North Oak corridor. The North Oak corridor was chosen because of its strong existing ridership, and to create a reference of existing density. Half mile buffers were applied to the following corridors:

- Future State Avenue Connex alignment from downtown Kansas City, Missouri to the Village West development Kansas City, Kansas.
- Troost MAX alignment from 75th Street north to downtown Kansas City, Missouri.
- KCATA Route 24 Independence Avenue alignment between Winner Road and Grand Boulevard.
- Burlington Avenue / North Oak Trafficway from downtown KCMO to Highway 152.

2010 employment point data and 2010 census block polygon data was obtained from the Mid-America Regional Council. 2012 ridership data was obtained from the KCATA for Troost MAX, Route 25 Troost Local, Route 24 Independence Avenue, Route

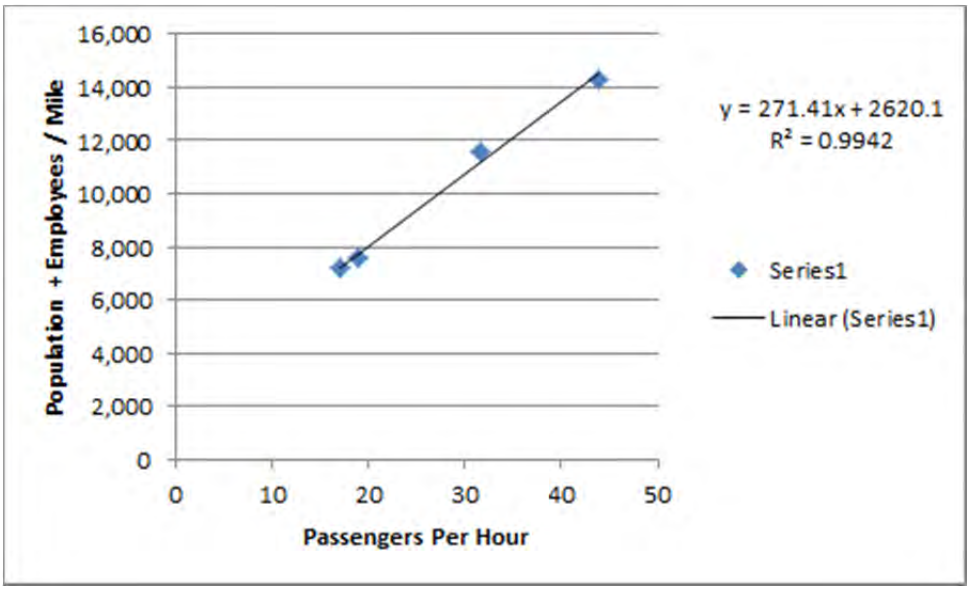
101 State Avenue, and Route 142 North Oak. The employment, population, and ridership data was clipped to each corridor's buffer using GIS. Daily revenue hours for the portion of the route within the corridor was also calculated to arrive at a passengers per hour figure. These metrics, along with corridor population densities, are presented below.

Table C.1

Corridor	Population	Employment	Square Mile	Ridership	Pass /Hour	Pop /Mile	Emp /Mile	(Pop+Emp) /Mile
Troost MAX	31,164	73,303	7.3	7,796	44	4,269	10,042	14,311
Independence Ave	33,502	48,463	7.1	3,731	32	4,719	6,826	11,544
State Ave	35,688	73,674	15.2	2,036	24	2,348	4,847	7,195
North Oak	29,376	64,334	12.3	1,101	19	2,388	5,230	7,619

A linear regression analysis was applied to this data. A positive relationship, indicated by a R^2 of 0.99, was found between passengers per hour, and the combined population and employment density per mile. This analysis is displayed below.

Figure C.0.1

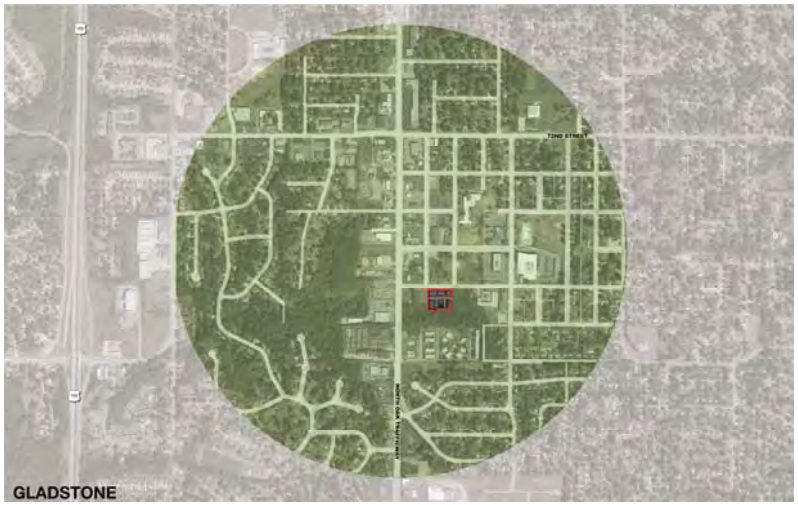


Appendix D

Land Use Project Examples

DEVELOPMENT DATA

- **TOTAL ACRES:** **1.5**
- **RESIDENTIAL DENSITY:** **14.67 UNITS / ACRE**
- PARKING: GARAGE / SURFACE
- # OF BUILDINGS: 5
- # OF STORIES: 2.5
- # OF UNITS: 22



NORTH OAK CORRIDOR STUDY: PROJECT SCALE COMPARISON

TOWNHOMESS AT BUCKLEY COURT

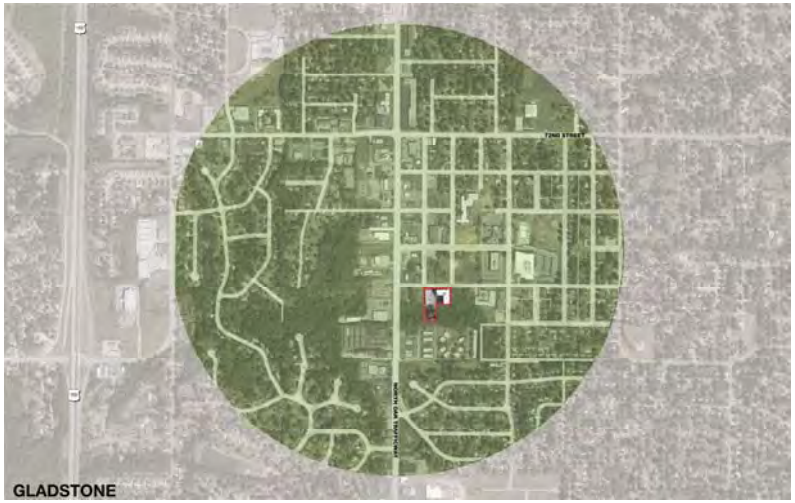
OVERLAND PARK, KANSAS

Note: This illustration is provided for project area scale comparison purposes only, and does not represent a specific planning or development proposal.

CONFLUENCE

DEVELOPMENT DATA

- **TOTAL ACRES:** **2.0**
- **COMMERCIAL F.A.R.:** **0.78**
- PARKING: STRUCTURE / SURFACE
- TOTAL BUILDING SF: 68,000 +/-
- TOTAL RETAIL SF: 10,675 +/-
- # OF BUILDINGS: 1
- # OF STORIES: 4
- # OF UNITS: 83 (HOTEL ROOMS)



NORTH OAK CORRIDOR STUDY: PROJECT SCALE COMPARISON

39 RAINBOW PHASE 1

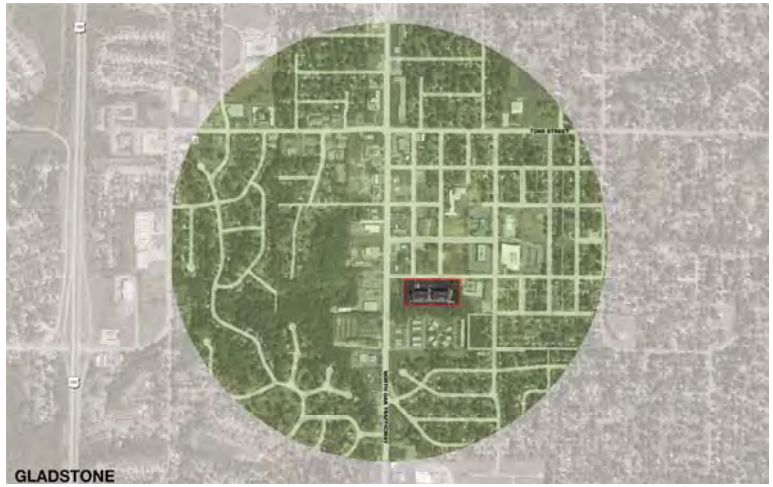
KANSAS CITY, KANSAS

Note: This illustration is provided for project area scale comparison purposes only, and does not represent a specific planning or development proposal.

CONFLUENCE

DEVELOPMENT DATA

- **TOTAL ACRES:** **4.8**
- **RESIDENTIAL DENSITY:** **12.50 UNITS / ACRE**
- **COMMERCIAL F.A.R.:** **0.19**
- PARKING: SURFACE / STRUCTURE
- TOTAL BUILDING SF: 125,250 +/-
- TOTAL RETAIL SF: 41,400 +/-
- # OF BUILDINGS: 2
- # OF STORIES: 3
- # OF UNITS: 60



NORTH OAK CORRIDOR STUDY: PROJECT SCALE COMPARISON

MISSION FARMS - SITE 1

LEAWOOD, KANSAS

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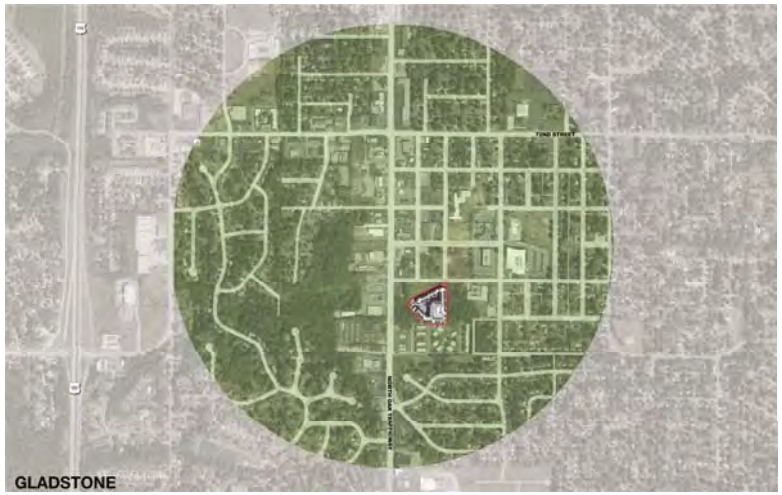
CONFLUENCE

DEVELOPMENT DATA

- **TOTAL ACRES:** **3.5**
- **RESIDENTIAL DENSITY:** **60.57 UNITS / ACRE**
- **COMMERCIAL F.A.R.:** **0.06**
- PARKING: STRUCTURE / SURFACE
- TOTAL BUILDING SF: 258,850 +/-
- TOTAL RETAIL SF: 9,580 +/-
- # OF BUILDINGS: 1
- # OF STORIES: 4
- # OF UNITS 212



Note: This illustration is provided for project area scale comparison purposes only, and does not represent a specific planning or development proposal.

NORTH OAK CORRIDOR STUDY: PROJECT SCALE COMPARISON

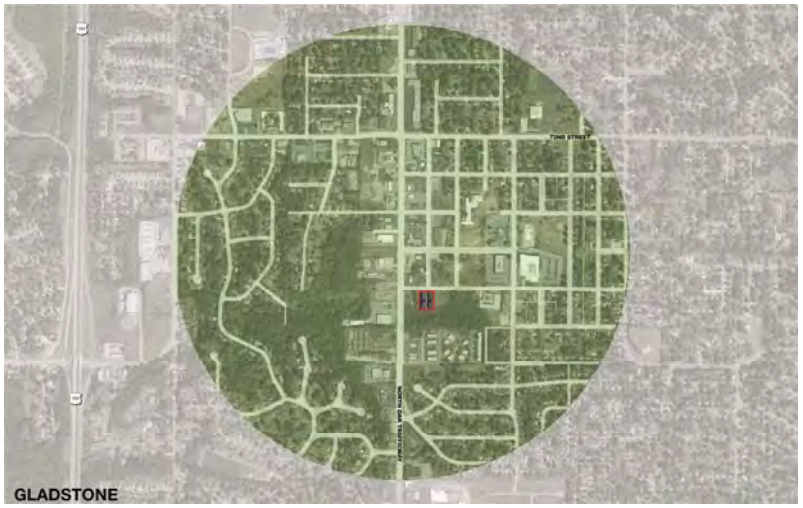
THE VILLAGE AT MISSION FARMS

LEAWOOD, KANSAS

CONFLUENCE

DEVELOPMENT DATA

- **TOTAL ACRES:** **0.8**
- **RESIDENTIAL DENSITY:** **20.00 UNITS / ACRE**
- PARKING: GARAGE
- # OF BUILDINGS: 4
- # OF STORIES: 2
- # OF UNITS: 16



NORTH OAK CORRIDOR STUDY: PROJECT SCALE COMPARISON

NORTHGATE VILLAGE

NORTH KANSAS CITY, MISSOURI

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CONFLUENCE

DEVELOPMENT DATA

- **TOTAL ACRES:** **2.1**
- PARKING: SURFACE
- # OF BUILDINGS: 1
- # OF STORIES: 5
- # OF UNITS: 123 (HOTEL ROOMS)

NORTH OAK CORRIDOR STUDY: PROJECT SCALE COMPARISON

COURTYARD MARRIOTT AT BRIARCLIFF

KANSAS CITY, MISSOURI

Note: This illustration is provided for project area scale comparison purposes only, and does not represent a specific planning or development proposal.

CONFLUENCE