

ALIGN



THE RAPID'S TRANSIT IMPROVEMENT STUDY

THE RAPID

Tech Memo #5: Phase 1 Evaluation Methodology

Prepared By: **AECOM** | **williams&works** | **UIS** | **the image
shoppe**

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1.0 Introduction

Align, *The Rapid's* Transit Improvement Study is a 12-month project being led by The Interurban Transit Partnership (aka *The Rapid*), which will identify, analyze, and prioritize a set of transit improvements that can be made to the existing bus system to improve the transit experience in Grand Rapids and the surrounding communities. The project will look for ways to add to and improve the network, recommend land use and other policies to help grow ridership, and determine the improvements the public would like to see for the system.

1.1 Evaluation Overview

As part of the study, a number of potential improvements will be identified and analyzed. However, due to limited financial resources, only a select number will be recommended to be implemented in the near- to mid-term. In order to determine which improvements will be ultimately recommended, an evaluation process will be used to prioritize improvements for implementation based on an assessment of costs, benefits, and impacts. This memo details the evaluation methodology used in this study. The potential improvement projects can be found in both Tech Memo #3: Identifying the Universe of Project Alternatives and Tech Memo #4: Phase 1 Project List.

Align will focus on three different types of improvements to help improve the existing Rapid system. Potential improvements will either be 'Potential BRT Corridors', 'Expansion Opportunities', or 'Enhancement Projects.' Each of these improvement types will look to enhance different aspects of the Rapid system. Potential BRT Corridor projects will be major capital investments in high capacity service that may pursue funding through the Federal Transit Administration's Small Starts capital grant program. Expansion Opportunity projects will evaluate the addition of new service in areas with the potential for high transit demand but are currently unserved by transit. Expansion Opportunities may occur inside or outside *The Rapid's* service area. Enhancement Projects will be smaller scale, targeted investments in the existing

Rapid system that will look to address localized issues. The recommended improvements, when combined, will help improve the rider experience and boost ridership.

1.2 Project Goals and Objectives

The goals and objectives for *Align* reflect *The Rapid's* priorities in planning for the system's future. Ridership has leveled off over the past few years, and identifying ways to attract new riders is a main driver of the study. Potential opportunities to increase ridership include adding new enhanced transit services, like Bus Rapid Transit, increasing service in areas with a high density of potential users, and implementing new technology, like transit signal priority, to help optimize existing operations. Additionally, *The Rapid* would like to increase access to transit in areas of the region that are typically underserved, as some of these areas have felt excluded in recent years. The region wants to continue to drive economic growth, particularly within the urban core, and transit can be used as a catalyst for economic development. Finally, all of the improvements recommended as a part of this plan need to be supported by the community. Having broad community support is a great way to encourage those same community members to use the services.

The five goals and related objectives for *Align* are detailed below. These goals will be used to develop the evaluation criteria to analyze the projects identified for the study.

Goal: ***Provide enhanced transit service options to grow ridership and improve reliability***

- Identify feasible new corridors for enhanced transit operations (BRT, express, etc.)
- Locate areas where new transfer stations or hubs could be established
- Improve pedestrian and bicycle access to the transit system
- Leverage infrastructure and technology to improve reliability and reduce travel time
- Optimize the route network and schedules to maximize connectivity at transfer points
- Create a more user-friendly rider experience to encourage transit use

Goal: ***Prioritize future transit Enhancement Projects that maximize positive regional impact***

- Consider prioritizing transit projects that:
 - Connect to high density neighborhoods
 - Connect to major employment centers and regional destinations
 - Serve high activity transit stops
- Provide frequent, direct connections between key regional activity centers

Goal: ***Improve equitable access to transit services***

- Increase mobility and accessibility for transit-dependent populations
- Identify service gaps and infrastructure needs in underserved neighborhoods

Goal: ***Foster transit supportive land use policies and encourage economic development***

- Position *The Rapid* as an added feature and benefit to future economic development initiatives
- Use the Vital Streets Plan as a guide for the location of new transit investments
- Develop policies and municipal support for transit friendly land use and zoning
- Encourage municipalities and developers to integrate transit friendly design features into new developments
- Identify areas where transit oriented development is feasible from both a market and planning perspective

Goal: ***Develop and select implementable investments that have community support***

- Define and select Potential BRT Corridors, Enhancement Projects, and Expansion Areas with strong public, stakeholder, and agency support
- Define and select Potential BRT Corridors, Enhancement Projects, and Expansion Areas that are cost-effective and financially feasible in both the short- and long-term
- Define and select Potential BRT Corridors, Enhancement Projects, and Expansion Areas that are competitive for Federal and State grant funding.



2.0 Phase 1 Evaluation Methodology

The first phase of a two phase process includes the evaluation criteria which were developed to determine which Potential BRT Corridors, Expansion Opportunities, and Enhancement Projects best meet the project goals. The project goals were used to link the evaluation criteria to the goals and objectives and ensure the evaluated improvements will be assessed based on the community's stated preferences. In addition to applying data-driven metrics that can help to assess the overall viability and attractiveness of potential improvements, community support and preference will play a significant role in developing the universe of alternatives and helping to influence their performance in the evaluation.

The Potential BRT Corridors, Expansion Opportunities, and Enhancement Projects will be evaluated concurrently and generally follows the same methodology, but will be evaluated separately – so Corridors will only be compared to Corridors, and Expansion Opportunities with Expansion Opportunities, etc. This process will help to ensure that an “apples-to-apples” comparison of the various Corridors and Projects will be made.

2.1 Phase 1 Evaluation Process

The Phase 1 Evaluation will identify the best-performing Potential BRT Corridors, Expansion Opportunities, and Enhancement Projects for detailed definition, evaluation and prioritization during Phase 2 of *Align*.

The Phase 1 evaluation process will subject the Potential BRT Corridors, Expansion Opportunities, and the Enhancement Projects to a two-step quantitative and qualitative analysis in order to determine which improvements best meet the *Align* goals.

- The first step of the Phase 1 evaluation is a **quantitative (numbers-based) analysis** that is based on data related to each of the Corridors, Opportunities, and Projects.
 - For most measures, a half-mile buffer radius will be used. This distance was chosen to be consistent with FTA guidelines and represents the typical distance a person is willing to walk to transit.
 - Four of the five project goals were linked to the quantitative analysis and were each assigned 25 points; individual criteria (each with corresponding points) were then assigned to each goal. The four project goals included in the qualitative analysis were all equally weighted to demonstrate that all project goals are equally important.
 - Individual project criteria were assigned point values that reflect their relative importance to overall project implementation success (see **Table 1**).
 - Due to the varying length and sizes of the Enhancement Projects and Expansion Opportunities, the project team chose to normalize the population and demographic data on a per square mile basis.
 - A perfect-scoring project could accrue 100 total points. The best-performing Corridor, Opportunity, and Project received the maximum number of points for each individual criterion; the scores of all successive Corridors, Opportunity and Projects pivot back from that high-scoring Corridor, Opportunity, or Project. The points were then summed across the criteria for each Project, Opportunity, and Corridor to calculate a total score, and the Corridors, Opportunities, and Projects were then ranked based on that score. Based on natural breakpoints in the scores, Corridors and Projects were ranked as Tier 1, 2, or 3.
 - Additional detail on the calculation of scores can be found in Section 3.1.
 - These quantitative results were then reviewed through the lens of the qualitative analysis, which is the second step of the process.

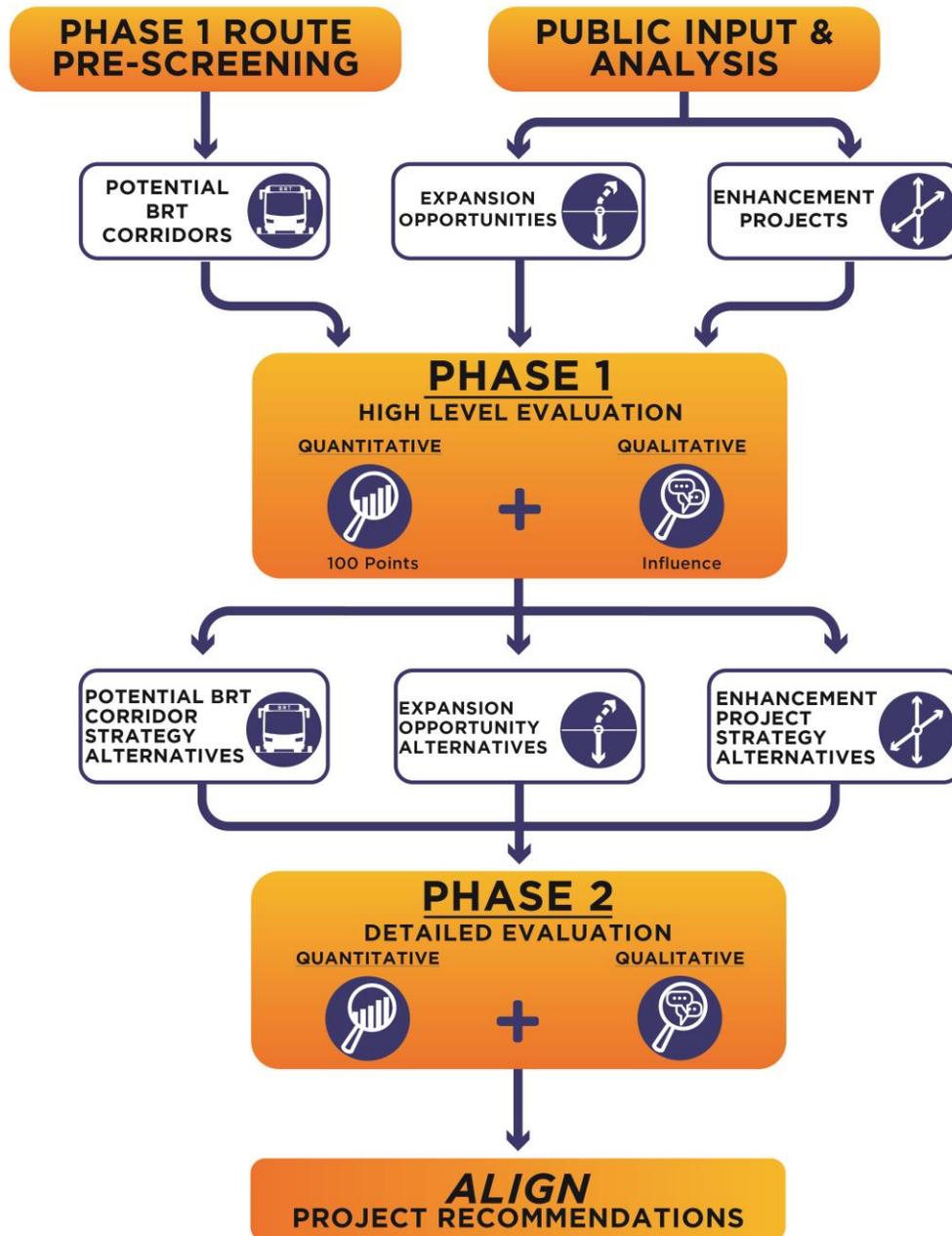
- The second step of the Phase 1 is a **qualitative (judgement-based) analysis**, which has been designed to capture project characteristics or elements that were not reflected in the quantitative analysis, and is linked to the fifth project goal.
 - The qualitative analysis presents the opportunity to shift the tiered results that came out of the quantitative analysis – so a project that may have been in Tier 1 after the quantitative analysis may have a project characteristic or element that indicates it should move it into Tier 2, or vice versa.

The outcome of this second step will be the list of Corridors, Opportunities and Projects that will be analyzed in Phase 2 (detailed definition and evaluation) of *Align*.

Each improvement type will be evaluated against each other, meaning that each will be subject to the same evaluation criteria, but not compared to the other identified project types. The full

Phase 1 evaluation process will be similar to the Phase 1 Pre-Screening, but will include a greater number of data points to better differentiate between the Corridors. **Figure 2-1** shows the evaluation process for the study.

Figure 2-1: Align Project Evaluation Process





3.0 Quantitative Evaluation Measure Methodologies

3.1 Phase 1 Evaluation Criteria

The Phase 1 Evaluation Criteria are based on the *Align* Goals and Objectives and are designed to differentiate the candidate alternatives from each other. Each goal is worth 25 points, so all goals are weighted the same. However, the evaluation measures that make up each goal are worth different points depending on the importance of the measure and depending upon which category it is (Potential BRT Corridors, Expansion Opportunities, and Enhancement Projects). For example, the Average Stop Activity measure is worth more points to an Enhancement Project than it is for an Expansion Opportunity and is not even measured for the Potential BRT Corridors. **Table 3-1** shows the goals, scoring, and evaluation measures that were developed for the Phase 1 evaluation for each of the categories. Detailed summaries of each evaluation measure are shown after the table.

For all of the quantitative evaluations, each improvement's score pivots back from the highest performer (which will be awarded the maximum number of points for that metric). This methodology allows the results to demonstrate differences in scale more effectively than a strict threshold-based methodology. For example, if the top performing Potential BRT Corridor has 2,000 riders per day, and the evaluated Potential BRT Corridor has 1,000 riders per day, the score for the evaluated Potential BRT Corridor will be 7.5 (15 max points * (1,000/2,000)). This ensures that the points awarded accurately represent the real-life metrics observed.

Table 3-1: Phase 1 Quantitative Evaluation Criteria

| Goals | Criteria | Measurement | Points | Project Type | | | | |
|-------------------------------------|------------------------------------|--|-------------|---------------|-----------|----------------|---------------------------|------------|
| | | | | BRT Corridors | Amenities | Infrastructure | Ind. Service Enhancements | Exp. Areas |
| Efficiency 25 Points | Total Ridership | Total rides in FY 2016 per route | 15 | X | | | | |
| | On-Time Performance | Average FY 2016 On Time Performance | 5 | X | | | | |
| | Roadway Congestion | Level of Service | 5 | | | X | | X |
| | Rapid Efficiency Score | Proprietary Rapid scoring metric to determine efficiency | 5 | X | | | | |
| | Number of Routes served | Number of routes directly connecting to project | 10 | | X | X | X | X |
| | Activity at nearest stop(s) | Average total activity at nearest stop OR average stop activity over length of project | 15 (10) | | X | X | X | X |
| Regional Impact 25 Points | Population | Population within ½ mile of project | 10 | X | X* | X* | X* | X* |
| | Employment | Jobs within ½ mile of project | 10 (5) | X | X* | X* | X* | X* |
| | Access to Activity Centers | Number of activity centers within ½ mile of project | 5 | X | X | X | X | X |
| | Regional Service | Evaluates if BRT corridors are extending into a different area than existing BRTs | 5 | X | | | | |
| Equity 25 Points | Minority Population | Minority population density within ½ mile | 5 | X | X* | X* | X* | X* |
| | Individuals Living in Poverty | Density of individuals in poverty within ½ mile | 5 | X | X* | X* | X* | X* |
| | Zero Car Household Proportion | Zero car household proportion within ½ mile | 5 | X | X* | X* | X* | X* |
| | Affordable housing | Number of renters spending 30% or more of income on rent within ½ mile of project | 10 | X | X* | X* | X* | X* |
| Land Use 25 Points | Transit Supportive Zoning | Acres of multifamily, mixed use within ½ mile of project | 10 | X | X | X | X | X |
| | Sidewalks/Pedestrian accessibility | Density of Sidewalks within ½ mile of project | 15 | X | X | X | X | X |
| Support Qualitative | Public Support for Project | Public input from outreach activities | Qualitative | X | X | X | X | X |
| | Planning Support | Previous planning effort(s) to support investment in new area | Qualitative | X | X | X | X | X |

*Normalized Value

3.2 Efficiency

Total Ridership

Evaluated Projects – BRT Corridors

A primary goal of the study is to identify areas and corridors where new enhanced transit services could and should be implemented. The ridership evaluation is centered on the existing transit travel demand for the identified corridors by analyzing the average daily transit ridership in the corridor. Transit investments in corridors with high levels of existing ridership have a better chance of succeeding because they represent the main travel patterns in the region. Higher ridership also makes a corridor a better candidate for federal funding.

Methodology

BRT Corridors were evaluated by the total ridership on the entire route for the year using *The Rapid's* FY 2016 ridership data. A maximum of fifteen (15) points was available for this metric.

Scoring

Total Ridership Score = (max points) * (alternative ridership / max ridership activity)

Example: (15) * (650/2,200) = 4.4

On Time Performance

Evaluated Projects – BRT Corridors

A goal of the Align project is to improve reliability and travel time on the routes in the system. Measuring on time performance for the Potential BRT Corridors is a good metric to understand which routes are having issues with reliability and travel time. Routes with a lower on time performance scored higher in the analysis as they are more in need of solutions to the issues.

Methodology

On time performance was measured using data from *The Rapid* for the Potential BRT Corridors. Since the worst performing routes needed to score higher, the percent not on time (late or early) was used for the scoring. A maximum of five (5) points was available for this measurement.

Scoring

Percent "Off Time" = 1 – (On time performance percentage)

On Time Performance (OTP) Score = (max points) * (route OTP / Top OTP)

Example: 85% OTP = 15% "off time", worst "off time" = 22%

(5) * (15% / 22%) = 3.4

Roadway Congestion

Evaluated Projects – Infrastructure, Expansion Opportunities

The Roadway Congestion measure evaluated both the Infrastructure Enhancements and Expansion Opportunities based on their proximity to congested roadways and high travel demand areas. The purpose of this measure was to determine the Infrastructure Enhancements, which will help to address the effects of congestion on transit, are the most needed. This measure also helped to understand the overall travel demand for the identified Expansion Opportunities.

Methodology

This metric used the Grand Valley Metro Council's (GVMC) Level of Service analysis from 2014 that was created as part of the Congestion Management Process. This process determines the Level of Service for the major roadways in the GMVC region. The majority of the streets that *The Rapid* runs on are included in this process. Projects were scored by the Level of Service (LOS) on the segment of roadway that contained the project and projects with a higher LOS received a higher score, meaning they have more congestion. Points were associated with the specific LOS ratings and a maximum of 5 points were available for the measurement.

Scoring

Projects were assigned a point value based on the LOS of the section of roadway it was located on. The point values are as follows:

- LOS F = 5 Points
- LOS E = 4 Points
- LOS D = 3 Points
- LOS C = 2 Points
- LOS B or LOS A = 1 Point

Rapid Efficiency Score

Evaluated Projects – BRT Corridors

The Rapid uses a metric in their monthly service reports that gives a score to the efficiency of a route based on ridership, passengers per mile, and farebox recovery. This metric gives a basic measurement of the efficiency of a route using three important datasets that they capture. This measurement helped determine which routes are the most efficient in the system.

Methodology

The total average Efficiency Score for FY 2016 was not calculated, so the raw data was used to calculate it. The Efficiency Score equation is as follows:

$$(\text{Passengers per Hour} / 2) + (\text{Passengers per Mile} / 0.13) + (\text{Farebox Recovery} * 50)$$

The Potential BRT Corridors were subjected to this measurement. A maximum of five (5) points is available for this measurement.

Scoring

Align Efficiency Score = (max points) * (alternative efficiency score / max efficiency score)

Example: $(5) * (65.3 / 87.5) = 3.7$

Routes Served

Evaluated Projects – Amenities, Infrastructure, Individual Service, Expansion Opportunities

The number of routes directly connecting to a specific project is an important measure to determine the overall potential use of a project. *The Rapid* can get a better “bang for their buck” by prioritizing investments in areas where two or more routes intersect or travel. Potentially more people will use these investments, improving the service for a greater number of riders.

Methodology

The three Enhancement Project categories and the Expansion Opportunities were evaluated based on the number of existing transit routes that intersect each project within a 300 foot buffer. The existing routes were assigned a weight based on frequency and travel ability. The weights are as follows:

- Bus Rapid Transit Route – 3
- 15 Minute Peak Route – 2
- 30 Minute Peak Route – 1
- DASH Shuttle – 1

A maximum of ten (10) points is available for this measure.

Scoring

Network Compatibility Score = (max points) * (alternative’s weighted route count / max weighted route count)

Example: $(10) * (3/23) = 1.3$

Stop Activity

Evaluated Projects - Amenities, Infrastructure, Individuals Service, Expansion Opportunities

A primary goal of the study is to identify areas where transit investments will serve the highest number of riders. The Stop Activity evaluation helps determine the travel demand by analyzing the boardings and alightings near the projects. Transit investments in areas with high levels of

existing travel demand have a better chance of succeeding because they represent the main travel patterns in the region.

Methodology

The Enhancement Projects and Expansion Opportunities were evaluated two different ways based on the nature of the projects. The Enhancement Projects analyzed the average daily stop activity at the project (single point projects) or the average along the length of the project (corridor based projects). The Expansion Opportunities projects were evaluated by the average activity at existing stops of the beginning of the expansion corridor. This helped determine the demand toward the end of existing routes. This measure had a maximum of five (5) points available.

Scoring

Stop Activity Score = (max points) * (alternative stop activity / max stop activity)

Example: (5) * (37 / 96) = 1.9

3.3 Regional Impact

The Regional Impact evaluation measures evaluated how well each project impacts the overall region. These measures looked at population, employment, activity centers, and the proximity to existing BRT service. The overall goal was to determine which projects would benefit the most people.

Existing Population Density

Evaluated Projects - All

A common criterion used to identify successful transit projects is the number of residents within walking distance of a route. Typically, the more people that live and work close to transit, the higher ridership the project is likely to generate. This evaluation measures the number of residents and jobs within a half-mile buffer of all the candidate alternatives (one mile from Expansion Opportunities), in conformance with FTA guidelines on transit accessible walking distance. Population data was gathered from the US Census 2015 American Community Survey.

Methodology

The evaluation measured existing population density by analyzing the block groups surrounding the Potential BRT Corridors, Enhancement Projects and, Expansion Opportunities. Potential BRT Corridors and Enhancement Projects were evaluated by measuring the population density within a half mile on either side from the route or project area. The Expansion Opportunities use

a one mile buffer to account for potential variations in the general route that was defined for Phase 1.

Population in block groups that are located partially outside of the buffer area were calculated by applying the percentage of the total block group area within the buffer to the total number of people in the block group. For example, if 25% of a block group was located within the buffer, the total population in that block group will be multiplied by 25%. Population data is normalized on a per square mile basis for the Enhancement Projects and Expansion Opportunities due to the varying size and length of the projects. A maximum of ten (10) points was available for this metric.

Scoring

Population Density = (max points) * (alternative population density / max population density)

Example: (10) * (2,500 / 3,000) = 8.3

Existing Employment Density

Evaluated Projects - All

Another common criterion used to identify successful transit projects is the number of jobs within walking distance of a route. Since transit is normally used for commuting, the more jobs are located near transit, the more ridership one can expect. This evaluation measured the number of jobs within a half-mile buffer of Potential BRT Corridors and the Enhancement Projects, in conformance with FTA guidelines on transit accessible walking distance. Expansion Opportunity jobs were measured within a one-mile buffer. The employment data is from 2010 and sourced from Grand Valley Metro Council's 2040 Metropolitan Transportation Plan.

Methodology

The evaluation measured existing employment density the same way as in the Route Pre-Screening, but used the Traffic Analysis Zones (TAZs) surrounding the alternatives. Potential BRT Corridors and Enhancement Projects were evaluated by measuring the density within a half-mile buffer from the route or project area. Expansion Opportunities were evaluated by measuring the density within a one-mile buffer to account of potential route variations.

Employment in block groups that are located partially outside of the buffer area will be calculated by applying the percentage of the total block group area within the buffer to the total number of jobs in the TAZ. For example, if 25% of a TAZ was located within the buffer, the total employment for that TAZ will be multiplied by 25%. Employment data is normalized on a per square mile basis. A maximum of ten (10) points is available for the Enhancement Projects and Expansion Opportunity candidates, and a max of five (5) points is available for Potential BRT Corridor candidates.

Scoring

Employment Density = (max points) * (alternative employment density / max employment density)

Example: (10) [max number of points] * (975 / 4,000) = 2.4

Access to Activity Centers

Evaluated Projects - All

Activity centers tend to be large draws for transit because they contain a high number of jobs and services that people use every day. This study defined Activity Centers as the within the region areas zoned as Commercial, Town Center, and Mixed Use. These areas are home to high concentrations of jobs, services, medical facilities, retail areas and other places where people typically travel each day. The number of activity centers within a half-mile of the Potential BRT Corridors and Enhancement Projects, and within the Expansion Opportunities, helps give a better understanding of the demand for transit at each project..

Methodology

All of the Activity Centers were mapped in GIS and half-mile buffers were drawn around the Potential BRT Corridors and Enhancement Projects. One-mile buffers were used for the Expansion Opportunities. The number of activity centers was tallied within the buffer areas for the three project types. A maximum of five (5) points was available for all projects for this metric.

Scoring

Activity Center Access = (max points) * (number of activity centers near alternative / max number of activity centers)

Example: (5) * (3 / 7) = 2.1

Regional Service

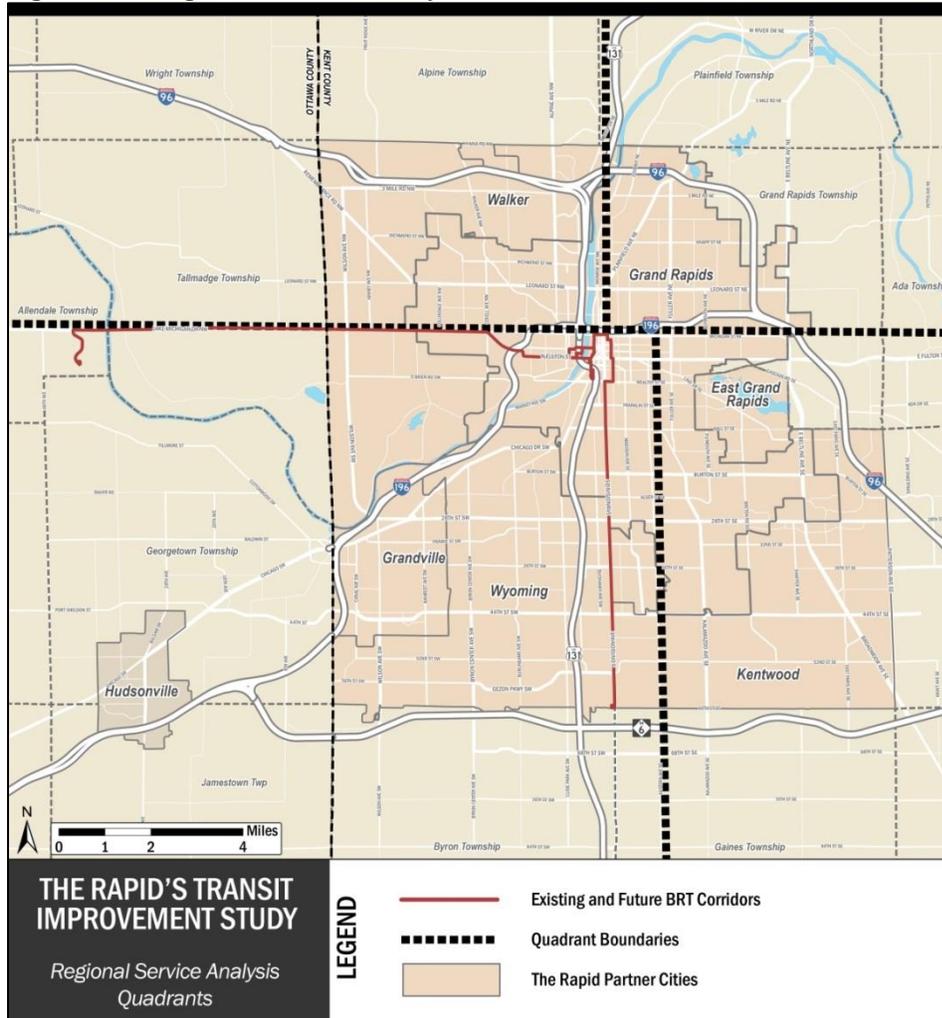
Evaluated Projects – BRT Corridors

One goal of the Align Study is to improve the equitable access to transit in *The Rapid* service area. Part of this includes diversifying the investments in enhanced transit service to other areas of the service area. The Regional Service measurement evaluates only the Potential BRT Corridor candidates on their proximity to the existing Silver Line BRT and the forthcoming Laker Line BRT.

Methodology

The Rapid's service area was divided into four areas to determine how well each Potential BRT Corridor candidate met the regional service metric. Corridors were scored based on its proximity to the existing BRT routes (Silver Line and Laker Line). **Figure 3-1** below shows how the service area was divided.

Figure 3-1: Regional Service Analysis Quadrants



Scoring

Potential BRT Corridors in the same quadrant as an existing BRT received 1 point, those in an adjacent corridor received 3 points, and corridors not touching an existing BRT corridor received 5 points.

3.4 Equity

The Equity evaluation measures analyzed the demographic factors that may indicate transit-dependent or traditionally underserved and under-represented communities that could benefit from additional transit investment. Indicators of these communities include high concentrations of individuals living in poverty, minorities, and zero-car households and the number of rent burdened individuals.

Minority Population

Evaluated Projects - All

In many regions, minority populations tend to have a higher proportion of transit ridership than the general population. Additionally, some of the areas with a high percentage of minority residents tend to see fewer investments. This evaluation helped determine which projects will benefit the greatest number of minority individuals with the goal of improving equity in *The Rapid* system.

Methodology

The non-white population data was analyzed for a half-mile buffer around the Potential BRT Corridors and Enhancement Projects, and for a one-mile buffer around the Expansion Opportunities. The data collected for the analysis was sourced from the US Census Bureau 2015 American Community Survey. For block groups that extended beyond the borders of the buffer, the percentage of the total block group area within the buffer area will be applied to the total population of the block group. For example, if 25% of a block group was located within the buffer, the total number of individuals in poverty was multiplied by 25%. The data was normalized on a per square mile basis. Results were normalized for the Enhancement Projects and Expansion Opportunities

A maximum of five (5) points was available for this metric.

Scoring

Minority Population = (max points) * (alternative minority population density / max minority population density)

Minority Population Density: $(5) * (1,000 / 3,100) = 1.6$

Individuals Living Below the Poverty Line

Evaluated Projects - All

In most cases, individuals who are living below the poverty line tend to ride transit more often than the general population. Areas with higher rates of poverty do not see the same level of investment, in some cases, as those more affluent neighborhoods. This evaluation will help determine which Potential BRT Corridors, Enhancement Projects, and Expansion Areas will benefit the greatest number of people living in poverty with the goal of improving equity in *The Rapid* system.

Methodology

The number of individuals living below the poverty line was analyzed for a half-mile buffer around the Potential BRT Corridors and Enhancement Projects, and for a one-mile buffer around the Expansion Opportunities. The data collected for the analysis was sourced from the US Census Bureau 2015 American Community Survey and applied at the block group level. The same technique for evaluating block groups partially within the buffer area was used for this metric as well. The results were normalized for the Enhancement Projects and Expansion Opportunities.

A maximum of five (5) points was available for this metric.

Scoring

Individuals Living below the Poverty Line Score = (max points) * (alternative poverty density / max poverty density)

Minority Population Density: $(5) * (1,500 / 2,300) = 3.3$

Zero Car Households

Evaluated Projects - All

Households lacking access to a personal vehicle are much more likely to take transit. Additionally, areas with high proportions of zero car households tend to be aligned with areas that have higher poverty levels and, in turn, lower levels of investment. This evaluation will help determine which Potential BRT Corridors, Enhancement Projects, and Expansion Areas will benefit the greatest proportion of zero car households with the goal of improving equity in *The Rapid* system.

Methodology

The number zero car households was analyzed for a half-mile buffer around the Potential BRT Corridors and Enhancement Projects, and for a one-mile buffer around the Expansion Opportunity areas. The data collected for the analysis was sourced from the US Census Bureau 2015 American Community Survey and applied at the block group level. The same technique for

evaluating block groups partially within the buffer area was used for this metric as well. The results were normalized for the Enhancement Projects and Expansion Opportunities.

A maximum of five (5) points was available for this metric.

Scoring

Zero Car Household Score = (max points) * (alternative zero car household proportion / max zero car household proportion)

Minority Population Density: $(5) * (26.2\% / 35.7\%) = 3.5$

Rent Burdened Population

People who use, or may be interested in using transit may not fall into the three equity categories listed above. The Rent Burdened Population refers to residents within *The Rapid* service area who are spending 30% or more of their income on rent or mortgage payments. This is the generally accepted standard of affordability for housing based on the National Housing Act. Many people are spending more on housing than 30%, but by including this metric, the study is able to capture those residents that may have affordability issues.

Methodology

The percentage of individuals spending 30% or more of their income on housing was analyzed for a half-mile buffer around the Potential BRT Corridors and Enhancement Projects, and for a one-mile buffer around the Expansion Opportunity areas. The data collected for the analysis was sourced from the US Census Bureau 2015 American Community Survey and applied at the block group level. The same technique for evaluating block groups partially within the buffer area was used for this metric as well. The results were normalized for the Enhancement Projects and Expansion Opportunities.

A maximum of ten (10) points was available for this metric.

Scoring

Rent Burdened Population Score = (max points) * (alternative rent burdened population proportion / max rent burdened population proportion)

Rent Burdened Population: $(10) * (14.3\% / 29.4\%) = 4.9$

3.5 Land Use and Policy

Land use surrounding transit is a good indicator of how accessible transit services are to riders. Dense, connected development patterns with sidewalks and limited parking are much easier for transit users to navigate, once they step off the bus and become pedestrians. These evaluation measures analyze the built environment surrounding the identified improvement projects.

Transit Supportive Zoning

Evaluated Projects - All

The Transit Supportive Zoning evaluation criterion is a way to determine how well transit adjacent development will benefit from transit improvements. This evaluation focused on the amount of 'transit supportive' land within the buffer areas of the three project types. 'Transit Supportive' land was defined as medium and high residential density zoning designations and mixed use development, as these typically yield more transit riders than low-density land use.

Methodology

The evaluation tallied the acreage of land zoned in a transit supportive designation (see below) within a half-mile buffer of the Potential BRT Corridors and Enhancement Projects, and within one-mile of the Expansion Opportunities. For parcels located partially within the buffer area, the fraction within the buffer was applied to the specific land use total.

Zoning data from the Grand Valley Metro Council (GVMC) was used for this analysis and is an aggregation of all the zoning layers in the GVMC region. This data was mapped in GIS and contained information about the residential density for those zoning types. This analysis included all residential zoning types with five units per acre or more. The following zoning types were determined to be "transit supportive":

- Medium Density Multi-Family Residential (5 to 8 units per acre)
- High Density Multi-Family Residential (8 or more units per acre)
- Mixed Use
- Central Business District
- Medium Density Single Family Residential (5 to 8 Units per Acre)
- High Density Single Family Residential (8 or more units per acre)

A maximum of 10 points were available for this metric.

Scoring

Transit Supportive Zoning percentage = (total transit supportive zoned acres / total buffer area)

Transit Supportive Zoning Score = (max points) * (alternative percentage of transit supportive zoning / max transit supportive zoning percentage)

Example: 'Transit Supportive Land Use: (10) * (35.2% / 75.3%) = 4.7

Pedestrian Accessibility

Evaluated Projects - All

As all transit trips begin and end with a trip on foot, it is important to think about the connectivity to the final destination for riders. This metric is also be a measure how many pedestrians one can expect to be in a specific area, as areas with more sidewalks typically have more pedestrians. Both are good indicators of how many people will use transit along a corridor or near a project. All three project types, Potential BRT Corridors, Enhancement Projects, and Expansion Opportunities, were evaluated by this measure.

Methodology

All three project types were evaluated by this metric, but in slightly different ways. For the Potential BRT Corridors, the percentage of sidewalks along both sides of the corridor was evaluated by finding the total length of sidewalks parallel to the route and comparing it to the total route length. Enhancement Projects were evaluated by the total length of sidewalks within a half-mile of the project. Expansion Opportunities were evaluated on the total length of sidewalks within one-mile of the route. All measures used GVMC's sidewalk layer for Kent County. A maximum of fifteen (15) points is available for this measure.

Scoring

Pedestrian Accessibility (Potential BRT Corridors) = (Total length of sidewalks parallel to corridor / (Total Corridor Length *2))

Pedestrian Accessibility Score (Potential BRT Corridors) = (max points) * (Alternative percent of sidewalks on both sides / max percent of sidewalks on both sides)

Example: Pedestrian Accessibility: (15) * (75.2% / 81.3%) = 13.9

Pedestrian Accessibility Score (Enhancement Projects & Expansion Opportunities) = (max points) * (alternative total length of sidewalks / max total length of sidewalks)

Example: Pedestrian Accessibility: (15) * (4.2 miles / 5.8 miles) = 10.9

3.6 System Wide Service Enhancements

The System Wide Service Enhancements could not be subjected to the quantitative analysis that the other projects used because each of the Service Enhancements includes multiple routes spread out through the entire system. Since all of the routes are included in the System Wide Service Enhancements, the standard quantitative analysis would result in the same results for each potential enhancement. Instead, a different methodology was used to evaluate the System Wide Service Enhancements that used only two criteria: Public Input and Service Efficiency.

Public Input

The Public Input results were qualitative in nature and based on the information received from the project steering committee, regional stakeholders, and the public involvement process. Service enhancements that were heard most often received a “High” score, enhancements that were less popular received a “Medium” score, and the enhancements that only a few mentioned received a “Low” score.

Scoring

- Most Common – 2 Points
- Somewhat Common – 1 Point
- Least Common – 0 Points

Service Efficiency

The Service Efficiency results were quantitative in nature and used stop activity data, sorted by hour of the day to determine which time periods would benefit the most from increased service or operating hours. An efficiency rating was developed using the average ridership and total system operating hours to show how the “ridership per operating hour” changes throughout the day and by the day of the week. Average efficiencies were developed for each day of the week and the times of day were scored by their relationship to the average. **Table 3-2** shows the efficiency by time of day for the entire *Rapid* system.

Scoring

The System Wide Service Enhancements were scored based on the existing efficiency of the system on the day of the week and time of day that the Service Enhancement is proposed. If the existing efficiency is above average, the project receives 2 points.

- Above Average Efficiency – 2 Points
- Average Efficiency – 1 Point
- Below Average Efficiency – 0 Points

Example

Project: Increasing AM Peak Hour Frequency on Saturdays

Current Saturday AM Peak Efficiency = 11.6, below the Saturday Average of 13.5

Project receives 0 Points

Table 3-2: Service Efficiency by Time of Day

| Efficiency (Riders per Hour) | | | | | | | |
|------------------------------|----------------|------------------|-----------------|------------------|------------------|----------------|-----------------------|
| | Early 4a-6a | AM Peak 6a-9a | Midday 9a-3p | PM Peak 3p-6p | Evening 6p-9p | Night 9p-1a | Average Efficiency |
| Weekday | 10.0 | 18.0 | 17.1 | 19.1 | 11.3 | 9.4 | 14.2 |
| Saturday | 7.4 | 11.6 | 17.0 | 19.0 | 13.3 | 12.4 | 13.5 |
| Sunday | - | 10.9 | 12.4 | 15.8 | 11.9 | - | 12.8 |



4.0 Phase 1 Qualitative Evaluation Methodologies

Following the Quantitative Evaluation, the identified projects were subjected to a qualitative (judgement-based) analysis, which was designed to capture characteristics of the projects that were not reflected in the Quantitative Evaluation. The Qualitative Evaluation explores three additional categories related to the final project goal: “Develop and select implementable investments that have community support”.

The Qualitative Evaluation is intended to potentially shift projects up or down a Tier based on the results of the analysis, so that projects with overwhelming community support that score low quantitatively can be carried forward for further study and projects with low support but high scores can be moved down. The criteria summarized below describe the how each project was rated.

Public Input

The Public Input evaluation criterion helped determine how interested the community and project stakeholders are in implementing a specific project based on the public input and outreach received in the first phase of *Align*. This criterion also evaluates each project on how well each project addresses the Public’s desires and needs for *The Rapid*.

Methodology

The public was presented with the opportunity to weigh in on potential improvements to the system at the platform public engagement event and online via MetroQuest. The identified projects will be scored by the amount of community support received over the course of the

project. In order to determine a final qualitative rating, each project is scored between 0 and 2 for each of the three criteria.

Scoring

The scoring for each project used the following guide below:

- High – 2 Points
 - Significant community interest and support for the specific project, significant community interest and support in fixes addressed by the project, or significant community interest and support for fixes in the location of the project
- Medium – 1 Points
 - Some community support for specific project, the fixes addressed the by project, or the location of the project
- Low – 0 Points
 - Little or no community support for specific project, the fixes addressed by the project, or the location of the project

Planning Support

The Planning Support evaluation criterion helped determine which projects are currently supported by existing planning documentation. Having previous planning studies related to the implementation of transit or transit enhancements in the project area means that the local governments are more prepared for implementation than those without planning.

Methodology

The evaluation for the Planning Support criteria is based on the specificity of the existing planning documents within the region. Using the review of previous planning documents from the existing conditions tech memo, the projects were scored based on how closely related each project is to the goals of the plan.

Scoring

The scoring for each project followed the following guide:

- High – 2 Points
 - Planning initiatives specific to the project have been developed and/or are in use
- Medium – 1 Point
 - Planning initiatives related to improving transit in the project's location have been developed
- Low – 0 Points
 - No planning initiatives related to transit have been developed for the project's location

Infrastructure/Implementation Constraints

The Infrastructure/Implementation Constraints evaluation helped determine which projects may have issues being constructed due to right-of-way, technology, and/or other limitations within the project boundary. This criterion will look mostly at or not the projects can fit within the existing right-of-way, but also will explore other implementation constraints.

Methodology

In order to determine the potential constraints to implementation, a desktop review using Google Maps and Google Streetview was conducted that explored each project area.

Scoring

The scoring for each project followed the following guide:

- High – 2 Points
 - No foreseeable right-of-way, technology, or other constraints that may inhibit the project from being constructed
- Medium – 1 Point
 - Part of route or project has some right-of-way or other constraints, OR small constraints that may require additional design or engineering
 - Ex. A street identified for dedicated lanes has limited ROW along part of the route, making a full dedicated lane much harder or impossible
- Low – 0 Points
 - Easily identifiable constraints along the route or project that may inhibit the project from being implemented
 - Ex. No ROW is available to construct a super stop at the desired location

Overall Qualitative Rankings

The 0 – 2 point scoring scale used above was put in place to easily assign each project an overall Qualitative Ranking. The overall Qualitative Score was used as the final ranking to determine whether or not a project position would change. Projects with a High overall score moved up one Tier from its Quantitative ranking, those with a Medium score stay at the same Tier, and projects with a Low ranking were moved down one Tier. The scoring was calculated as follows:

- High Qualitative Ranking: 5 to 6 points total
- Medium Qualitative Ranking: 3 to 4 points total
- Low Qualitative Ranking: 0 to 2 points total