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Use of This Feasibility Report

The Grand Rapids Streetcar Feasibility Report is intended for use only in assessing the feasibility of implementing the first leg of a downtown streetcar system in Grand Rapids, Michigan. The route evaluated does not constitute a final alignment and does not provide any level of preliminary engineering. While observations regarding vehicle options are provided, the discussion does not constitute endorsement of any manufacturer. Estimates of probable costs are based on best available information for 2008. Financial plan discussion presents options that have been discussed with the Task Force and may be undertaken by local stakeholders. This report should not be used for purposes other than that for which it was intended.

Introduction

Throughout the United States, a national movement toward downtown revitalization is under way. Sprawl into suburbs and rural lands is now being seen as consuming valuable farmland, open space, and wetlands while also contributing to growing fuel consumption and related vehicle emissions.

The national trend is displayed in Grand Rapids. Residential growth in the downtown area has been rather dramatic in the last several years and a further seventy-five percent increase is forecast over the next ten years. Retail, restaurant, and entertainment business has returned to the downtown area with great vibrancy.

In planning for this growth, the observation was made that the cities with the most downtown growth (such as Portland, Denver, and Seattle) have purposefully developed downtown transit as part of their plans. Transit systems allow the rapid movement of people without having to devote a high percentage of downtown space to parking and automobile travel. In the fall of 2006, a contingent of Grand Rapids community and business leaders toured the Portland Streetcar system to see if such a system in Grand Rapids might provide similar job creation and economic development benefits as were reaped in Portland.

This report summarizes findings of a Grand Rapids Streetcar Feasibility Study aimed at evaluating the potential benefits and costs of a streetcar system in Grand Rapids. During the course of the study, various potential routes were examined along with vehicle type, accessibility benefits, capital costs, and operating costs. Interaction with a wide variety of interested community members has taken place throughout the study. Contributors to shaping a potential system have included students, young professionals, business owners, and leaders from within various governmental units.

"Investment in modern mass transit is probably the single most effective long-term strategy driving the redevelopment of America's central cities. The permanence of public investment in tracks for streetcars and light rail trains, station stops, electrified cabling, and other transit infrastructure is a proven strategy to build investor confidence in even the grittiest of urban areas."

Andy Guy
Michigan Land Institute
March 3, 2008

Project Overview

From 2003 to 2007, the Interurban Transit Partnership (The Rapid) conducted an Alternatives Analysis in order to implement high capacity transit in Grand Rapids. With system ridership over eight million trips annually and with transit demand dramatically rising (likely due to escalating gasoline prices), The Rapid's Alternatives Analysis identified two projects that formed a "first steps" strategy. One "first step" project identified was the South Division Bus Rapid Transit (BRT) project. The second project identified was a downtown streetcar circulator, the subject of this feasibility study.

The streetcar study was guided by a Task Force composed of members from the government, business, and university communities. Two focus group meetings were held during the study, one with Calvin College students and one with a group of young professionals. Meetings with the City of Grand Rapids allowed input on traffic concerns, emergency services, utilities, and planning. Discussion and understanding of traffic concerns led to refinement of the alignment to reduce perceived impacts.

The most significant challenge in this study was finding the “best balance” for the initial streetcar circuit that served existing development and served potential development and redevelopment.

A market analysis was conducted as part of the feasibility study. The analysis was prepared based on interviews with local planners and developers. The analysis also used information previously collected in downtown residential, arts, and entertainment studies. A market analysis summary is included later in this report. Two key observations from the market analysis are:

- The streetcar system would focus redevelopment intensity. A portion of the projected redevelopment would take place in downtown Grand Rapids regardless of whether the streetcar is implemented. The streetcar would focus redevelopment along the streetcar route. This focus is typically viewed as beneficial in reducing other infrastructure costs and increasing potential for urban green space development.
- The streetcar system would encourage a bolder scale of development that leads to faster ramp up and occupancy plus improved return on investment.

Ultimately, the purpose of the study was to determine feasibility. In order to better serve future development, the route may be adjusted between this study and construction. To provide a higher level of service, frequency may be increased. Stations may be shifted to coincide with transitions into development. However, minor adjustments as the implementation process proceeds are not likely to shift the project from a “feasible” to a “not feasible” condition.

Summary of Recommendations

After evaluation of several options for the first leg of the proposed streetcar system, a single route was selected to evaluate in the feasibility study. This route was used to prepare cost estimates, prepare an operating plan, prepare operating cost estimates, and assess potential development within the three to four blocks surrounding the route. This route generally follows Monroe and Market Avenues. The route extends from Monroe Avenue at Newberry Street (at the Sixth Street Bridge) to Market Avenue at Bartlett Street. Bartlett Street is used to provide the transit connection to Central Station. This route allows multiple expansion options that connect to this “first ribbon” and provide a connection to Central Station and the proposed streetcar yard and shop. Maps of the route and potential expansion options are provided later in this report.

Modern streetcar vehicles are recommended (as opposed to refurbished historic or historic replica vehicles). Modern streetcar vehicles are a “green” technology. They are electric powered and have no street-level emissions. Modern vehicles have low floors, multiple wide doors, and bridge plates, which make the vehicles easily accessible for the mobility impaired.

Frequency on existing streetcar systems in the U.S. ranges from 10 to 15 minutes with an average frequency of about 12.5 minutes. In Grand Rapids, an initial frequency of ten minutes is proposed. To provide an operating



Bridge plates on modern streetcar vehicles allow easy access from ten inch high station platforms to the fourteen inch high low floor vehicle.

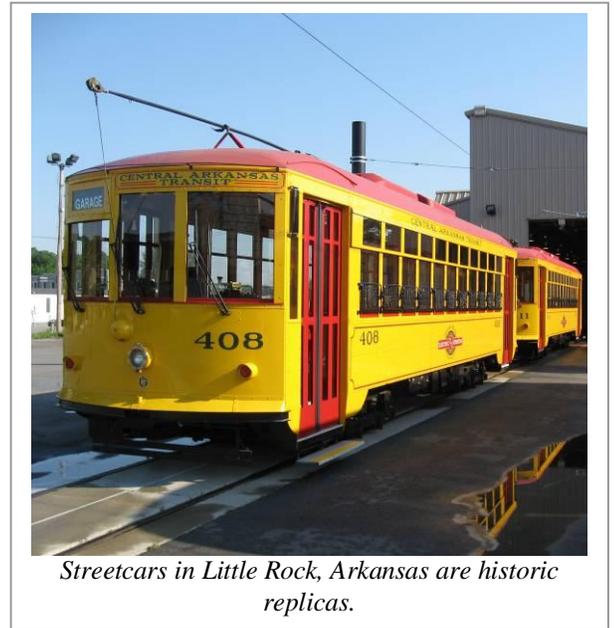
Photo source: LTK Engineering Services

What is a Modern Streetcar?

When the word “streetcar” is mentioned, people’s thoughts typically turn to trolleys from a bygone era or cable cars from movies or commercials featuring San Francisco. Some components of historic trolleys are identical in function as modern streetcars. Trolley cars originally used steel wheels on steel rails in order to provide a very smooth ride quality. Electric streetcars still draw power from an overhead wire, provide propulsion with an electric motor, and ground the electrical system to the steel rails. A number of innovations used on modern streetcar systems were invented in Grand Rapids in the early twentieth century.

Historic streetcars and historic replicas still operate in several cities in the U.S. New Orleans and Memphis provide examples of historic systems while Tampa and Little Rock provide examples of replica systems. Replica systems often have modern propulsion systems, electronics, and air conditioning, but retain the appearance and operating characteristics of historic cars. Historic and replica systems generally have boarding through doors at either end of the vehicle. Boarding requires the use of stairs or a lift. The interior of historic and replica cars are generally geared toward seated passengers.

Vehicle boarding, interior arrangement and appearance differentiate the modern streetcar. Modern streetcars do not try to mimic historic trolley appearance. The interior and exterior are characterized by a sleek, new appearance with large windows and wide doors. The interior arrangement allows more standing passengers than seated passengers. There are two reasons for this interior arrangement. First, most trips on the modern streetcar are short. For the proposed Grand Rapids system, a trip from one end to the other is only ten minutes and the average trip would take less than six minutes. Most passengers accept standing for several minutes on a streetcar (while they would not readily accept standing for a longer distance trip such as a thirty minute commuter rail journey).



Modern streetcars, such as the system in Melbourne, Australia, have low floors and multiple wide doors which greatly decrease the time needed for entering and exiting the vehicle. Modern streetcars also have a sleek, modern appearance.

Second, the wide access throughout the streetcar allows ease of movement to and from doors. A key operating feature of modern streetcar is the speed of getting on and off the vehicle. Modern streetcars have multiple, wide doors and low floors. This allows the time at stations—called dwell time—to be greatly reduced as compared to historic streetcars. Reduced dwell time means faster overall trips. This encourages more ridership and may allow reduced vehicle requirements.

Modern streetcars are often described as smaller versions of light rail transit (LRT) vehicles. The shorter lengths and slightly narrower width allows operation in an urban environment where tighter turns may be required. The

vehicles are generally capable of top speeds near 45 miles per hour, but travel at traffic speeds within the city. If the flow of traffic is 25 miles per hour, the modern streetcar moves right along with the traffic.

Most manufacturers of modern streetcars—also called trams overseas—use a modular design. The ends of the vehicle where the driver controls the vehicles are identical. The modern streetcar is made to travel in either direction. The number of modular “links” between the two cab ends determines the length of the vehicle. One center section gives a vehicle approximately 20 meters long (66 feet) capable of carrying over 100 passengers (with just over 30 of the passengers seated). Some systems, such as Luas in Dublin, Ireland, started with a portion of the fleet with this shorter length. As ridership demand grew, additional modular links were ordered which lengthened the vehicles and increased vehicle and system capacity.

Although there may not be enough systems operating in the U.S. to draw firm conclusions, one observation about modern streetcars is key: The modern streetcar systems in the U.S. have higher daily ridership than historic or replica systems. When statistically equilibrated for differing urban populations, modern streetcars are delivering ridership numbers at least two times greater than the equivalent historic or historic replica system.

Did you know?

- Grand Rapids once had over 70 miles of streetcar lines.
- Use of roller bearings in streetcars was invented in Grand Rapids and is still used today.
- Vision testing for streetcar operators was first conducted in Grand Rapids.
- A streetcar design developed in Grand Rapids using a light weight vehicle and modern interior and exterior finishes set the standard for all future streetcar vehicles in the U.S.
- In Grand Rapids, L. J. DeLamarter became one of the first to use advertising to promote streetcar ridership.
- The last streetcar in Grand Rapids took its last run on August 23, 1935 along the Cherry Street route.

Source: Dr. Robert Samuel Gillespie, Michigan History Magazine, May/June 2005

Table 1. Daily Ridership on other Streetcar Systems

City	Daily Ridership	Population	Riders per 100,000 Population	Type
Portland	6,900	533,000	1,295	Modern
Tacoma	2,900	193,000	1,503	Modern
Memphis	2,774	650,000	427	Historic
Tampa	800	303,000	264	Replica

What Benefits Do Streetcars Provide?

A general principle in modern urban planning is summed up in the quote: “A successful city is a city where people walk.” Cultural life and social vitality depend on people walking.

Streetcars function within the urban context to extend walkable distances. Streetcars allow a pedestrian to comfortably reach further neighborhoods, restaurants, or services without the use of a car than they could otherwise reach only by walking.

Streetcars are not intended to provide a commuter mode from suburbs to the core of downtown. Streetcars do allow visitors to or residents of downtown to access destinations more distant than a typical walking distance (which is one-quarter mile for the average person).

The schematics on the following page show the existing walkable core of downtown Grand Rapids and the potential extension of walking destinations with the initial leg of the streetcar system.

Figure 1.
Schematic of Existing
Walkable Core

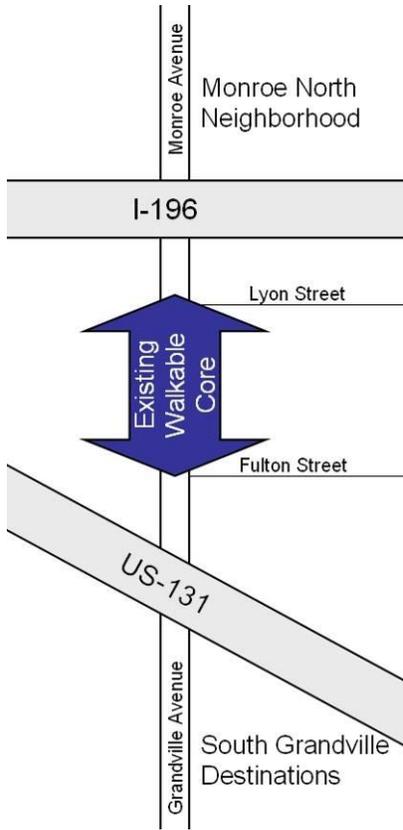
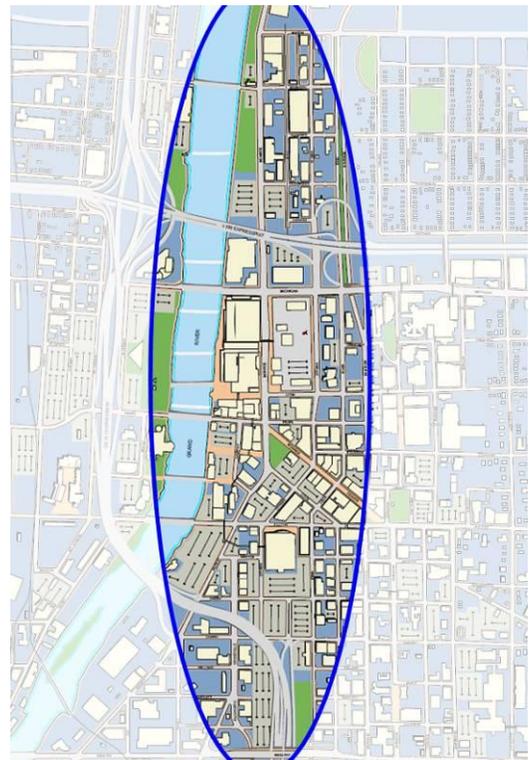
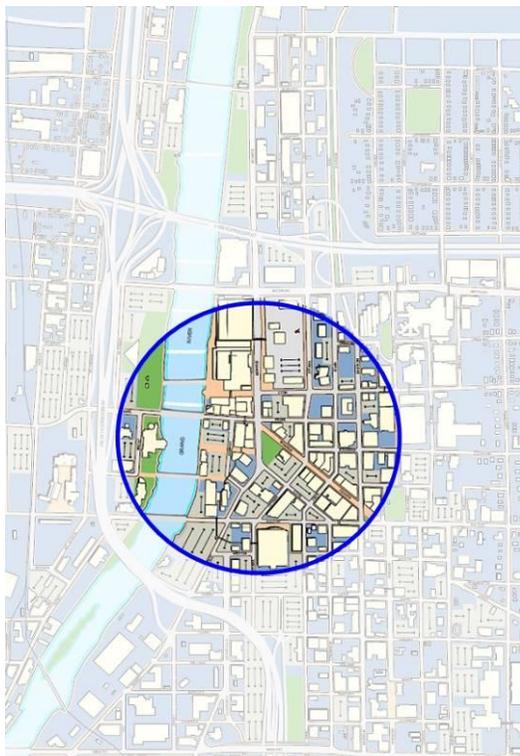
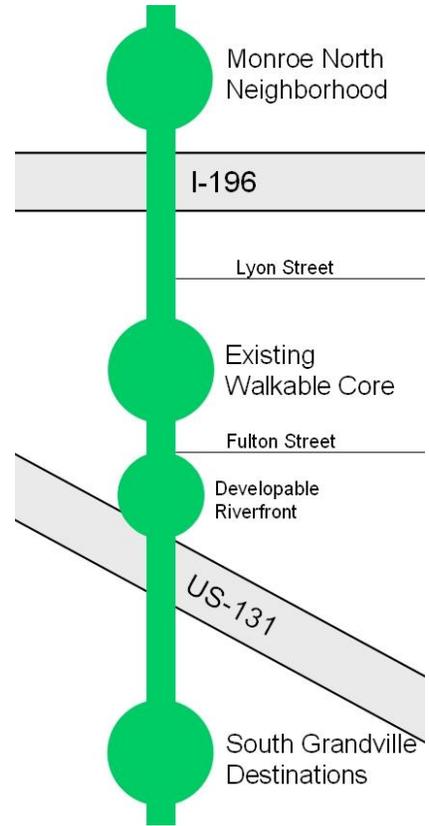


Figure 2.
Schematic of Extended
Walkable Distances with Streetcar



Route

Multiple alternatives were examined as part of the feasibility study. In order to constrain the initial build option within projected fiscal capacity, the following boundaries were set as limits for the study area:

- West: The west boundary of the initial study area is the active freight railroad tracks generally running north-south immediately west of the downtown Grand Valley State University campus. While active railroad tracks can be crossed, the cost is usually high and the coordination issues rather complex. For the “first ribbon” of a streetcar system, reducing complexity was part of setting the study area boundaries.
- North: The old north boundary of Grand Rapids, Leonard Street, was selected as the northern limit of the study area. This boundary allowed developing and developable land in the area called “Monroe North” to be included in the study.
- East: College Avenue was used as the east boundary as development on the Medical Mile is moving toward and somewhat beyond College Avenue. Note, however, that the gradients of many streets providing access to Medical Mile form a strict physical constraint within the study area. Portions of Michigan Street, Lyon Street, Fountain Street, Crescent Street, Lafayette Avenue, and all of John Street are too steep for operation of rail technology.
- South: The general vicinity around Wealthy Street served as the southern boundary of the study area.

The initial study area was formed to examine a “first ribbon” or “anchor leg” to a streetcar system with potential for expansion. Potential extensions are briefly examined later in this report.

Three initial concepts were evaluated:

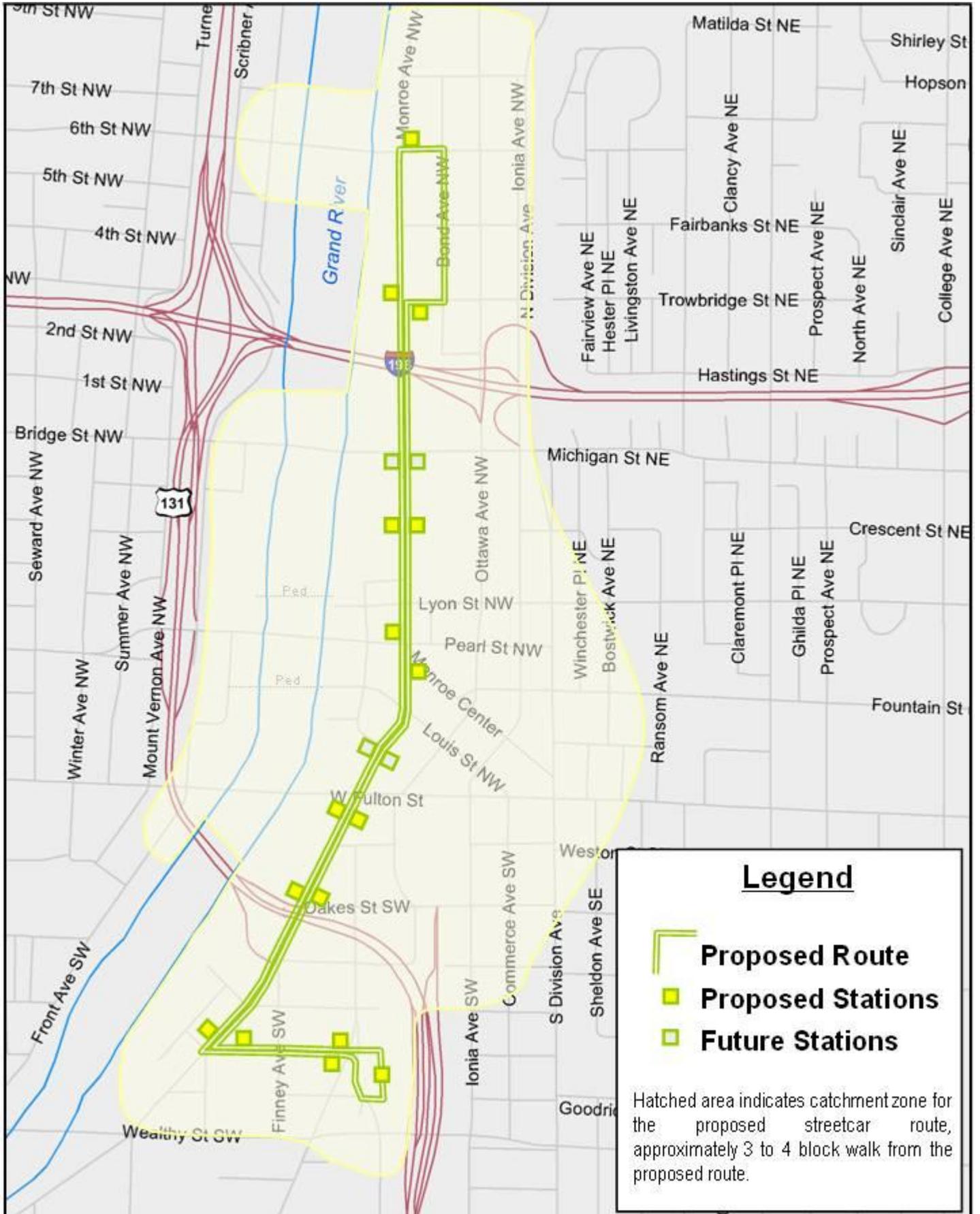
- Generally north-south route along Monroe Avenue connecting from Newberry Street on the north to Central Station on the south
- Generally north-south route using Ottawa and Ionia Avenues, both one-way streets through the core of downtown, from Mason Street on the north to Central Station on the south.
- Generally east-west route along Fulton Street from Winter Avenue on the west to a point along College Avenue on the east

Other variations and combinations were briefly examined early in the study, but were eliminated as alternatives for the “first ribbon” because of longer routes, circuitous routing, or higher costs. Although serving Grand Valley State University’s Pew Campus would be valuable, the east-west alternative was eliminated early in the study since it would not link to Central Station.

The Ottawa-Ionia alignment was felt to serve the core of existing development especially as it passed perpendicular to Monroe Center. Ottawa Avenue north of Michigan Street was part of the original streetcar network prior to 1935. Ultimately, the Ottawa-Ionia alignment was eliminated from further study because of the undesirable routing through the I-196 interchanges and because the cross-slope at Michigan Street exceeds desirable limits for modern streetcar vehicles. (In other words, the lean of the streetcar while crossing Michigan Street would be excessive.) Reconstruction of Michigan Street to correct this problem was deemed too costly for further consideration.

The proposed initial system is shown on the following page.

Figure 3. Proposed Initial Streetcar System



This alignment allows reasonable access to the core of downtown between Monroe and Division Avenues while also providing access within a few blocks to downtown hotels and museums. In the Monroe North area, since the land is bound by the Grand River and bluff, any alignment would allow access from land available for development and redevelopment. In the Monroe North area, Monroe Avenue currently provides access to the front doors of most residential units. South of Fulton Street, the alignment focuses on development potential especially along the Grand River.

The streetcar would run in the travel lane closest to the curb. Most on-street parking along the route would remain. The exception is that several on-street parking spaces would be impacted by the proposed boarding platform along Newberry Street just to the east of Monroe Avenue. The figures below show typical sections at three points along the route. All typical sections are looking north.

Figure 4. Proposed Typical Section on Monroe Avenue north of Trowbridge Street

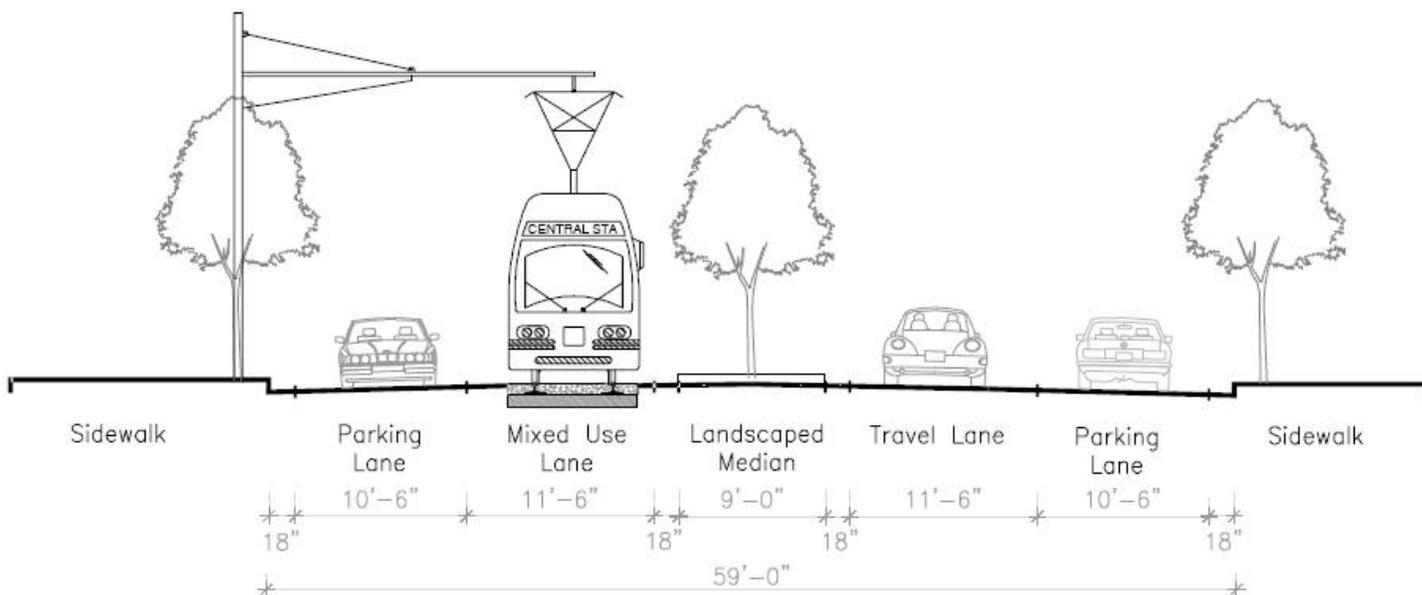


Figure 5. Proposed Typical Section on Monroe Avenue south of Pearl Street

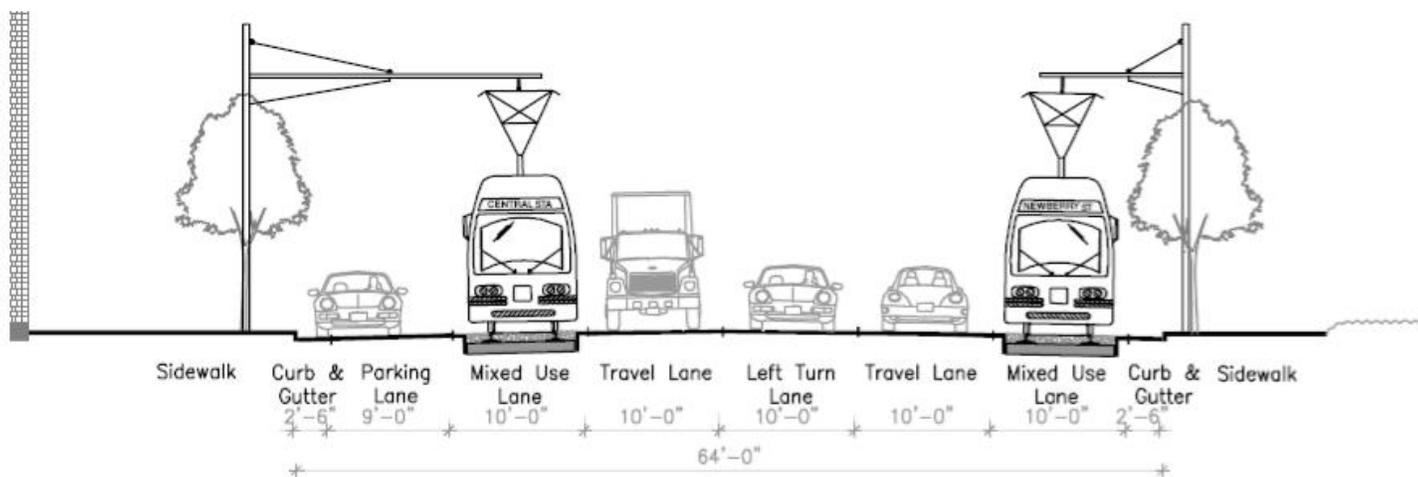
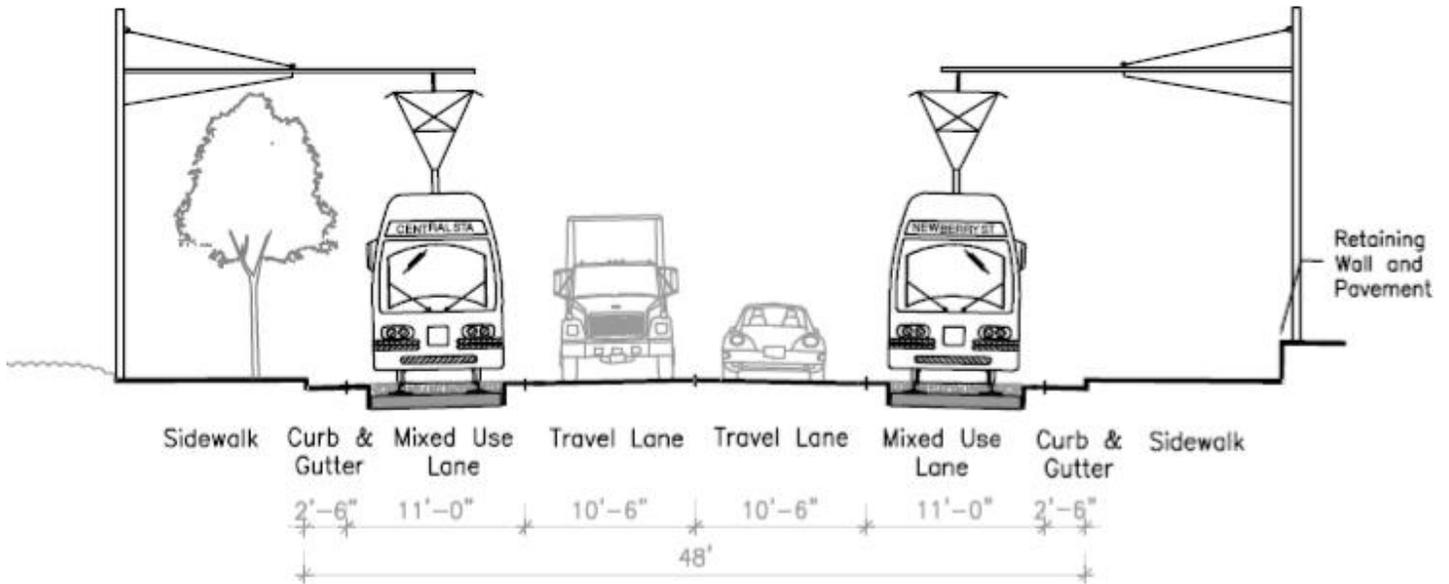


Figure 6. Proposed Typical Section on Market Avenue south of Fulton Street



For the electric power system, a single wire system is recommended. Single wires are less visually intrusive and allow smaller, lighter poles. The recommended route has three ideal locations for traction power substations. These substations would be approximately 18 feet by 25 feet and include a transformer to step power from 480 volts to 750 volts and a rectifier to change AC power to DC power. Modern streetcar vehicles run on 750 volt direct current power. The locations for proposed substations are:

- Vicinity of power company substation north of I-196 on the west side of Monroe Avenue
- Adjacent to the power company substation south of Fulton Street on the east side of Market Avenue
- In the vicinity of the proposed yard and shop on the east side of Ellsworth Avenue north of Wealthy Street

In the era of streetcars a hundred years ago, the trolley cars were parked in a trolley barn. This expression carries over from the days prior to electricity when horses pulled the cars. A location to park, inspect, clean, and repair the streetcars is still needed today (and in some cities is still called a barn).

To minimize the cost of tracks connecting the revenue alignment to the yard (called yard leads), the yard should be located in close proximity to the alignment. The preferred yard location for the proposed alignment is directly south of Central Station. The site has sufficient room for the initial system and room for expansion from the initial four vehicles to ten to twelve vehicles in the future.

The shop would include a 15,000 square foot building, an inside wash facility (due to the harsh winters in Grand Rapids compared to all existing streetcar systems in the U.S.), and equipment for light maintenance and repair. Daily vehicle inspections and interior cleaning, and periodic exterior wash, preventive maintenance, and repairs take place within the shop and yard. When vehicles are not in service, such as in off-peak hours or outside of service hours, vehicles are stored in the yard. During winter months, sufficient room inside the shop would allow indoor storage of vehicles.

Proposed Stations and Station Locations

Proposed station locations are shown on the map in Figure 3 (page 8). These station locations are subject to review and refinement during later engineering phases. Station locations are often adjusted in coordination with development or redevelopment in order to maximize benefits to both the development and to transit ridership.

Station platforms would be approximately sixty feet long. The platform is raised about ten inches to provide ease of boarding onto the low floor vehicles. A tactile strip would run along the edge of the platform. Where the adjacent building allows, the platforms would include an architectural canopy. Stations would generally include lighting, signage, and limited seating. "Next vehicle" technology would either display the locations of the vehicles in revenue service or display the time until the next vehicle arrives. Approximately fifty percent of the stations would have fare vending machines. Safety and security measures are the norm for modern transit stations.

Figure 7. Station Concepts



Descriptions of each station, beginning at Central Station and ending on Newberry Street, are provided below. The term "station pair" means streetcar platforms on either side of the street in close proximity serving the same area.

Central Station: The southern terminus station. Streetcar vehicles would enter and exit from service at this station. Central Station allows convenient transfer to and from local bus routes.

Founders Brewing: Bartlett Street immediately west of Grandville Avenue. This station pair (serving eastbound and westbound streetcar service on Bartlett Street) is easily accessible from Founders Brewing Company, Hopson Flats (apartments), Grand Rapids Ballet Company, and potential future development near the station on Grandville Avenue, Ellsworth Avenue, and Bartlett Street.

Bartlett at Market: A station pair near the intersection of Bartlett Street and Market Avenue targets future riverfront development between Wealthy Street and the US-131 Market Avenue exit ramp. This station would also serve the existing Amtrak station which is only two blocks south along Market Avenue.

Market at Oakes: A station pair just to the north of Oakes Street along Market Avenue would allow access within one block to restaurants and offices surrounding the intersection of Oakes Street and Grandville Avenue. This would include the renovated Anheuser-Busch building.

Market at Fulton: The station pair located just south of Fulton Street along Market Avenue would be co-located with proposed bus rapid transit (BRT) station. The southbound platform would be located directly adjacent to the entrance to the skywalk. The northbound platform would be located between Weston Street and the entrance to the electric substation. This key station location allows

easy access to the BOB, the Van Andel Arena, the Courtyard Hotel, Riverfront Café, Kinkos, and the Riverwalk. Across the Fulton Street Bridge, this station pair is close to the southeast corner of the downtown Grand Valley State University (GVSU) campus including the L.V. Eberhard Center and the Fred M. Keller Engineering Lab.

Monroe at Campau: This is a potential location for a future station pair. To the west, this station would provide straight-line access across the Blue Pedestrian Bridge to the main entrance of the Grand Valley State University Pew Campus. Immediately on the east side of the station is the proposed hotel, condominium, restaurant, and entertainment complex just north of the BOB. This station may be a key element related to walkable city implementation.

Rosa Parks Circle (Northbound): Along Monroe Avenue in front of Rosa Parks Circle, this station would also be co-located with proposed bus rapid transit (BRT) station. This station would serve all surrounding businesses and residences including providing direct access up Monroe Center. The Grand Rapids Art Museum is located only one block away on Monroe Center.

Monroe at Pearl (Southbound): Along Monroe Avenue in front of Starbucks, this station would also be co-located with proposed bus rapid transit (BRT) station. Directly to the west along Pearl Street are the Amway Grand Hotel and the J. W. Marriott Grand Rapids. Across the Pearl Street Bridge are the Van Andel Museum and the Gerald R. Ford Museum.

City/County Complex (Northbound): Along Monroe Avenue in front of the City/County Complex, this station would be co-located with proposed bus rapid transit (BRT) station.

DeVos Place (Southbound): Also co-located with proposed bus rapid transit (BRT) station, this platform would serve both the DeVos Place Convention Center and DeVos Performance Hall.

Monroe at Michigan/Bridge: This potential future station location will require additional evaluation. The intent of this station is to shorten the distance from a streetcar station to the River House. Due to the right-turn lane on southbound Monroe Avenue at Bridge Street, this platform would need to be located on the south side of Bridge Street. This location is very close to the DeVos Place platform and may not be necessary.

Trowbridge: Trowbridge Street begins the north loop of the proposed system. The northbound platform is proposed on Trowbridge Street just east of Monroe Avenue. The southbound platform is proposed along Monroe Avenue, set back from the travel lane, opposite Trowbridge Street. This station would serve existing development such as Icon on Bond, and also serve potential development on what is now surface parking lots surrounding this station location.

Sixth Street Bridge: The northernmost station is proposed on Newberry Street just to the east of Monroe Avenue. This station would serve the existing and proposed residential and business development within a two to four block radius. Several on-street parking spaces on the north side of Newberry Street immediately east of Monroe Avenue would likely be displaced with this platform.

What is Transit-Oriented Development?

Simply adding a public transportation system into the downtown environment may help in reducing emissions and reducing parking demand. To realize the full potential of a public transportation component, a mutually beneficial relationship with development surrounding stations should be promoted. This development, termed transit-oriented development (TOD), provides destinations, vitality, and a sense of safety and security for the transit system while the transit system delivers customers to the retail, restaurant, and entertainment establishments.

Components of transit-oriented development include:

- A high degree of walkability. Design of sidewalks and walkway connections promote the pedestrian movement. While the station area generally includes pedestrian, bicycle, transit, and automobile modes, the highest priority is provided to the pedestrian. Connections to existing walkways (such as the Riverwalk or skywalk) are easily made.
- Mixed-use development. Locating the places where people live, work, shop, eat, play, and learn in close proximity promotes greatly decreased use of automobiles and also decreases parking demand (which, in turn, allows higher overall densities and vibrancy). Mixed-use development typically includes retail, services, restaurants, and entertainment venues on the first floor with residential development above. Artisan-type storefronts and workshops blend particularly well within station areas.
- High density residential. The residential development above may include condominiums, townhomes, apartments, or even student housing. Residential units should be offered with a variety of price points. Residential density supports services in the station area as well as creating an origin for transit ridership.
- Reduced parking. Parking in station areas is generally joint use and is located behind buildings. Parking may be used for services during the day, restaurants in the evening, and residential parking at night. Parking supply is intentionally reduced since the proximity of destinations and the transit system allow the number of automobile trips to be greatly reduced.
- High-quality design and appearance. Transit-oriented development generally features landscaping, public art, and high-quality finishes. TOD can include courtyards, fountains, green space, and wide sidewalks featuring historic design elements. A key intent is to create "gather places" where social and aesthetic elements combine toward community.

The downtown streetcar and development would work hand-in-hand. The streetcar would encourage higher levels of pedestrian activity with decreased parking demand. The development provides destinations for the pedestrians, whether for living, shopping, eating, or fun. Together, density of activity provides vibrancy and sustainability.

The proposed route was selected to allow streetcar service to developable parcels of sufficient size to create the above TOD. The route connects these developable parcels through an established core of downtown. From Michigan Street to Fulton Street, with the exception of a few lots, the land is fairly developed. Monroe Center represents a time when TOD was not a new thing. Through at least 1930, streetcars ran up and down Monroe Center (then Monroe Street) at a very high frequency. Both sides of the street were lined with retail, services, and artisans. The shop of one of Grand Rapids' few luthiers was right along Monroe allowing pedestrians to watch as he made and repaired violins.

Developable land may include some smaller infill parcels, but generally the larger surface parking lots are viewed with potential for TOD development. Some land may also be currently underutilized with activities which are not the “highest and best use” for the property. This may especially apply to riverfront parcels. The selected route would serve large parcels in the Monroe North area and large parcels along Market Avenue and Bartlett Street.

The following renderings depict the potential for such development. The drawings show mixed-use development that would be of the scale identified in the market analysis conducted in conjunction with this study.

Figure 8. Transit-Oriented Development Concept
Monroe North Vicinity – Site Concept



Figure 9. Transit-Oriented Development Concept Monroe North – Program

This proposed transit node includes high-density and mixed-use offering a new downtown destination along the Grand River. The development would offer retail, restaurants, cafes and other entertainment opportunities along Monroe Street and a new Riverfront plaza which expands the existing Riverwalk and provides great views to Sixth Street Bridge and the Grand Rapids Fish Ladder.

Program:

Retail.....50,000 square feet

Office.....18,000 square feet

Residential202 units

This program was developed from the Market Study conducted in conjunction with this study.

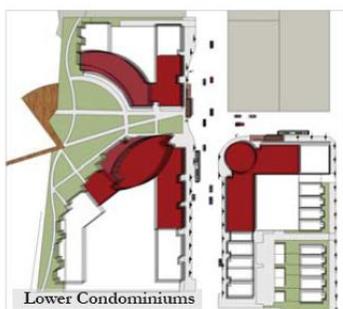
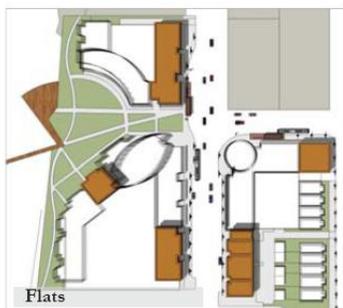
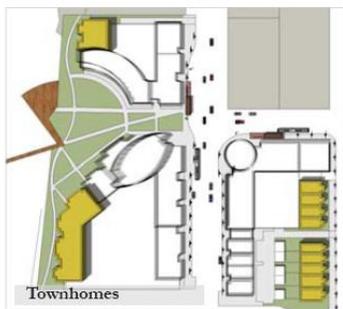


Figure 10. Transit-Oriented Development Concept Monroe North – Aerial View



Concept only – Not intended to depict any specific location

Figure 11. Transit-Oriented Development Concept
Monroe North – Aerial View of Concept



Figure 12. Transit-Oriented Development Concept
Monroe North – Street Level View of Concept



Figure 13. Transit-Oriented Development Concept
Market at Fulton – Second Floor View from the B.O.B.



Figure 14. Transit-Oriented Development Concept
Market at Fulton – Aerial View



Figure 15. Transit-Oriented Development Concept
Market at Fulton – Concept Plan



Fares and Fare Collection

Modern streetcar systems in the U.S. have a wide range of fare structures. Some systems operate with free fares, free fare zones, or free fare times of day. A common opening strategy is to offer free fares for a designated period following the system opening so that residents can become accustomed to riding the system and making use of system benefits and amenities. The range of fares extends from free to two dollars (or more) for single ride tickets.

It is important to realize that the fare structure is not intended to allow fare box revenues to cover most or all of the operating cost. Modern streetcars are part of an urban system that stimulates decreased parking demand and increased densities for downtown residential development. Modern streetcars increase vitality within the urban core and provide benefits to retail, restaurant, and entertainment businesses. Reduction in parking demand allows development to devote less space and cost to parking spaces and more square footage to revenue producing structure. The urban vibrancy that streetcars stimulate generally leads to faster absorption rates for development (i.e., units sell sooner). Since modern streetcars have no street-level emissions, they allow a greater movement of people without pollution than would be created by moving those same people with automobiles. As streetcars contribute to revenue generation and other urban benefits outside of the streetcar rails and vehicles, a portion of the operating expenses is expected to be derived outside of the fare box.

For Grand Rapids, fares are specifically structured to provide a seamless transition between streetcar, other local buses, and the proposed bus rapid transit (BRT) system. There are three exceptions to this seamless structure. The first is the sale of passes, which apply mainly to visitors to the core of downtown such as persons attending a convention at DeVos Place. The second exception will apply to the streetcar and the proposed BRT system. Both feature off-board fare collection and on-board verification. In order to enforce the on-board verification system, the streetcar and BRT systems would use a fine structure. The third exception is a "park-and-ride" fare, which allows a combined payment for parking and streetcar fare.

Recommended Fare Structure (as of April 24, 2008):

Transparent with the rest of The Rapid's system including proposed BRT

- One ride: \$ 1.30 (same as system)
Must verify single ride ticket onboard vehicle
One-ride ticket good for two hours
- Transfers: Transfers to the streetcar must be verified onboard the vehicle
Transfers from the streetcar must be purchased at the time of the one-ride ticket or use of a ten-ride ticket
- One-day Streetcar Pass: \$2.50 (Streetcar Only)
Good for one calendar day (with calendar extending to end of early AM service the next day for days with service past midnight)
- Three-day Streetcar Pass: \$5.00 (Streetcar Only)

Grand Rapids Streetcar Feasibility

- Ten-Ride: \$10.00 (same as system)
Must use ten-ride off-board at platform to print single ride ticket – verify single ride ticket onboard vehicle
- 31-day Pass: \$35.00
- Park-and-Ride: Park-and-Ride Ticket is valid for up to four riders for one roundtrip – must verify onboard for each direction of trip
Park-and-Ride Ticket is only valid for travel on the BRT and streetcar systems
- University Pass: Based on agreements between universities and The Rapid, university identification cards for some universities serve as unlimited ride passes.
- Major Employer Passes: In order to decrease parking demand, the employee identifications for employees of some major employers (based on agreements with The Rapid) serve as unlimited ride passes. The bulk cost of passes is more than offset by decreased parking demand and thus decreased cost of parking expansion.

Fare Collection:

- Primarily off-board. Passes can be purchased at outlets as with regular tickets. Downtown hotels will be encouraged to distribute or sell passes. For conferences, Air Porter and Streetcar Passes will be promoted as a means to decrease parking demand and emissions related to automobile use. The benefit to travelers also will be promoted – i.e., Why rent a car just to park it? On-board ticket dispensers may prevent delays at station ticket vending machines.
- Encourage smart cards for purchase of tickets.
- Encourage colleges and major employers to enter into a cooperative agreement so that student or employee identification doubles as a monthly pass.

Fines:

- With a proof-of-payment system, an honor system, fines are higher. North American examples include:
 - Denver RTD (Light Rail): First offense – warning and identification information entered in the RTD database; Second offense - \$51 fine; Multiple offenses - \$121 fine.
 - San Francisco Muni: Fines up to \$500.
 - York Region Transit VIVA: \$150.
 - Vancouver: \$150.
 - Edmonton: \$110.
- Proposed fines for the Grand Rapids may follow a structure such as:
 - First offense – cost of three-day pass plus processing fee (\$10.00 – includes issuance of a three-day pass). Name is entered in violation database.
 - Second offense – forty times cost of a one-way fare (\$52.00)
 - Multiple offenses – one hundred times the cost of a one-way fare (\$130.00)

Fares and fines are subject to change to remain in accordance with general system fares.

Capital Cost Estimate

The table below presents a summary of the estimate of probable capital costs for the route identified previously in this report. The capital cost estimate was developed using quantities and unit costs for each construction item within the cost categories identified below. Costs are presented in FY2008 dollars.

Unit costs were derived from recent projects with similar features in Houston, Baltimore, Portland, Tacoma, and Washington, D.C. Adjustments in costs were made using RSMMeans 22nd edition.¹

Quantities were calculated for subcategories including but not limited to: imbedded track, universal crossovers, underground utility relocations, utility pole relocations, overhead contact system, substations, communications, platforms, fare vending equipment (assumed at fifty percent of stations), yard, shop, and maintenance of traffic during construction. The estimate also includes vehicles, engineering, construction management, testing and contingencies. The estimate does not include right-of-way acquisition or easements if required for this project.

Table 2. Capital Cost Estimate

Cost Category	Cost Estimate
Guideway Facilities	\$ 9,060,000
Utilities and Environmental Systems	\$ 11,580,000
Station Stops	\$ 6,867,000
Shop & Yard Facilities	\$ 3,332,000
Miscellaneous Items	\$ 5,650,000
Contractor Cost Contingency (15% of above costs)	\$ 980,000
Owner Costs (including vehicles and engineering)	\$ 5,620,000
Owner Cost Contingency (15% of vehicle cost and engineering)	\$ 29,203,000
TOTAL	\$ 6,463,000
	\$ 78,755,000

In FY2008 dollars, the estimate calculates to \$24.8 million per mile. Escalated to FY2012 dollars, the estimate is \$29 million per mile. Checking against other streetcar projects and studies, the national average is running \$25 to \$30 million per mile. The opinion of cost for the Grand Rapids downtown system falls within this range.

¹ RSMMeans construction cost data provides regional comparison of construction cost estimates and allows adjustment of estimates between regions. The cost models allow construction estimates based on one region to be easily adjusted for another region.

Risk Assessment

Assessment of risk is identification of project tasks and elements that hold potential for change from what is foreseen at the time of this study. Risk may generally impact changes in schedule, changes in cost, changes in availability of funds, or any combination of these three.

Different project components carry different degrees or levels of risk. Some factors may be fairly insignificant. Other factors carry the potential to completely stop project implementation. By identifying risks ahead of time, steps may be taken to control or mitigate impacts. Note, however, that some risks—especially those associated with leaps in material costs—are difficult to mitigate unless competitive material options are available.

Though not necessarily an all-inclusive list, the most significant risks identified are:

- **Project Cost:** Escalation in overall project cost due to unforeseen underground utility relocation, unforeseen changes in material costs, or the falling value of the U.S. Dollar (especially related to vehicle procurement). Key materials used in construction of the streetcar system include steel (for rails and concrete reinforcement), concrete, and copper (for the overhead contact system).
- **Project Implementation:** Local issues or concerns over implementation of the streetcar system can prevent movement of the project toward construction. The most common concern is potential impacts to vehicular traffic, emergency service response, and bicycle use. A common local issue is evaluation of a transportation investment against other city issues or against generally declining availability of local funds.
- **Agency Coordination:** The streetcar route passes under US-131, which is owned by the Michigan Department of Transportation. Coordination will be required to run the electric system under the structure. The system will likely involve mounting some hardware to the structure including shielding. There are coordination risks with City of Grand Rapids departments including those related to parking and traffic.
- **Project Funding:** The lack of sufficient private or public capital funds for construction or the lack of a local funding mechanism for operating the system can be the most significant issues. In Michigan, the inability to pass enabling legislation allowing collection of local sales tax creates a significant funding obstacle.
- **Project Start-Up:** Start-up problems can prevent fast ramp up of ridership and can create negative perceptions of the system which can impact the system and potential expansion for years. Common start-up problems include delay in vehicle delivery, problems with fare vending especially in cold weather, sustaining on-board verification of fare payment, and securing enabling ordinances for fare violation fines.

Projected Ridership

Computer modeling of ridership potential was not within the scope of the Grand Rapids Streetcar Feasibility Study. A key reason modeling was not included in the scope is that models have been demonstrated as unreliable for evaluation of downtown circulators including streetcar. Transportation demand models are normally geared toward regional travel demand based on highway planning needs. In some cities with well developed commuter transit systems, commuter rail and subway systems have been incorporated in the model. Presence of an existing major transit system allows calibration of the model. Since a downtown streetcar system would connect small analysis zones and function essentially to extend walking distances, models designed for regional commuting patterns are unproven for analysis of transit circulators. Experience in cities with recently opened streetcar systems has shown the models substantially under predict ridership.

Ridership was estimated using comparable cities. Portland has an established streetcar system and has similar topological characteristics. Portland’s population is approximately two-and-a-half times that of Grand Rapids, so Portland ridership values were scaled down. Tacoma has very similar total population and similar population that lives and works in the city. Tacoma has a higher downtown population than Grand Rapids while Grand Rapids has a higher college student population than Tacoma.

Based on comparison cities, projected ridership is shown in the following table.

Table 3. Weekday Ridership Estimates

Ridership Category	System Opening (2012)	Future (2021)
Winter	2,700	3,100
Summer	3,700	4,200
Average	2,900	3,300

These ridership projections are the basis for determining operating frequencies and vehicle requirements.

Operating Plan

For the proposed route, circulation time for a vehicle would be just over 20 minutes. With additional time for schedule recovery, potential traffic delays especially during peak hours or events, and potential added time for bridge plate deployment for mobility impaired riders, the planned total cycle time is 30 minutes.

This thirty minute cycle time allowed comparison of multiple service frequencies. Frequencies considered included 5, 6, 7.5, 10, and 15 minutes. *For the projected ridership, ten minute headways are appropriate for initial service.*

Comparing with other cities, headways range from ten to fifteen minutes in peak hours. Service more frequent than ten minutes is unusual in the U.S. except for special events.

Headway: Transit term for the time between vehicle departures. Also called frequency.

Transit systems can be schedule driven or headway driven. With schedule driven operation, passengers refer to a schedule to determine the next departure. With headway driven operation, vehicles depart with a uniform frequency during various operating periods. A schedule on headway driven systems may simply state “vehicle departs every ten minutes during morning and evening peak hours.”

For the proposed ten minute headways, three revenue vehicles and one spare vehicle would be required. A spare vehicle allows uninterrupted service when preventive maintenance is being performed or repairs are needed.

All physical features of the proposed system would allow improved headway with simply the addition of another vehicle. The next most frequent service (7.5 minute headways) may be appropriate for summer peaks in future years.

Operating and Maintenance Costs

The above operating plan with ten minute headways in peak hours calculates to 110,000 annual vehicle miles and 16,000 annual vehicle operating hours. Unit costs were derived from the National Transit Database (FY2006 inflated to FY2008). Operating and maintenance costs include vehicle operations, vehicle maintenance, non-vehicle maintenance (track, electric power system, stations, station amenities, shop and yard), and general administrative costs.

Based on the route and operating plan above, the estimate of probable annual operating cost (in FY2008 dollars) would be \$1.75 million. Two following sections of this report, financial plan and funding sources, discuss the revenue stream required to fund this expenditure amount. A technical memorandum is available showing more detail on operating cost statistics and costs.

Potential Extensions

An observation in the Market Analysis indicates validity of the strategy of creating an "anchor leg" for a downtown streetcar system that can be expanded upon. The observation was, "Once the route becomes more of a network, linking other areas, especially Grand Valley State University's Downtown Campus, the impacts will grow." The Market Analysis is referring to impacts of the streetcar in fueling additional downtown development. This impact would certainly include increased ridership on the streetcar system.

Regardless of desired future destinations, there are physical limitations which create obstacles for expansion. Some physical limitations are not absolute but would require significant expenditure to overcome. Limitations include:

- Active railroad tracks – Active tracks run just west of Grand Valley State University's Pew Campus, south of Wealthy Street, and diagonal through the intersection of Leonard Street and Plainfield Avenue. While crossings are possible, cost is high and coordination is extensive.
- Low bridge overpasses – For bridge vertical clearances below a height of 14'-6", insufficient room is available for the electrical system. If the vertical clearance is close to 14'-6", the street could be lowered. Lowering streets even a few inches is costly. Lowering streets more than a few inches is very expensive and can involve utilities, drainage, and adjacent intersections.
- Structural capacity of existing bridges – While streetcar vehicles weight less than allowable loads for commercial trucks, existing bridges would need to be structurally evaluated for the additional load. At this time, only the Fulton Street Bridge is proposed for future extensions. (The US-131 vertical clearances immediately west of the Bridge Street Bridge make a crossing of the Grand River on Bridge Street unfavorable.)
- Steepness of terrain – Steel wheels on steel rails have a lower coefficient of friction than rubber tires on concrete or asphalt pavement. With clear, dry conditions, climbing grades over eight to nine percent is possible. However, with snow, ice, sleet, heavy frost, or leaf residue, the

coefficient of friction is significantly reduced as is the maximum allowable grades. For modern streetcars with power to all wheels, eight percent grade is the maximum preferred. Nine percent is possible for short distances. Six percent is the desired maximum.

- Subsurface utilities – The streetcar rail bed is made to bridge most utilities without creating additional loading. However, larger pipes and culverts may require more detailed analysis. Planned utility reconstruction should be completed before or in conjunction with streetcar track construction to prevent system interruption in the future. The key utility feature impacting streetcar track construction is manholes. Large underground utility structures or a high density of manholes present obstacles to low-cost track installation.

Based on input from the Task Force, focus groups, and developers, potential extensions cover all points on the compass. The highest priority stated among the focus groups was an extension to the southeast toward Eastown and East Grand Rapids. This extension is the longest section considered and would likely require implementation in phases. Other extensions include: West to the GVSU Pew Campus then north to Bridge Street; North from Newbery Street to the Old North Boundary at Leonard Street (and potentially further north); and, South along Ellsworth Avenue to serve potential loft development south of Wealthy Street. Other options and combinations are possible. With future public involvement, other extensions and other priorities may be identified.

Figure 16 below shows the overlap of the proposed South Division Bus Rapid Transit (BRT) route and the proposed streetcar route. Potential extensions and their connection points to the proposed “anchor leg” are shown on the following page (Figure 17).

Figure 16. Streetcar and Bus Rapid Transit Connectivity

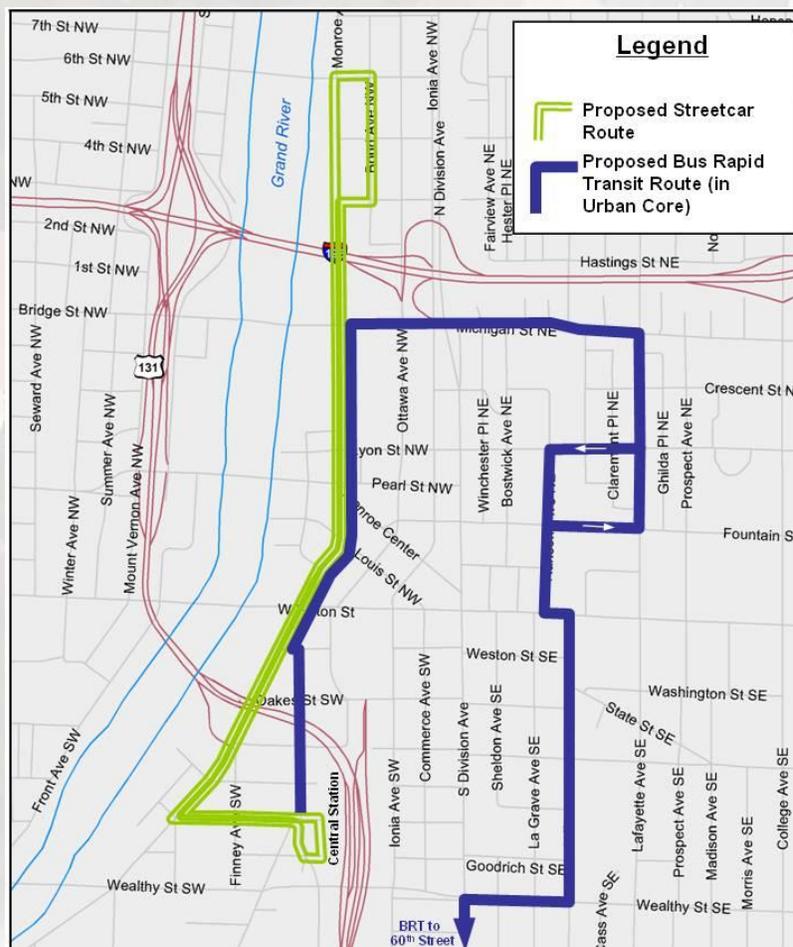
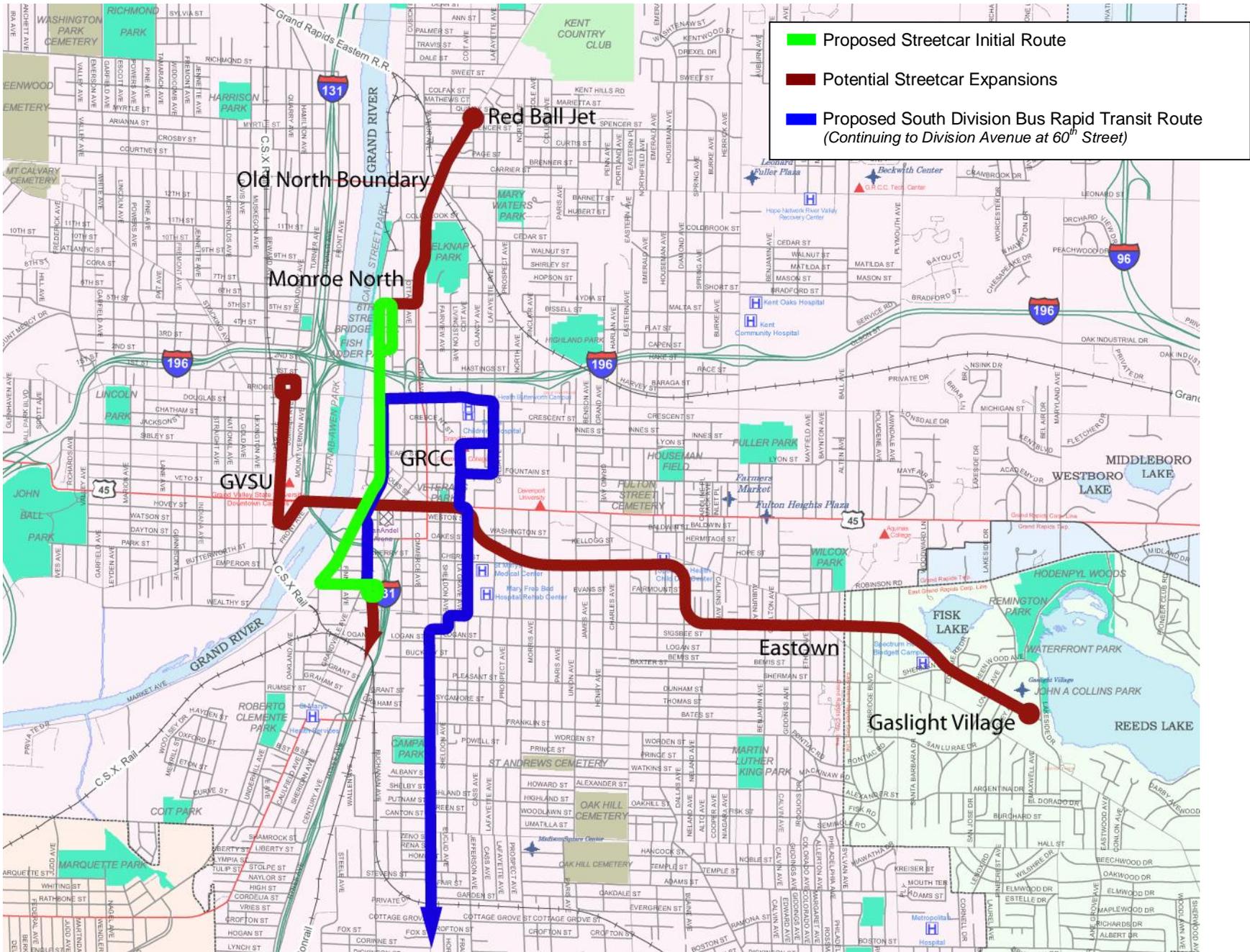


Figure 17. Potential Streetcar System Expansion
(Additional expansion recommended in future public involvement phases may be possible.)



Financial Plan and Potential Funding Sources

The current estimated operating and maintenance cost service with ten-minute frequency is \$1.75 million per year (in 2008 dollars). Funding to support this annual expenditure will come from a range of sources. The State of Michigan, which provides operating support to all transit providers in the state, will provide approximately \$525,000 (30% of the total) per year. Passenger fare revenues are estimated to provide another \$472,500 (27%), and \$196,000 (11%) in funding from the Grand Rapids Downtown Development Authority (which current supports Dash Bus service) will be transferred over to the streetcar (based on replacement of Dash South service with the streetcar). Together, these three sources will provide approximately two-thirds of the necessary operating funding. The remaining one-third (approximately \$556,500) has not yet been committed, but a tax on downtown parking spaces has emerged as an alternative. A \$0.25 tax per weekday on the roughly 10,000 public and private spaces around the streetcar alignment would generate sufficient revenue to fill the operating funding gap.

The current estimated capital cost for the streetcar project is \$78.8 million (in 2008 dollars). This figure covers the guideway, vehicles, utilities, station stops, a shop and yard, and other project costs and contingencies. Committed capital funding for the streetcar has not yet been identified. Grand Rapids has a long tradition of private and philanthropic support for important civic assets, and private support for the streetcar is anticipated, perhaps up to as much as half the capital cost. A transportation improvement district (TID), which would levy an assessment on commercial and/or residential units near the streetcar alignment, could provide the necessary funding to support bond financing of the remaining capital costs.

This financial plan is very preliminary. If the streetcar project progresses toward implementation, a more detailed year-by-year financial plan could be produced. In order to complete the next stage of financial planning, a number of key steps need to occur, including:

- Further refinement of cost estimates and project schedule
- Assessment of private funding opportunities
- Refinement of market analysis
- Determination of project sponsorship

In addition to these key steps, additional funding sources need to be explored. In particular, Task Force members and other local leaders have expressed a growing interest in pursuing a dedicated local sales tax. Such local sales taxes are not currently permitted in Michigan and would require both a constitutional amendment and a successful local ballot referendum. As an example, even a 0.25% additional local sales tax in Kent County could provide as much as \$18 million per year for transportation (including the streetcar) and other local needs. Revenues for a sales tax in the transit service area would need to be determined in future project development phases.

Market Analysis

The Grand Rapids area has been growing at a healthy rate over the last seven years, as well as prior. This growth has been marked by two trends. The first is development of the suburban areas including residential and retail growth. The second is the redevelopment and growing density of downtown. As will be discussed in more detail in the following chapter, in every category of land use, the downtown has seen growth. Much of this is due to intentional efforts of civic-minded citizens, business leaders, and local government leaders. Residential and housing is reappearing downtown after years of flight, Grand Valley State is growing into a true residential campus, the convention center and hotel superstructure has undergone rapid and high-quality expansion, medical facilities continue to expand, and retail/restaurant uses have revitalized formerly shuttered or underutilized real estate. The proposed streetcar is planned to link many of these successful nodes of development for more fluid transportation downtown and as a residential and visitor enhancement. It may also reduce the need for parking, which reduces development costs, which in turn makes more projects feasible.

The following table provides a summary of the predicted growth in various market segments assuming streetcar implementation (in 2012). This market analysis is for an area surrounding the proposed streetcar route by one-quarter mile.

Table 4. Market Analysis Summary

Sector	2008	2012	Percent Growth 2008-2012	2021	Percent Growth 2012-2021
Housing (Units)					
Condo	762	1,266	66%	2,445	93%
Apartment	224	336	50%	482	43%
Student Housing	299	328	10%	427	30%
Total Units	1,285	1,930	50%	3,354	74%
Office (Occupied square feet)	3,793	4,238	12%	5,240	24%
Retail (Occupied square feet)	274	363	32%	608	67%
Hotel (Rooms)	1,411	1,524	8%	1,993	31%

The implication for Grand Rapids is that while the street car will begin as a simple line connecting the downtown along a north-south spine, it will likely attract many proposed developments to be near it. So instead of developing a project in the suburbs or another part of downtown, project stakeholders will likely shift many projects to be nearer to the stations/stops. We also note that once a larger system is developed that creates more of a transit network (e.g. linking Grand Valley into the system), the level of use and the impacts should increase exponentially.

The streetcar system “focuses redevelopment intensity” and “encourages a bolder scale of development that leads to faster ramp up of occupancy.”

Finally, the impact on and usage by tourists and conventioners could be one of the more notable system benefits. Many of the downtown assets that visitors want to use are located along the line. As such, we would expect this group to utilize the streetcar at a high rate. The streetcar system should also positively impact the feasibility of future hotels along the route.

Economic Development Analysis

The following tables present a summary of projected economic benefits of streetcar system implementation. The analysis examined Kent County and the State of Michigan. (State of Michigan totals include Kent County.) Capital expenditures are the direct expenditures created by the project. The transit-oriented development (TOD) amounts include only the incremental difference between building the streetcar system and not building the system. Therefore, all capital expenditures and employment shown are new.

The output figures are the indirect sales generated from the direct capital expenditures. This figure is often discussed as the “ripple effect” in that expenditure of each dollar causes a cascading of spending as direct wage earners spend the wages on goods and services in the area.

Earnings represent the total wages earned by the newly created jobs. Employment indicates the projected full-time equivalent (FTE) jobs created. The average annual wage for these created jobs in Kent County is just over \$38,000.

Table 5: Combined Economic Impacts on Kent County

	Capital Expenditure (Ths \$ 2008)	Output (Ths \$ 2008)	Earnings (Ths \$ 2008)	Employment (jobs)
Streetcar	\$ 78,755	\$ 137,301	\$ 32,038	772
TOD	\$ 87,928	\$ 159,660	\$ 39,761	1,034
TOTAL	\$166,683	\$296,961	\$71,799	1,806

A technical memorandum detailing methodology is available.

Table 6: Combined Economic Impacts on the State of Michigan

	Capital Expenditure (Ths \$ 2008)	Output (Ths \$ 2008)	Earnings (Ths \$ 2008)	Employment (jobs)
Streetcar	\$ 78,755	\$ 168,664	\$ 51,717	1,269
TOD	\$ 87,928	\$ 191,666	\$ 63,748	1,666
TOTAL	\$166,683	\$ 360,310	\$ 115,465	2,935

The primary measures to compare to the Streetcar cost are output and earnings. Table 7 shows the return on investment (ROI) when measured on the basis of economic impact divided by Streetcar cost.

Table 7: ROI Measures

MEASURE	Kent County	State of Michigan
Output / Streetcar Cost	3.77	4.58
Earnings / Streetcar Cost	0.91	1.47

The investment in the Streetcar generates sales among Kent County businesses at a rate of 3.77 to 1, (each \$1 of capital investment in the Streetcar generates \$3.77 in sales for Kent County businesses). The ratio increases to 4.58 to 1 for the larger economy of the State of Michigan. Each \$1 investment in the Streetcar produces \$0.91 in earnings for jobs located in Kent County and \$1.47 in earnings for jobs located in the State of Michigan. This can be roughly divided as \$0.91 in earning for jobs in Kent County and \$0.56 in earnings for jobs in the rest of the state.

To put this in perspective, recent work on other potential streetcar projects (in Washington, DC and Birmingham, Alabama) with cost estimates ranging from \$83 to \$463 million produced Earning-to-Streetcar-Cost ratios of 0.17 to 0.28. The ROI measures shown in Table 7 (previous page) indicate the Grand Rapids streetcar system would provide substantially higher benefits than these other city streetcar systems that have been recently studied.

It is instructive to test the projections of earnings for reasonableness. Past work has shown that the impact of rail transit is one percent or less on a mature economy. The May 2007 data released by the U.S. Department of Commerce place non-farm employment in Kent County at 418,961 in 2005 and private sector earnings of \$17.9 billion. With \$71.8 million in earnings attributable to Streetcar implementation and TOD construction the impact is 0.4 percent (4/10ths of 1 percent).

The creation of new jobs and earnings associated with implementation of the project and the resulting increases in income will foster greater retail spending. The State of Michigan taxes retail sales at a 6.0 percent rate. The additional revenues from this spending are recurring gains. Additionally, the wages earned during the project implementation time cycle are subject to state and local income tax. Business tax is a levy on gross receipts. Property tax revenues are estimated for the project implementation time period and extend from 2012 to 2021 for the property taxes generated from TOD.

Table 8 shows the estimated tax revenues for the Streetcar and TOD for the following state and local taxes.

- Retail sales tax
- Personal income tax
- Business tax
- Property tax

Table 8: Tax Revenue Attributable to Project Implementation (thousands 2008 \$)

REVENUE SOURCE	Michigan	Kent
Sales and use tax	\$ 1,668	
Personal income tax	\$ 2,367	\$ 491
Business tax	\$ 2,882	
Property tax		\$ 15,189
TOTAL REVENUE	\$ 6,917	\$ 15,680

The following bullet points present conclusions of the economic analysis.

- The combined impact of the Streetcar and transit oriented development generates \$72 million in earnings from jobs in Kent County, only slightly less than the capital cost of the project inclusive of contingencies.
- When the broader economy of the State of Michigan is considered the earnings impact increases to \$115 million exceeding project cost.
- Employment impacts for Kent County equate to 1806 jobs (FTE) and 2935 jobs (FTE) jobs for the State of Michigan.
- The economic analysis was conducted presuming a funding mix of contributions, naming rights and tax increment financing (TIF).
- \$388,000,000 in housing, office, retail, and hotel development would be expended from 2012 to 2021 in the one-quarter mile surrounding the proposed streetcar route.
- The Streetcar project is a strategic investment for the future growth of the metro area in that implementation:
 - Provides connections to major employment locations and attractions throughout the corridor
 - Provides access to major sports, entertainment and meeting venues
 - Uses a substantial amount of existing alignment while preserving road capacity
 - Decreases the need for parking, which enables an acceleration in adaptive reuse redevelopment activities
 - Provides a focal point for demonstrating the value of transit in the Grand Rapids region
 - The Streetcar combined with the future investment in a comprehensive transit system in the region increase modal choice options
 - Corridor investments provide the context for focused growth through Transit Oriented Development

Recommendations

Implementation of a streetcar system in downtown Grand Rapids would likely produce returns in the form of jobs and retail sales that outperform streetcar investments currently being studied in other cities. Projected job creation would be a benefit to the local and area economy. An electric streetcar system allows use of energy from renewable sources, which contributes to decreased foreign oil dependence. The streetcar system would also contribute toward improved air quality both directly as vehicles have no street-level emissions and indirectly as the system would promote a reduction in automobile travel.

A streetcar system would provide intangible benefits especially with regard to attracting talented knowledge workers and students to the Grand Rapids area. A streetcar system would also certainly contribute toward continued revitalization of the downtown area as a walkable city.

On May 22, 2008, the Task Force recommended the Feasibility Study to the Interurban Transit Partnership (ITP) Board. On June 25, 2008, the ITP Board recommended examination of next steps through the Strategic Planning Committee. Primary next steps included continued examination of funding sources and continued examination of the first alignment to ensure service to the core of the City.

Future Steps toward Implementation

If the decision is made to move forward toward implementation, next steps include:

Formation of an authority for the ownership of the streetcar system. Based on the experience of other streetcar systems, this authority is usually a non-profit corporation. This non-profit oversees the funding and construction of the initial system as well as future extensions. Ownership of assets and operation of the system are typically by the local transit agency since administration, fare collection, and most other required administrative support and personnel are already in place.

Project visualization. In order to convey the streetcar concept, station appearance, transit-oriented development features, and the overlap with the bus rapid transit system, an animated visualization could be developed. Other cities studying streetcar, such as Tucson, have developed such animations.

Capital funding. The streetcar authority will need to continue pursuit of capital funding options including private support and creation of a transportation improvement district as discussed in the financial plan.

Operating funds. Implementation of a funding mechanism will be required for the portion of operating funds not covered by State operating funds and by fares. The financial plan examines a \$0.25 surcharge (per weekday) on all public and private parking spaces surrounding the proposed streetcar alignment as one option to generate sufficient revenue to fill the operating funding gap.

Parking policy. The streetcar system may allow movement of some parking away from the core of downtown. Former parking areas would be replaced with development which provide employment and create destinations. Coordinated action including short, medium, and long range plans will allow orchestrated movement toward the vision for downtown Grand Rapids as a place which retains and attracts talented workers and students.

Transportation Improvement District. A Transportation Improvement District (TID) would generate revenue for application to the streetcar system by levying an assessment on benefiting property owners. Assessments can vary by property type (commercial versus residential) and assessments could vary based on the distance from the streetcar alignment. TID assessments can also be based on property values or can be a fixed amount per unit.

Local sale tax. In virtually every other state in the U.S., transit is funded through a small local sales tax. Steps required to allow this option in Michigan should be investigated. This action may be considered longer-term than other funding options.

Delivery method. Alternate delivery methods can be appropriate for streetcar implementation. Traditionally, most transportation projects use design-bid-build. Design-bid-build divides responsibility and places the risk with the owner. Streetcars are an integrated system. Placing the responsibility for vehicles, track, electric system, fare collection, and testing all with a single entity has benefits. Design-Build-Test-Train is an option whereby a single party is responsible for all elements other than system operation and maintenance.

Alignment refinement. Based on future public involvement, potential refinements in the alignment are possible. Refinements may also take place based on potential for reduction in capital cost and the time for the streetcar to cycle the route (which, in turn, may allow an improvement of service frequency). Finally, some refinements may improve the harmony between the streetcar system and walkable city planning initiatives currently underway within the City of Grand Rapids.