Bus Rapid Transit: An Overview and Research Application on

OKC's RAPID NW Transit Line

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Abstract

This case study of the Oklahoma City RAPID NW Line first begins with a literature review of the bus rapid transit (BRT) system to provide background to the subject. A history of the transportation option leads into examples from Latin America, where the system was first founded. Afterwards, a brief overview of bus rapid transit in the United States then allows for national examples of BRT to be discussed. Finally, ending the literature review is an overview of various way bus rapid transit effects cities. These include, but are not limited to, transportation justice, car-centric design changes, economic growth and gentrification issues, community health, and climate change mitigation.

After the literature review, an analysis of Oklahoma City's RAPID NW Transit System begins with city background and demographics discussions. An introduction to the RAPID bus rapid transit system then leads into the research question of the analysis: "Based on the availability of supportive resources along the RAPID Northwest line, will the Oklahoma City bus rapid transit system increase connectivity for those living along the line, thus improving the social, economic, and physical makeup of the region?" A Google Maps Analysis showcases that, overall, the RAPID NW line does increase connectivity to other resource options. Personal thoughts and recommendations for the RAPID NW Line conclude the paper, and these include using the economic development from the line to transform the physical infrastructure of the road into more pedestrian-oriented areas, with mixed-use development, larger sidewalks and bike lanes, and beautification goals.

1. Overview of Bus Rapid Transit

Introduction

The role public transportation plays in the everyday lives of citizens, no matter the country, is immense. Community health, economic success, development types, climate change, and numerous other issues are affected by whether or not people can effectively travel between places. The private automobile has long been the top choice for transit option, but looking at public transit options instead can help reduce the car-centric developments that often occur and other negatives. Bus rapid transit, in particular, helps solve or mitigate issues of transportation by providing an affordable, reliable, efficient, and rapid transit option.

Bus Rapid Transit History

Cost-effectiveness, speed, and quality, each determined by the technologies available, have long been issues in urban-area public transportation (Wright, 2010). Rail systems, whether underground or elevated, "topped the list in terms of speed and quality, but the price was such that only a limited number of corridors in a limited number of cities could deliver a system," (Wright, 2010). Light rail transit (LRT) carries fewer people than other rail systems while still being expensive. Some of the cheapest options include bus services and paratransit, both of which provide versatile and flexible access to a city via urban roadways (ISSUES IN BUS RAPID TRANSIT, n.d.). These options are typically poor quality and low capacity, however, "leading to operations that are slow, unsafe, insecure, uncomfortable, and low on status," (Wright, 2010). While utilizing urban roadways can be a cost-benefit for implementing these systems, they also face "congested streets… vehicles and traffic signals... and time-consuming stops," causing travel speeds less than private automobiles on the same street (ISSUES IN BUS RAPID TRANSIT, n.d.). Here, the flexibility of these services translates to "unreliability and disorganization," contributing to the lack of speedy, safe, high-capacity, and cost-effective transportation (in many cities around the globe) (ISSUES IN BUS RAPID TRANSIT, n.d.). Thus, the background of unsatisfactory public transit set the stage for a new, more effective concept – the bus rapid transit system.

Bus rapid transit delivers "metro-like capacity and quality but at an affordable price," by using existing roads with an efficient bus method (Wright, 2010). Some of the key features include specific bus lanes on city streets, priority at intersections (traffic signals, no-turns across bus lanes (ITDP, 2014), and longer green lights for approaching buses), boarding stations with curb realignments and covered shelters, and faster boarding with low-floor buses and an alternative, off-board fare collection method (ITDP, 2014). Along with making the transit option more accessible and people-oriented, these features contribute to the "rapid" portion of "bus rapid transit" by solving the three main public transportation delays: "1) boarding and alighting, 2) intersections, and 3) traffic congestion" (ITDP, 2014).

BRT in Latin America

"One of the best examples of south-to-north technology transfer," BRT has shown its versatility and compatibility by beginning in developing countries and spreading to wealthier ones (Wright, 2010). The context of where BRT systems were developed is important to understanding the need for such a development. More than a simple method of transportation, these systems have proven to be "cultural transformations" for their communities in developing countries (Latin America's, 2017).

Curitiba, Brazil

Curitiba, Brazil, is known as the birthplace of bus rapid transit. In 1943, Curitiba's comprehensive plan "envisioned exponential growth of automobile traffic and wide boulevards...to accommodate the traffic," (ISSUES IN BUS RAPID TRANSIT, n.d.). However, rather than succumb to widespread private automobile ownership and the issues that arise from it, planners focused on how public transportation and modest projects could be used instead, developing the 1965 Master Plan to plan the city (ISSUES IN BUS RAPID TRANSIT, n.d.). They focused on channeling the rapid growth of the city into pedestrianfriendly streets to prevent congestion and unchecked growth. When an urban rail system proved too costly, other methods of efficient public transportation were considered, and thus bus rapid transit was born. As populations began turning more towards the system, the Master Plan was able to encourage commercial growth linearly, limiting congestion in the central portion of the city (ISSUES IN BUS RAPID TRANSIT, n.d.). Mixed-use zoning "encouraged local community self-sufficiency by providing each city district with its own adequate education, health care, recreation, and park areas," allowing economic and community health to flourish (ISSUES IN BUS RAPID TRANSIT, n.d.). Private parking became expensive, public parking became time-restricted, subsidies were given for public transportation, and new growth was limited to certain areas (ISSUES IN BUS RAPID TRANSIT, n.d.). Altogether, despite high incomes, high car ownership rates, and increasing populations, the city of Curitiba successfully introduced bus rapid transit as the popular

option for transit and steered pedestrian-friendly development and population increases along the line.

Bogota, Colombia

Becoming more efficient than even Curitiba's BRT system, Bogota's implementation of BRT lines has boasted rates of "45,000 passengers per hour in each direction – a rare feat, even for rail corridors," (Latin America's, 2017). Like with Curitiba's Master Plan, Bogota worked to implement a BRT system with other lasting effects. By "adapting to the conditions of an already built city," Bogota and its BRT system reduced private car usage and improved other methods of transportation such as biking and walking, resulting in "a drastic reduction in traffic fatalities, lower emissions, less congestion and faster travel times," (Latin America's, 2017). Implementing a successful BRT system in a city with a large population and an already built system of transportation, Bogota offers a prime example of how bus rapid transit could be implemented in similar cities across Latin America and the globe.

BRT in the United States

Across the globe, "public transport is increasingly seen as an integral instrument in addressing traffic congestion, local air quality, energy security, and global climate change," (Wright, 2010). Offering a quick and affordable option for public transportation, bus rapid transit can bring along these changes and more, reintegrating and revitalizing cities long lost to the private automobile and its infrastructure.

United States Overview

Inspired by the success of the system in Latin America, the United States began its journey with BRT systems in 1977 in Pittsburgh, Pennsylvania (Kitsko, 2022). With a busonly lane and frequent service, the Pittsburg South Busway line served as an example of BRT for other US cities. Over the past two decades, BRT has become the "nation's fastestgrowing transit mode" (Federal Transit Administration, n.d.) in cities across the US, the system "often the most feasible, quickly implemented and cost-effective way to improve mobility in the United States," (Latin America's, 2017). As American cities continue to grow, transportation beyond individual cars can help with increasing congestion issues (Latin America's, 2017). Yet, there are numerous antagonists against the widespread implementation of American BRT systems. Issues arise despite the benefits of BRT; lobbyists with stakes in other transportation methods (ex. railway manufacturers and engineers) aim to discredit the system, misconceptions of buses (slow, noisy, continued racial and economic discrimination) continue to spread, and financial worries about the low-fare system and permanency of the system have created notions of limited funding for development around the lines (Latin America's, 2017). BRT systems in the U.S. have historically not been seen as "complete, high-quality rapid transit system[s] as typically [are] found in other parts of the world, especially developing countries" (Vincent, 2010). Beyond this, showcasing that BRT is a development tool rather than only a transportation improvement of buses is key to effective, widespread implementation (Latin America's, 2017). Although cars have long been the societal norm and preferred method of transportation in the United States, tackling a plethora of issues - climate change, transit equity, etc. - requires showing that other methods, such as bus rapid transit, are beneficial for all.

Cleveland, Ohio

The Healthline in Cleveland, Ohio, proves to be one of the best examples of BRT in the United States. Covering 6.8 miles of Euclid Avenue, the line features a large stretch of bus-only lanes, fifty-eight semi-enclosed pick-up stations, and renovated sidewalks and roadways implemented to replace the preexisting bus route (Vincent, 2010). Improving this public transportation system and creating economic revitalization were the main concerns of the project, both of which proved to be successful. Thirteen months after opening, the Healthline already had 47% more ridership than the previous bus line and featured \$3.3 billion in finished or developing economic development (Vincent, 2010).

Los Angeles, California

Another prime example of a full BRT line, the Los Angeles Orange Line is 14 miles of dedicated bus lanes built on abandoned rails. It features fourteen stations, rubberized asphalt and sound walls to reduce noise pollution, an irrigation system for landscaping, and a plethora of elements for users' benefit (message signs, covered seating, security cameras and lighting, level boarding, etc.) (Vincent, 2010). Designed to improve the overall public transportation of Los Angeles, the Orange Line connects and coordinates with the Red Line subway, Metro Rapid Ventura Line, and local bus lines, and it has 3,800 free parking spaces along the line and a shuttle from the Orange Line's Warner Center to workplaces nearby (Vincent, 2010). The Orange Line was generally successful, with weekday boarding numbers already exceeding future goals only seven months after the line opened (Vincent, 2010). However, issues have still risen such as overcrowding (Vincent, 2010) and gentrification along the line (Brown, 2016).

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Washington, D.C.

Although it is a geographically smaller area than the previous two examples, Washington D.C. has numerous smaller cities and suburbs surrounding the main metro. With 1 million people in the area, countless job opportunities and high-density development in these smaller, outer cities, traffic congestion rates compare to those in cities such as Los Angeles and New York (Latin America's, 2017). Thus, plans to develop "120 miles of transit corridors to connect residential communities to job centers" show an example of how valued bus rapid transit can be in dense areas (Latin America's, 2017).

How BRT Changes Public Transportation Issues

The effects that bus rapid transit can have on cities are immense. The shortcomings of proper public transportation have created extreme dependencies on automobiles, encouraging further automobile infrastructure and car-centric developments. Numerous issues have arisen from improper public transportation in cities, including limited transit justice, poor community and economic health, and climate change. Bus rapid transit, a quick, affordable, and efficient method of transit, thus offers cities a viable development type to mitigate these issues.

Transportation Justice

For public transportation, allowing physical and economic mobility to communities is essential. "Access to transportation reduces barriers to employment, educational opportunities, health care, and child care," as well as access to healthier food options, all of which promote healthy, autonomous, and economically successful communities (Urban Institute, 2024). For neighborhoods lacking in efficient, affordable transportation options, higher rates of unemployment occur (Urban Institute, 2024). Along with this, quicker transportation methods are found to be associated with higher incomes later in life, making more school systems available, and reducing feelings of isolation for children and young adults (Urban Institute, 2024). Transportation access also disproportionately affects people of color, lower-income individuals and families, and single-parent households. Behind housing, transportation costs were the "second largest household expenditure... accounting for 15% of average household spending," in 2022 (BTS, 2024). For low-income households, however, the total comes out to be closer to 30% of income (BTS, 2024). Households with one or more vehicles spend more than those without vehicles, highlighting the necessity for affordable and efficient public transportation options instead. Bus rapid transit fills these gaps by using preexisting roadways and transit routes to create an accessible, reliable, and quick method of getting from place to place. As previously mentioned, through zoning practices along Curitiba's BRT lines, the resources and transit access to them were improved for each city district (ISSUES IN BUS RAPID TRANSIT, n.d.). Along with spurring resource developments around the line and stops, BRT lines also create an efficient and usable mode of public transportation, promoting an increase in ridership and stops and thus an increase in access. Living near transit hubs has promoted more walking, less automobiles, and increased health (Grame, 2015).

Along with this, "community members are more engaged with their neighborhoods and one another in densely populated areas surrounding transit stations," showing the importance of transportation with community health. Fixing the aforementioned transit equity issues is thus possible through bus rapid transit and its frequent transit stations.

Car-Centric Design Changes

As cities continue to grow in population, the increase in cars, parking lots, and sprawl-type development patterns for residential, commercial, and other developments continue to spread. Car-centric cities, or places where walkability is low and access is only achieved through private car usage, are widely seen as the norm in America. Populations move to areas where they can access the resources needed. For most, this has meant owning a private vehicle, living in a suburban home, and driving on nearby freeways to hop from place to place. With the addition of a reliable and quick transit option, however, populations will likely be more willing to live *within* the city, "conserving land and promoting the vitality of neighborhoods and urban commercial centers," (ISSUES IN BUS RAPID TRANSIT, n.d.). Bus rapid transit delivers each of these requirements, and it has even been linked to increased growth specifically along its transit lines. In Curitiba, while the city itself had a population increase of 73%, the population specifically along the new BRT lines grew by 120% (ISSUES IN BUS RAPID TRANSIT, n.d.).

Pushes to reduce parking minimums near transit-oriented developments is another benefit of introducing a BRT system. As "parking lots account for large swaths of land use in urban areas," their effects on humans are also large (Grame, 2015). Massive or frequent parking lots create underutilized areas for economic opportunities by making spaces specifically for parked cars. They also promote private car usage, contributing to disconnected communities, increased emissions, and other car-related issues (Grame, 2015). Rather than this, an increase in viable public transit options, like BRT, can limit the need for cars and thus limit the need for parking lots.

Economic Growth and Gentrification Issues

A prominent push for many cities to develop BRT lines involves the lure of an increase in physical and economic development activity along those routes. Curitiba's Master Plan even went as far as to plan for this economic growth, using zoning establishments to encourage "local community self-sufficiency by providing each city district with its own adequate education, health care, recreation, and park areas," (ISSUES IN BUS RAPID TRANSIT, n.d.). The economic impact of BRT lines on property values, specifically in the United States, is less researched. One study, which looked at 11 bus rapid transit systems across the United States, found only 3 systems to increase residential property values significantly along the line (Acton et al., 2022). The same study also found one system to decrease the nearby property values, while the remainder did not experience significant changes. Similarly, gentrification caused by economic development is another underresearched area for bus rapid transit. Contrasting the previous research study, the case of Los Angeles's Orange Line BRT showed significant issues in the surrounding neighborhoods (Brown, 2016). The areas with more renter-occupied housing and lower incomes exhibited higher rates of change from 2000 to 2013 than other areas along the line. Providing affordable housing options is thus necessary to combat the rising housing costs in these areas (Brown, 2016).

Community Health

Cars have taken over streets that used to belong to people. Moreover, they have separated communities physically or socially through the spread of highway systems, which support the sprawl of cities and create a mindset that prioritizes the end goal of the transportation trip rather than the trip itself. Inhospitable roads have been created from "very deliberate choices that have been made to shape our communities around the private automobile" rather than humans (Projects for Public Spaces, 2014). Discovering and implementing other modes of transportation and creating complete streets can allow these methods of transit "to serve as public forums where neighbors and friends can connect with one another," (Projects for Public Spaces, 2014). Transportation and the terminals, sidewalks, roads, and stations along the route can become part of everyday life and offer access to community events, fostering connections. Bus rapid transit, an affordable and efficient option for public transportation, thus offers both physical infrastructure and quick access to other areas in the community, reconnecting areas that have long been divided. BRT stations can promote neighborly gatherings and interactions, the switch from automobile users to BRT users can limit the need for parking lots (which can then be used for other things, such as public markets), and the system itself offers efficient access to other communities.

Climate Change Mitigation

It has become increasingly common knowledge that the effects air pollution has on climate change are immense. Of the generators of air pollution, the individual automobile is one of the more notable. Bus rapid transit helps to solve this issue by creating an efficient alternative to the private automobile. In Curitiba, the effects of the BRT are noticeable with air pollution. Despite the city's history of having high rates of private car ownership, Curitiba's BRT line demonstrated to have reduced "about 27 million auto trips per year, saving about 27 million liters of fuel annually," (ISSUES IN BUS RAPID TRANSIT, n.d.). Nearly 28% of the users had previously owned and operated a car but switched to the BRT line, contributing to more than half (55%) of private trips being from public transportation and thus the subsequent low level of air pollution in the city (ISSUES IN BUS RAPID TRANSIT, n.d.).

2. Oklahoma City's RAPID Transit System Analysis

Oklahoma City Background

As with other United States cities, the acceptance of the car as the main method of travel spurred car-centric development in the early 20th century. The private automobile "quickly emerged as a necessity for Oklahomans," the number of vehicles in the state almost quadrupled "from 127,000 in 1918 to 500,000 in 1926," (Oklahoma Historical Society, 2016). This trend towards automobiles progressed further after World War II, with superhighways and turnpikes being built across the state (Oklahoma Historical Society, 2016). As with other cities, the highway took over the existing developments, dividing neighborhoods and causing the automobile to be prioritized.

Oklahoma City Demographics

Oklahoma City's county, Oklahoma County, faces **higher amounts of food insecurity** (12%) than the national average (10%) as well as **limited access to healthy foods** (7%)

versus the national average (6%). There are more children in **single-parent households** (29%) than the national average (25%) as well. **Air pollution** via particulate matter (9.7) is also higher than the nation (7.4). **Traffic volume** is also well over the national average, a comparison of 137 for the county to 108 for the nation. **Youth** are also more **disconnected** in the county (9%) than in the nation (7%). There are also **less primary care physicians** in the county, with 1,230:1 comparing to the national 1,330:1.

All demographic data from: (County Health Rankings, n.d.)

Oklahoma City's RAPID Line

The Oklahoma City BRT line is an introduction of the public transportation method into central Oklahoma, beginning with Northwest Oklahoma City (2023 RAPID). The RAPID system aims to "bridge communities... easily connecting diverse areas of people and experiences and making an otherwise expansive metropolitan area feel like a cohesive, welcoming neighborhood," (2023 RAPID). The Northwest line will connect downtown Oklahoma City to the northwestern portion of the city, the creation being the first step in creating the full bus line. Covering 9.5 miles, the RAPID NW line offers typical BRT station amenities like level boarding and shelter, ADA compliance, transit signal priority, two park-and-ride locations, and departures every 12-15 minutes during the day (2023 RAPID).



Above: RAPID Departure schedule (COTPA, 2024b)

It also connects to a larger system of buses in the area, increasing the accessibility of the line. The RAPID NW line is located within a half-mile of "more than 20% of the region's jobs... potentially reaching 40,000 residents and 91,000 jobs in the local workforce," (2023 RAPID). Similar other cities, the RAPID bus rapid transit system will also work in tandem with the "Better Streets, Safer City" initiative of Oklahoma City, which works to improve pedestrian infrastructure, special traffic lanes, and other beneficial developments (2023 RAPID). An extension of 17 miles of the system was also approved in July of 2024, serving the northeastern and southern parts of the city (City of OKC, n.d.). Economically speaking, the projected revenue estimates are \$1.07 billion for the project, showing economic success (City of OKC, n.d.). However, the success of the project's connectivity goals, and thus the issues that it solves, need further research.

Research Question

Based on the availability of supportive resources along the RAPID Northwest line, will the Oklahoma City bus rapid transit system increase connectivity for those living along the line, thus improving the social, economic, and physical makeup of the region?

Google Maps Analysis

The goal with the Google Maps analysis is to determine the resource options available via rapid connectivity on the RAPID Northwest line. Walking distances/times are used in combination with BRT times to showcase the resources available without a car or bike. A side effect of this analysis is showing where regions lack resources, specifically for those without automobiles.

Method

To begin the analysis, a comparison between the RAPID Northwest line System Map and Google Maps is made, marking each RAPID bus station on Google Maps. Afterwards, 3 BRT stations are chosen to be the basis of each of the 3 research tests. The stations on either side of the 3 primary stations are also chosen for each individual test, careful to not overlap the stations picked for testing. These stations are within 15 minutes of travel time via BRT; 15 minutes is the time used for BRT travel in this research.

With the 3 primary stations, accommodations for 1. Grocery stores, 2. Schools, 3. Medical centers, and 4. Recreation are researched in the station's vicinity, specifically within 15-30 minutes walking distance. Preference of resources is given to those closer to the primary stations; therefore, although numerous resources may pop up, those closer to the station are more likely to be listed. A total of 3-5 resources are listed if there are numerous options in the area. With the nearby secondary stations on either side of the 3 primary stations, the same process was repeated.

For the analysis, the resources available and times to each are noted. Times from the primary location to the resource options are also noted, adding the time on transit (15 minutes for this research) to the walking time, producing a total time. Conclusions are then drawn from these times, showing if viable, comparable resource options are available and giving the times for trips.

Variables

When choosing which resources to search for nearby the primary and secondary stations, residential and jobs were not resources researched due to the highly suburban environment in the region and the varying nature of employment opportunities. Controlled variables were also used to produce consistent search results for the 4 researched resources. The exact wordings for each search were: "grocery store," "school," "medical," and "recreation."

Analysis

Stations Chosen:

- 1. Primary: NW 63rd & Meridian
 - a. Secondary: Meridian & Expressway
 - b. Secondary: Expressway & Portland
- 2. Primary: Expressway & Penn

- a. Secondary: Independence & NW 56th
- b. Secondary: Expressway & Blackwelder
- 3. Primary: Classen & NW 31st
 - a. Secondary: Classen & NW 36th
 - b. Secondary: Classen & NW 23rd



LEFT: RAPID NW Systems Map (COTPA, 2024a)

Right: Google Maps; Starred RAPID Stations (Google, 2024)

KEY:

- * = longer of the two times for the same option
- ** = shorter of the two times for the same option

Resources and Times/Distances Found:

1. NW 63rd & Meridian

Grocery Stores, NW 63rd & Meridian



			Total Option Time (Walking +
Station	Store Name	Time (Walking)	BRT)
	Walmart Neighborhood Market	27 minutes	
NW 63rd & Meridian	Pruett's Food OKC	28 minutes*	
	Supermercados Morelos	24 minutes	
Meridian & Expressway	(No viable options)		
Expressway & Portland	Pruett's Food OKC	6 minutes	21 minutes**

Schools, NW 63rd & Meridian			
			Total Option Time (Walking +
Station	School Name	Time (Walking)	BRT)
NW 63rd & Meridian	Odyssey Leadership Academy	18 minutes**	
	Rollingwood Elementary School	15 minutes	
Meridian & Expressway	Odyssey Leadership Academy	12 minutes	27 minutes*
Everes average Portland	Messiah Lutheran School	4 minutes	19 minutes
Expressival & Portianu	Kirkland Elementary School	16 minutes	31 minutes

Medical Care, NW 63rd & Meridian			
		Time	Total Option Time (Walking
Station	Medical Center Name	(Walking)	+ BRT)
NW 63rd & Meridian	Innovative Medical Associates	6 minutes	
	Family Healthcare & Minor Emergency		
	Clinic	29 minutes	
	Meridian Medical Center	22 minutes	
Meridian &			
Expressway	(No viable options)		
	Access Medical Center Urgent Care OKC	4 minutes	19 minutes
Expressway &	Edgewater Medical Center	8 minutes	23 minutes
rondanu	INTEGRIS Baptist Medical Center	7 minutes	22 minutes

Recreation, NW 63rd & Meridian			
Station	Recreation/Park Name	Time (Walking)	Total Option Time (Walking + BRT)
NW 63rd & Meridian	Rollingwood Park	5 minutes	
	North Rotary Park	23 minutes**	
	Dolese Park	12 minutes	
	Cole Community Center	19 minutes**	
Meridian & Expressway	Cole Community Center	13 minutes	28 minutes*
Expressway & Portland	North Rotary Park	14 minutes	29 minutes*
	Tinsley Park	20 minutes	35 minutes

2. Expressway & Penn

Grocery Stores, Expressway & Penn			
Station	Store Name	Time (Walking)	Total Option Time (Walking + BRT)
	Walmart Supercenter	15 minutes**	
Expressively & Depp	Target Grocery	22 minutes	
Expressway & Perin	Aldi	30 minutes**	
	Mediterranean Imports	24 minutes	
Independence & NW 56th	Pruett's Food OKC	15 minutes	30 minutes
	Sprouts Farmers Market	25 minutes	40 minutes
	Aldi	23 minutes	38 minutes*
Expressively & Plackwolder	Walmart Supercenter	13 minutes	28 minutes*
Expressway & Diackweluer	QC Grocery	20 minutes	35 minutes

Schools, Expressway & Penn			
		Time	Total Option Time (Walking +
Station	School Name	(Walking)	BRT)
	Epic Charter Schools	8 minutes	
Evpressway & Donn	Monroe Elementary School	21 minutes	
	Belle Isle Enterprise Middle		
	School	20 minutes	
	Project Research	7 minutes	22 minutes
Indopondonco & NW/ 56th	Kirkland Elementary School	7 minutes	22 minutes
Independence & NW John	OKC Heartland Montessori	13 minutes	28 minutes
	Rising High Christian Academy	15 minutes	30 minutes
	Horace Mann Pre-K Center	16 minutes	31 minutes
Expressway & Blackwelder	Putnam Heights Academy	27 minutes	42 minutes
Diackweider	Westminster School	28 minutes	43 minutes

Medical Care, Expressway & Penn			
		Time	Total Option Time (Walking +
Station	Medical Center Name	(Walking)	BRT)
Expressway & Penn	AllSet Urgent Care North Penn	2 minutes	
	Strategic Medical Partners	8 minutes	
	SSM Health Medical Group	4 minutes	19 minutes
Independence & NW 56th	Northwest Medical Center	3 minutes	18 minutes
	INTEGRIS Bapstist Medical		
	Center	3 minutes	18 minutes

Expressway &	Classen Medical	21 minutes	36 minutes
Blackwelder	Revive Medical	19 minutes	34 minutes

Recreation, Expressway & Penn			
Station	Recreation/Park Name	Time (Walking)	Total Option Time (Walking + BRT)
Expressway & Penn	Smitty Park	21 minutes	
	Flower Garden Park	21 minutes**	
Independence & NW 56th	North Rotary Park	22 minutes	37 minutes
	Tinsley Park	17 minutes	32 minutes
Expressway & Blackwelder	Flower Garden Park	9 minutes	24 minutes*
	Sarah & Lily Warren Park	24 minutes	39 minutes

3. Classen & NW 31st

Grocery Stores, Classen & NW 31st			
		Time	
Station	Store Name	(Walking)	Total Option Time (Walking + BRT)
	MS Green Field Grocery		
	LLC	5 minutes	
Classen & NW 31st	Chinatown		
	Supermarket	8 minutes	
	Super Cao Nguyen	13 minutes**	
Classen & NW 36th	QC Grocery	18 minutes	33 minutes
	Homeland	10 minutes	25 minutes
	Super Cao Nguyen	4 minutes	19 minutes*

Schools, Classen & NW 31st			
		Time	
Station	School Name	(Walking)	Total Option Time (Walking + BRT)
	Bishop John Carroll School	6 minutes	
Classen & NW	Trinity School	19 minutes	
31st	Putnam Heights Academy	17 minutes**	
	Dove Science Academy	19 minutes**	
Classen & NW	Putnam Heights Academy	9 minutes	24 minutes*
36th	Horace Mann Pre-K Center	18 minutes	33 minutes
	Hartwell Academy	4 minutes	19 minutes
Classen & NW	Dove Science Academy	6 minutes	21 minutes*
23rd	Classen SAS Middle		
	School	12 minutes	27 minutes

Wilson Elementary School	16 minutes	31 minutes
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Medical Care, Classen & NW 31st					
		Time			
Station	Medical Center Name	(Walking)	Total Option Time (Walking + BRT)		
Classen & NW 31st	Lee Medical Clinic	14 minutes**			
	Horizon Medical Clinic	13 minutes**			
Classen & NW 36th	Classen Medical	8 minutes	23 minutes		
	Revive Medical	11 minutes	26 minutes		
Classen & NW 23rd	Horizon Medical Clinic	3 minutes	18 minutes*		
	Lee Medical Clinic	5 minutes	20 minutes*		

Recreation, Classen & NW 31st				
		Time		
Station	Recreation/Park Name	(Walking)	Total Option Time (Walking + BRT)	
Classen & NW 31st	Classen Park	12 minutes**		
	Memorial Park - OKC	7 minutes**		
	Goodholm Park	26 minutes**		
Classen & NW 36th	Classen Park	<1 minute	15 minutes*	
	Memorial Park - OKC	3 minutes	18 minutes*	
	Crown Heights Park	8 minutes	23 minutes	
Classen & 23rd	Goodholm Park	22 minutes	37 minutes*	
	Perle Mesta Park	15 minutes	30 minutes	
	Alice Harn Park	16 minutes	31 minutes	

Findings

Overall, the **RAPID NW line offers connectivity to other resource options**. These options varied per primary station as well as per resource option. Thus, breaking it down per primary station is simpler:

1. NW 63rd & Meridian

Grocery Stores: The secondary stations **did not give another option** for grocery stores, although it gave an **alternative and shorter route** to get to Pruett's Food OKC.

Schools: The secondary stations gave **other options** for schools, and they gave an **alternative but longer route** to get to Odyssey Leadership Academy.

Medical Care: The secondary stations gave **other options** for medical care facilities. Recreation: The secondary stations gave **another option** for a recreational resource, and they gave **alternative but longer routes** to get to Cole Community Center and North Rotary Park.

2. Expressway & Penn

Grocery Stores: The secondary stations gave **other options** for grocery stores, and they gave **alternative but longer routes** to get to Aldi and Walmart Supercenter. Schools: The secondary stations gave **other options** for schools.

Medical Care: The secondary stations gave **other options** for medical care facilities. Recreation: The secondary stations gave **other options** for recreational resources, and they gave an **alternative but longer route** to get to Flower Garden Park.

3. Classen & NW 31st

Grocery Stores: The secondary stations gave **other options** for grocery stores, and they gave an **alternative but longer route** to get to Super Cao Nguyen. Schools: The secondary stations gave **other options** for school, and they gave **alternative but longer routes** to get to Putnam Heights Academy and Dove Science Academy.

Medical Care: The secondary stations gave **other options** for medical care facilities, and gave **alternative but longer routes** to get to Horizon Medical Clinic and Lee Medical Clinic. Recreation: The secondary stations gave **other options** for recreational resources, and they gave **alternative but longer routes** to get to Classen Park, Memorial Park – OKC, and Goodholm Park.

Notes

Notes should be made regarding the findings drawn from resource distances via time. Although the goal of the research is to show connectivity to other options of resources in 3 example areas, the author and research is unable to showcase the wider feelings and values of public transportation of the nearby public, which could depend on attitudes for or against public transportation, car ownership and usage rates, specific demographics and abilities of people, and other background issues. Preferences for walking and travel time also vary per person, and Google Maps showcases only the average walking speed. For example, where some nearby citizens may not mind walking extra distance for a shorter overall travel time, overs may prefer to take public transit to get closer to the location and then walk a shorter distance, creating a longer overall travel time. Classen & NW 31st Recreation is an example, as Classen Park is less than a minute walk from the secondary station. Although this would create a longer time of transportation, it may be preferred over only walking. Choosing the longer travel time and using the secondary station may also be preferred for children, elderly, people with groceries or other items, people with illnesses, etc., who would prefer to walk a shorter distance, even if the time increases. Thus, conclusions are used to show whether viable, accessible, comparable options for nearby residents exist, not whether the options are better or worse due to their distances. If options are available with more than one path -

walking from the primary station vs. riding BRT to the secondary station and walking from the secondary station – the times are noted for each transport option (see KEY). This is a comparison of times, not preferences.

Another note involves the location of the people in the study. This study stems from each bus station, but this of course is not typically the starting location of nearby residents. Thus, rather than a simple 15-minute walk, which is typically common in modern "15 Minute City" ideas, the study has extended the analysis to closer to 25 minutes. By doing so, we can encompass the nearby resources to the bus station and the residents surrounding the station. Some residents may be closer to the resource, some may be further away. The goal is to show the access to other resource options that the BRT line brings, giving residents who *want* to go elsewhere or *have* to go elsewhere the options to do so.

3. Finishing Thoughts and Recommendations for RAPID

Overall, along with the RAPID NW line creating large amounts of economic prosperity, the line also succeeds in giving nearby populations connectivity to other resource options without the need for a car. Where the county demographics suggest food insecurity, low physician rates, high air pollution, and other concerns, the RAPID NW line and other, future RAPID lines can help mitigate or solve these issues by offering a fast and cost-effective method of transportation. As single-parent, low-income, and minority households are all shown to be strongly affected by transportation issues, the RAPID lines will also, specifically, offer these populations a method of transit that is cheaper than the private automobile. While doing the Google Maps analysis, I saw numerous large parking lots. For some stations, such as the NW 63rd and Meridian station, more options for groceries would be beneficial. Going through each section of the line, as well as other parts of the city, these parking lots should be transformed into spaces for farmers' markets to be set up weekly or for community events. As the public starts to utilize and rely on the RAPID line over private automobiles, these large empty lots can thus be reused to bring more beneficial resources to the areas.

Along with this, economic development along the line should be aimed at spurring physical infrastructure for pedestrians. Adding or renovating sidewalks to be larger, putting in bike lanes, beautifying the areas, and even creating more mixed-use developments for population increases and local business growth would benefit both the community and increase ridership along the line. Altogether, the RAPID NW line provides more connectivity for the populations in the areas surrounding it, but creating new beneficial developments around the line is the next step towards solidifying its place as the top Oklahoma City public transportation option.

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