

# Five-Year Transit Plan

ADOPTED DECEMBER 7, 2017

For the Northern Arizona Intergovernmental Public Transportation Authority (NAIPTA), Mountain Line



# Table of Contents

**Executive Summary . . . . . 3**

Balancing Ridership and Coverage Goals . . . . . 4

    Focusing on Frequency . . . . . 4

Short-Term Network . . . . . 5

Permanent Transit Network . . . . . 6

A Future Funding Scenario . . . . . 7

**How We Got Here . . . . . 8**

Geographic Challenges. . . . . 9

Opportunities . . . . . 9

Access to Any Service, and Frequent Service . . . . . 9

Key Choice . . . . . 10

Conceptual Alternatives . . . . . 11

Public and Stakeholder Input. . . . . 12

    Web survey input . . . . . 12

    Stakeholder input. . . . . 14

Board Guidance . . . . . 15

**Short-Term Network . . . . . 16**

**Future Funding Scenario and Permanent Transit Network . . . . . 18**

    High Capacity Transit . . . . . 19

A Future Funding Scenario . . . . . 21

Future Funding . . . . . 22

Voter Support for Transit . . . . . 22

**Transit-Supportive Policies and Practices . . 23**

    Land Use and Development Planners . . . . . 24

    Street Designers and Managers. . . . . 25

    Developers and Site Planners. . . . . 27

    Transportation Demand Managers . . . . . 28

    Transit Service Operator (NAIPTA). . . . . 29

Key Infrastructure and Capital Projects . . . . . 30

    Signal Priority and Bus-Only Lanes . . . . . 30

    Moving the Downtown Connection Center . . . . . 30

    Lone Tree Overpass . . . . . 30

    Two-Way Beaver Street . . . . . 30

    East-West Connections through NAU Campus . . . . . 31

    Off-Board Fare Vending . . . . . 31

**Forecast Change and Growth . . . . . 32**

Possible Predicted Growth . . . . . 33

High-Occupancy Housing . . . . . 34

Extending Beulah Road. . . . . 35

Extending J.W. Powell Boulevard . . . . . 35

Northern Arizona University Enrollment Growth . . . . . 35

# 0

## Executive Summary

---

# Executive Summary

This report provides a Five-Year Transit Plan (the Plan) for NAIPTA’s Mountain Line fixed route bus service. It follows an earlier report that summarizes the existing conditions of transit and land use in Flagstaff, called the *Transit Choices Report*.

A key choice examined in this planning process was how NAIPTA should prioritize any future service investments, in particular whether they should be higher frequency service, longer spans of daily service, or coverage of new areas.

## Balancing Ridership and Coverage Goals

Most conversations about transit arrive, sooner or later, at a basic conflict between transit’s major goals: maximize ridership or provide coverage?

Maximizing ridership serves a number of values, such as:

- Making transit more convenient for potential riders.
- Reducing driving, and with it pollution, carbon emissions, noise, parking requirements, and reducing other negative impacts.
- Supporting compact urban development without an accompanying increase in auto traffic, congestion and parking demand.
- Reducing household transportation costs.
- Improving access to jobs.
- Reducing subsidy per passenger, since high ridership transit divides its operating costs over a larger number of passengers.

There are other goals for transit, that do not depend on high ridership:

- Providing access to transit to a large geographic area. (Access can be valuable whether or not many people ride the transit service.)
- Providing service close to those who pay for it (e.g. through taxes).
- Making sure that people with severe needs for transit (due to income, age or disability) have access, no matter where they live.

These two sets of goals can be thought of as “ridership goals” and “coverage goals.” Ridership goals are only achieved when ridership is high relative to cost. Coverage goals, on the other hand, are served through the presence and availability of transit, whether or not people ride it in large numbers.

It is important that we think clearly about the difference between ridership and coverage goals because, for simple mathematical reasons, they are in conflict. If a transit agency wants to do more of one, it must (within a fixed budget) do less of the other.

If the Mountain Line system were designed *only* for maximum ridership, it would focus only on areas where there are many potential riders, and transit is useful for many of their trips. In other words, NAIPTA would be targeting a market where its product is competitive.

Yet maximizing ridership is not the only goal of public transit systems. While private transit companies may focus on profits, and therefore on

exclusively high-ridership routes, public transit is almost always expected to meet other goals. In nearly every city, there is an expectation that transit service should cover some or all places regardless of the ridership it attracts.

Within a fixed budget, a trade-off is always present between concentrating service into routes that generate the highest ridership and spreading service out to cover more people and places.

### Focusing on Frequency

Public input guided a decision by the NAIPTA Board of Directors about how to balance ridership and coverage goals in this Plan. The Board directed staff to maintain all existing coverage, so that no one would lose access to the service they ride today. The Board also directed staff to focus any new future funding on increasing frequencies and increasing ridership.



# Executive Summary

## Short-Term Network

The Plan includes a Short-Term Network that is largely similar to the existing network, shown in the map at right in Figure 1. The operating cost of this network is estimated by NAIPTA staff to be a slight increase that is within NAIPTA’s budget forecast for coming years.

The recommended service changes for the short-term are:

- Increasing the frequency of Route 5 (to Cheshire) to every 30 minutes on weekdays, and sending it directly to downtown (not via Thorpe Park).
- Creating a new route that serves Thorpe Park.
- Serving West Hwy 66 with a route that goes to the Downtown Connection Center (DCC) in both directions (rather than westbound only, as it does today).
- Increasing the frequency of Route 7 (Sunnyside) to every 20 minutes on weekdays, and terminating it at the DCC in both directions.

Aside from the changes noted here, the frequencies and spans of service for Mountain Line routes would remain as they are today.

There is also the potential for Mountain Line to add service to new developments, along a future J.W. Powell road, to Woody Mountain, and to the airport. This will depend on the transit orientation of those future developments. NAIPTA will work with city partners to evaluate that future possibility.

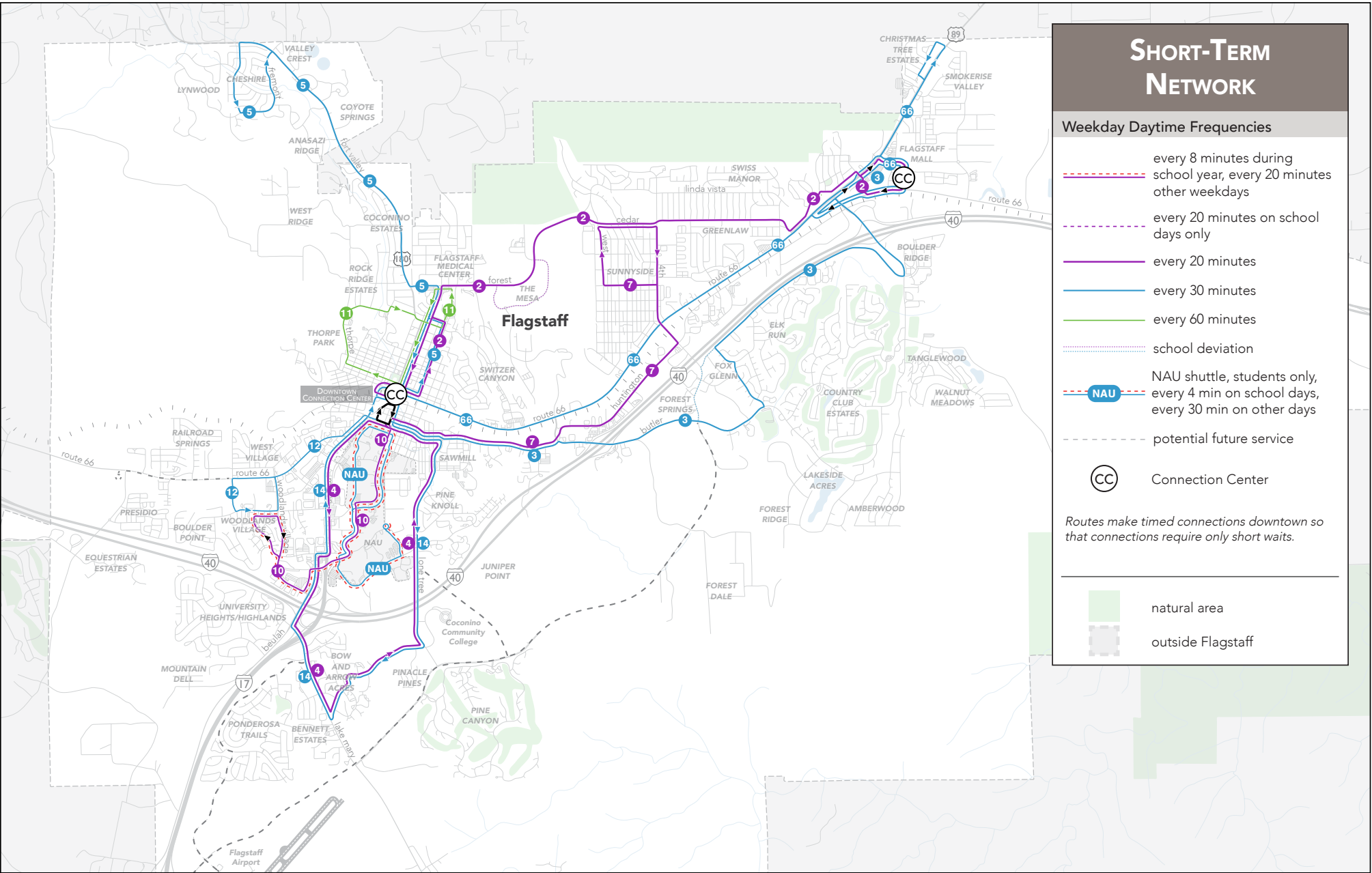


Figure 1: The Short-Term Network, which includes small changes to Routes 5 and 7.

12/14/2017

# Executive Summary

## Permanent Transit Network

As part of this Five-Year Plan, NAIPTA and its partners have identified a set of corridors on which the agency can make the strongest commitment to service. In the map at right, these corridors are highlighted in purple.

The Permanent Transit Network is NAIPTA’s contribution to the ongoing conversation among transit planners, land-use planners, developers and private organizations about how and where the city should have Transit Oriented Development. Development, street improvements and transit priority projects on these corridors will do the most to help NAIPTA deliver efficient and high-ridership service in the future.

A number of other organizations have a role to play in the success of the transit network, and are likely to find that their own transit-related goals are more successful once they take into account the Permanent Transit Network. These organizations will have an opportunity to refine their policies, practices and regulations now that NAIPTA has defined the Permanent Transit Network. These include:

The **City of Flagstaff**, whose land use and development regulations and review processes could be amended to encourage transit-supportive development along and near the permanent transit corridors.

Public works agencies, including both the **City of Flagstaff** and the **Arizona Department of Transportation**, whose decisions on road and street design determine how efficiently transit service can operate, and how easily people can access transit.

**Large institutions** like Northern Arizona University, who make large-scale development decisions, and can decide whether to orient new activities to the Permanent Transit Network. Large institutions also make decisions about how heavily to subsidize parking, which affects the relative attractiveness of transit.

**Real estate developers**, who can build projects that take advantage of transit, with the confidence that their investment is matched by a long-term public commitment to transit service on these corridors.

The **Flagstaff Metropolitan Planning Organization** (FMPO), which coordinates regional transportation and land use planning, and can use the Permanent Transit Network to focus transportation improvements and transit-oriented developments where they will have the greatest impact.

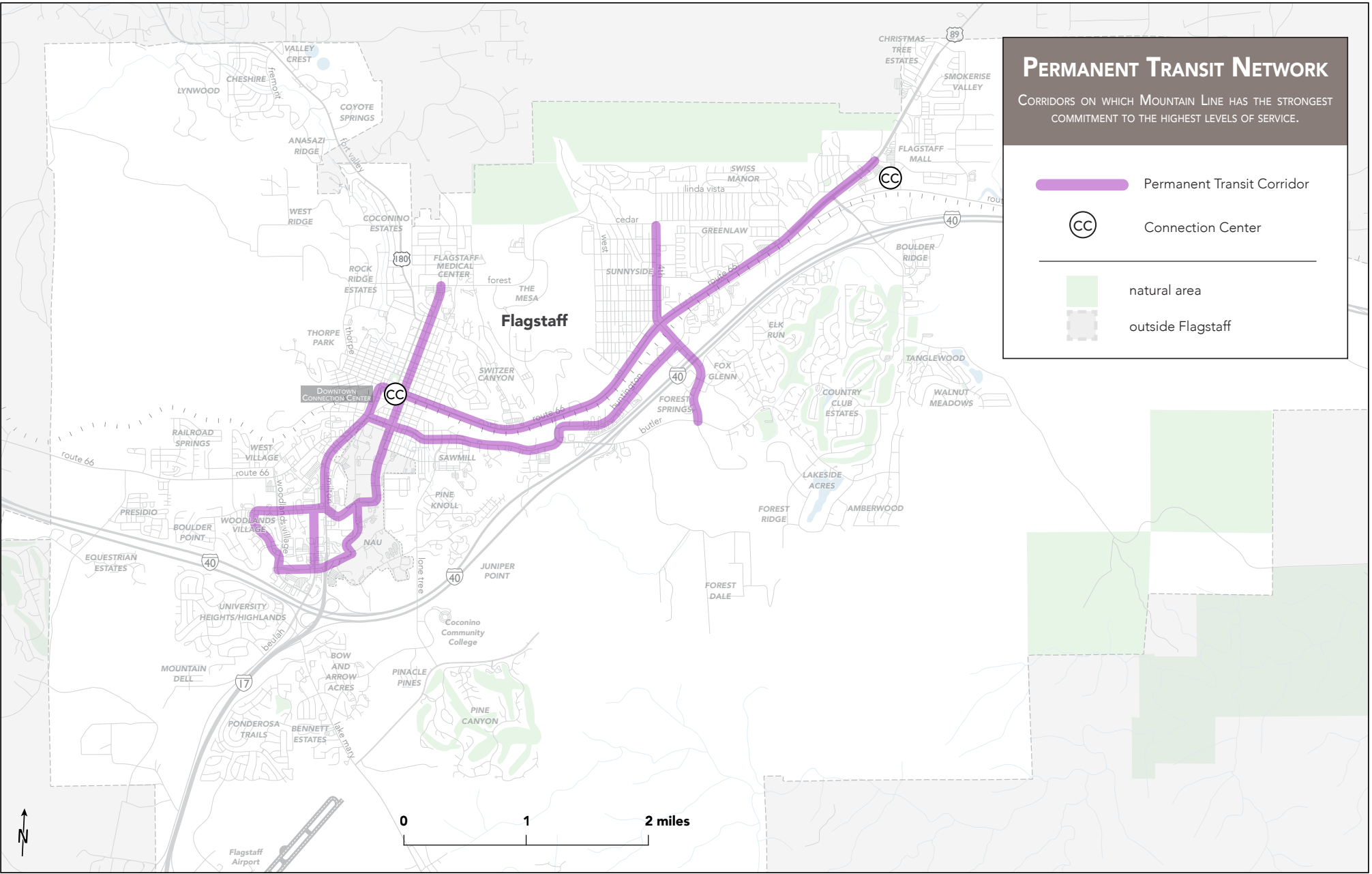


Figure 2: The Permanent Transit Network, a subset of transit corridors on which NAIPTA can make the strongest commitment to service. Public and private organizations in Flagstaff that want high frequency transit to be part of their plans should consider focusing on these corridors.

Some steps that these organizations could take to reflect the Permanent Transit Network in their own plans and activities are described starting on page 23.

# Executive Summary

## A Future Funding Scenario

With about 50% more operating funding for fixed routes, NAIPTA could offer longer spans of service and higher frequencies on many of its routes, especially on weekends, offering:

- Service earlier in the morning and later at night, lengthening the span of daily service by about 3 hours depending on the route.
- Longer hours of service on Friday and Saturday nights in particular.
- Higher frequencies on high ridership corridors.

NAIPTA would target these improvements to the Permanent Transit Network. While the exact assignment of higher frequencies and longer spans to individual routes will be decided at a later date, the map at right illustrates one possible version of a more frequent, future transit network.

If NAIPTA adds coverage to new areas, those areas may include:

- Woody Mountain (on West Highway 66).
- The Flagstaff Airport (via Ponderosa Trails)
- J.W. Powell Boulevard between the Airport and 4th Street.

Whether or not service is warranted in these new development areas will depend on whether the new development is transit-friendly. NAIPTA will work with city partners to evaluate this future possibility.

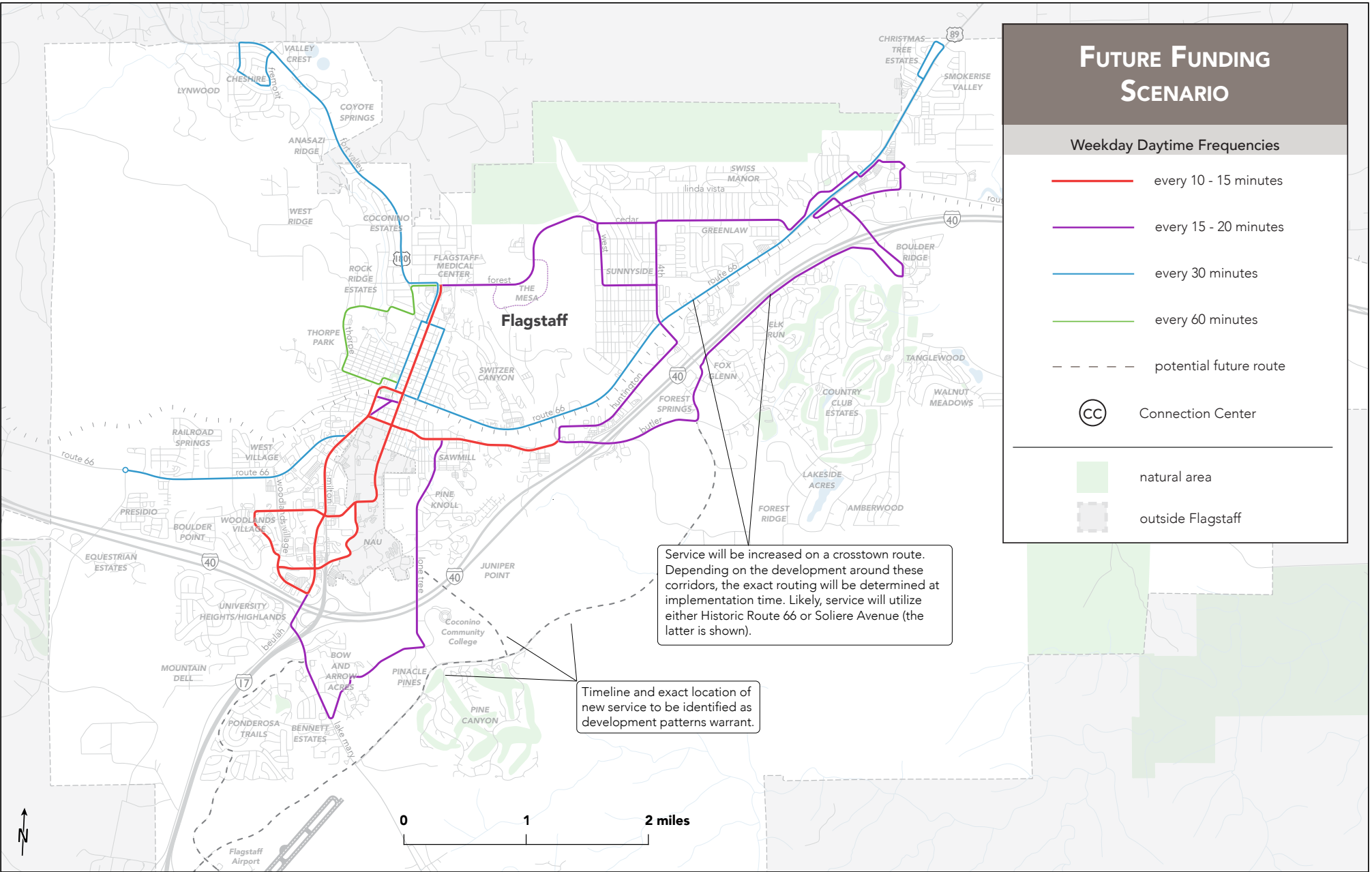


Figure 3: This Future Funding Scenario illustrates how an increase of 50% in NAIPTA's fixed-route transit operating budget could be used to increase weekday daytime frequencies on existing routes. (Hours of service each day could also be lengthened, especially on high-ridership and high-frequency routes.)

# 1

## How We Got Here

---



# How We Got Here

The Five-Year Plan process began with the publication of a *Transit Choices Report*. That report examined the existing conditions of transit and land use in Flagstaff; identified certain challenges and opportunities; and posed a key choice about the major goal of transit in Flagstaff.

## Geographic Challenges

- Flagstaff’s geography and development pattern present a few challenges to achieving high-ridership and cost-effective transit:
- Freeways and the railroad divide the city, and make it difficult for people to walk to transit service that may be nearby (as the crow flies). This has the effect of isolating some neighborhoods, and of increasing the cost of reaching them with transit service.
  - Hills, ridges and a street network that mostly goes around (rather than over) them also has the effect of isolating some neighborhoods, and increasing the walking, riding and driving distances between places that would otherwise be close.
  - The segregation of residential and commercial areas make average trip distances longer.
  - Non-connective street networks present a barrier and a discouragement to walking and biking, which affects transit access.
  - Abundant free and subsidized parking (on both private and public property) reduces the incentive to ride transit. (However, the recent launch of downtown paid parking will add an incentive to ride transit, walk or bike to downtown.)
  - Low-density residential development far from the center of the city makes it more expensive to get transit service close to many residents.
  - The current locations of Connection Centers (in Southside and at the Flagstaff Mall) are difficult and time consuming for transit vehicles to ingress and egress.

## Opportunities

- However, a couple of characteristics contribute to the success of existing transit and suggest potential for continued success:
- Downtown is a walkable, dense and vibrant place, and is also the place where roads and therefore transit routes naturally converge.

- This makes it easy to provide a lot of service in a place where a lot of people want to go anyway.
- Planned development close to downtown and on major commercial corridors will be close to existing transit routes, and will require no additional cost to serve.
  - NAU, like all large universities, generates a lot of transit ridership, and most of the campus is arranged in ways that make it possible to serve with cost-effective transit.
  - Mountain Line is a well-respected organization running a solid transit system, and is effective within its existing resources.
  - Flagstaff is a growing community, and recently-adopted and drafted growth plans will encourage a more transit-oriented, walkable pattern.

## Access to Any Service, and Frequent Service

Today, nearly 70% of jobs and about 55% of residents in the City of Flagstaff are near some kind of transit service (as shown in Figure 4). For a small U.S. city, this is a fairly high proportion.

However, all transit service is not the same, and most people do not have the time or patience to use a bus that isn’t coming soon. Measuring access to *frequent* service is a way to measure transit ridership potential, because frequent service is generally the most useful to the largest number of people.

Today, about 19% of jobs are close to frequent service, and 17% of residents are close to frequent service. A lower proportion of low-income residents are close to frequent service, which is common in U.S. cities today, and arises from the lack of affordable housing in walkable, transit-oriented areas.

Given NAIPTA’s ridership-related

goals, a key area of focus should be increasing the usefulness of Mountain Line routes for the largest number of people possible. This would result in larger proportions of residents and jobs being close to service that runs frequently, for most hours of the day and week.

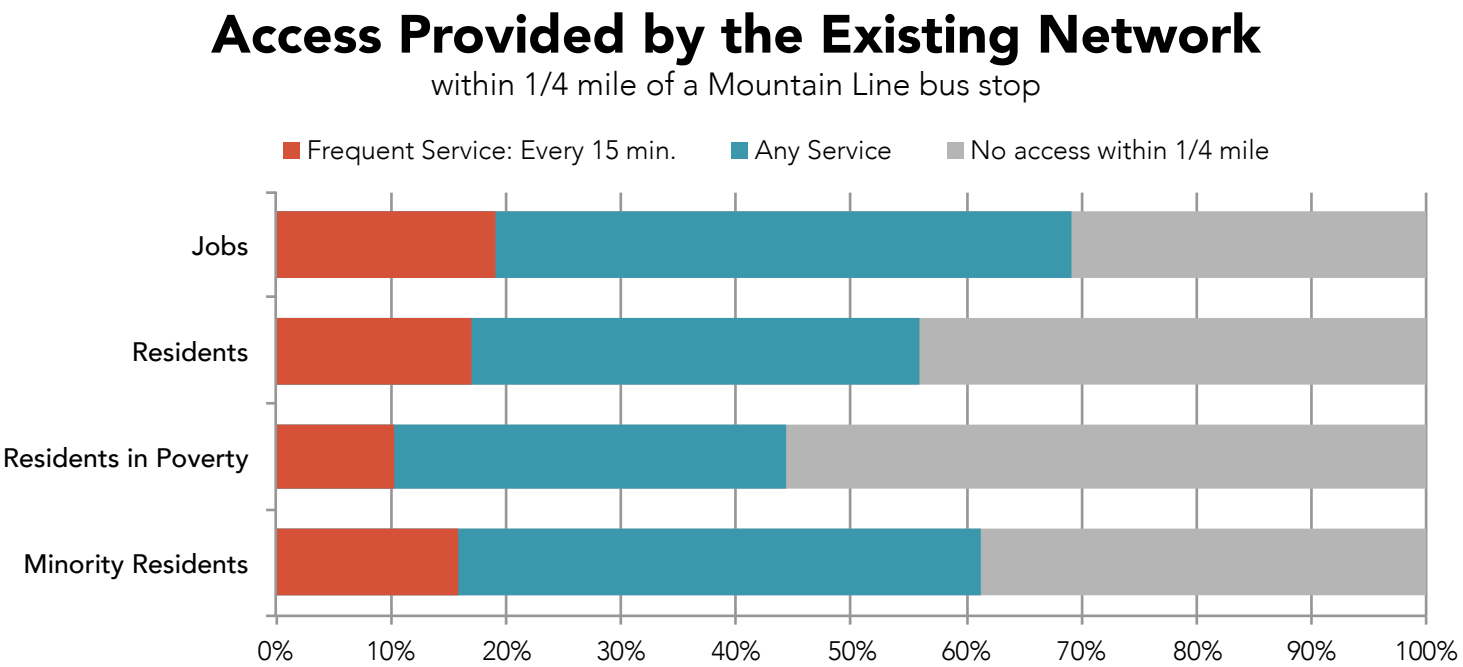


Figure 4: This graph summarizes the proportion of residents who have access to any service at all (in blue) and frequent service (in red).

# How We Got Here

## Key Choice

Increasing the proportion of residents and jobs near frequent service would be a sure way to increase ridership in Flagstaff. Yet in every transit network, there is a basic trade-off between concentrating service into higher frequency routes and spreading service out to provide wider geographic coverage within a fixed budget. This trade-off is illustrated in the diagram at right, in Figure 5.

NAIPTA heard from its stakeholders and partners in this process that it should be providing shorter waits and longer hours of service, and that it should be covering new neighborhoods. Yet, without substantial new funding, it is not possible to do both of these things. In fact, shifting investment towards one requires shifting away from the other. However, when additional revenues for transit become available, the trade-off is much less stark, because frequencies can be increased without reducing geographic coverage, or vice versa.

In order to help people imagine the impacts of such shifts in policy, the planning team designed a pair of Conceptual Alternatives, both limited to the existing transit budget. These Alternatives are shown on the next two pages (and are described in detail at the end of the *Transit Choices Report*).

This key choice was presented to the public, to stakeholders and to the NAIPTA Board in the spring of 2017. The Board was asked whether to:

- Maintain the existing system,
- Decrease the number of routes, but increase their frequencies,
- Increase the areas served within city limits, but decrease the frequencies of many routes, or
- Increase both frequencies and coverage (but this would require additional funding).

The Board directed staff to maintain the existing coverage of the city, and as additional incremental funding is received to spend that funding mostly on increasing route frequencies.

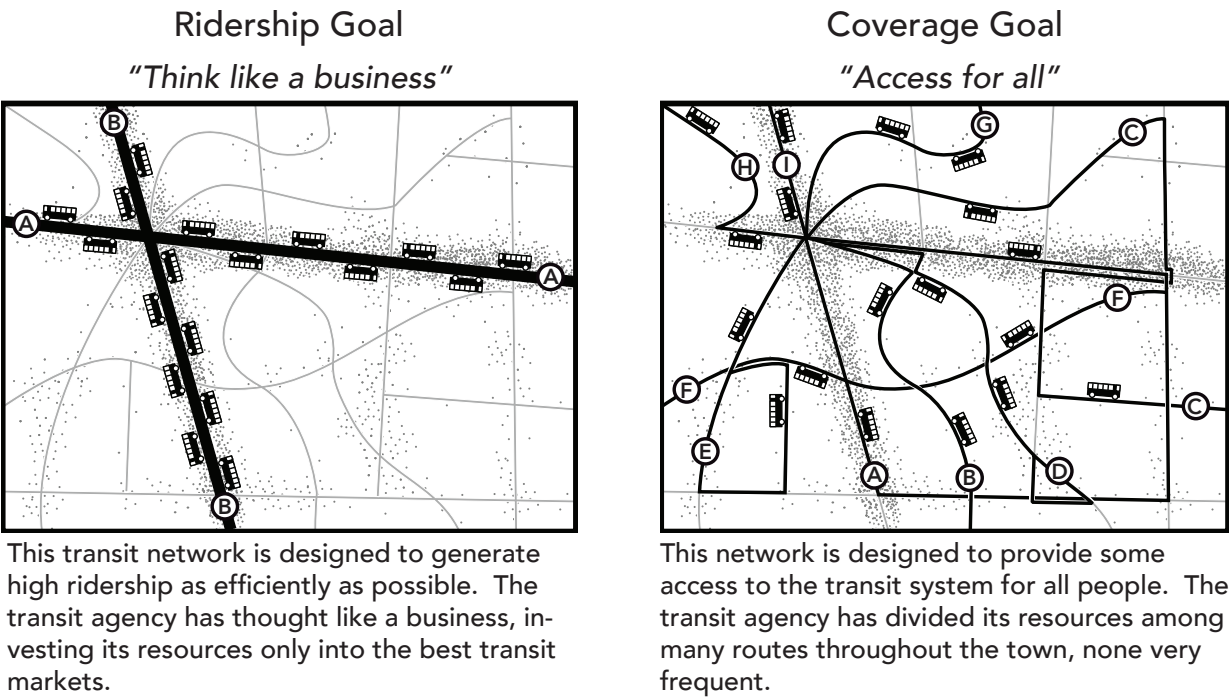


Figure 5: Illustration of the Ridership / Coverage Trade-off

# How We Got Here

## Conceptual Alternatives

The maps on this page (in Figure 6) and the next (in Figure 7) were created to illustrate how the existing Mountain Line budget could be spent towards different transit goals:

- Achieving higher “ridership” by concentrating service into fewer routes with high frequencies, in places where demand is high and people are numerous. (A map of this Alternative is shown at right.)
- Achieving high geographic “coverage,” by spreading service out into more routes and longer routes, with lower frequencies. (A map of this Alternative is shown on the following page.)

Neither of these Alternatives would be technically “better” for Flagstaff. The question posed to the community in this process was which of these Alternatives came closer to meeting their goals and values, how NAIPTA should balance these competing goals, and how future funding should be invested.

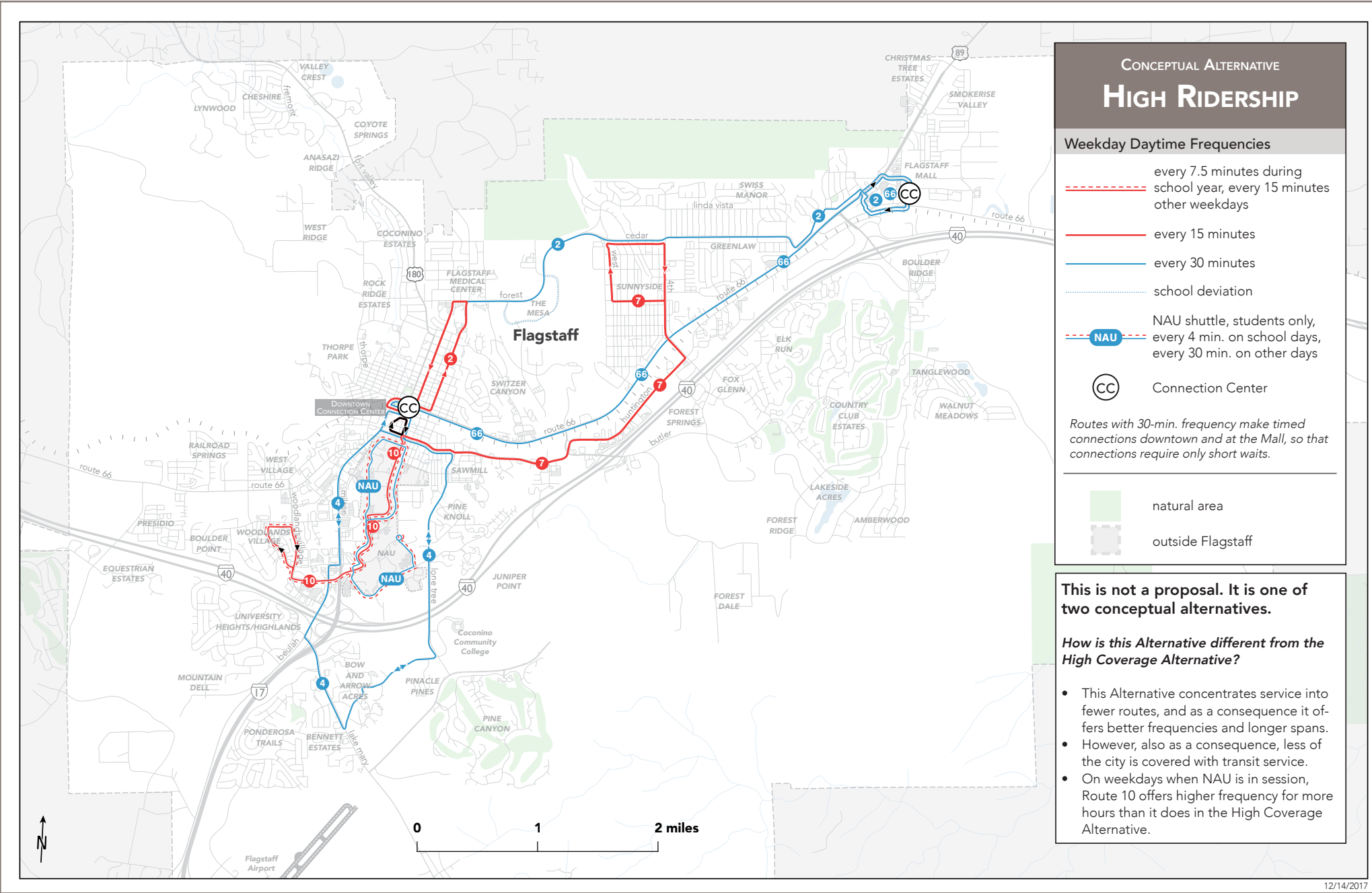


Figure 6: The High Frequency (High Ridership) Conceptual Alternative.



# How We Got Here

## Public and Stakeholder Input

Public input was gathered through a web survey (which was also administered in-person at events) and at an intensive stakeholder workshop.

### Web survey input

Four hundred and twenty-nine people living within the City of Flagstaff<sup>1</sup> completed the survey. Of these people, 224 reported using either a Mountain Line or NAU Shuttle route recently.

The 429 City residents who took the web survey tended to prefer:

- Shorter waits for transit.
- Maintaining existing coverage of the City, and adding new coverage.
- Higher frequencies and longer spans of service.

On average, this group of people expressed a very strong preference for high frequency service, and a willingness to walk further to reach it:

- 31% said they would definitely prefer to walk farther if to get a shorter wait for the bus.
- 15% said they would mostly prefer to walk farther, to get a shorter wait.
- Another 22% said they would prefer to do whatever gets them to their destination fastest (including walking farther to get a shorter wait).

In total, 68% of respondents expressed a preference for short waits and a tolerance for longer walks.

The survey also asked a much more abstract question, about how NAIPTA can balance high frequency service and wide coverage within its existing fixed budget. Respondents were shown the maps of the Conceptual Alternatives (on this and the previous page) and asked which would come closer to meeting their own values for transit.

In response to this abstract question, more respondents expressed a preference for maintaining Mountain Line’s existing wide coverage of its service area and even adding some additional coverage with new routes.

Input on key questions posed in the web survey is summarized in the charts on the following pages.

<sup>1</sup> It is likely that a handful of responses included in this dataset are from people who do not live within City boundaries, but live in a Traffic Analysis Zone (used to identify home locations) that is mostly within the city.

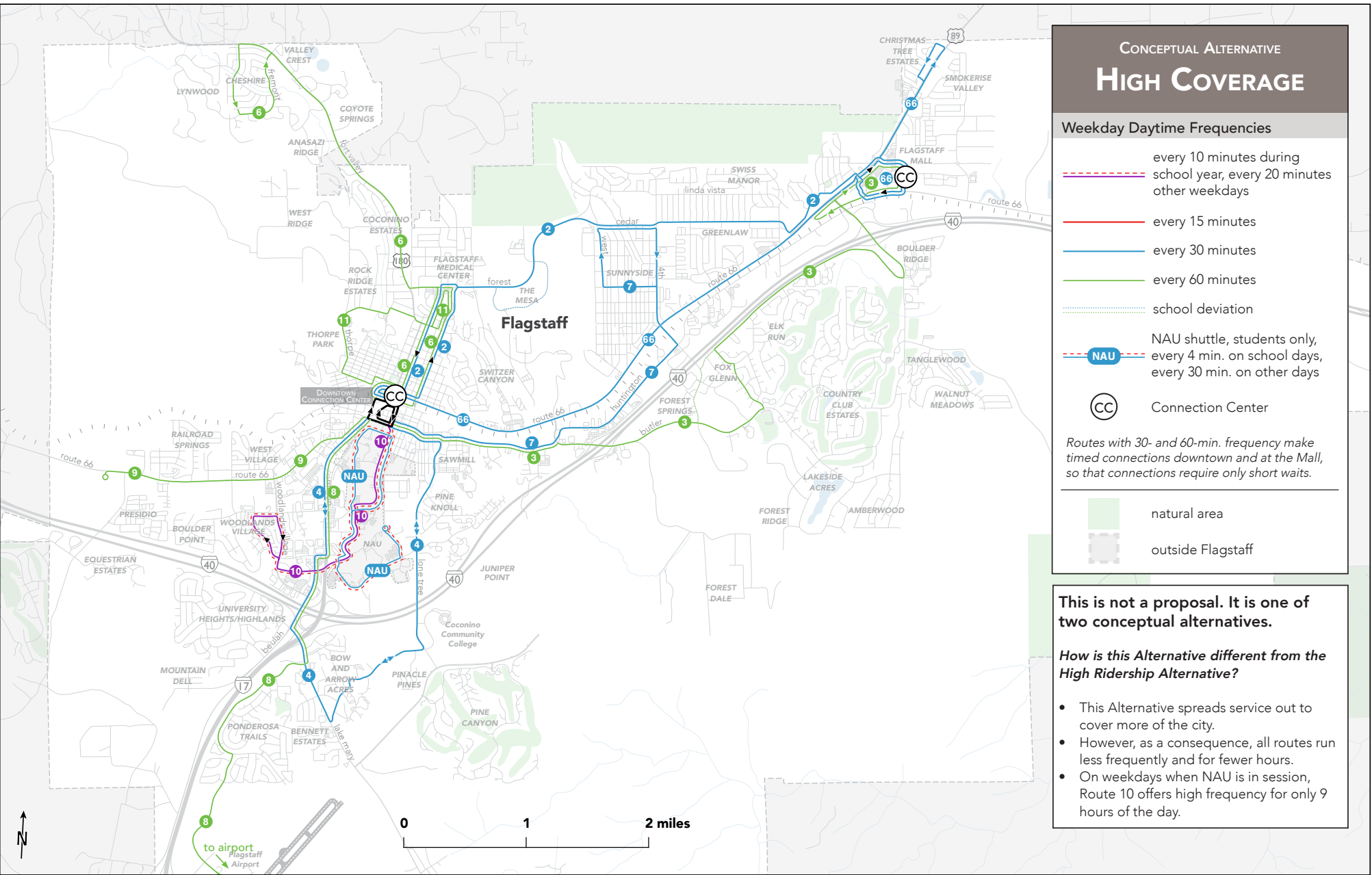


Figure 7: The High Coverage Conceptual Alternative.



# How We Got Here

While the bulk of responses to the web survey came from people living in the City (and those are the responses summarized in the charts at right), a number of people living outside of the city also took the survey. Kachina Village, Mountainaire and Doney Park were particularly well represented.

The 81 residents of non-city areas who took the survey were much more likely to prefer wide geographic coverage over high frequency and high ridership. This is understandable, since those areas do not have transit service today, and only through a large increase in geographic coverage would Mountain Line service reach those places.

Taken in combination, City residents’ preferences for short waits for transit for themselves (shown at top in Figure 8) but high coverage of the city (shown at bottom in Figure 8) suggests that there is support for increases in both frequency and coverage.

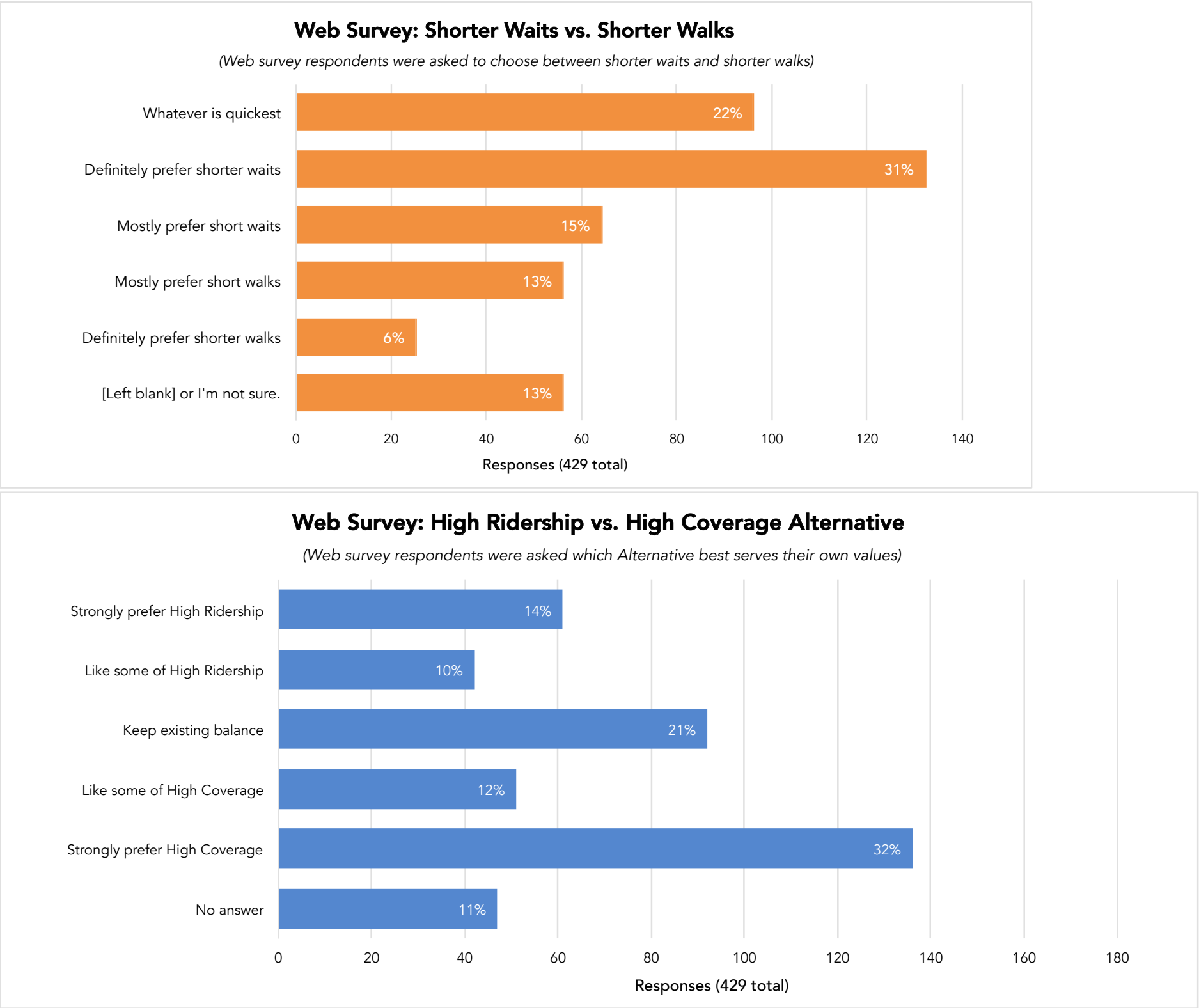


Figure 8: In the web survey, people were asked the concrete question of whether they would prefer to get a shorter wait for a bus (even if it meant walking farther), or a shorter walk to a bus (even if it meant a longer wait). Most people preferred shorter waits or doing whatever is quickest, as shown at top. When asked to make a more abstract choice between a high ridership (high frequency) network, and a high coverage network, more people expressed support for high coverage.

# How We Got Here

## Stakeholder input

A group of key stakeholders was recruited to an all-day Saturday workshop, where they went through a transit training and then gave input on key choices. Their responses were similar to those collected in the web survey, as they tended to prefer:

- Walking over waiting.
- Wider geographic coverage, rather than shifting the transit budget to provide higher frequencies.
- The group was also asked whether weekend service was so important that existing weekday service should be cut to pay for it, and most said “No.”
- Finally, the group was asked whether they would want more transit service in Flagstaff, in total, even if it meant paying more taxes, and the great majority said “Definitely” or “Maybe.”

Charts summarizing the stakeholders’ responses at the workshop are shown at right in Figure 9.

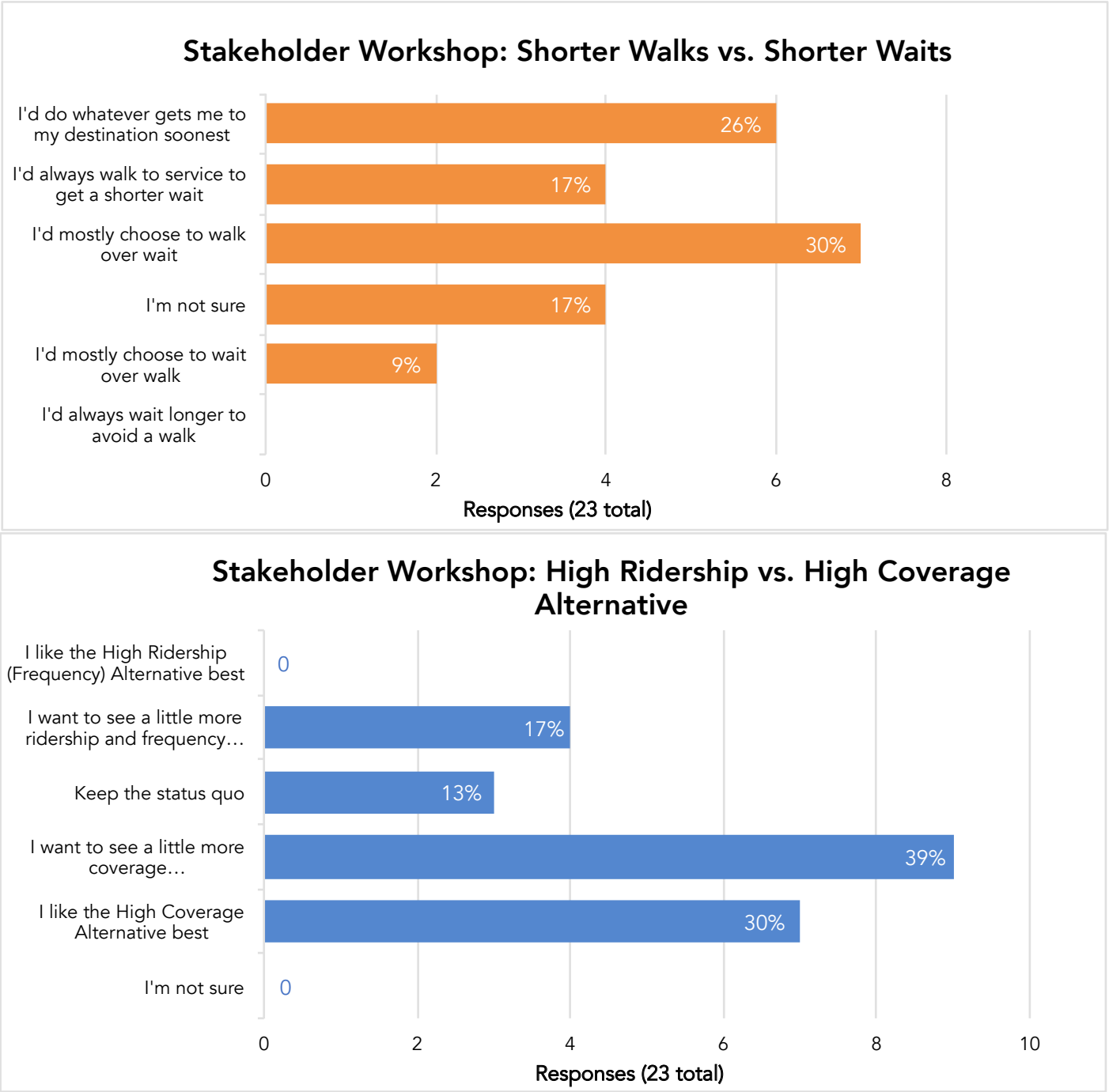


Figure 9: Among stakeholders polled at the workshop, their answers to the concrete question of walking farther vs. waiting longer were mostly that they would prefer to walk farther (shown at top). Similar to web survey respondents, stakeholders still preferred wide coverage of the city (at bottom).

# How We Got Here

Stakeholders at the workshop had a discussion about the value of weekend and evening service, and whether Flagstaff should have later service at night, especially on weekends. When asked whether it is so valuable that it would be worth redistributing existing service to run more at night and on weekends, most people said, “I’m not sure” or “No” (as shown in the chart at right).

After a discussion about the total quantity of service in Flagstaff, and the desires for higher frequencies, wider coverage, later night and more weekend service, the group was asked whether they would want NAIPTA to provide more service in total, even if it meant paying higher taxes. As shown in the chart at right, bottom, most said, “Definitely” or “Maybe.”

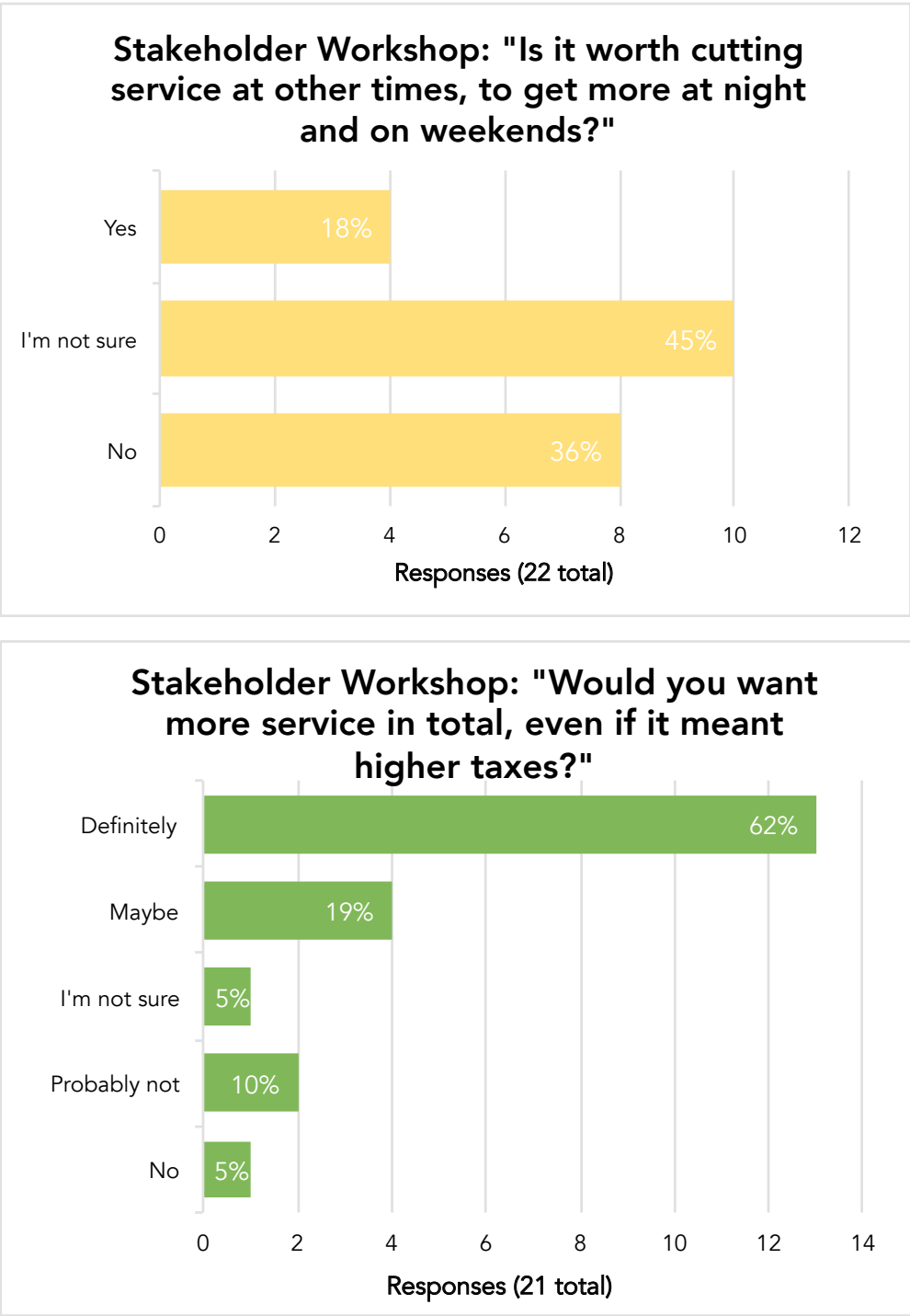


Figure 10: Charts summarizing stakeholder responses to questions about weekend service (at top) and the total quantity of service in Flagstaff (at bottom).

## Board Guidance

The NAIPTA Board of Directors provided guidance for this Five-Year Transit Plan, with respect to the key choices identified in the first part of the planning process.

The Board considered the public and stakeholder input summarized in this chapter, other adopted NAIPTA goals, funding constraints and operating constraints.

Input from riders, stakeholders and the public indicated that people value both high frequency service and coverage for all parts of the city, and that cutting coverage to concentrate service into fewer, more frequent routes would not be supported by the community. Yet, many adopted planning goals depend on achieving higher transit ridership. For example, reducing greenhouse gas emissions, increasing transportation energy efficiency, and achieving walkable compact development would all be aided by more frequent transit service that attracts more riders.

In addition, some of NAIPTA’s funding for transit service is granted based on ridership. Thus, high ridership is key to the future growth and long-term sustainability of Mountain Line.

The way that NAIPTA can increase transit ridership while still providing the high degree of coverage valued by the public is to focus future investments on higher frequencies and longer hours of operation, but to maintain all existing geographic coverage within the existing budget.

Thus, the Board directed NAIPTA to:

- Plan, in the short term, to maintain the existing transit coverage of the city. While increases in frequency and span are desirable, coverage should not be cut to make them possible, in keeping with public and stakeholder input.
- If new funding becomes available in the future, focus that new service into higher frequencies and longer spans in ways that are likely to increase NAIPTA’s ridership relative to costs. In addition, this will provide the shorter waits for service that are valued by the public and stakeholders.

This high-level policy guides the Short-Term Network, the Higher Funding Scenario and the Permanent Transit Network, all described in the following chapters.

# 2

## Short-Term Network

---

# Short-Term Network

The map at right (in Figure 11) shows a Short-Term Network that NAIPTA staff estimate would cost only slightly more than NAIPTA's budget forecast for coming years. This network is nearly identical to the existing transit network, with a few exceptions:

- Route 5 would be split into two separate routes.
  - ▶ One would serve Cheshire, as it does today; travel down Fort Valley Road; pass the Medical Center; and deliver riders to downtown and the Downtown Connection Center via Beaver and San Francisco streets. Because this route would be shorter than the existing Route 5, NAIPTA staff estimate that it can run at a higher frequency (every 30-minutes) during weekday daytimes. This would be called Route 5.
  - ▶ Another route would serve Thorpe Park, at the same frequency as today.
- Route 7 would no longer continue west, past the Downtown Connection Center. Instead, the western segment of that route would be served with a new Route 12.
  - ▶ The frequency of Route 12 would be the same as is provided today. Route 12 would offer two-way service to the Downtown Connection Center (instead of westbound-only service, as happens today).
  - ▶ Because Route 7 would become shorter, NAIPTA staff estimate that it can be run at a slightly higher frequency, with buses coming every 20 minutes during weekday daytimes.

No bus stop that is served today would lose service as a result of these changes, though some people may experience changes to their itinerary for some trips.

Aside from the changes noted here, the frequencies and spans of service of Mountain Line routes would remain as they are today.

There is also the potential for Mountain Line to add service to new developments, along a future J.W. Powell Road, to Woody Mountain, and to the airport. This will depend on the transit orientation of those future developments. NAIPTA will work with city partners to evaluate that possibility in the future.

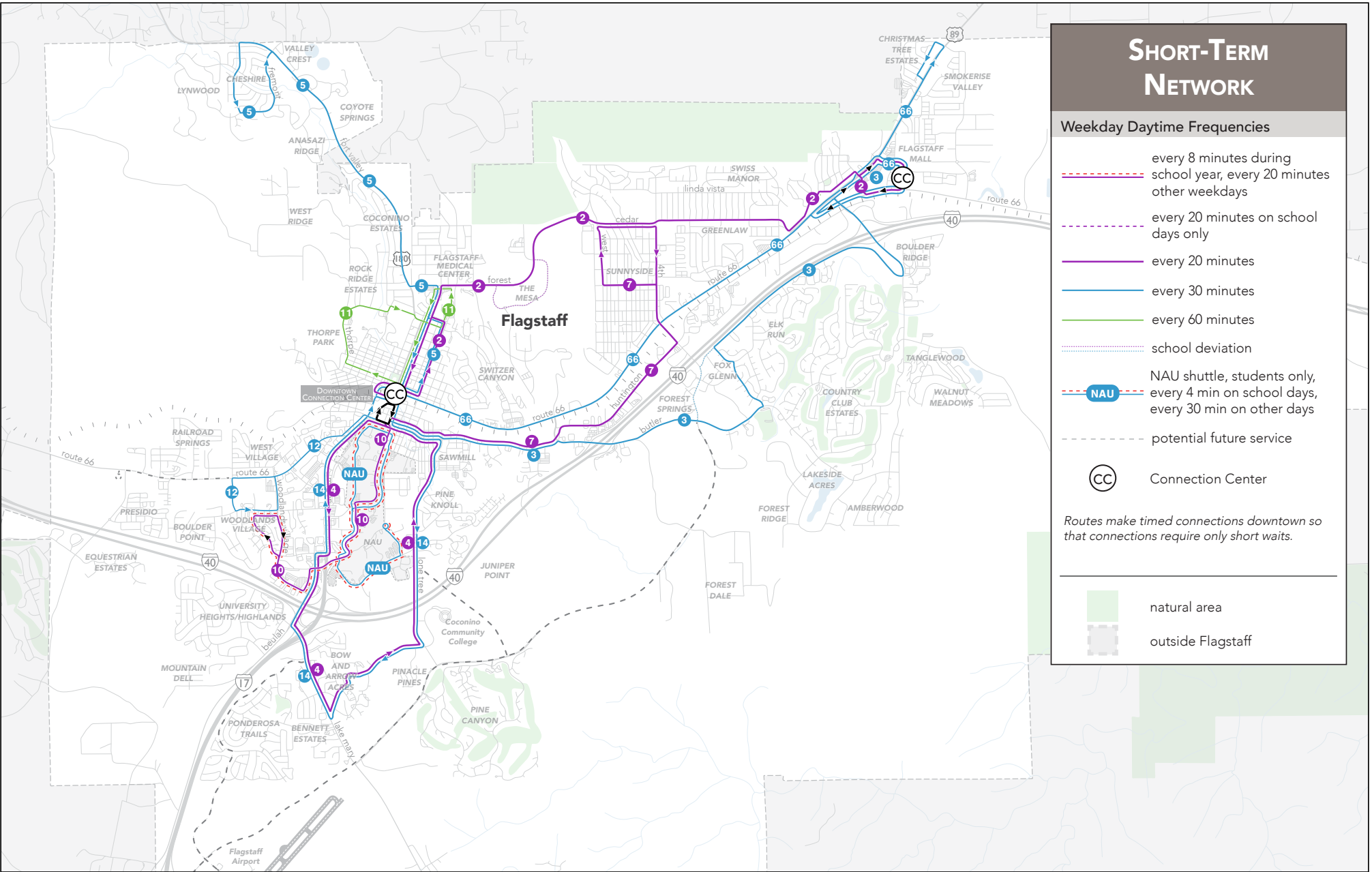


Figure 11: The Short-Term Network, which includes minor changes to existing Routes 5 and 7.

# 3

## **Future Funding Scenario and Permanent Transit Network**

---



# Future Funding Scenario and Permanent Transit Network

As part of this Five-Year Plan, NAIPTA and its partners have identified a set of corridors on which the agency can make the strongest commitment to service and along which infrastructure improvements will be most valuable. In the map at right (Figure 12), these corridors are highlighted in purple.

NAIPTA will continue to run transit service on many more roads than the ones that are included in the Permanent Transit Network. The purpose of the Permanent Transit Network is not to limit service to certain corridors, but rather to focus development and infrastructure investment, and to organize growth around permanently useful transit.

A number of other organizations have a role to play in the success of the transit network, and are likely to find that their own transit-related goals are more successful once they take into account the Permanent Transit Network. These include:

The **City of Flagstaff and the Flagstaff Metropolitan Planning Organization (FMPO)**, whose land use plans, Regional Plan, development regulations and development review processes could be amended to encourage transit-supportive development along and near the permanent transit corridors.

Public works agencies, including the **City of Flagstaff and the Arizona Department of Transportation**, whose decisions on road and street design determine how well transit service can operate, and how much pedestrian access is afforded.

**Northern Arizona University and Coconino Community College**, which make development decisions on campus, and can decide to locate any expansions along and near the designated corridors. Large institutions also make decisions about how to subsidize parking or transit passes, which affects the relative attractiveness of transit.

**Private real estate developers**, who can build projects that take advantage of transit, with the understanding that their investment is matched by a long-term public commitment to service on these corridors.

**Large institutions** and all of the above-mentioned agencies, who have the power to set up Transportation Demand Management (TDM) programs, to manage demand for scarce roadway space. TDM programs can provide incentives to use transit, or help fill in the gaps where transit is not the best tool.

## High Capacity Transit

The spine of Mountain Line’s planned high-capacity transit line is included in this network, from the Flagstaff Medical Center to

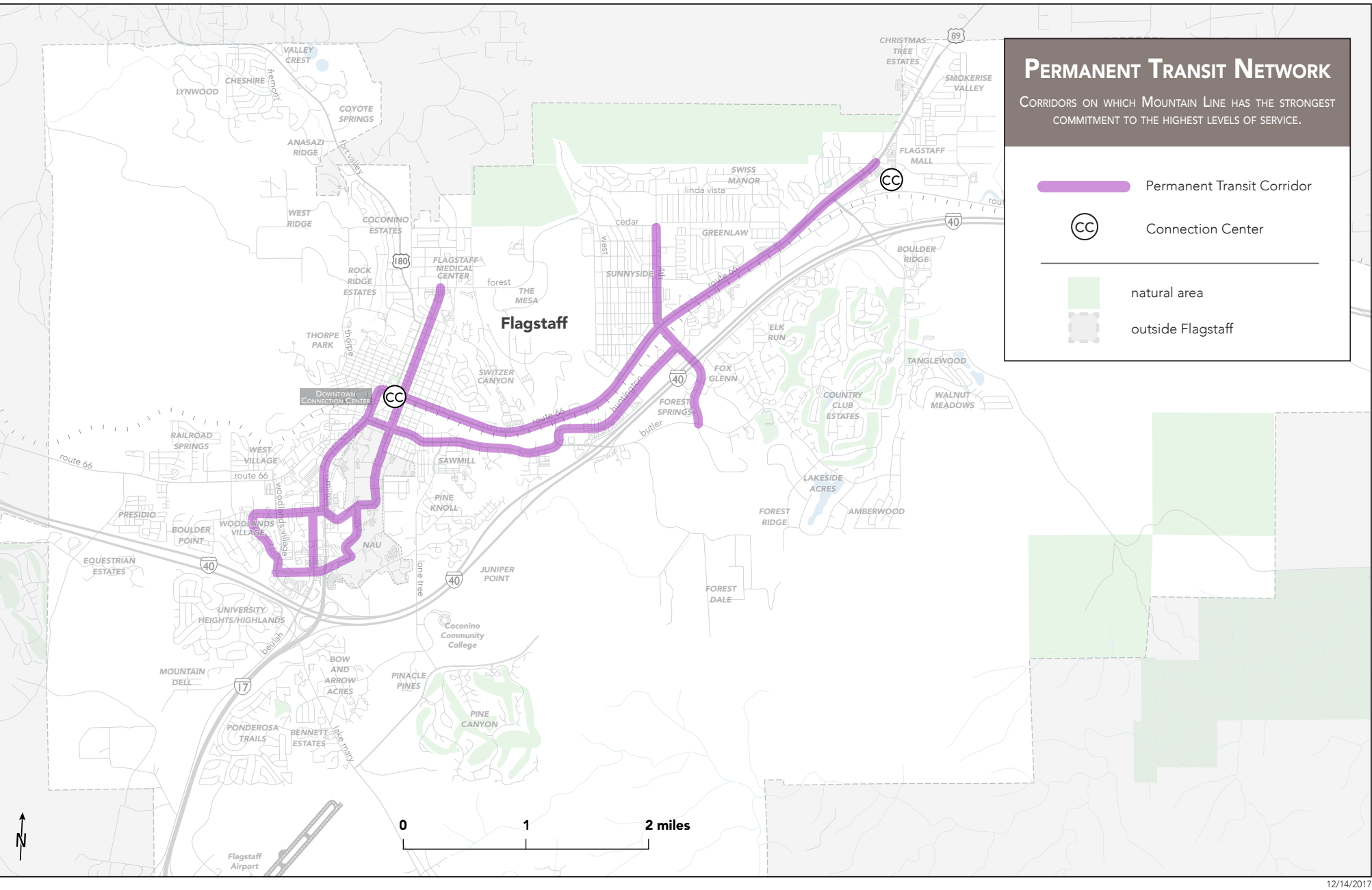


Figure 12: The Permanent Transit Network, a subset of transit corridors on which NAIPTA can make the strongest commitment to service.

Woodlands Village.

The capital investments made in high-capacity transit lines can help to speed up the transit service (making it possible to offer higher frequencies at lower cost), improve the rider experience, and improve access to bus stops. In Flagstaff, capital investments along the spine may include transit priority lanes, transit signal improvements, pedestrian crossings, enhanced transit stops and streetscape improvements.

The high frequency and long hours of service that are typically provided on high-capacity transit make the transit very useful, which increases the development and activity that can happen along it.

High-capacity transit is not the only way to organize transit-oriented developments. Another way is to work with partner agencies to identify and reinforce a Permanent Transit Network that includes high-capacity transit as well as other high-ridership lines, like the Network pictured above.

# Future Funding Scenario and Permanent Transit Network

The planning team, NAIPTA staff and partners from other public agencies worked together to identify this Permanent Transit Network. Consideration was given to:

- Existing transit ridership and productivity (described in the *Transit Choices Report*).
- Existing development and demand (also described in the *Transit Choices Report*).
- Forecast or planned future development.

Land use and street design decisions can increase or limit transit ridership potential through density, walkability, linearity and proximity. The illustrations at right (in Figure 13) summarize these effects. Most of these factors are not under the purview of NAIPTA, but instead are decided by the Flagstaff City Council, the Flagstaff MPO, Coconino County, and private developers.

The Permanent Transit Network is made up of the corridors on which all four of these factors are in effect, and the road segments along which a transit route would need to travel in order to connect those corridors. The corridors are far enough from one another that transit services running on them do not compete for the same ridership market.

The Permanent Transit Network corridors are:

- A north-south corridor connecting downtown, Milton and Beulah Roads.
- A north-south street between downtown and the Flagstaff Medical Center (e.g. Beaver).
- Butler Avenue and Huntington Drive between downtown and 4th Street.
- 4th Street between Butler Avenue and Cedar Avenue.
- University Avenue and McConnell Drive between Northern Arizona University (NAU) and Woodlands Village.
- Woodlands Village Boulevard between McConnell Drive and University Avenue.
- Historic Highway 66, between downtown and the Flagstaff Mall.

Keep in mind that the density, walkability and ridership along a corridor are not by themselves sufficient to warrant inclusion in the Permanent Transit Network. Transit operating cost is an essential consideration, because it affects NAIPTA's ability to maintain service levels through

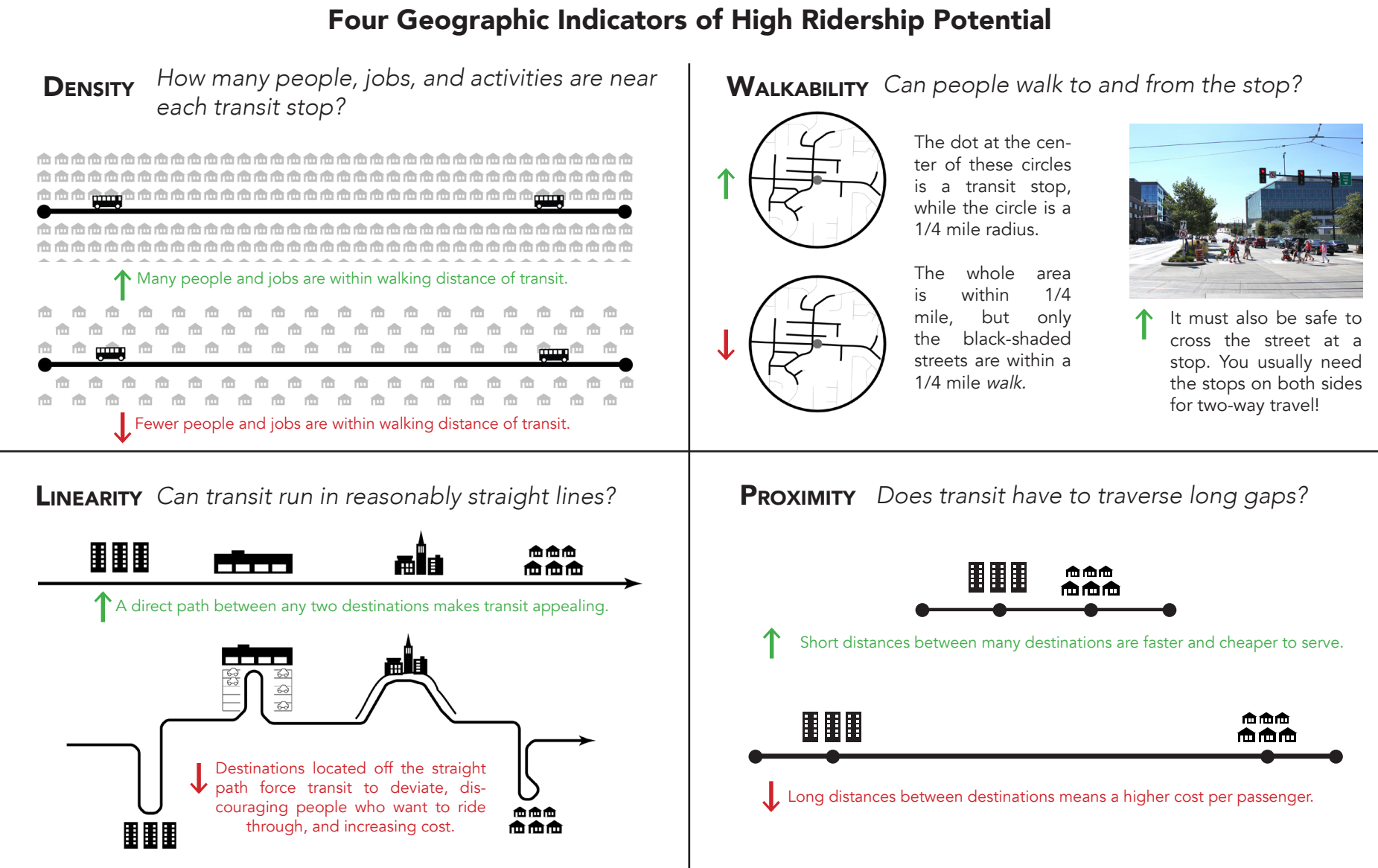


Figure 13: The Ridership Recipe describes land-use and urban design factors that have huge influence over transit's usefulness and transit operating cost, and therefore transit ridership.

unknowable future financial cycles. Longer routes are more expensive to operate, so proximity and linearity have a huge effect on operating cost. Operating cost affects the frequency of service that can be provided on a route, which in turn affects the route's potential ridership.

Dense, high-ridership areas that are far from the rest of the Mountain Line network are therefore harder to justify including in the Permanent Transit Network than are nearby areas, especially areas that are "on the way" between the city's major activity centers. The Permanent Transit Network reflects a synthesis of these ridership and cost considerations.



# Future Funding Scenario and Permanent Transit Network

## A Future Funding Scenario

With about 50% more operating funding for fixed routes, NAIPTA could offer longer spans of service and higher frequencies on many of its routes, especially on weekends, offering:

- Service earlier in the morning and later at night, lengthening the span of daily service by about 3 hours depending on the route.
- Longer hours of service on Friday and Saturday nights in particular.
- Higher frequencies on high ridership corridors.

NAIPTA would target these improvements to the Permanent Transit Network, as described on the previous page. While the exact assignment of higher frequencies and longer hours of service to individual routes will be decided at a later date, the map at right illustrates one possible version of a more frequent, future transit network.

If NAIPTA adds coverage to new areas, those areas may include:

- Woody Mountain (on West Highway 66).
- The Flagstaff Airport (via Ponderosa Trails)
- J.W. Powell Boulevard between the Airport and 4th Street.

Whether or not service is warranted in these new development areas will depend on whether the new development is transit-friendly. NAIPTA will work with city partners to evaluate this future possibility.

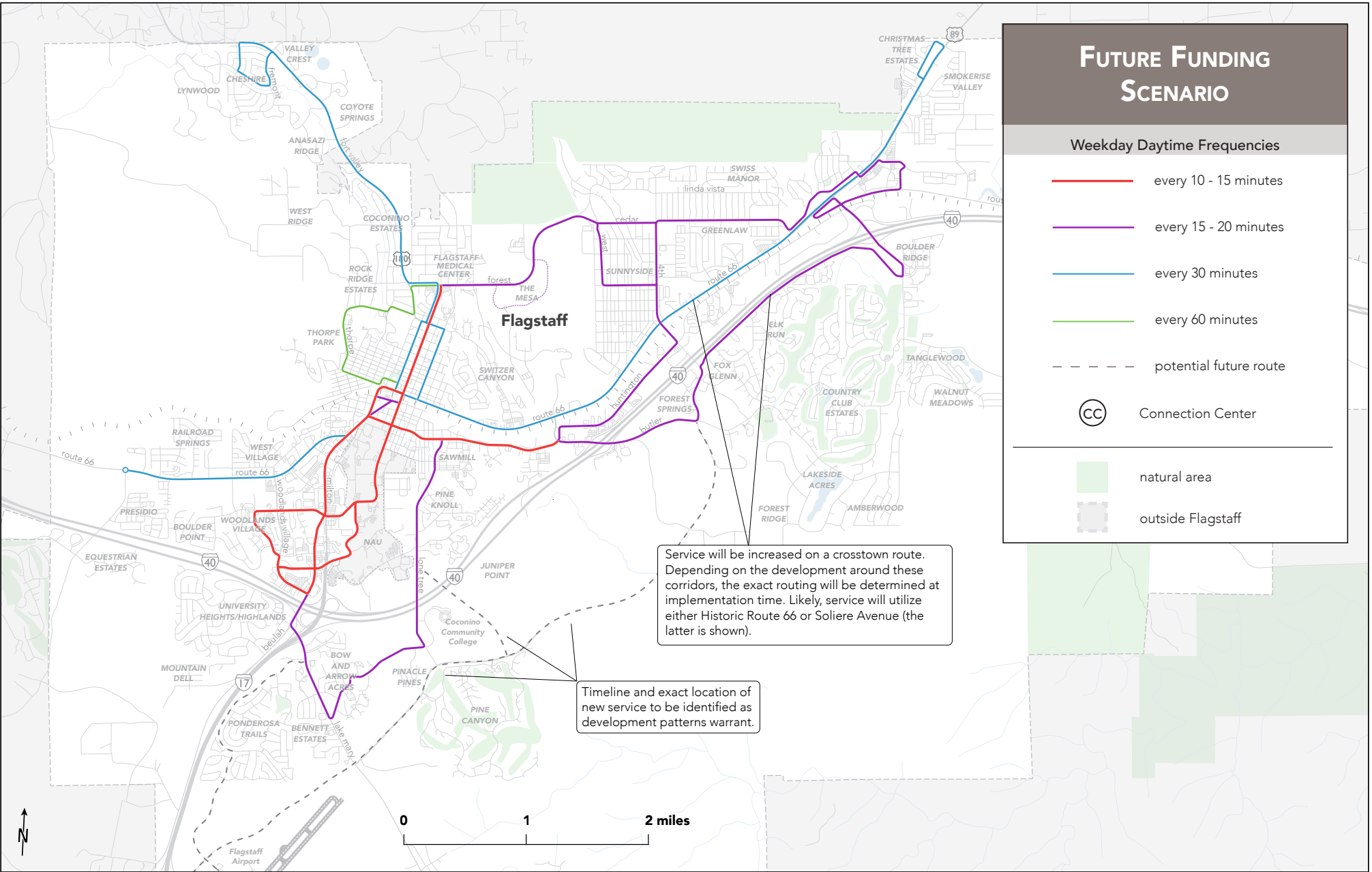


Figure 14: This Future Funding Scenario illustrates how an increase of 50% in NAIPTA's fixed-route transit operating budget could be used to increase weekday daytime frequencies on existing routes. (Hours of service each day could also be lengthened, especially on high-ridership and high-frequency routes.)

# Future Funding Scenario and Permanent Transit Network

## Future Funding

The City of Flagstaff is evaluating the next twenty-year transportation sales tax initiative. NAIPTA is working with the Citizens’ Tax Commission to evaluate the possibility of including a transit component in a potential 2018 ballot measure.

Aside from that potential source for funding, a number of other sources could be considered:

- New and additional partnerships with private and public institutions, such as NAU, Coconino Community College, developers and major employers.
- Property taxes.
- A state-wide dedicated funding source for transit.
- Local improvement districts. (Arizona is one of two states remaining that do not allow local improvement districts, though this prohibition may someday be overturned.)
- Development impact fees.

## Voter Support for Transit

In the fall of 2017, NAIPTA conducted a statistically valid survey of likely voters in Flagstaff, to assess their priorities, concerns and preferences.

Among the survey results, some key findings that relate to transit planning and funding are:

- The most-mentioned concerns about Flagstaff today relate to growth and development, the high cost of housing, and transportation issues including traffic congestion.
- The popularity of non-driving modes of travel has increased compared to when a similar survey was conducted in 2016.
- More than half of surveyed voters have ridden a Mountain Line bus at least once in the past year. In general, surveyed voters were more familiar with Mountain Line than ever before.
- 83% of surveyed voters said that they receive a “good” or “very good” value from the sales taxes they contribute towards Mountain Line.
- 53% of surveyed voters expressed support for having Mountain Line buses run more frequently. (24% did not support more frequency, and 23% did not know or did not have an opinion.)
- Likely voters prefer increasing the frequency of buses by a two-to-one margin.

# 4

## Transit- Supportive Policies and Practices

---



# Transit-Supportive Policies and Practices

NAIPTA and the partners listed on page 19 should consider adopting transit-supportive policies that reference the Permanent Transit Network, and prioritizing actions that improve conditions for high transit ridership on the Permanent Transit Network.

The following is a set of policy principles, actions and standards that support and reinforce the permanent transit network, and fall within the purview of each of these partner entities.

## Land Use and Development Planners

### ZONE FOR DENSITY AND MIXED USES

Transit works best when many people can be connected to many destinations. This is possible when buses serve corridors with higher density development and a variety of destinations.

The City of Flagstaff could zone parcels near transit corridors for denser development, and allow for a mix of residential, commercial, employment and other uses.

For example, the LEED for Neighborhood Development (ND) standard requires that areas within ½-mile of transit service be developed with residential densities of at least 12 dwelling units per acre and a commercial floor-area ratio FAR of at least 0.80.<sup>1</sup>

<sup>1</sup> LEED ND v4, current revision: [https://www.usgbc.org/sites/default/files/LEED%20v4%20ND\\_07.8.17\\_current.pdf](https://www.usgbc.org/sites/default/files/LEED%20v4%20ND_07.8.17_current.pdf)



Figure 15: A mixed-use, dense development in the Sawmill District.

### REQUIRE CONNECTED STREET NETWORKS AND HIGH-QUALITY SIDEWALKS

The first and last part of nearly every transit trip is a walk, so making transit an attractive option requires a good pedestrian environment.

There are two basic elements to walkability: one is the sheer existence of rights-of-way that allow people to walk reasonably direct paths from one place to another; the other is the quality and safety of those walking routes.

In order to ensure that reasonably direct walking routes exist, the City should require (as is contemplated in the Draft High-Occupancy Housing Plan) high degrees of street and/or pathway connectivity around the Permanent Transit Network. Where street connectivity is high, many different routes are possible for people walking, cycling or even driving. The result is more direct and safe walking routes, and also narrower streets (because car traffic is not funneled onto few possible routes) that are easier to walk across. Requiring small blocks is another way that the City can achieve high street connectivity. These changes, made around the Permanent Network Corridors, would help to increase ridership on those corridors and to improve the safety of people already accessing transit there.

Even when a direct walking path does exist to a transit stop, nobody likes to walk on the shoulder of a road or on a narrow sidewalk near fast, loud traffic. An essential step toward an attractive pedestrian environment (already taken by the City of Flagstaff) is to require that every new



Figure 16: A sidewalk wide enough for two people to walk side-by-side, with a parkway that separates them from traffic.

development or redevelopment within a ½-mile of the permanent transit network include sidewalks. The Flagstaff Zoning Code requires that all new developments (excepting industrial developments and single family houses) provide pedestrian connections to adjoining sidewalks, as well as internal pedestrian and bikeway networks linking to transit stops and building entrances.

Sidewalks should be at least 6 feet wide (which allows two people to walk side-by-side, and allows people using mobility devices to pass one another), and complemented by a parkway to better separate people from noise, water and snow coming off of traffic in the road.

**CONTINUE TO ENCOURAGE BUILDINGS TO FACE STREETS**

Just as nobody likes to walk on the shoulder of a busy road, few people enjoy walking long distances from a sidewalk through parking lots to reach the door of a building.

There are a variety of ways to address this issue, including limiting setbacks, requiring main entrances to face the sidewalk, and requiring parking lots to be set behind the building or to one side. The Flagstaff Zoning Code includes standards that require developers to place building entryways close to at least one street, though some exceptions may be allowed. The Code also urges developers to place parking lots to the side or behind a building rather than between the building and the road.

**LIMIT OFF-STREET PARKING**

An even more ambitious way to reduce pedestrian hazards and inconveniences related to off-street parking is to simply reduce the number of required parking spaces.

This can be done by reducing minimum parking requirements embedded in the zoning code. The Flagstaff Zoning Code currently requires parking in all zones, except for a few types of development, and except within a Parking Management District. For most types of multifamily residential developments, 1 to 1.5 parking spaces are required per bedroom (though the required total can be increased or decreased based on exceptions and incentives). The Zoning Code allows for the possibility of a slight reduction to required parking if a development is within 1/4 mile of a bus stop, though the frequency and permanence of service at that bus stop need not be taken into account.

For properties near the Permanent Transit Network, the City of Flagstaff could consider eliminating minimum parking requirements; allowing a more significant reduction in required parking; and/or imposing maximum parking limits.

The Flagstaff Zoning Code caps the maximum number of surface



# Transit-Supportive Policies and Practices

parking spaces that a very large development may include. Any parking spaces over that maximum must be provided in a parking structure. There is no maximum on the number of *structured* parking spaces that can be built. Developers of small commercial parcels are permitted to build as much surface parking as they desire.

Fargo, North Dakota, is unusual among western cities like Flagstaff for having recently eliminated parking requirements downtown. It did so as part of a redevelopment and transportation demand management strategy implemented in close partnership with the state university. Increasing transit service and launching bike share were also part of the strategy.

### LIMIT DRIVEWAYS AND GARAGE ENTRANCES

Another way to improve the pedestrian environment is to limit the number of times pedestrians need to watch for and avoid moving cars. This can be achieved by limiting the number and width of driveway and parking entrances, particularly for sites with high traffic volumes.

In high-traffic areas, every driveway and garage requires pedestrians to focus attention to avoid getting hit. For example, many big-box commercial sites are designed with multiple driveways to maximize the number of opportunities for a driver to turn into a parking lot. This also maximizes danger and stress for pedestrians.

The Flagstaff Zoning Code requires that developers “minimize” the number of driveway curb cuts onto public streets, and connect with adjacent parking lots whenever feasible. However, the design of the driveways and the adjacent roadway prioritize vehicle throughput over pedestrian access, so even with fewer driveways conflicts between cars and pedestrians can be exacerbated.

### ENCOURAGE NEW GOVERNMENT OFFICES TO LOCATE ON THE PERMANENT TRANSIT NETWORK

Locating key government offices far from transit makes it clear that members of the public and public employees are expected to drive.

While past siting decisions can’t easily be reversed, all government agencies have a role in ensuring that their offices and services are accessible to the broader public, regardless of their mode of transportation.

By locating any new offices on the permanent transit network, agencies can be certain that their services will always be accessible by transit and on foot.

The City of Flagstaff can encourage other government agencies to locate on the permanent transit network by zoning areas within a

half-mile of the designated corridors to allow institutional uses, and by limiting the circumstances where the City might permit institutional uses elsewhere.

### Street Designers and Managers

#### PROVIDE TRANSIT SIGNAL PRIORITY (TSP)

There are a variety of ways that roads can be managed to improve transit performance and reliability. One way to improve on-time performance is to allow priority for transit vehicles at traffic signals. This is especially effective on roads with long signal cycles, because the potential gains in travel time per signal are so large.

In a typical TSP arrangement, a transponder on a bus will signal that the bus needs priority to stay on schedule. The computer that controls the signal will then adjust signal time accordingly, either extending an existing green light for a few more seconds, or imposing an early red light on cross traffic to allow the bus to keep moving.

Experiences in Minneapolis, Portland, Seattle and Los Angeles have shown up to 10% reductions in transit travel times as a result of transit

signal priority (not including the results of transit-only lanes).<sup>2</sup>

#### CONTINUE TO IMPROVE SIDEWALK CONNECTIVITY AND QUALITY

The City of Flagstaff and the Arizona Department of Transportation could also take proactive steps to improve the pedestrian environment around the Permanent Transit Network. These include:

- Increasing the number of safe crossings and reducing the distance between crossings.
- Improving existing sidewalks and crosswalks to meet ADA standards and make walking more appealing.
- Making sure sidewalks are available on both sides of the street.
- Adding in new sidewalks in places where there are none.

<sup>2</sup> NACTO Transit Street Design Guide: <https://nacto.org/publication/transit-street-design-guide/intersections/signals-operations/active-transit-signal-priority/>

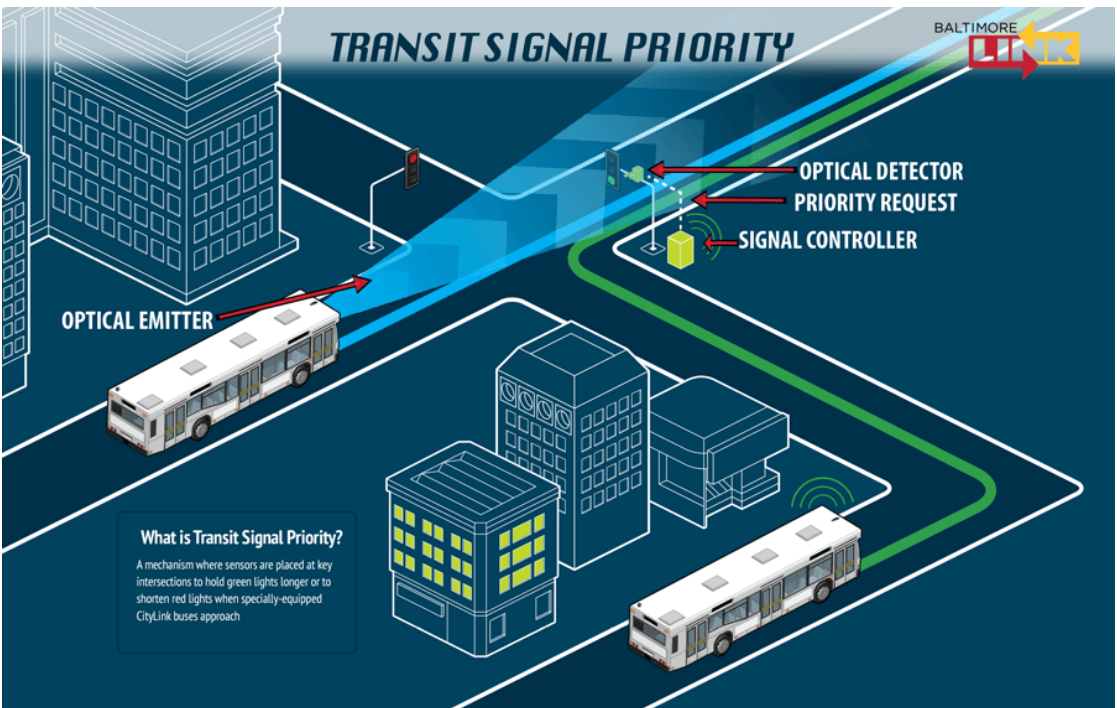


Figure 17: Transit Signal Priority (TSP) allows an approaching bus to hold a green light a little longer, or shorten a red light, and in that way reduces the amount of time buses and riders spend waiting at stoplights. (Image created by the Maryland MTA.)



Figure 18: Sidewalks with holes, poles, standing water and other obstacles do not meet ADA standards. Sidewalks that put pedestrians next to fast-moving cars are much less comfortable to walk on than those with a parkway.



# Transit-Supportive Policies and Practices

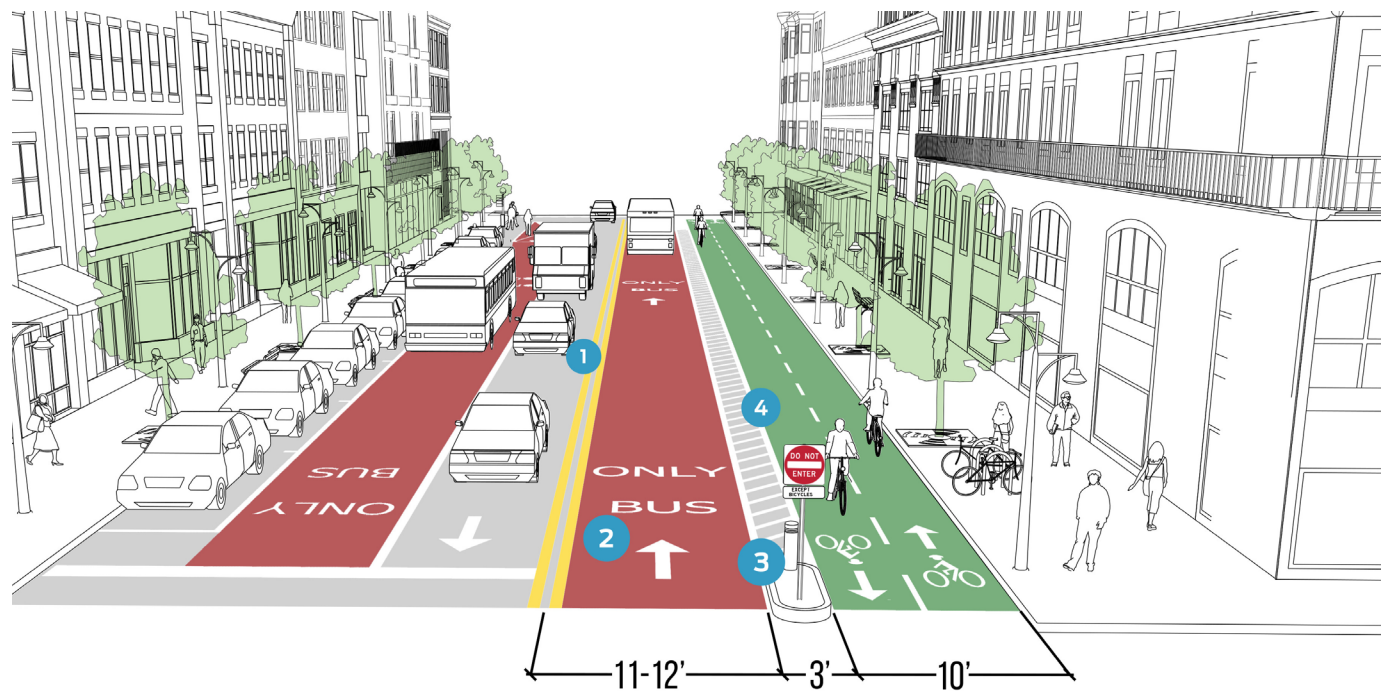


Figure 19: A one-way street for cars can still permit two-way transit travel, with a contra-flow bus lane (shown in red).  
(Image from the NACTO Transit Street Design Guide.)



Figure 20: Streets designed for slow vehicle speeds, short pedestrian crossing distances, and comfortable walking can encourage transit use. Such measures sometimes have the side-effect of slowing down transit operations, which can be mitigated with transit priority measures.

It's important to recognize that these measures have significant capital costs, and that their implementation likely requires agreements and partnerships with property owners. NAIPTA could consider forming a partnership with the City to mobilize some of the necessary funding.

In addition to capital improvements to the sidewalk network, NAIPTA and the City should consider prioritizing snow clearance on the Permanent Transit Network. (Snow clearance is already prioritized near high-ridership bus stops.) A buildup of snow and ice makes accessing transit in winter very difficult for all but the hardest pedestrians.

### INCREASE CROSSING TIMES, DECREASE CROSSING DISTANCE, AT PEDESTRIAN SIGNALS

Access to transit also depends on being able to safely cross the street to reach a bus stop on the other side.

One obstacle to safe crossings can be signal timing, particularly when crossing a wide road where signals are optimized to maximize green time.

Older versions of the Manual of Uniform Traffic Control Devices (MUTCD) assumed pedestrians could clear an intersection at a speed of 4 feet per second. More recent guidance suggests 3 feet per second to accommodate older and slower users, and adding a minimum of 7 seconds of walk

time and 3 seconds of buffer time.<sup>3</sup>

An additional consideration is not just the crossing time itself, but the time spent waiting for a walk signal. The longer someone needs to wait for a walk signal, the longer their walk takes to or from the bus stop, and the longer it takes them to transfer between buses.

Finally, shortening the distances that people have to cover to cross the street reduces the need for long signal times while also reducing peoples' discomfort. Flagstaff and other cities use curb "bump-outs" to shorten pedestrian crossing distances at intersections, which in turn can help to shorten signal cycles and therefore shorten pedestrian waits to cross.

### CREATE DEDICATED RIGHTS-OF-WAY AT CHOKEPOINTS

Traffic congestion can be another impediment to reliable transit performance. Transit service can be insulated from the impacts of chokepoints if dedicated right-of-way is provided.

Depending on the shape of the chokepoint, dedicated right-of-way can take several forms such as:

- Bus-only lanes, a continuous segment of traffic lane available only to

buses.

- Business access and transit (BAT) lanes, where transit vehicles share the lane with right-turning cars and bikes (unless bicycle travel is provided for in a separated path or cycle track).
- Queue jump lanes, where transit gets a special added lane at intersections to "jump the queue" at the signal. These lanes sometimes also have a dedicated signal that gives buses a green light before other traffic.
- Contra-flow lanes, where transit is allowed to operate against the flow of one-way traffic on a special bus-only lane.

These dedicated lanes could be added as new lanes in a road widening. Unfortunately, chokepoints usually occur in locations where widening is impossible or highly constrained. This strategy will therefore require measuring an intersection's performance in terms of people-throughput (counting bus riders, pedestrians, people driving and cycling) rather than the traditional measures of vehicle-throughput.

### LIMIT TRAFFIC SPEEDS

Considerable research shows that pedestrians are far less safe in environments where they need to interact with faster vehicles. Although the

<sup>3</sup> Current version of the MUTCD: <https://mutcd.fhwa.dot.gov/htm/2009/part4/part4e.htm>

# Transit-Supportive Policies and Practices

exact numbers vary from study to study, it appears that<sup>4</sup>:

- Vehicle impacts at 20 mph or less are unlikely to cause fatalities
- Vehicle impacts at 30 mph are somewhat likely to cause fatalities
- Vehicle impacts at over 45 mph usually cause fatalities

Because nearly every transit trip involves walking (or rolling), environments where pedestrians are at risk discourage the use of public transit.

The City of Flagstaff and ADOT could invest in the success of the Mountain Line network by calming streets and lowering speed limits on and near the Permanent Transit Network.

### PERMIT BUS STOPS NEAR CROSSINGS AND INTERSECTIONS

For a bus stop to be usable, it must be reachable on foot, from both sides of the street. This requires installing crosswalks (as covered earlier), but also:

- Locating new bus stops close to the actual pedestrian crossing point.
- Where possible, relocating existing bus stops so that they are as close as possible to the nearest pedestrian crossing.
- When possible, locating bus stops at the far side of an intersection, to make future transit priority measures more effective.<sup>5</sup>

In both cases, reducing the distance between the bus stop and the crossing makes it much easier to access the bus stop in general, and much less likely that a passenger will miss a bus because they were on the wrong side of the street at the wrong time.

In addition, permitting buses to stop in a vehicle lane to load and unload passengers makes transit service faster and more cost effective. According to the NACTO Transit Street Design Guide, *“By allowing buses to move in a straight line, in-lane stops eliminate both pull-out time and traffic re-entry time, a source of delay and unreliable service. In-lane stops are especially valuable on streets operating at or near vehicle capacity, or on streets with long signal cycles, in which transit vehicles may experience long re-entry delays while waiting for traffic to clear.”*<sup>6</sup>

4 Rosen & Sander (2009): <https://www.autoliv.com//ProductsAndInnovations/Documents/Research%20Papers/1.%20RosenSander.pdf>

5 NACTO Transit Street Design Guide, with regards to stop placement: <https://nacto.org/publication/transit-street-design-guide/stations-stops/stop-design-factors/stop-placement-intersection-configuration/>

6 NACTO Transit Street Design Guide, with regards to in-lane curbside stops: <https://nacto.org/publication/transit-street-design-guide/stations-stops/stop-configurations/in-lane-sidewalk-stop/>

Urban transit streets with more than one lane in each direction typically permit in-lane bus stops because the success of transit is so important to the success of urban development. In most urban transit systems, pull-outs are only used at the edges of the urban area, on rural highways.

In-lane stops also reduce wear and tear on pavement and buses by reducing the occurrence of lane changes during braking and accelerating.

### Developers and Site Planners

#### FACE THE STREET

Developers can make sure that new buildings and sites are designed to take advantage of the Permanent Transit Network. Because transit operates on street, the most important aspect of this is to orient site and building design to face the street. This can mean several things:

- Locate buildings, and especially their front entrances, as close to the sidewalk as practical.
- Design the shortest possible paths from building entrances to the sidewalk. Where possible, provide shade and/or weather protection on those paths.
- Design building frontage to have many windows looking out on the street, and, where practical, multiple entrances from the sidewalk.
- Ensure that sidewalks are at least 6 feet wide and are protected from traffic by a parkway at least 3 feet wide. Connect sidewalks on adjacent properties.
- Locate any off-street parking behind the building (or to one side if the site is not deep enough to accommodate all parking in back).
- Interrupt the sidewalk with only one vehicle driveway.

#### CONNECT TO ADJACENT DEVELOPMENTS

Many sites are developed with barriers that hinder or prevent access to places just next door. Examples of such barriers include hedges, drainage ditches, fences, and even walls.

Removing these barriers increases the range of places someone can get to by walking, including the range of transit options someone can reach.

Sometimes barriers are necessary to protect private property. Other times they may be a habit of design, or installed primarily for aesthetic reasons or to meet code requirements on landscape and buffering.

In cases where barriers exist primarily to mark a separation in space, rather than to provide security against intruders, developers should consider ways to make the landscape more permeable to pedestrians.

Walkways and paths can easily cut through ditches, hedges, fences or walls. On larger sites with internal streets, those streets can meet the property line in a way that allows the next new development over to extend them onto their own site. The Flagstaff Zoning Code already requires some of these efforts to be made, so that pedestrian connectivity is provided across development boundaries.

#### BUILD LESS PARKING

The multiple inconveniences to pedestrians caused by off-street parking have already been covered in this chapter. There is also strong evidence that the ample supply of free parking encourages people to drive, rather than use other modes of transport.<sup>7</sup>

Many sites, especially commercial sites, are built with huge amounts of parking, meeting or exceeding 5 spaces per 1,000 square feet, and consuming land that could otherwise be developed or landscaped.

The historic practice has been to size commercial parking lots to meet holiday demand, although there is some evidence that even on the busiest days many shopping center parking lots lie mostly empty.<sup>8</sup> Parking lots are consuming otherwise potentially valuable real estate.

Developers should consider building no more parking than is required by code, or even appealing parking requirements when a parcel is on the Permanent Transit Network.

#### SELL (OR RENT) PARKING SPACES SEPARATELY

If parking requirements cannot be lowered in the permitting process, another way to encourage tenants and buyers to drive less is to separate the purchasing or leasing of space from the purchasing or leasing of parking.

This allows individual purchasers and tenants the freedom to decide how much parking they need, lowering the base price of the space by unbundling it from its parking space(s). At the same time, the developer (or lessor/seller) can monetize an asset that they were required to build regardless of cost.

7 McCahill et al. (2015): [http://www.cows.org/\\_data/documents/1761.pdf](http://www.cows.org/_data/documents/1761.pdf)

8 Kobos & Strong Towns: <https://www.strongtowns.org/journal/2016/7/14/so-many-shoppers-so-much-unused-parking>



# Transit-Supportive Policies and Practices

## Transportation Demand Managers

### JOIN A CARPOOL/VANPOOL PROGRAM

Transit can't reach everywhere, or operate all the time. There will always be trips that can't efficiently be served by Mountain Line. But some of those trips can still be served using fewer vehicles, by forming carpools and vanpools.

A carpool can be difficult to organize individually, and can easily break down if one of the members changes jobs or moves. Carpool programs can be run by large employers or other private organizations, but they are often run at a regional scale by a public agency.

In Flagstaff, NAIPTA is the TDM provider that offers a vanpool program. It is open to any workplace. Individuals can find use it to a vanpool for themselves, or employers can use it to organize a vanpool for their employees.<sup>9</sup>

Vanpools work particularly well for long-distance commutes because participants have a big incentive to avoid the cost and stress of driving themselves all the way to work. Vanpools can also be successful at workplaces where shifts change at times when transit is not running, because many potential riders are coming and going from the job site at the same time of day but transit is not available for their trip.

Carpool and vanpool programs also typically include a guaranteed ride home, which relieves the stress some people feel when they ride transit or use a carpool or vanpool, but fear they will have personal emergencies and unscheduled late work. The basic concept is that anyone eligible for the program can order a free taxicab ride a few times a year to cover these unplanned events. NAIPTA's vanpool program includes a guaranteed ride home, as does NAIPTA's EcoPass bulk-transit-pass program for employers.

### BRING IN VEHICLE SHARING SYSTEMS

If there is a high enough density of trips that cannot be served by transit, another option to consider is the establishment of a bikeshare or car-share system.

In these types of systems, a fleet of vehicles is made available within a given service area. Anyone who registers to use the service may then use any available vehicle to go where they need.

In most bikeshare systems, bicycles are stored in corrals. The user picks the bike up at a corral, and then rides it to the corral nearest their destination. However, a new generation of bikeshare system is emerging that



Figure 21: Vanpool programs work particularly well for long-distance commutes.

no longer requires corrals, embedding the necessary hardware to use the system in each bicycle.

Certain carshare systems (e.g. Car2Go, ReachNow) allow users to pick a car up and drop it off anywhere within their service areas. Other systems (e.g. Zipcar) keep cars parked in set locations and require users to return the vehicle to its original location at the end of their reservation.

### SUBSIDIZE TRANSIT PASSES

In some cases, providing or subsidizing transit passes can encourage people who might otherwise drive, or who might otherwise not make important trips, to use transit. Some possible use cases:

- Employers might provide subsidized transit passes to employees to ensure they are able to get to work, and also reduce the amount of parking they need to reserve. NAIPTA sells discounted bulk passes for purchase by employers through its EcoPass program. NAU, among others, purchases such passes for all employees.
- Universities and schools might provide subsidies for student passes to reduce the number of students driving in or being dropped off. For example, NAU and Coconino Community College recently ran a one-year pilot program to offer students bus passes that were good on all Mountain Line routes. NAU funds the operation of Route 10, which NAU students can ride for free. In other cities, large universities (like Illinois State University or the University of Oregon) make financial arrangements with the transit agency that allow students to ride all routes.

- Human service agencies might offer free or subsidized transit passes for their clients to access basic services, or for non-emergency medical trips.
- Real estate managers might offer new tenants a free or reduced cost transit pass for some months as an incentive to sign a lease.
- Apartment building managers and condo HOAs might offer discounted passes, to reduce demand for parking and as an amenity for residents.

Subsidized transit pass programs (like NAIPTA's EcoPass) are often paired with a guaranteed ride home, as described on this page.

### SUBSIDIZE "LAST MILE" SERVICES

NAIPTA can support transit use by subsidizing services that help riders access transit over distances too far to walk.

Some U.S. agencies have established partnerships with ride hailing companies like Uber and Lyft, offering discounted fares for trips to and from transit stations or stops. These services can be particularly useful to people living in low-density areas where fixed-route transit is not cost effective.

While the cost per rider in such partnerships tends to be higher than the cost per rider of fixed-route transit, the public agency can establish program guidelines that share that cost among the agency, the ride hailing company, and the customer.

<sup>9</sup> <http://www.mountainlinevanpool.com/>



# Transit-Supportive Policies and Practices

## Transit Service Operator (NAIPTA)

### CONTINUE INVESTING IN HIGH-QUALITY BUS STOPS

By investing in high-quality bus stops on the Permanent Transit Network, a transit agency can significantly improve the passenger experience, while simultaneously increasing its visibility and advertising its services to people who might not otherwise consider riding, or who might not know where to catch the bus.

Every bus stop is different, but a combination of most of the following elements can improve almost any stop:

- All-weather shelters
- Clear signage and transit system information
- Benches and/or other forms of seating
- Trash cans
- Lighting
- Bicycle parking

NAIPTA already provides most of these amenities at many of its bus stops, especially high-ridership stops. Unlike in many transit systems, the Mountain Line bus stops are already well-spaced, with the result that



Figure 22: High-quality bus stops include weather protection, lighting, visible signage and real-time arrival displays.

NAIPTA has fewer bus stops to improve and maintain than many of its peers, and has been able to afford a higher level of amenities and good maintenance at each stop than many of its peers.

### SET FUTURE MINIMUM SERVICE STANDARDS FOR SERVICES ON THE PERMANENT TRANSIT NETWORK

The Permanent Transit Network identifies streets on which transit service is most permanent in the city. In real estate, permanence encourages investment.

One way to emphasize the permanence of transit service is through infrastructure. Dedicated right-of-way and investments in bus stops and other facilities can show that there is a public commitment to this designated set of streets.

But infrastructure only does so much to ensure permanence. After all, examples abound of abandoned streetcar lines, unused subway branches, bus stops and rail spurs.

A surer way to invest in the permanence of the transit network is to maintain a commitment to a minimum level of service that this set of streets will always receive, no matter the state of service in other areas. This minimum service level can also be tied to development targets, such as the density of residents or jobs in the areas around the route.

The exact level of commitment is at NAIPTA’s discretion, and will depend a great deal on available funding. NAIPTA already has a basic standard

for Mountain Line routes that they will all operate seven days a week, at least once per hour.

The Future Funding Scenario assumed that the minimum frequency of routes operating on the Permanent Transit Network should be every 60 minutes, 14 hours per day, 7 days per week. Offering shorter hours of service each day, or lower frequencies, would decrease the operating cost of the Future Funding Scenario.

The chart below illustrates frequencies and hours of operation for a set of Service Categories towards which NAIPTA can aspire over time.

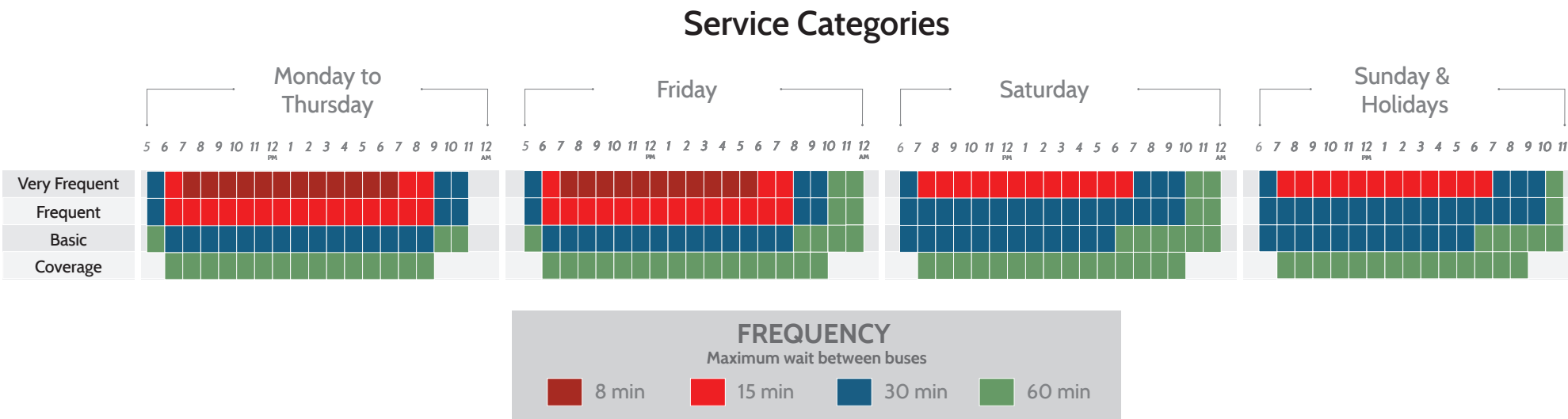


Figure 23: Minimum frequencies and hours of operation can be established for different types of routes in a network, and become a type of service standard. This chart illustrates a set of four Service Categories with associated frequencies and hours of service. NAIPTA could establish, for example, that with a certain growth in the transit operating budget every part of the Permanent Transit Network would have “Frequent” service.

# Transit-Supportive Policies and Practices

## Key Infrastructure and Capital Projects

In this section, we describe conceptual infrastructure projects that may make the existing Mountain Line network and a future higher-frequency network more cost-effective to operate. All of these potential projects would require further study to evaluate their feasibility, costs and benefits.

### Signal Priority and Bus-Only Lanes

Flagstaff has low street connectivity and numerous obstacles that are caused by the highways and railroad. As a result Flagstaff has surprising congestion for a city of its size. Congestion affects transit in three ways:

- Congestion makes transit passengers’ trips longer, which is discouraging and frustrating for them.
- Congestion make travel times unreliable.
- Congestion slows down bus speeds, which makes it more expensive for NAIPTA to provide any given frequency.

Every dollar spent operating service (including high-capacity transit service) will be spent more efficiently if transit operations and transit riders are protected from the effects of congestion.

One of the ways that many agencies speed up their buses, when congestion starts to slow them down, is by “thinning-out” bus stops. Mountain Line bus stops, however, are already very well spaced from one another.

Two tools that can also be used to protect transit from congestion are signal priority and bus-only lanes. While they are often implemented together, for example as part of high-capacity transit projects, they are very commonly used separately as well.

The most strategic places to make investments in signal priority and bus-only lanes, in any network, are at chokepoints where multiple routes come together. That way, the cost of the capital investment results in benefits on multiple routes.

The other place where signal priority and bus lanes are strategic investments is at connection centers, where every bus in the system is ingressing and egressing. Delays at connection centers can impact the cost, speed and reliability of every route in the system.

The NACTO Transit Street Design Guide provides comprehensive design guidance for transit priority treatments, a great deal of which is applicable in cities like Flagstaff.

### Moving the Downtown Connection Center

The Downtown Connection Center (DCC) is currently located at Phoenix and Milton. While this location is very central, access for buses and for pedestrians is challenging because of the high speeds, congestion, limited turns and long waits associated with Milton Road/Historic Route 66 and the railroad. In addition, the DCC is located in the river floodplain, and so opportunities to redevelop the site or add other uses are limited.

NAIPTA is seeking to move the DCC to a place with better bus and pedestrian access, and to a place where improvements to the transit center and other development are possible. As long as the new location is close to the place where most Mountain Line routes intersect (i.e. in downtown or Southside) such a move could be very beneficial to the cost-effectiveness of transit service in Flagstaff.

Reducing the amount of time buses spend driving in and out of the Center can save revenue hours that could be used to contribute to higher-frequencies, longer spans or longer routes to new areas. NAIPTA staff estimate that a DCC located downtown, near Beaver Street, would save about 5,000 revenue hours per year.

Improved pedestrian access to the Center would make it more useful to a larger number of potential riders.

### Lone Tree Overpass

A planned project that would change the possibilities of the Flagstaff transit network is an overpass for Lone Tree Road over the railroad tracks, connecting to Historic Route 66. If NAIPTA moves the DCC to the north side of the railroad tracks, this would allow service from the south (e.g. Route 4, on Lone Tree, as well as Routes 3 and 7 on Butler) to enter downtown without getting stuck at long train crossings. Train crossings are a source of delay, cost and unreliability for the transit system.

A Lone Tree Overpass would also change the geography of the central city, opening up possibilities for a slightly different shape to the transit network.

A route split by direction appears to cover more, actually covers less.

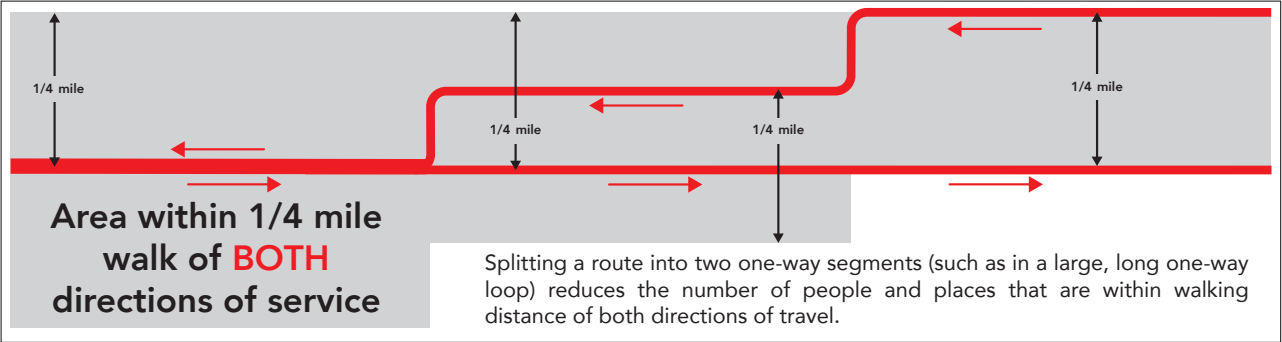


Figure 24: The one-way couplet on Beaver and San Francisco streets actually provides two-way service to fewer residents and jobs than if both directions of service were on one street.

### Two-Way Beaver Street

Because Beaver and San Francisco are a one-way couplet, Mountain Line must offer the two directions of travel on these two widely-spaced streets.

As shown in the diagram in Figure 24, above, splitting two directions of service onto two different streets reduces the area from which people are walking distance to service in BOTH directions. The effect gets worse as the one-way couplet gets wider.

The central axis of downtown development is Beaver Street. Beaver Street is fairly dense, with a mix of uses, and with major anchors at its north end (the high school, shopping center and Medical Center). The area around San Francisco Street has lower densities.

The usefulness of transit service in downtown would be considerably improved if Mountain Line were able to run two-way service on Beaver Street, between downtown and the Medical Center.

Note that this recommendation may conflict with our recommendation relating to bus-only lanes and bus speeds. It is sometimes easier to set aside right-of-way for transit on one-way streets than on two-way streets.

One-way streets also typically move traffic (including buses) faster. Northbound bus operation on Beaver Street might be slower than the current one-way northbound operation San Francisco Street. Signal priority can help speed up buses on both one-way and two-way streets.

# Transit-Supportive Policies and Practices

## East-West Connections through NAU Campus

Today, the eastern edge of NAU campus (against Lone Tree Road) from Franklin to Pine Knoll is impenetrable by car or bus. (It is possible to enter campus on foot from Lone Tree Road, however.)

An east-west transit connection through campus (at Sinclair Wash) would open up new possibilities for the Mountain Line transit network. City-spanning transit routes would be able to go through campus, instead of going around it.<sup>1</sup>

## Off-Board Fare Vending

One source of transit delay is the time that it takes passengers to board buses. This time can be reduced if more passengers pay using fare media that they purchased off-board, such as monthly or annual passes; smartphone (“mobile”) tickets; or ordinary tickets purchased at an off-board fare vending machine.

In the future, NAIPTA may wish to study where the most riders board with cash fares, and invest in off-board ticket machines in strategic locations, as well as mobile ticketing. (Changing the fare structure so that transfers are included in a one-way ticket price can also reduce boarding delay.)

Growth in sales of employer- or institution-provided transit passes, like NAIPTA’s EcoPass, can also increase the proportion of boardings that are faster because they do not involve cash payment.

<sup>1</sup> The key to having great transit access, for any development, is to “be on the way!” Even NAU, with all the transit service that passes near and through it, would benefit from being more “on the way” to other parts of the city.

# 4

## Forecast Change and Growth

---



# Forecast Change and Growth

While this Plan is focused on the next five years, the Permanent Transit Network (described in the previous chapter) was designed with consideration of likely future development in the city.

## Possible Predicted Growth

A major source of information about where growth and development are likely is growth projections. The map at right (Figure 25) shows the outputs of the Metropolitan Planning Organization’s model, for the year 2030.

Growth forecasts are based in part on adopted growth plans, created by the FMPO and the City of Flagstaff. Thus a major source of potential variation between this forecast, and what actually happens in the future is any changes to land use plans.

NAIPTA is establishing a Permanent Transit Network in part to show land use agencies the corridors on which transit-oriented development should be encouraged. Thus it is reasonable to regard the map at right not as the definite future, but as part of an on-going iterative conversation about how and where Flagstaff should develop.

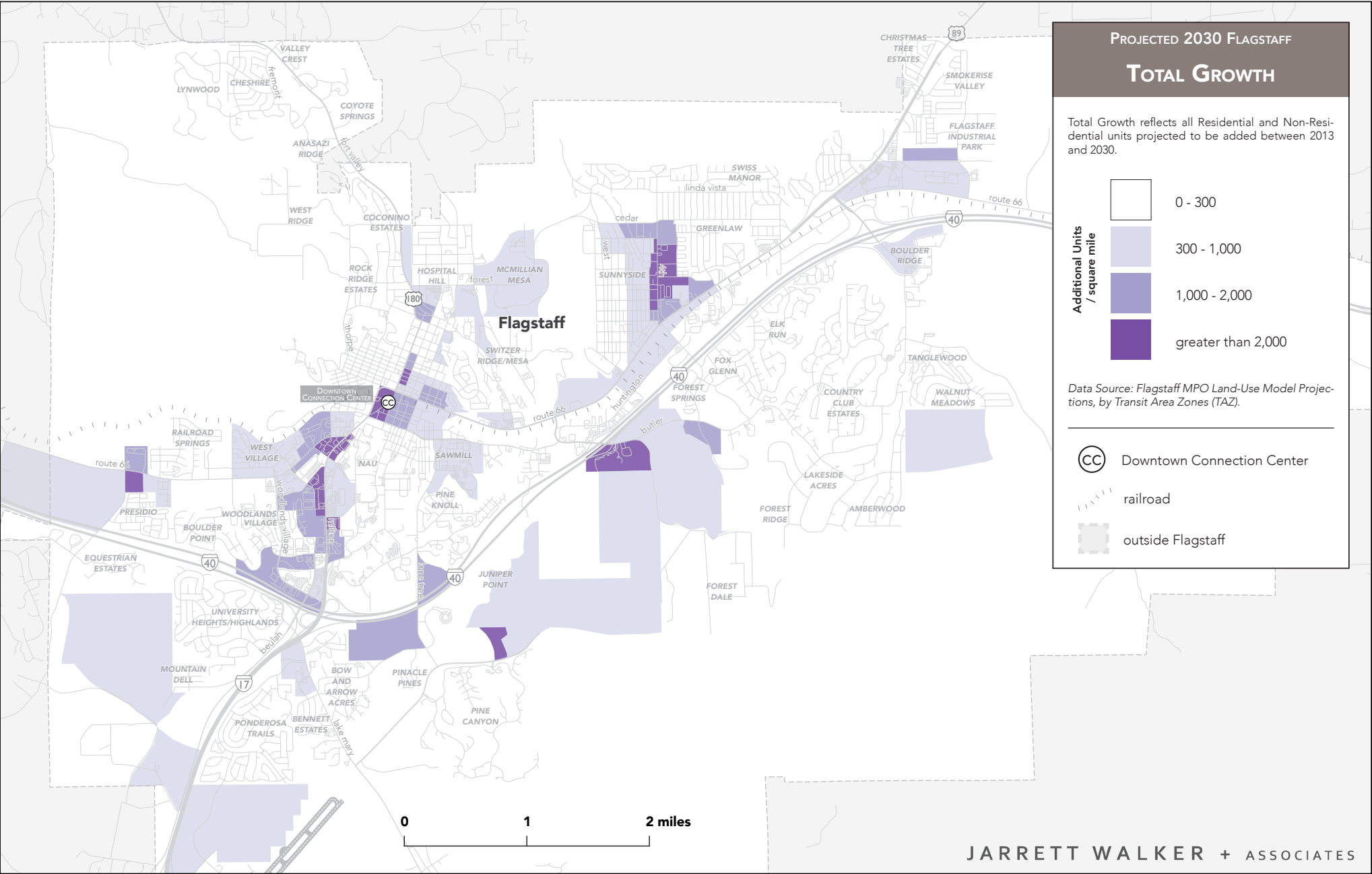


Figure 25: Forecast growth in density Flagstaff by 2030.



# Forecast Change and Growth

## High-Occupancy Housing

Flagstaff is currently developing a High-Occupancy Housing (HOH) Specific Plan. City and FMPO planning staff who are engaged in HOH planning contributed the knowledge gained through that process to the design of the Permanent Transit Network.

The HOH Specific Plan will define future patterns of High-Occupancy Housing development in the city – not only where such housing is allowed, but also the form of the development and the ways that it will interact with transportation, public spaces and other urban infrastructure.

A draft of the HOH Specific Plan was released for public review and comment in the summer of 2017.

The map at right (Figure 26) was prepared as part of the analysis of potential Activity Centers, in the Draft HOH Specific Plan. All of the Regional Activity Centers (shown in red) are on or very near the Permanent Transit Network (shown as a yellow line).

The Draft HOH Specific Plan recommends that the City of Flagstaff permit some large-scale HOH development in Regional Activity Centers, particularly in locations that are served by frequent transit. The Draft HOH Plan also recommends specific requirements for such developments, related to street connectivity, block size, transit-orientation, all intended to improve walkability and the usefulness of transit service in those Centers.

Frequent, useful transit service can lessen the impacts of high-occupancy housing by:

- Reducing the need for every resident to own and park their own car.
- Reducing the amount of car traffic going into and out of the housing.
- Increasing walking in the Activity Center, which improves public safety and improves conditions for small-scale businesses.
- Allowing people with a wider range of incomes to live in the Activity Center, because their transportation costs can be so much lower.

A Final HOH Specific Plan will be considered by the Planning and Zoning Commission and City Council in the winter of 2017/2018.

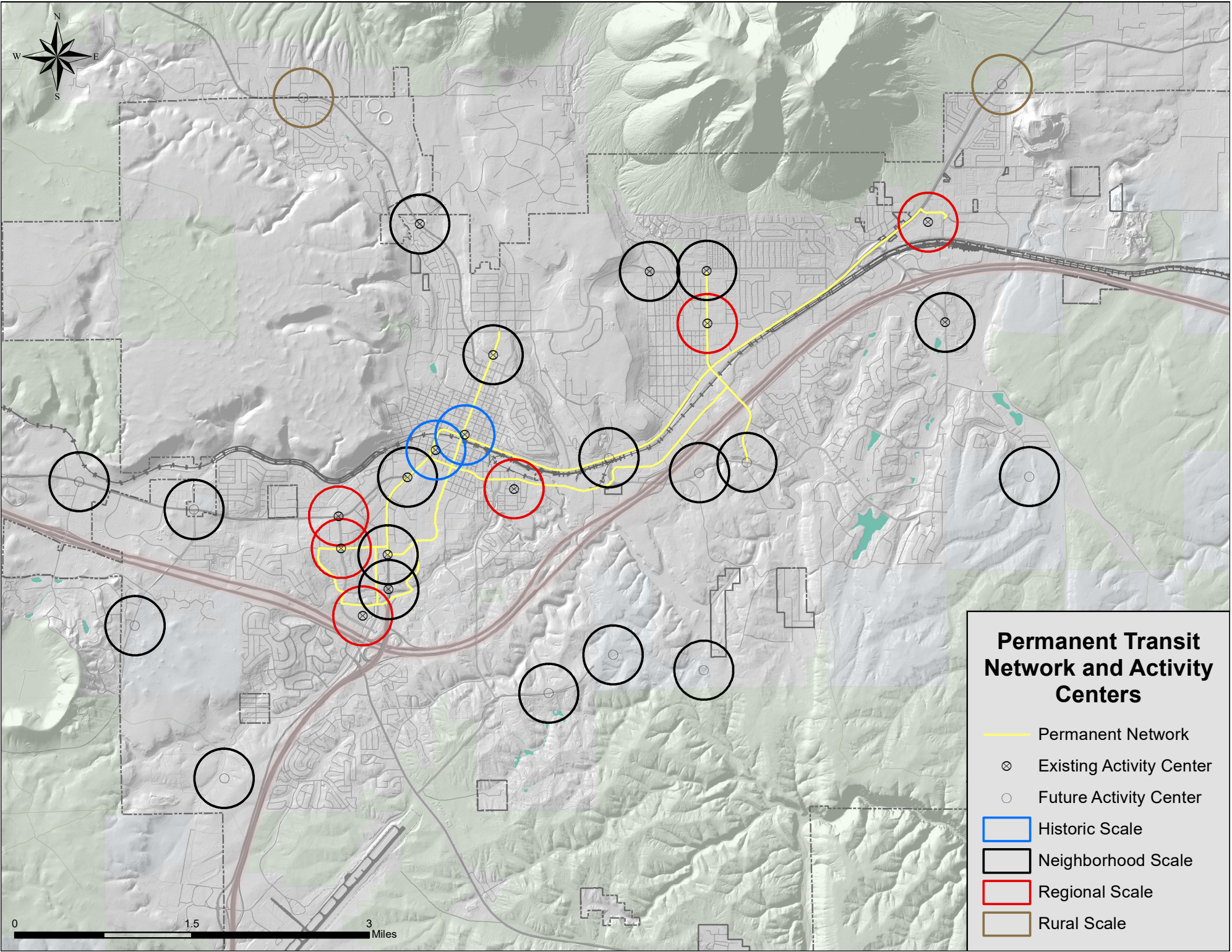


Figure 26: The Draft HOH Plan includes recommended changes to Flagstaff's Activity Centers. All of the city's Regional Centers (shown in red) are on the Permanent Transit Network (drawn in yellow).



# Forecast Change and Growth

## Extending Beulah Road

The City of Flagstaff is planning to extend Beulah Road (west of Milton Road) to connect Forest Meadows Street to University Avenue.

This will provide an opportunity to develop transit-oriented places away from pedestrian-hostile Milton Road, but close to the major activity centers of NAU, Woodlands Village and Milton Road shopping centers.

There are near-term plans for major development at the intersection of Beulah and University Avenue. The segment of Beulah Road between University Avenue and McConnell Drive is part of the Permanent Transit Network.

## Extending J.W. Powell Boulevard

There are plans to extend J.W. Powell Boulevard to connect to the airport to the west and Fourth Street to the east, and to develop urban densities of housing and other activities along the Boulevard.

If J.W. Powell Boulevard is developed into a dense, walkable area, it will be reasonable for NAIPTA to provide service there. The appropriate level of service will depend on the ridership potential from the area, and on NAIPTA's available transit operating funding.

It should be noted that the segment of J.W. Powell between Pine Canyon and Butler Avenue is not "on the way" between any pair of regional activity centers (e.g. the Mall and downtown or NAU). A route designed to service J.W. Powell will be useful for people living along J.W. Powell Boulevard itself, but people travelling between other activity centers will naturally choose other, more direct routes.

This means that potential transit ridership along J.W. Powell Boulevard would have to be generated by development in that area alone, because only small numbers of people could be expected to ride through the area. (In contrast, and as an example, large numbers of people are riding between the Mall area and downtown, so any development along that corridor benefits from a high service level by virtue of being "on the way.")

## Northern Arizona University Enrollment Growth

Precise development plans for NAU are not known, but university leadership states that they hope to grow the student body by about 25% between now and 2025. How much of that growth would be

accommodated by the campus in Flagstaff is unclear. (As of 2016, there were more than 22,000 students enrolled at the Flagstaff campus.)

NAU is currently building new residence halls to accommodate this growth, as are private developers. Demand for student housing and affordable housing in Flagstaff are, in part, driving the High-Occupancy Housing plan described on page 34.

In most situations, housing and transportation costs are linked. The farther a household lives from needed services and activities, the less their housing is likely to cost, but the more their transportation (largely, private car) is likely to cost.

Universities tend to be aware of this trade-off, because they share in the costs of both housing and transportation with students. For example, a university that builds off-site housing far away, and off the frequent transit network, often finds that it needs to pay for (or charge students for) shuttles to connect that housing to campus. NAU has had this experience, leading to its partnership with NAIPTA for the operation of Route 10, which connects student housing to campus.

NAU staff contributed their knowledge of university-related growth plans and trends to the design of the Permanent Transit Network. NAU will be an important player in the success of the Permanent Transit Network. Hopefully the Permanent Transit Network can also help NAU shape its growth to meet its own transit and transportation goals.