



Pursuant to A.R.S. § 38-431.02, notice is hereby given to the members of the Mayor and Council Transit Task Force and to the general public that the Mayor and Council Transit Task Force will hold the following meeting which will be open to the public.

Mayor and Council Transit Task Force A G E N D A

Monday, July 13, 2015 at 4:00 p.m.

**Location: 149 N. Stone, Second Floor
Tucson, AZ 85701**

TOPICS	SUGGESTED TIME ALLOTTED
1. Call to Order	
2. Introductions / Roll Call	5 Minutes
3. Approval of June 23, 2015 Minutes	5 Minutes
4. Call to the Audience	10 Minutes
5. Update on Transit/Announcements	10 Minutes
6. FY2016 Bus Service Change Implementation Plan	30 Minutes
7. Next Steps: JWA Transit Choices Report Recommendations	40 Minutes
8. Call to the Audience	10 Minutes
9. Next meeting date and time/Meeting schedule	5 Minutes
10. Agenda items upcoming meeting	5 Minutes
11. Adjourn	

Action may be taken on any item.

(Material, if available, can be provided by contacting Karen Rahn at 520-837-6584)



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Mayor and Council Transit Task Force MINUTES

Monday, June 23, 2015, 4:00 p.m.

Location 201 N. Stone, 6th Floor, Public Works Building
Tucson, AZ 85701

1. Call to Order

Meeting was called to order at 3:02 p.m. with eight (8) of the eleven (11) members present which established a quorum.

2. Introductions / Roll Call

*Members Present: Eugene Caywood, Chair (Ward 5)
Suzanne Schafer, Vice Chair (Ward 3)
Margot Garcia, (Ward 6)
Linda Dobbyn (CTAC)
Peggy Hutchison (Ward 1)
Sami Hamed (CTAC)
Brian Flagg (Ward 2)
Michael Wall (Mayor)
David Heineking, U of A Advisory Member*

*Members Absent: Vacant (Ward 4)
Vacant (CTAC)
Vacant (CTAC)*

*Staff Present: Jeremy Papuga, Transit Administrator
Kate Riley, General Manager of Sun Tran/Sun Van
Kandi Young, Marketing & Communications Director for Sun Tran/Sun Van
Jared Forte, Assistant General Manager of Sun Tran/Sun Van
Bob McGee, Scheduling Manager*

3. Approval of May 4, 2015 Minutes

Motion: *A motion was made to approve the minutes as submitted.*

Seconded

Motion Passed: *Unanimously*

4. Call to the Audience

Maria Cadaxa – Ms. Cadaxa passed out copies of two articles from the Arizona Daily Star concerning transit. The first one says “SunTran, like our schools or police, not meant to be for-profit.” There are hidden costs and benefits to a transit system that are not shown on an Excel spreadsheet. The second article talks about Jarret Walker and his recommendations for Tucson’s transit system. The article states that “having transit service at 15-minute intervals has been an effective way to maximize ridership. Conversely, decreasing the frequency of service has caused precipitous drops in ridership.”

Cesar Aguirre – Mr. Aguirre said he noticed that from the City Staff’s memo there is no recommendation; information only. He commented that he thought the Task Force and staff have an influence on the budget and the City Manager. Mr. Aguirre also said that the City is always reactive but they need to start thinking long-term. When we cut service, there are a lot of long term consequences. We are going to be back here again in a year or two cutting service, cutting routes and cutting frequencies and it will hurt our overall system. He said that of the more than 30 comments, only three were in agreement. Mr. Aguirre quoted Jarret Walker as saying “Frequent lines thrive on the diversity of their users and the diversity of the kind of trips they’re making.” The people who are forced to use the system are the ones who suffer.

Barbie Urias – Ms. Urias wanted to remind everyone that the Tucson Bus Riders Union is here to stay and to be on top of things. She said the Tucson bus system is one of the best bus systems in the country and she would like to see it be like it was before the Streetcar. She said we should make it available and affordable to everyone.

Pancho Medina – Mr. Medina reminded everyone that the Tucson Charter states that the transit system is a core service, not for profit. We shouldn’t be making a profit at all. We should not be using the term subsidizing. We should be putting money into operating just like the Fire Department.

Allen Benz – Mr. Benz referred to an article in the Arizona Republic regarding transit in Phoenix. There will be a proposition going on the ballot in August to vote on this issue that will help determine the course of growth or non-growth in Phoenix for the next 35 year. What we do here and now will help determine the growth of Tucson for a number of years.

Susan Willis – Ms. Willis commented on transit system as a utility. She said we need to focus on educating the public. Public perception is that we are putting too much money into the buses and the buses are empty. We need to educate the public that this is a public utility.

John Myles – Mr. Myles wanted to commend this task force for the job that they’re doing. He also stated that he hopes whatever they decide will be heard by the City Council and that they take it seriously.

5. Discussion of FY16 Minor Service Changes

Jeremy Papuga reminded the Task Force that there are three goals for implementing the minor service changes. Those goals are:

- *Meet the City Manager's recommended budget amounts*
- *Identify reoccurring cost savings*
- *Maintain system health, minimize negative impact and improve service where possible.*

Each proposed change was explained by Mr. Papuga and discussion followed. The following motions were made:

Motion: *A motion was made to approve recommended changes to Routes 1, 5, 8 and 34 as proposed by staff*

Seconded

Motion: *A motion was made to amend the prior motion to leave out the frequency cut on Route 8.*

Seconded

Motion Passed: *Unanimously*

Previous Motion with Amendment

Seconded

Motion Passed: *6 to 1*

Motion: *A motion was made to postpone action on Routes 2 and 25*

Seconded

Motion Passed: *Unanimously*

Motion: *A motion was made to oppose the proposed change to Route 3*

Seconded

Motion passed: *Unanimously*

Motion: *A motion was made to amend the prior motion to vote separately on the frequency and the route split.*

There was no second

Motion: *A motion was made to oppose the frequency change to Route 8*

Seconded

Motion Failed: *4 to 3*

Motion: *A motion was made to accept the staff recommendations for Route 8 to change the frequency from 10 to 15 minutes in the morning.*

Seconded

Motion Passed: *4 to 3*

Motion: *A motion was made to oppose the recommended route changes (only) to Route 10.*

Seconded

Motion Passed: *6 to 1*

Motion: *A motion was made to support the TTF proposed frequency changes for Routes 10, 27, and 29 in the evening; 30 minutes in the early evening and 60 minutes in the later evening and not support staff's recommendation.*

Seconded

Motion Passed: *Unanimously*

Motion: *A motion was made to oppose combining Routes 11 and 50.*

Seconded

Motion Passed: *Unanimously*

Motion: *A motion was made to leave the frequency the same for Routes 11 and 50.*
Seconded

Motion Passed: *Unanimously*

6. Call to the Audience

Michael Oatman – Mr. Oatman expressed his concerns regarding the direction of the loop on the Route 5 and the 8. He used an illustration to show the routes and said he was concerned about the fact that there is nothing out there; there is a wash and a Costco and 6 lanes on Grant with no cross walks. If the Route 5 made a left turn, people would have to cross 6 lanes. Making this a clockwise loop instead of a counter-clockwise loop would be life-saving.

Liz Burden – Ms Burden commented on Jarret Walker’s report and reminded staff that the 15 minute headway in terms of frequencies is a minimum standard for a high-frequency network and said that she was hoping that staff will keep that in mind and start looking for a system that is a 21st Century system. Ms. Burden said that with the proposed cuts, the Mayor and Council are taking us backwards instead of forward. She also said there is a perception that the bus riders want everything and are not willing to make reasonable adjustments in service; that is not the case. She also encouraged staff to engage the bus riders beyond this when looking at some things such as modeling. She stated that working on a computer and service modeling live in an un-hurried atmosphere fosters creative solutions and allows the building of a world class system. Ms. Burden finished by saying that we should hold the line against cuts and really try to work with riders toward a World Class 21st Century system and the Mayor and Council should find their cuts someplace else.

7. Next meeting date and time/Meeting schedule

The next meeting is scheduled for July 13, 2015 at 4:00 p.m.

8. Adjourn

The meeting adjourned at 5:07 p.m.



TRANSIT TASK FORCE MEMORANDUM

Item 6: FY2016 Bus Service Change Implementation Plan

Page: 1 of 1

Issue – This is an agenda item to update Transit Task Force members on the implementation plan for bus service changes scheduled for Fiscal Year 2016.

Staff Recommendation – None. This is an information item.

Background – Staff’s planned strategy for reducing the FY2016 Sun Tran operating expenses by \$2.4 million to meet the requirements of the FY2016 Adopted Budget includes two phases of bus service changes:

- Minor Service Changes (August 9, 2015)
- Major Service Changes (February 2016)

The service change strategy was introduced to the Transit Task Force in May as part of the City Manager’s Recommended Budget and the minor service changes were subsequently discussed at the June 9 and June 23 Transit Task Force meetings. In addition to gathering information from the Transit Task Force, staff gathered input from the general public and Jarrett Walker and Associates (JWA). JWA evaluated the planned changes against the visioning process and performed a review of the planned FY2016 service changes to ensure that no planned changes have a negative impact to the service priorities identified during the stakeholder workshops.

Staff took all the input received into careful consideration during the development of the FY2016 Service Change Implementation Plan.

Present Consideration – The following two-phase service plan has been developed by staff for implementation:

- **Phase 1 (August 9, 2015)** – Implement all TTF approved changes as well as the frequency adjustments supported by JWA that standardize headways to 15 minutes intervals.
- **Phase 2 (February 20, 2016)** – Conduct a Title VI service equity analysis, public input process and public hearing on staff proposed major service changes as well as a selection of recommended Priority 1 frequent network improvements identified in the JWA transit visioning process.

The details regarding the plan can be found in the attached informational memo that was provided to Mayor and Council on July 9, 2015

Financial Considerations – None

Attachments:

- A. Staff Implementation Plan for FY2016 Transit Service Changes
- B. Jarrett Walker and Associates Memo on Proposed Network Changes

FY2016 Bus Service Change Implementation Plan

Transit Task Force

July 13, 2015



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Presentation Overview

1. Review of goals and objectives
2. Service change process to date
3. Planned FY 2016 Sun Tran bus service changes
4. Next steps



2

Goals and Objectives

1. Meet the Mayor and council adopted budget expenditure limits
2. Identify reoccurring cost savings
3. Maintain system health, minimize negative impact and improve service where possible



3

Service Change Process to Date

1. May 4 – Transit overview of city manager's recommended budget
2. June 8 – Minor proposed service changes
3. June 23 – Minor proposed service changes (with public and JWA comments)
4. Today – Presentation of planned FY 2016 bus service changes



4

Planned FY 2016 Bus Service Changes

Input Process

Public. Input gathered through email, social media and by phone. Info posted in several different ways.

TTF. Outlined in the prior slide, today is our 3rd discussion

JWA. Changes evaluated against visioning process and a separate JWA review of changes was conducted



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FY 2016 Implementation Plan

Two Phases

Phase 1 (8.9.15) – Implement all TTF approved changes as well as frequency adjustments supported by JWA that standardize headways to 15 minute intervals

Phase 2 (2.20.16) – Conduct a Title VI service equity analysis, public input process and public hearing on originally proposed Phase 2 changes with the addition of select Priority 1 Frequent Network improvements



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Phase 1 Service Change Summary

Minor Service Changes - August 9, 2015

Route	Type	TTF Support	Staff Recommend	JW Assoc. Support**	All Minor Changes
1	Route Adjustment	X	X	X	X
5*	Route Adjustment	X	X	X	X
8(a)	Route Adjustment	X	X	X	X
8(b)	Frequency Adjustment	X	X	X	X
34	Route Adjustment	X	X	X	X
10	Frequency Adjustment		X	X	X
25	Frequency Adjustment		X	X	X
27	Frequency Adjustment		X	X	X
29	Frequency Adjustment		X	X	X
10	Route Adjustment			X	X
2	Route Adjustment			X	X
11(a)	Frequency Adjustment				X
3	Split Route / Frequency				X
11	Merge Routes				X
50	Merge Routes				X
FY 2016 Cost Chg.		-\$658,700	-\$1,427,900	-\$1,425,100	-\$1,077,600
Annual Cost Chg.		-\$780,000	-\$1,620,000	-\$1,617,000	-\$1,238,000

* Due to construction at the intersection of Pima and Wilmat the change to Route 5 can not be implemented until February 2016, it's savings reflects February 2016 implementation

** JWA Assoc. support refers to Jarrett Walker and Associates analysis that change has no negative impact on vision



Phase 1 Service Change Variance

Planned Minor Service Changes not Supported by the TTF

Route	Description
25	Decrease service frequency from 20 minutes to 30 minutes for 5 hours during weekdays between the hours of 7 a.m. - 9 a.m. and 2 p.m. - 5 p.m.
10	Decrease evening service frequency from 40 to 60 minutes (7 p.m. to 11 p.m.)
27	Decrease evening service frequency from 40 to 60 minutes (7 p.m. to 11 p.m.)
29	Decrease evening service frequency from 40 to 60 minutes (7 p.m. to 11 p.m.)



Phase 1 – Frequency Adjustments

The implementation of the frequency changes enhance service by...

“...improving connectivity from other lines due to harmonized frequencies”

They:

- Create consistent headways throughout the day (Rte 25)
- Realign service level to meet demand
- Increment of 15 min. aligns with all routes after 7 pm



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Phase 2 – Service Change Summary

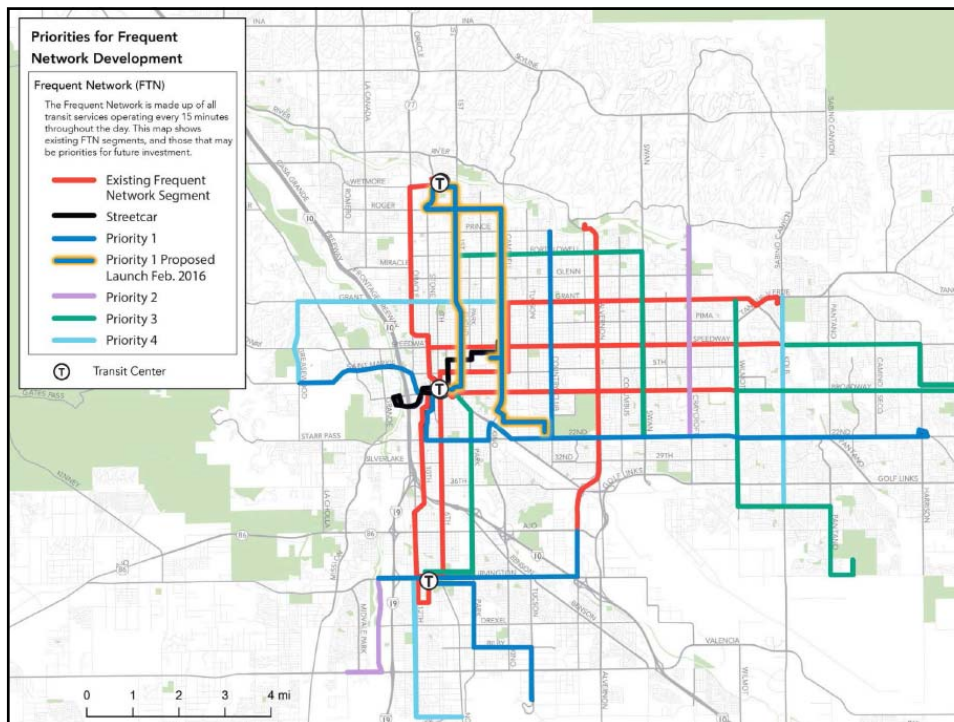
Major Service Changes - February 2016

Route	Type	JW Assoc. Support	FY2016 Cost Chg	Annual Cost Chg
9	Merge Route	Eventual	-\$313,000	-\$751,000
20	Merge Route	Eventual	See Rte. 9 Above	See Rte. 9 Above
27	Frequency Change	No Impact	-\$194,000	-\$465,000
6	Frequency Increase	Recommended	\$74,500	\$179,000
15	Frequency Increase	Recommended	\$143,000	\$343,000
TOTAL			-\$289,500	-\$694,000

GRAND TOTAL MINOR AND MAJOR CHANGES	-\$1,717,400	-\$2,314,000
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FY 2016 Service Changes

In Summary the Implementation Plan:

1. Meets the requirements of the adopted budget
2. Improves system connectivity
3. Does not negatively impact future vision of transit
4. Immediately implements Priority 1 Frequent Network improvements



Questions?



Staff Implementation Plan for FY 2016 Transit Service Changes

Input:

- **Public.** Staff gathered public input through email, social media and by phone. Information requesting input on the service changes was posted in all transit vehicles, at all transit centers, at the Special Services Office, online, through social media and through local media outlets. A total of 62 individuals provided comments, with a total of 86 comments, 78 of which are opposed to select service adjustments and 8 are in support.
- **Transit Task Force.** Staff also requested and received input from the Transit Task Force at two meetings (June 9 and June 23).
- **Jarrett Walker and Associates (JWA) Analysis.** Planned changes were evaluated against the visioning process and JWA performed a review of the planned FY2016 service changes to ensure that no planned changes have a negative impact to the service priorities identified during the stakeholder workshops.

Implementation Plan:

After careful consideration of input received from the general public and the Transit Task Force (TTF), as well as a detailed review of the service change analysis and transit vision recommendations made by JWA, staff has finalized the following service change implementation plan.

- **Phase 1 (August 9, 2015)** – Implement all TTF approved changes as well as the frequency adjustments supported by JWA that standardize headways to 15 minutes intervals.
- **Phase 2 (February 20, 2016)** – Conduct a Title VI service equity analysis, public input process and public hearing on staff proposed major service changes as well as a selection of recommended Priority 1 frequent network improvements identified in the JWA transit visioning process.

Minor Service Changes - August 9, 2015

Route	Type	TTF Support	Staff Recommend	JW Assoc. Support**	All Minor Changes
1	Route Adjustment	X	X	X	X
5*	Route Adjustment	X	X	X	X
8(a)	Route Adjustment	X	X	X	X
8(b)	Frequency Adjustment	X	X	X	X
34	Route Adjustment	X	X	X	X
10	Frequency Adjustment		X	X	X
25	Frequency Adjustment		X	X	X
27	Frequency Adjustment		X	X	X
29	Frequency Adjustment		X	X	X
10	Route Adjustment			X	X
2	Route Adjustment			X	X
11(a)	Frequency Adjustment				X
3	Split Route / Frequency				X
11	Merge Routes				X
50	Merge Routes				X
FY 2016 Cost Chg.		-\$658,700	-\$1,427,900	-\$1,425,100	-\$1,077,600
Annual Cost Chg.		-\$780,000	-\$1,620,000	-\$1,617,000	-\$1,238,000

* Due to construction at the intersection of Pima and Wilmot the change to Route 5 can not be implemented until February 2016, it's savings reflects February 2016 implementation

** JWA Assoc. support refers to Jarrett Walker and Associates analysis that change has no negative impact on vision

Phase One:

The difference between the TTF recommendations and the staff implementation plan are four frequency improvements that were identified as having no negative impact on the recommendations that resulted from the JWA transit visioning exercises and identified as system improvements in the FY 2016 service change analysis. The frequency changes are:

Route	Description
25	Decrease service frequency from 20 minutes to 30 minutes for 5 hours during weekdays between the hours of 7 a.m. - 9 a.m. and 2 p.m. - 5 p.m.
10	Decrease evening service frequency from 40 to 60 minutes (7 p.m. to 11 p.m.)
27	Decrease evening service frequency from 40 to 60 minutes (7 p.m. to 11 p.m.)
29	Decrease evening service frequency from 40 to 60 minutes (7 p.m. to 11 p.m.)

The implementation of the additional service changes meet the FY 2016 budget requirements, enhance existing service by *“improve(ing) connectivity with other lines due to harmonized frequencies”* as described by JWA and provide the funding capacity to immediately implement Priority 1 frequent network improvements identified during the transit visioning process. In summary, these changes:

- Create consistent headways throughout the day (Route 25)
- Realign the level of service to meet service demand (Routes 10, 25, 27 and 29)
- Change frequency to an increment of 15-minutes to align transfers with all other system routes that operate after 7 p.m. (Routes 10, 25, 27 and 29)

Phase Two:

The service changes recommended for February 2016 are below:

Route	Type	JW Assoc. Support	FY2016 Cost Chg	Annual Cost Chg
9	Merge Route	Eventual	-\$313,000	-\$751,000
20	Merge Route	Eventual	See Rte. 9 Above	See Rte. 9 Above
27	Frequency Change	No Impact	-\$194,000	-\$465,000
6	Frequency Increase	Recommended	\$74,500	\$179,000
15	Frequency Increase	Recommended	\$143,000	\$343,000
TOTAL			-\$289,500	-\$694,000
GRAND TOTAL MINOR AND MAJOR CHANGES			-\$1,717,400	-\$2,314,000

The “JW Assoc. Support” column in the above table indicates that Jarrett Walker and Associates recommends merging the Routes 9 and 20 when other system improvements are made. Their analysis concluded that the merging of the Routes 9 and 20 in isolation could negatively impact riders, however the merger of the two routes paired with an increase in frequency on perpendicular routes is a system improvement. As a result staff recommends that the service change package for February 20, 2016

include two Priority 1 frequency improvements (Route 6 - Euclid/1st and Route 15 - Campbell) from the Regional Transit Visioning process. Those routes are highlighted in blue above and are included in the attached map. The proposed changes to routes 9, 20, 6 and 15 are therefore interrelated and should be considered as one packet of complementary change.

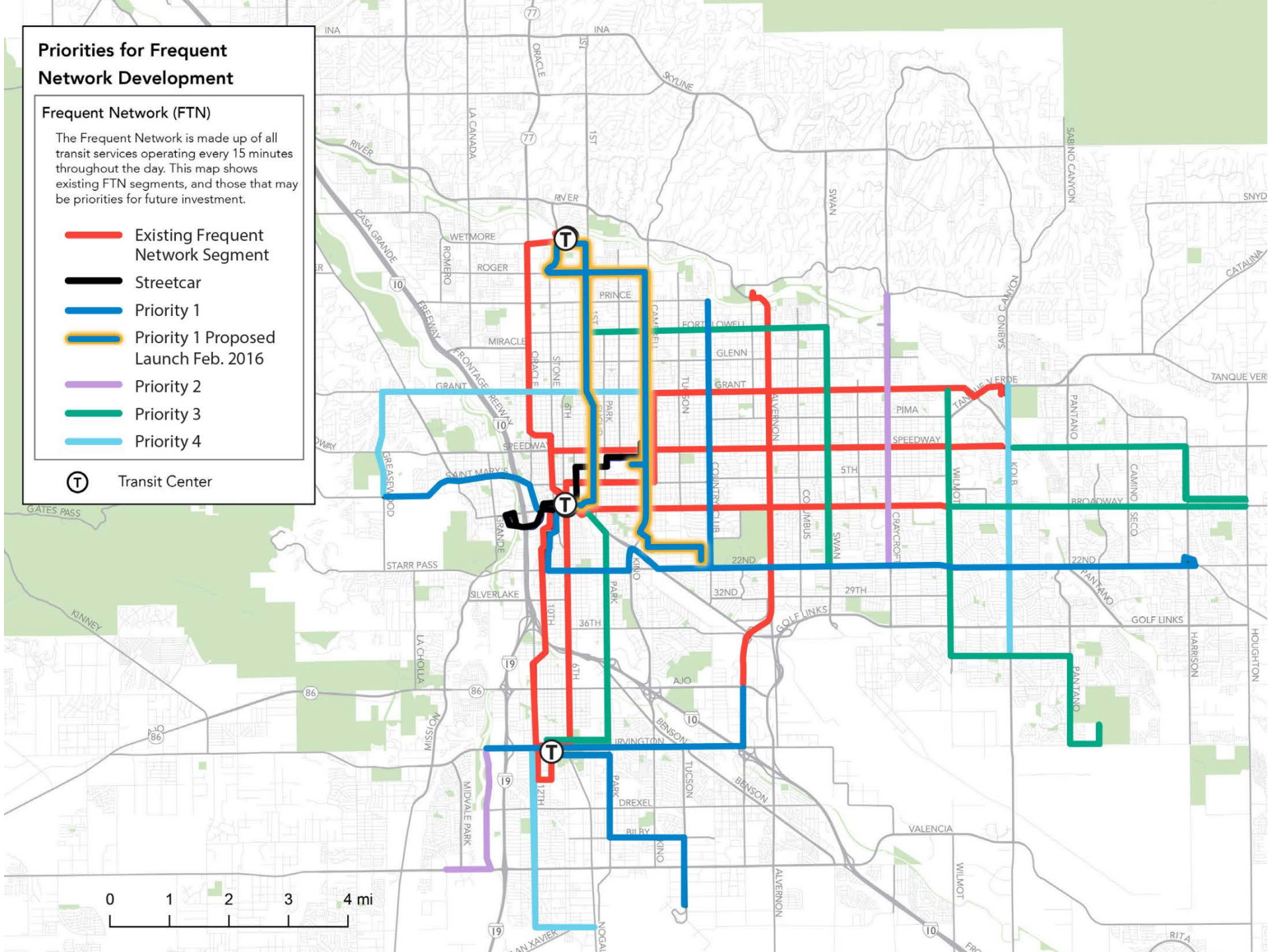
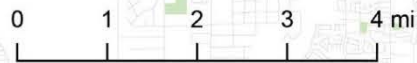
Priorities for Frequent Network Development

Frequent Network (FTN)

The Frequent Network is made up of all transit services operating every 15 minutes throughout the day. This map shows existing FTN segments, and those that may be priorities for future investment.

-  Existing Frequent Network Segment
-  Streetcar
-  Priority 1
-  Priority 1 Proposed Launch Feb. 2016
-  Priority 2
-  Priority 3
-  Priority 4

 Transit Center



To: Jeremy Papuga, City of Tucson
From: Jarrett Walker, JWA
Date: June 22, 2015
Subject: Comments on Proposed Network Changes

This memo discusses our observations regarding proposed changes to the Sun Tran network in August 2015 and February 2016. This memo is designed to provide shared understanding of our view as it stands today.

Attached to this memo and included in it by reference is a table summarizing the proposed changes and our comments, and also a set of maps showing our understanding of what the network would look like after each proposed round of changes.

Our scope was to review these changes particularly in light of the outcomes of the concurrent Transit Visioning process, but also in light of our understanding of network design best practice. We have not analyzed the details of the planned service changes for the City of Tucson FY 2016 to anywhere near the detail that Sun Tran staff has. As a result, our concerns are high-level.

The Big Picture

Difference Between Short and Long-Range Thinking

We want to emphasize that our concerns about the proposed FY 2016 service changes are not criticisms of anyone involved in preparing it. The problems arise, rather, from the fact that service changes are included in the assumptions in the FY 2016 budget adopted by the City of Tucson Mayor and Council, without the framework of a long-term plan. A long-term planning process is just beginning, and its only product so far is the draft (unadopted) Visioning report. Given that the FY 2016 service changes are a reaction to a budget reduction it is not surprising that it could be in conflict with the

Visioning report. This is a normal issue to have when there is a need to make service adjustment due to a decreased budget.

Short term planning tends to be reactive to known problems and issues. In the absence of a visioning or long-range planning framework, short-term planning tends to be especially reactive to current ridership patterns, cutting service where ridership seems low and sometimes adding it where it seems high. Sometimes staff may also be working toward a particular goal for the future network that they have in mind, but if this vision hasn't been developed in a way that is shared and adopted by enough stakeholders, they usually do not get much support to pursue that goal.

Purely short term planning, no matter how well it's done, has some limitations. For example, it relies heavily on patterns of existing ridership even though existing ridership depends on the existing pattern of service. This process is unavoidably circular. If a substantially different pattern of service is better for the city, it is very hard for a process driven by ridership analysis to discover that, because ridership data about an existing system rarely reveals such patterns.

A long-range plan arises from a very different impetus. It begins by observing that the city faces challenges that take time, consensus and leadership to address, and noting how these challenges may get worse in the future. For a city, these tend to include issues of traffic congestion, emissions, public health, economic development, and ensuring access to jobs and opportunity. None of these issues usually seems to be especially at stake in a typical short-range planning process or adjusting service to meet budgetary requirements, but they are the foundation of a long-range plan.

When a strong long-range plan is in place, the short-range planning task becomes quite different, because all planning is expected to move toward the long-range vision. We anticipate that had such a vision been in place, the service recommendations could look different. The conversation about cutting the transit budget would also have been more informed.

Special Problems of Budget Cut

Among the immediate problems the FY2016 service changes are addressing is a substantial budget reduction required by the City of Tucson. This budget direction was not based on an assessment of the degree of damage that any particular percentage cut would inflict to the various transit outcomes that the City values. The final FY 2016 service changes, whatever they turn out to be, should be presented to Council in a way

that helps them understand, at a suitably high altitude, what damage was done by the decision to cut the budget by the specified amount.

Again, if the short-range plan had been in place first, any direction to cut the transit budget, as well, would have happened with a greater awareness that this was a decision to move away from the city's transit goals, and of the specific outcomes that would likely be undermined as a result.

Level of Authority of the Visioning Report

The Visioning report – as presented to elected officials, agency staff members, and the public on Friday, June 19 – is *not* a short-range transit network plan, but it does provide some core ideas for such a plan and an impetus to develop it further. In this exercise we use the Visioning report's priorities map as though it were a short-range network plan, because nothing more authoritative is available, but we do not want to overstate the authority or comprehensiveness of that document.

Typically, a full long-range transit network plan would have a much more thorough exploration and analysis of alternatives, a stakeholder advisory committee, a more extensive and structured public discussion, and finally adoption by both PAG and the City Council.

The Visioning report is the report on one workshop of key stakeholders who worked through the city's transit issues together, and also on our own observations about the kinds of network design that tend to prosper in the long run. It is necessarily high-level. The key outcomes are maps showing recommended priority sequences for expanding the Frequent Network and beginning High Capacity Network planning.

We observed in our analysis of the workshop results that the vision networks that workshop participants drew tended to focus southern service on access to the airport – which is a citywide interest but possibly not the top priority for people living in the south. As a result, this is an area where our own high-level network ideas, expressed in the priorities map, differ substantially from the workshop networks – for example by providing east-west service in the south rather than just the north-south patterns that the workshop tended to prefer.

We therefore feel it's important not to oversell the Visioning report. Where there was strong consensus in the workshop on network design principles and major corridors, we think this is a strong indication that these are solid assumptions, but further analysis and

consensus building would be needed to lock down every detail of the proposed Visioning priorities to the point that it would constitute an overriding authority on network design. Such work is recommended but was not part of this project.

Core Visioning Principle: The Frequent Network

The most important disconnect between the proposed FY 2016 changes, and the Visioning process is the concept of the Frequent Network and especially the high frequency grid.

As outlined in that report, the Frequent Network is the set of all services that run frequently enough that customers perceive that the next bus is always coming soon. There is widespread industry agreement that the baseline definition of frequent service includes 15-minute frequency or better all day. Stronger definitions extend this service level to weekends and evenings.

Frequent Networks are associated with minimal waiting and therefore the freedom to travel spontaneously, not just on rigidly scheduled itineraries. The payoff is evident: most transit agencies report their highest all-day productivity (ridership per unit of operating cost) on their Frequent Network lines. This routine finding should nevertheless be striking because doubling the frequency doubles operating cost, which initially would cut the productivity ratio in half. The high productivity of frequent lines means that frequency, *despite its operating cost*, is the key to high-ridership transit that is heavily useful and valued in a city.

Frequency is especially powerful when it creates grid patterns, because every time two frequent lines cross, transfers are easy and fast, so each line becomes useful for reaching all the destinations on the other line. This is why frequent services in grid patterns tend to be even more productive than frequent services generally.

The Visioning process is emphasizing this frequent grid service pattern as the foundation of future transit mobility in Tucson, and this view was enthusiastically embraced in the workshop. All of the networks drawn in the workshop feature strong grid elements, and the thinking about future grid corridors, such as debates about the relative value of Craycroft, Wilmot, or Kolb crosstowns – was all informed by an understanding that these lines work only as well as their grid connections do. If this approach is confirmed as the vision, it will follow that service planning must view itself as a steward of the Frequent Network, and will be instructed to protect and enhance this product even in the face of the vagaries of the daily budget.

Portland's TriMet, for example, took this approach in the financial crisis. Their 2008 service cuts, precipitated by a steep fall in tax revenue, went out of its way to protect the midday frequencies on its Frequent Service Network, and focused instead on cuts in other areas. When the budget situation became so severe that they had to reduce midday frequencies from 15 minutes to 17 or 18 on the frequent grid, they experienced the biggest ridership drops in the history of the agency. This is easily explained when you consider how these cuts affect both the delay and reliability involved in connecting at grid transfer points. In a grid, if these connections don't work, the system doesn't work.

Transit agencies that rely on frequent networks are also using them to organize land use, and advertise them as logical location choices for people, businesses, and institutions that want or need to rely on transit. To achieve these outcomes, the frequent network must feel permanent. To that end, TriMet sometimes introduces frequent services but does not brand them as part of the Frequent Service Network until they are confident of their permanence. This also explains why TriMet did everything possible to avoid cutting the Frequent Service Network below 15-minute headways, and why restoring those frequencies has been their top priority as the economy has improved. Many other transit agencies – including such comparable cities as Las Vegas and Fresno – are now planning frequent service brands using the same principles.

Other Recommended Principles

Our thinking on these changes is also motivated by two other well-tested principles:

- Look for service patterns useful to many different people and trips. Do not focus too narrowly on any one market, demographic group, or trip pattern. This tends to require pushing back on requests for specialized service or special accommodation of some groups over others.
- Design all-day service around all-day demand. Don't design the all-day service pattern around a problem that happens only for a few hours. Overcrowding, school demand, and various other issues may come up routinely but only at certain times of day. While it's good to handle these problems with the all-day network if it is efficient to do so, designing the all-day network around these problems is usually more expensive and inefficient than just running one or two tripper buses at the times of high demand.

Both of these principles are essential for building a frequent network. Within any limited budget, maximizing frequency means running the fewest possible number of separate routes or patterns, which in turn means building lines that are useful for many purposes, not just one or two, and at all times of day and days of week. Frequent lines thrive on the *diversity* of their users and the diversity of the kinds of trips they're making.

Current Frequent Network

Tucson has no formally defined frequent network, but prior to February 2015 it did have an extensive network of services that are every 15 minutes throughout the service day. *Two of these, as noted, were cut to 20 minutes in February, effectively removing them from the frequent network.*

East-West Elements:

- 22nd st, downtown to Harrison (Line 7, cut to 20 minutes in February).
- Broadway, downtown to Wilmot (Line 8).
- Speedway, downtown to Kolb (Line 4).

North-South Elements:

- Oracle, downtown to Tohono Tadaí (Line 16).
- Campbell, U of A to Tohono Tadaí (Line 15, cut to 20 minutes in February).
- Alvernon, Rillito River/TJCC to Palo Verde & Ajo (Line 11).

There are also two South Tucson frequent radials that do not form a grid:

- S 10th/12th downtown to Laos (Line 12).
- S 6th, downtown to Laos (Line 18).

In addition, Line 9, which covers Grant between Campbell and Kolb, is frequent for several midday hours, but not all day. We do not consider it part of any implied frequent network.

Service Change Recommendations and Their Impacts

This section reviews the specific service change recommendations for August 2015 and February 16. Here, we discuss in detail specific changes that bring up more complex

network design issues. Smaller changes, and those for which we have no comment or critique are noted in the table attached to this memo. That table shows each proposed change and our current reaction to it. Also attached are maps showing our understanding of the February 2015, August 2015, and February 2016 networks, to help us see network effects and especially grid effects.

We begin by reviewing the frequency cuts to Campbell and 22nd that were made in February 2015 but which we suspect may need to be undone, all or in part, depending on their ridership impact. We think it is important to keep this issue in mind when considering the proposals for August 2015 and February 2016, because it may be possible to undo some of the more harmful impacts of those changes.

February 2015 Changes (Retrospective)

CAMPBELL AND 22ND REMOVED FROM FREQUENT NETWORK (FEB 2015)

Of the eight corridors forming what could be branded as a Frequent Network, two, Campbell and 22nd, were cut to 20 minute all day headways in February 2015, a level at which grid connection points cease to function well because transfer waits are both too long and too unpredictable. Again, the experience of other agencies is that frequency changes in this 15-20 minute range have especially large ridership impacts, especially in a grid structure. We think both of these changes are likely to be relatively harmful, not just to existing ridership but also to the potential to grow these corridors in the long term.

We understand that this change was motivated, in part, by a desire to complete an important missing link in the grid, by extending the Campbell line to touch Broadway and 22nd. This is certainly a good idea, as it makes Campbell service useful for more types of trips, including providing 22nd St passengers with a connection directly to the University. It was also motivated by the observation that ridership was falling along Campbell, and that not much ridership improvement along 22nd had been observed when its frequency was increased to 15 minutes just over a year ago.

We agree that extending Campbell service to 22nd is an excellent move but would have been more reluctant cut frequencies below 15 minutes to achieve it. As a short north-south line, Campbell is especially dependent on transfers and thus on the consistent high frequency connections with east-west lines. Extending the line south will make this even more true.

On the other hand, now that the frequency on Campbell has been cut, it may be appropriate to consider whether Euclid/1st should be the next priority for high frequency. Staff notes that university activity concentrations appear to be moving south and west, closer to Euclid than to Campbell. Euclid-1st also shows up as the most productive corridor that has only 30 minute service, which is a signal that raising that corridor to 15-minute frequency may yield even better benefits than that frequency does on Campbell. Both Campbell and Euclid-1st are high priorities for frequent service, but we do not claim to know which should come first.

Line 7 on 22nd St looks like a very logical grid element, but it is weaker than Broadway and Speedway for some obvious structural reasons. Densities are lower, and a long stretch between Park and Country Club is essentially inaccessible.

If the 20 minute headway proves to be a problem, one option is to restore the 15 minute headway but introduce a shortline in the vicinity of Kolb, with 30 minutes service further east, as demand drops off east of there. This would restore the core grid element and its frequent connections while still saving at least one bus from the line. It would also pull back the Frequent Network brand to the strongest segment of the line, to be extended east further in the future, rather than dropping this line from a Frequent Network. While some 22nd trips are busy east of Kolb, this might still be a solution if that demand occurs only on select trips. Obviously any shortline in this area is contingent on the availability of a turnaround, something Sun Tran staff have indicated may be an issue. Still, if ridership does suffer with the cut to frequency, this option is may be worth additional investigation.

A more radical option for shortening the 7 to improve its frequency would be to delete service on 22nd west of Aviation Parkway and simply run the 7 nonstop into downtown via Aviation Parkway. The neighborhood that would lose the service would still have abundant north-south service, with easy connections at Ronstadt to access 22nd. This added delay is largely cancelled out by restoring 15-minute frequency on the 7 so that the timing of connections with the southern radials is consistent.

Another option is to decide, as a matter of policy, that the city does not see 22nd as a Frequent Network corridor in the long run. While the Visioning network shows 22nd as first priority for restoration of service, this was not tested in the workshops. The workshops used a base map that showed Campbell and 22nd as existing frequent network services (the pre-February 2015) condition, so the participants were not

presented with the question of how important these segments are or how urgent it is to restore them.

Finally, staff notes that the planned reconstruction of the 22nd St bridge will make Line 7 faster, which could also contribute to making frequency restoration easier.

While further changes to Campbell and 22nd are not contemplated in the forthcoming service changes, these possibilities should be considered at least for 2016.

Minor Changes (August 2015)

LINE 11-ALVERNON: FREQUENCY INCREASE AND REMOVAL FROM LAOS TC

While this change is accurately categorized as minor for Title VI purposes, it raises some significant issues.

The proposal is to:

- Increase Alvernon frequency to every 10 minutes, and frequencies on the Ajo Way and Palo Verde segments to every 20 minutes, across a long span of the afternoon, though not quite all day.
- Combine the Ajo way of Route 11 with Route 50, making this a continuous route all the way from Palo Verde to Mission, not deviating into Laos

There are two main arguments for it:

- By deleting duplicating service along 6th Ave between Ajo Way and Irvington, resources are release to support higher frequency.
- The frequency increase on Alvernon is also a response to many indications of overcrowding.

The proposal has three obvious downsides:

- The expensive frequency increase looks lavish at a time when severe frequency cuts have just been made elsewhere. We generally recommend maximizing the extent of 15 minute frequency before introducing more 10-minute frequencies, as is proposed on Alvernon, unless we are dealing with a very short-trip market, like the streetcar's, where sensitivity to frequency is especially high. Staff has justified this frequency change as a response to overcrowding, which we discuss below.
- It severs all trips between Alvernon or Ajo Way and any of the feeder lines extending south from Laos. This trips now require an additional transfer, and:

- The proposed 20-minute frequency on Ajo Way (still 30 at most times of day) is not sufficient to make this transfer easy going north, despite the 7.5 minute frequency of Line 18. Traveling from a Laos feeder to a point of Ajo or Alvernon requires not just a double transfer, but one where the second transfer is to a lower frequency service. When Ajo is at 20-minute headways there is a further problem, which is that the time required to make the transfer varies dramatically from one trip to the next.

On balance, we advise against this change at the currently proposed frequencies, though we would enthusiastically endorse it if all-day 15-minute frequency along Ajo Way were possible. The following details our reactions in more detail.

Overcrowding and Pass-Ups on Alvernon

Sun Tran indicates that bus drivers and passengers along Alvernon sometimes report severe overcrowding. However, if overcrowding were *routine* and *occurring over a long period of the day*, there would also be reports of pass-ups. Pass-ups happen when there is no more room on the bus no matter how tightly people are packed in, and if severe overcrowding were the routine condition, the normal variation of loading would mean that pass-ups would be happening occasionally. Sun Tran has received no reports of pass-ups.

Sun Tran *encourages* drivers to report overcrowding but *mandates* that they report pass-ups, so while it is possible that pass-ups go unreported, we think this is unlikely to be happening routinely. Drivers are usually motivated to report pass-ups, as they tend to want to offer some encouragement to the people left behind. The lack of any reports of pass-ups suggests that there are probably many instances of severe overcrowding on certain trips, especially trips running late, but that severe overcrowding is not chronic and routine. If it were, pass-ups would inevitably occur now and then and there would be some record of them.

While Alvernon would support 10-minute all-day frequency in a network of abundant resources, the proposed frequency increase across all of Line 11 is going to seem questionable to people who are experiencing frequency cuts elsewhere.

An additional problem is that the two branches of the line have very uneven demand. Ajo Way has much higher demand than the Palo Verde / Airport branch, which suggests that in the long run the Palo Verde segment will have to be separated so that its frequency can be set lower to match its lower demand. Combining the Palo Verde segment with Swan might be one solution along these lines, so that all Alvernon trips

would flow through to Ajo Way or eventually Irvington. The latter is suggested both in the Visioning document and Gene Caywood's comment.

Meanwhile, Sun Tran may wish to do some more explicit surveying to determine exactly when and in what conditions overcrowding is occurring along Alvernon. This would help clarify whether the solution is a frequency increase or whether inserting trippers at certain times, briefly increasing the frequency to 7.5 min, is a better solution. The advantage of trippers is that they do not require increasing the Palo Verde frequency from 30 minutes to 20 minutes, which does not appear justified even in the long view of the Visioning.

Ajo Way Crosstown Proposal

Like the Grant crosstown discussed below, the Ajo Way crosstown will be a big success in the context of an eventual high frequency grid. Currently, however, the proposed frequency on Ajo is insufficient for good grid connections, and there are not enough north-south high-frequency lines crossing Ajo to provide abundant mobility payoffs in return for losing the direct service into Laos.

Severing Ajo Way from Laos has some very severe impacts on a number of logical trips inside southern Tucson. Notably, residents along Ajo Way will have great difficulty getting to important destinations in their own area, such as the major shopping areas along Calle Santa Cruz and the Wal-Mart area just west of there on Valencia.

A logical long-term structure for this area would be to expand the high-frequency grid to include 15-minute crosstowns on both Ajo Way and Irvington. One eventual possibility is for Alvernon to be combined with Ajo Way only, while another north-south high-frequency route, eventually Country Club or Campbell, is extended south and

turns west to be the Irvington crosstown.¹ Palo Verde, which is a very low priority for frequency, would then be an extension of Swan, where frequency is also a very low priority. This eventual structure, creating a southern grid, would deliver routes that allow frequency to be set correctly for each segment.

Meanwhile, our assessment is that the currently affordable frequencies are too low to replace a radial structure (centered on Laos) with a grid structure. When introducing newly required transfers, these need to be either (a) among high frequency services, so that the transfer is fast, or (b) at timed-transfer or “pulse” points where schedules can be coordinated.

In general, best practice design on the edges of grids is especially careful in designing the transition point between the inner grid area and the more radial timed-transfer area further out. Sometimes a crosstown analogous to Ajo Way is created but still deviated into the major center, Laos in this case, to retain one-transfer access to all the other routes converging there. The situation is rather analogous to Euclid and Park; on the surface they suggest a good crosstown but they are too close to Ronstadt for that to work well; they would lose too many connections by not deviating there while the time cost of deviating to Ronstadt is low. Although the distance is further, we suspect that removing the Ajo Way corridor from Laos will be a net negative for similar reasons.

LINE 8-BROADWAY FREQUENCY CHANGE AND ROUTE ADJUSTMENT

Two changes are proposed to the 8-Broadway. The first would reduce AM peak frequency from every 10 minutes to every 15 minutes. While this frequency cut will increase waiting times, likely negatively impacting ridership during this period, the

¹ We concur with Gene Caywood’s suggestion here, which is that an Irvington crosstown, described going east from Laos, would turn north on Country Club, east on Ajo Way, north on Palo Verde and etc. to continue as a north-south frequent line. This provides frequent service between Laos and the medical center at Ajo & Country Club..

proposed 15-minute frequency at least preserves the integrity of the route's grid connections.

One important aspect to this frequency change is an implied cut to the frequencies of both branches of the 8, serving Wilmot north of Broadway and Broadway east of Wilmot. These branches are not currently frequent, but cutting them from 20 to 30-minute frequency does increase waits, diminishing the service quality and likely impacting ridership. The only bright side is that the pattern of connections with intersecting 15- or 30-minute services becomes more consistent.

We note that neither of these branches was not an especially high priority for frequent service in the Visioning workshop. There was a general interest in extending the high-frequency grid further east, but apart from some shared interest in Kolb there was little consensus about priorities here. In our Visioning report we assigned relatively low priorities to improvements in this area because so many higher-ridership areas (both central and south) clearly need the frequency first.

The second change to the 8-Broadway would revise the north branch to extend out Tanque Verde to Sabino Canyon, rather than turning around via Wilmot, Grant and Tanque Verde. Line 5 would now turn around using the 8's current turnaround. We have no concerns about this change.

LINE 3 SEVERED DOWNTOWN

The Visioning report suggests that the direct link between downtown and PCC West Campus, currently provided by Line 3, should eventually be in the Frequent Network. At that stage, it would probably become an extension of the Broadway, Speedway or 22nd lines, so that customers on north-south lines east of downtown would have a one-transfer grid connection to reach PCC West Campus.

In the short run, breaking up Line 3 does introduce potential double transfers to reach PCC West Campus from many origins that now make a single transfer. On the other hand, Line 3 is so infrequent that it is difficult to transfer to in any case, so this change may not make things that much worse. In general this change moves us toward the Visioning network in that it severs PCC West Campus from a permanently low frequency line, the 5th St corridor, so that it can later be made more frequent and reconnected to a more appropriate eastern partner.

STANDARDIZING CLOCK HEADWAYS (LINE 10, 27, 29)

Some proposed changes increase the use of clock headways, patterns that repeat each hour. For infrequent service, we recommend that all headways of 30 minutes or worse be multiples of 30 minutes. This (a) makes the schedule easy to remember, (b) makes it possible to build timed connections at obvious nodes such as Laos, and also (c) ensures that even if connections are not timed, they work the same way no matter which trip you're on. We note the change of the 29's evening headway from 40 minutes to 60, and more generally we would endorse all frequency cuts that change all headways of 35-59 minutes to 60. We do not even consider these to be cuts, as they improve connectivity with other lines due to harmonized frequencies.

Clock headways are the same reason we generally recommend adjusting 20-minute headways either up to 15 or down to 30. In a network where the multiple of 15 is the dominant headway pattern, the multiple of 20 interacts awkwardly with other routes, especially half-hourly routes, causing wide swings in the connection time from one trip to the next.

LINE 34 AND 10 COVERAGE REDUCTIONS NORTH OF RILLITO RIVER

The small northward deviations of Lines 34 and 10 in the vicinity of Tohono Tadaí Transit Center are both proposed for deletion, and given the low ridership, and the alternative service via Sun Shuttle routes for the Line 10 area, we see little downside to this.

We noted a potential for a stronger change here. Line 34, which generally covers Fort Lowell, turns north on 1st to Tohono Tadaí. This potentially creates a high frequency segment along the northern part of the Euclid-1st corridor but not the higher-demand southern part. Rather than turn north at all, consider turning Line 34 south and running it into downtown via 1st-Euclid, thus delivering 15-minute headways on this high demand segment. This also solves a key problem with the Grant crosstown proposal discussed below. It would clearly be an interim arrangement because the entire Euclid-1st corridor is a high-priority for frequent service. Once that frequency is achieved, and when Fort Lowell also supports frequent service, the final configuration of Fort Lowell service should be to continue west on Fort Lowell to Oracle, then potentially take over the current 10 routing via Miracle Mile, etc. to Tohono Tadaí. This would achieve some savings by removing Line 10 from downtown, and would provide complete grid service on the full length of Fort Lowell, while retaining direct service from this corridor to

Tohono Tadaí. Again, this should only be attempted when sufficient grid frequencies are available.

LINE 25 FREQUENCY CHANGE

The minor change proposed for Line 25 would standardize the route to a 30-minute frequency all day long. Currently, the route runs every 20 minutes during the midday period from approximate 12:30 pm to 4:30 pm.

This change would improve the ability of Sun Tran to time connections throughout the day at Laos Transit Center. Additionally, Sun Tran staff plan to offset the frequencies of Line 25 and Line 2 on Irvington between Laos TC and Park, introducing a new segment of frequent service.

In addition, we strongly recommend that the next service change include a review of scheduling at Laos, to ensure that timed transfer connections among all half-hourly and hourly lines are as consistent and reliable as possible. This is an area of high transit reliance but scattered destinations, and a timed-transfer structure is the only way to deliver all trips to their destinations without long delay. Timed transfer is also a way to create more security at Laos (both perceived and actual) at the time that most customers are using it.

Major Changes (February 2016)

GRANT ROAD (LINES 9 AND 20) CROSSTOWN

Building successful grids inevitably requires taking apart historic routes that run in a more radial pattern, zigzagging into downtown. Line 9 is a route of this kind. With the emphasis on everywhere to everywhere access along the grid, combining Lines 9 and 20 to create a continuous Grant line – all the way from Greasewood in the west to Kolb in the east – seems like an easy and obvious move.

However, the frequency necessary to make this work is not fundable at this time. Successful changes of this kind require high frequency on the new grid elements, so that if passengers must transfer who formerly had a direct trip, the transfer is not too onerous. Instead, FY 2016 proposed service changes have a 30-minute frequency on the new Grant crosstown, which is insufficient for a grid effect. Line 9 now runs every 15 minutes for about six hours a day, and this would be cut back to half hourly, so the change is substantial. This change also interacts badly with the frequency cut on the Campbell crosstown, which will make it more difficult to reach U of A from outer parts

of Grant. This amounts to a transfer between a 30-minute service and a 20-minute service, which means not just long waits but waits that vary based on which trip you're on.

We recommend deferring a Grant crosstown until it can be run every 15 minutes, and until the necessary *high frequency* grid elements are in place to support it. At a minimum this would include 15-minute frequency on Campbell and Euclid-1st, which are very high priorities for this service in any case. Meanwhile, since the Line 9 frequency is too brief to count as Frequent Network service in any case, it may be possible to curtail some of this, depending on demand, to achieve some savings.

FREQUENCY CHANGE TO LINE 27-MIDVALE PARK

This change would reduce peak frequency on the Line 27-Midvale park from every 15 minutes to every 30 minutes. Currently, the 27-Midvale Park operates at 15-minute headways from approximately 2:00 pm until 6:15 pm, and serves several important destinations such as PCC's Desert Visa campus at Calle Santa Cruz and Drexel, a commercial concentration at Valencia and Midvale, and Casino del Sol, where the route has its terminus.

There is a minor conflict between the Visioning future frequent network and this frequency change. The real problem, however, is the routing, which needs to be revised at the earliest opportunity. This may not be addressable at this time but the route should be studied further in the context of February 2016 changes.

In the Visioning network, a Priority 2 frequent network segment extends down Calle Santa Cruz from Irvington, terminating at Midvale Park. This is envisioned as an extension of a future frequent network element on Irvington between Palo Verde and Calle Santa Cruz. This is an obvious and urgent improvement to the route, making it both more direct and also introducing service to the retail part of Calle Santa Cruz, north of the college, which the current route misses. This area with its jobs and shopping opportunities obviously needs access from all parts of southern Tucson.

Staff has clarified that the current coverage on Santa Clara Ave, which requires the existing route to be so circuitous, is primarily a security issue; residents in this neighborhood do not feel safe walking to the service on 12th Avenue. While this is understandable, it creates an unmanageable precedent that conflicts with the core Vision idea that routes cannot be so close together if frequencies are going to be maximized. Frequency arises from dividing the resources over the fewest possible

route segments. We therefore question whether any neighborhood can demand two parallel routes 1/4 mile apart if the Visioning network is ever to be achieved.

In addition, spending eternal operating cost is a poor solution to security issues. Modest infrastructure is often a better solution.

Meanwhile, we encourage staff to study other solutions to this problem. Deviations of the 12th Ave service may be worthwhile if they allow Route 27 to be made more rational. If Route 27 could support being 1 mile longer round trip, there is a possible (though still circuitous) solution to getting service to the developed part of Calle Santa Cruz: From Laos, operate west on Irvington, south on Calle Santa Cruz, loop the college and return north to Drexel, then east on Drexel, south on Santa Clara, and west on Valencia to terminate.

Finally, as with all these issues, it may be worth studying whether the security problems are focused at certain times of day. If it is, for example, a problem arising mostly at night, that suggests temporary or short-span solutions, such as deviating from 12th Avenue only at those times.

Conclusion

The above discussion covers the proposed changes that we think are strongly related to the Visioning and may not be aligned with it. In making these comments we want to emphasize again that we were not scoped to analyze these changes in sufficient detail to make exact recommendations, nor do we claim to know all of the considerations that led to the current proposals. We hope these comments are useful to staff as you seek the right balance between short-term and long-term considerations.

Attachments:

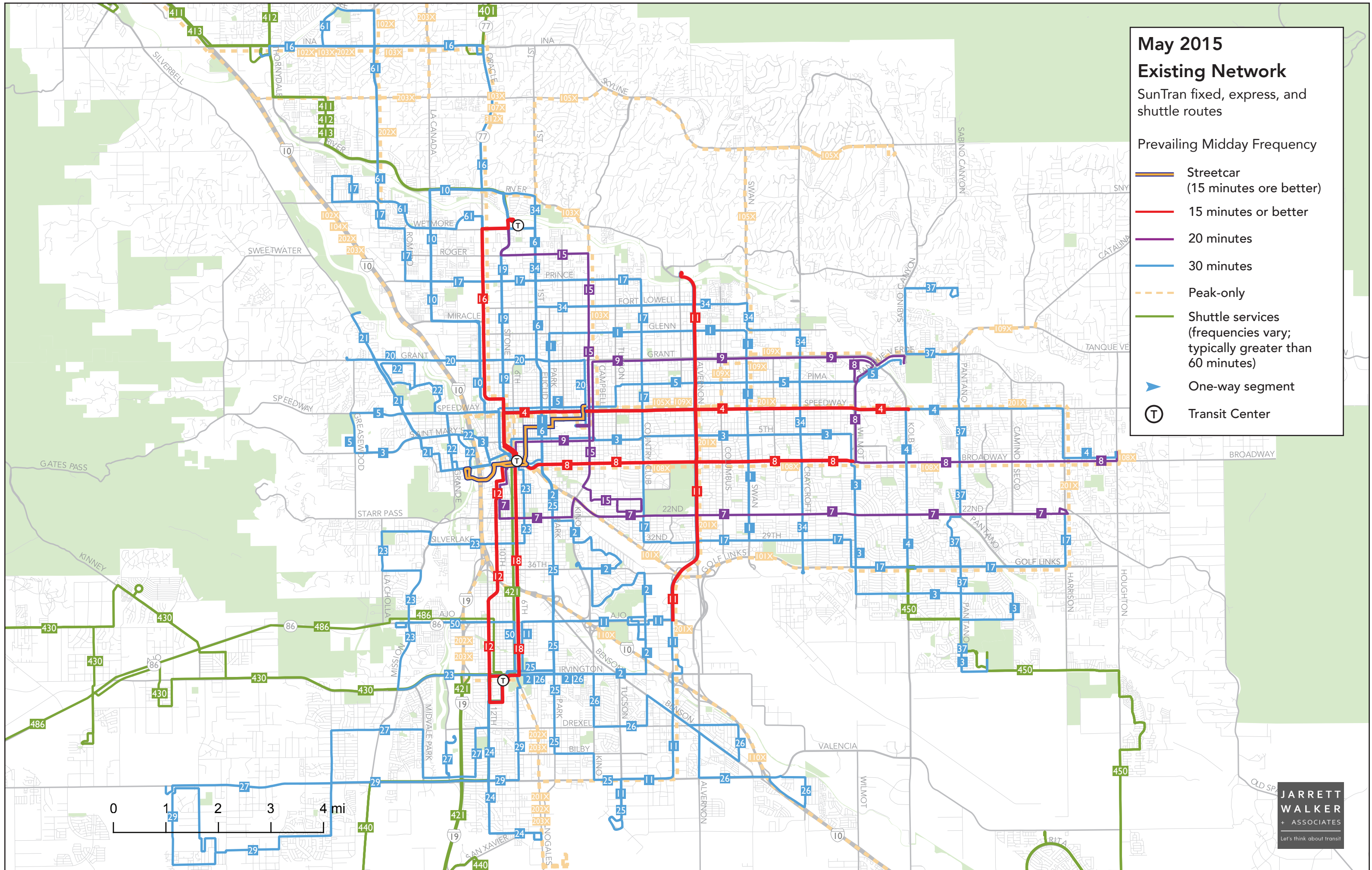
Network Maps as we understand them for February 2015, August 2015, and Feb. 2016.
Summary of Changes and JW+A comments.

May 2015 Existing Network

SunTran fixed, express, and shuttle routes

Prevailing Midday Frequency









- ▬ Streetcar
(15 minutes or better)
- ▬ 15 minutes or better
- ▬ 20 minutes
- ▬ 30 minutes
- - - Peak-only
- ▬ Shuttle services
(frequencies vary;
typically greater than
60 minutes)
- ▶ One-way segment
- T Transit Center

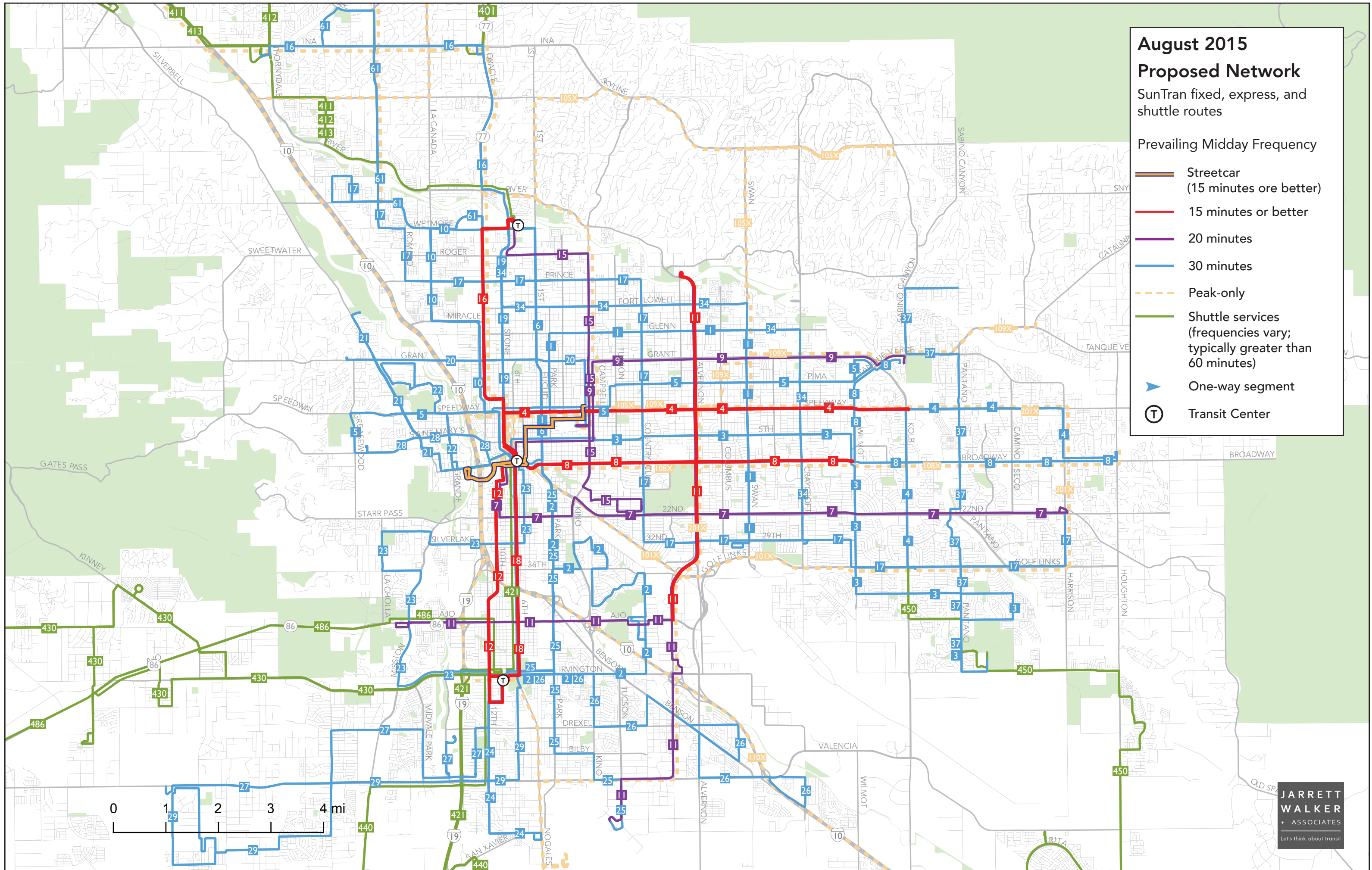


August 2015 Proposed Network

SunTran fixed, express, and shuttle routes

Prevailing Midday Frequency









-  Streetcar (15 minutes or better)
-  15 minutes or better
-  20 minutes
-  30 minutes
-  Peak-only
-  Shuttle services (frequencies vary; typically greater than 60 minutes)
-  One-way segment
-  Transit Center

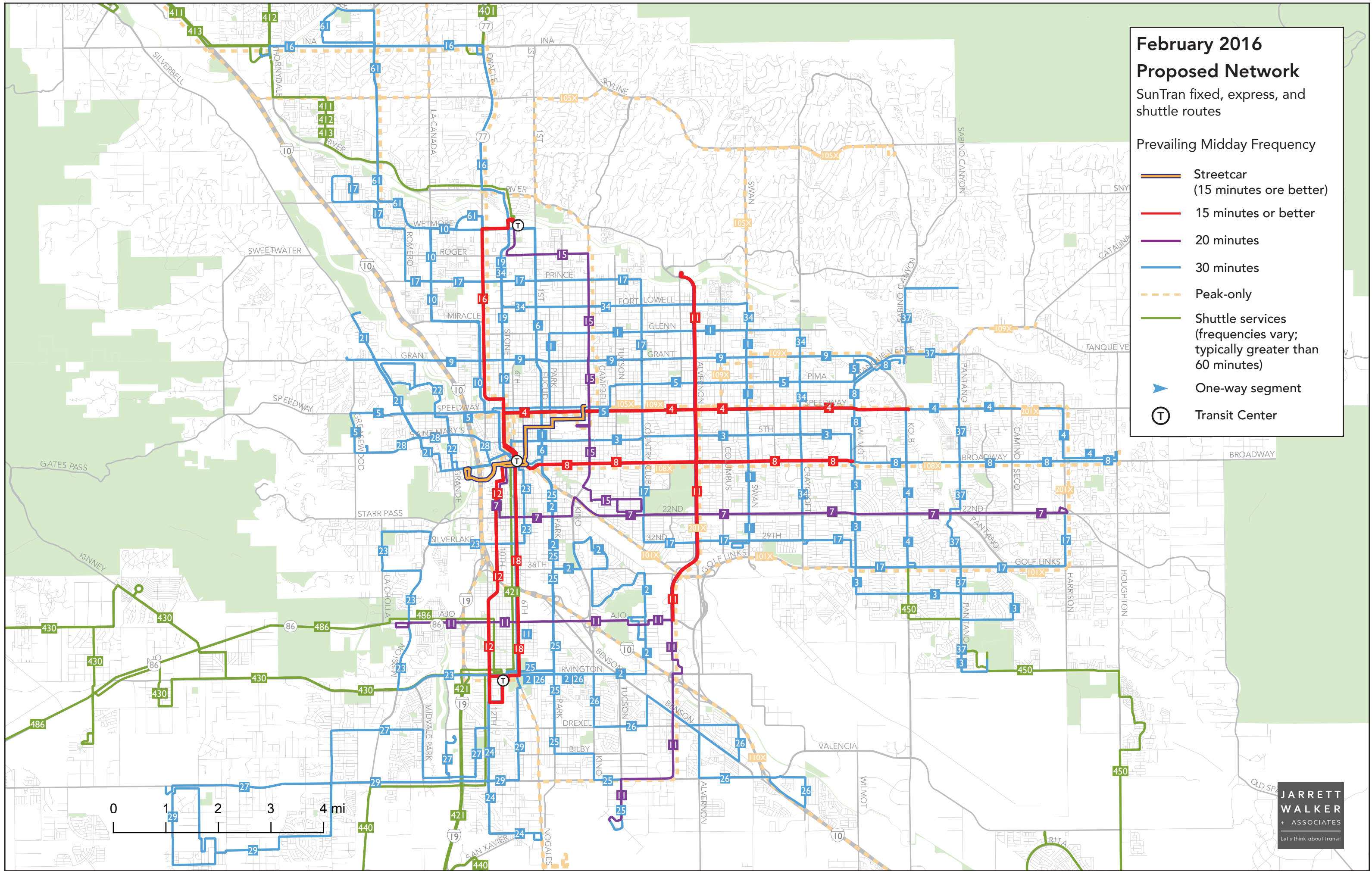


February 2016 Proposed Network

SunTran fixed, express, and shuttle routes

Prevailing Midday Frequency

-  Streetcar (15 minutes or better)
-  15 minutes or better
-  20 minutes
-  30 minutes
-  Peak-only
-  Shuttle services (frequencies vary; typically greater than 60 minutes)
-  One-way segment
-  Transit Center



Minor Service Changes - August 2, 2015

Route	Description	Type	Vision Impact	Comments
1	New southeast turnaround just west of 29th and Swan	Route Adjustment	No Impact	OK. No additional comments.
2	Simplify routing through Pueblo Gardens area west of Park between 36th and 22nd.	Route Adjustment	Positive	Excellent. Increases service frequency on Park to every 15 minutes between 36th St and RTC.
5	Delete east of Wilmot; new turnaround via Wilmot / Pima / Grant (similar to existing 8(a))	Route Adjustment	No Impact	OK. No additional comments.
8(a)	Extend out Tanque Verde past Wilmot turnaround at Udall Station; basically takes this segment from the Route 5	Route Adjustment	No Impact	OK. No additional comments.
10	Delete River Rd. segment between Wetmore and TTC; new shorter, more direct routing via Wetmore from Flowing Wells to Stone.	Route Adjustment	No Impact	OK. No additional comments.
34	Reroute from TTC to 1st and Ft Lowell via Stone, Ft Lowell. Deletes existing River/1st path, which is longer.	Route Adjustment	No Impact	OK. No additional comments.
8(b)	Reduces AM frequency (From 7:15 a.m. to 11:30 a.m.) on Route 8 to 15 minutes for the current frequency of currently every 10 minutes	Frequency Adjustment	No Impact	Expect some ridership loss. Route 8 branch frequency move from 20 to 30 minutes during this time.
11(a)	Increase frequency to 10 min, 20 on branches (Should be part of the 11/50 improvement)	Frequency Adjustment	Eventual	Not at this time. This frequency increase looks hard to justify while frequency cuts are underway elsewhere. If route does not go to Laos TC it must have another frequent North/south connection.
25	Decrease frequency from 20 minutes to 30 minute frequency all day (4 a.m. to 8 p.m.)	Frequency Adjustment	No Impact	This is an improvement. The offset with Route 2 between RTC and 36th/Park, to yield 15-min frequency. Potential ridership payoff of new frequent segment.
10	Adjust evening frequency from 40 to 60 minutes in the evening (7 p.m. to 11 p.m.)	Frequency Adjustment	No Impact	OK. This is an improvement.
27	Adjust evening frequency from 40 to 60 minutes in the evening (7 p.m. to 11 p.m.)	Frequency Adjustment	No Impact	OK. This is an improvement.
29	Adjust evening frequency from 40 to 60 minutes in the evening (7 p.m. to 11 p.m.)	Frequency Adjustment	No Impact	OK. This is an improvement.
3	Splits route 3 in downtown; new route 28 would provide service between PCC West and Downtown; at this time, both would operate at 30-minute frequency	Split Route / Frequency	Mixed	OK if the separability is needed. Future Route 28 is part of Visioning's Frequent Network. Adds a transfer to many trips from the east, but probably only for riders originating along 3.
11(b)	Combine with 11-Alvernon Ajo branch, extending the route west from 6th to Mission	Merge Routes	Eventual	Not at this time. The proposed frequency needs to be 15 minutes to function as a grid route. This change eliminates many potential timed transfer connections for routes south of LTC.
50	Combine with 11-Alvernon Ajo branch, extending the route west from 6th to Mission	Merge Routes	Eventual	Not at this time. See Route 11 Above.

Major Service Changes - February 2016

Route	Description	Type	Vision Impact	Comments
9	Combine with Route 20, operating through route on Grant from University Greasewood to Sabino and Tanque Verde	Merge Route	Eventual	Not at this time. Grid is not strong enough to support this yet. Do not do this until you have 15-minute all day service on Grant, Campbell, and Euclid-1st.
20	Combine with Route 20, operating through route on Grant from University Greasewood to Sabino and Tanque Verde	Merge Route	Eventual	Not at this time. See Route 11 above.
27	Reduce peak frequency from 15 to 30 minutes (creates consistent 30 minute frequency until 7 p.m.)	Frequency Change	No Impact	Light conflict with Visioning map regarding frequency along Calle Santa Cruz and to WalMart, which has this as a frequent segment.

Next: JWA Transit Choices Report Recommendations

Transit Task Force
July 13, 2015



1

Presentation Overview

1. Review of visioning process
2. Summary of frequent network priorities
3. Recommendation
4. Discussion
5. Next steps?



2

Review of Visioning Process

1. PAG recently completed are Regional Transit Vision exercise for the 2045 Regional Transportation Plan
2. Exercise conducted by Jarrett Walker and Associates and contained the following components
 - Framing the Questions Report
 - Transit Choices Stakeholder Workshop
 - Transit Choices Report
 - Elected Officials Workshop



3

Visioning Process Outcomes

Primary Outcomes

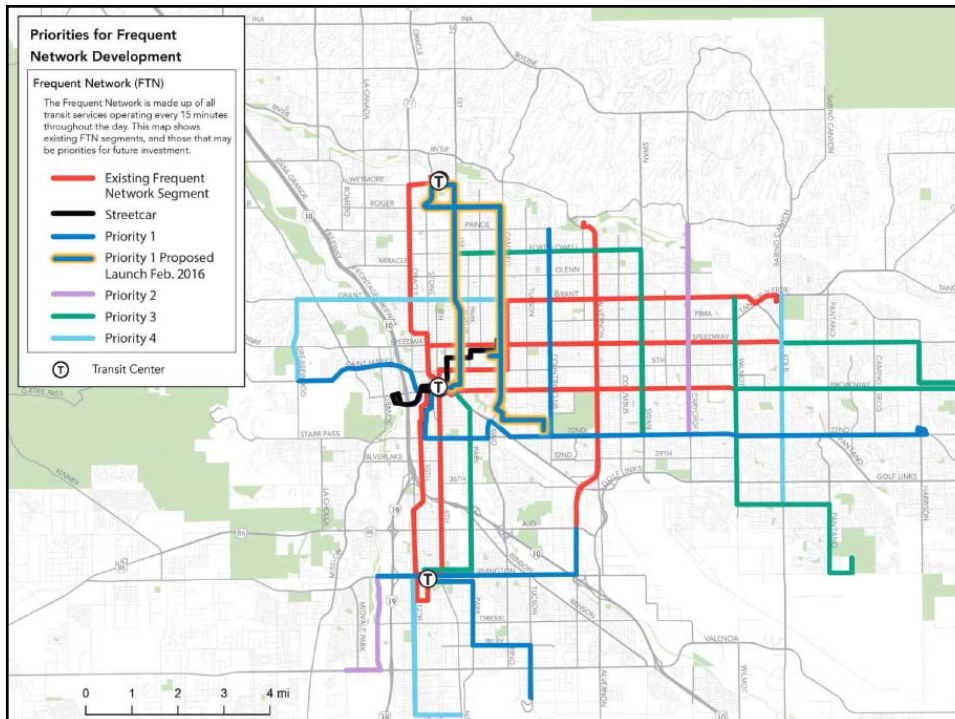
1. Prioritized list of future frequent network improvements
2. A set of potential study corridors for future High Capacity Transit investment
3. Several study areas for future coverage expansion



4

Summary of Recommendations

FTN Segment	Stakeholder Agreement	Land Use	Existing Ridership	Network Continuity	Major Destination	Priority
22nd		✓	✓	✓	✓	1
Campbell		✓	✓	✓	✓	1
Euclid / 1st	✓	✓	✓	✓	✓	1
Country Club	✓	✓	✓	✓		1
Anklam (to PCC)	✓		✓			1
Palo Verde - Irvington	✓	✓		✓	✓	1
S. Park - Bilby (to Airport)	✓		✓	✓	✓	1
Calle Santa Cruz (Irvington to PCC Desert Vista)	✓	✓		✓	✓	2
Craycroft	✓	✓	✓	✓		2
Wilmot	✓	✓		✓	✓	3
S. Park (downtown to Laos TC)	✓			✓		3
Fort Lowell	✓		✓	✓		3
Swan	✓	✓	✓	✓		3
Broadway (Wilmot to Harrison)		✓	✓	✓		3
Kolb	✓			✓		4
W. Grant / Greasewood				✓		4
S. 12th (south of Laos TC)		✓				4



Recommendation

Staff recommends that the Transit Task Force support the frequent network priorities identified in the Jarrett Walker and Associates Transit Choices report and use those priorities to guide future transit service improvement investment.



Discussion





TRANSIT TASK FORCE MEMORANDUM

Item 7: Next Steps: JWA Transit Choices Report Recommendations

Page: 1 of 1

Issue – This is an agenda item to discuss the Jarrett Walker and Associates Transit Choices Report and how it relates to guiding transit planning decision-making.

Staff Recommendation – Staff recommends that the Transit Task Force support the frequent network priorities identified in the Jarrett Walker and Associates Transit Choices Report and use those priorities to guide future transit service improvement investment.

Background – The Pima Association of Governments (PAG) recently completed a regional transit visioning exercise intended to provide the framework for the development of a transit vision to be included in their 2045 Regional Transportation Plan (RTP). A Transit Choices Workshop was conducted with the goal of collecting input from a variety of stakeholders and members of the public. Participants took part in three primary activities that included - answering transit specific questions using silent polling devices, playing a transit planning game with a fictional city to learn basic concepts of transit planning and lastly performing the same transit planning activity using the City of Tucson. The primary outcomes of the session were a prioritized list of future frequent network improvements, a set of potential study corridors for future High Capacity Transit investment and several study areas for future coverage expansion.

Present Consideration – The attached Jarrett Walker and Associates Transit Choices Report includes a prioritized list of future frequent network improvements. The prioritized list developed by Jarrett Walker and Associates is based on the information that was collected in the stakeholder workshop that were evaluated based on five criteria:

1. **Stakeholder prevalence** – Did many stakeholders agree on a particular segment on their maps?
2. **Development and street pattern** – Is there density? Does the street network allow easy access to people?
3. **Current ridership** – Is there already strong ridership on existing service or corridors?
4. **Network continuity** – Is the segment important to the usefulness of the network?
5. **Major destinations** – Does the segment provide service to a major regional destination?

The list of priorities can be found in the attached Transit Choices Report on page 26. Staff recommends utilizing the list of priorities to guide future service improvements.

Financial Considerations – None

Attachments: Jarrett Walker and Associates Transit Choices Report

Transit Choices Workshop Report

JUNE 11, 2015

Pima Association of Governments

JARRETT WALKER + ASSOCIATES

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1. Executive Summary

1. Executive Summary

Workshop Goals and Objectives

The major objective of this workshop was to collect input from people representing a broad array of organizations and constituencies on their visions for the future of transit in Tucson. While no single workshop can clarify such a vision for an entire community, in combination with ongoing outreach efforts, the results of this event are intended to form the framework for the development of a vision to be included in PAG's 2045 Regional Transportation Plan.

The organizations shown in Figure 1 and their representatives participated in the workshop.

Additional transit workshops were held with members of the public in May. These workshops used some of the same tools and exercises as the stakeholder workshop, the results of which are described in Appendix C.

Silent Polling

At several points in the workshop, stakeholders were asked to respond to questions using silent polling devices. These devices allow a user to respond to a question asked by a presenter in real time, anonymously. Thus, stakeholders could be assured that nobody would know which answer to a particular question they selected except

Bus Friends Forever

Bus Riders Union

City of South Tucson

City of Tucson City Manager's Office

City of Tucson Transportation

City of Tucson Transit Task Force

City of Tucson Ward 1 Office

City of Tucson Ward 3 Office

Drachman Institute

Friends of the Streetcar

Living Streets Alliance

PAG/RTA Transit Working Group

Partners for Housing Solutions

Pima Community College

Pima Council on Aging

Pima County Environmental Quality

Pima County Transportation

RTA CART Committee

Southern Arizona Leadership Council

Southern Arizona Transit Advocates

Sun Tran

Town of Oro Valley

Tucson Association of Realtors

Tucson Metropolitan Housing Commission

Figure 1: Participating Organizations

themselves.

Stakeholders were asked questions pertaining directly to the two interactive planning exercises completed during the workshop, as well as general questions about their priorities for transit in Tucson. Questions regarding each exercise are discussed in their respective sections and throughout; each question regarding each of the two major exercises of the workshop are reproduced in Appendix A and B as well.

Fictional City Game

The first workshop exercise gave the participants a chance to acquire some knowledge of the basic tools of transit planning, using a map of a fictional city called Prairieville. This exercise introduces the tools of transit planning, and asks players to consider major questions of transit planning in a place where they have no constituents or agendas to advocate for. This exercise is discussed in detail in Chapter 2, and the results of the game are compiled in Appendix A.

1. Executive Summary



Figure 2: Stakeholder Workshop

Tucson Planning Game

After designing a fictional transit network for Prairieville, the stakeholders were asked to do the same thing for Tucson. They were provided with a budget equal to a 25% expansion of service, and asked to show what they would do with it using a map and tools very similar to the Prairieville game. At the end, each group also indicated where they would put Tucson's next High Capacity Transit (HCT) line in the future. This exercise is discussed in Chapter 3, and the results of the game are compiled in Appendix B.

Priorities for Transit Development

This report presents the outcomes of the exercises described above, and then makes some preliminary observations about priorities for the future development of transit in Tucson. These observations are not a plan, but rather a framework for decisionmaking on transit investment, comprising three major elements, as shown in the map in Figure 3 on page 6. :

- A prioritized list of future Frequent Network improvements, drawn from stakeholder input, observations drawn from existing data of land use and ridership, and network design principles of continuity and connectivity.
- A set of potential study corridors for future High Capacity Transit investment. These are not recommended corridors for any particular technology or service. Instead, they are a larger set of corridors that seem likely to be included in a more thorough process to identify where such an investment would be planned.
- Several study areas for future coverage expansion, where new service might be needed depending upon future development.

Acknowledgements

This project has been made possible with financial support from the Federal Transit Administration (FTA) and the following partners providing a portion of the local match contributions from the City of Tucson, COX Communications, Drachman Institute, TEP, AT&T and Casa Maria.

1. Executive Summary

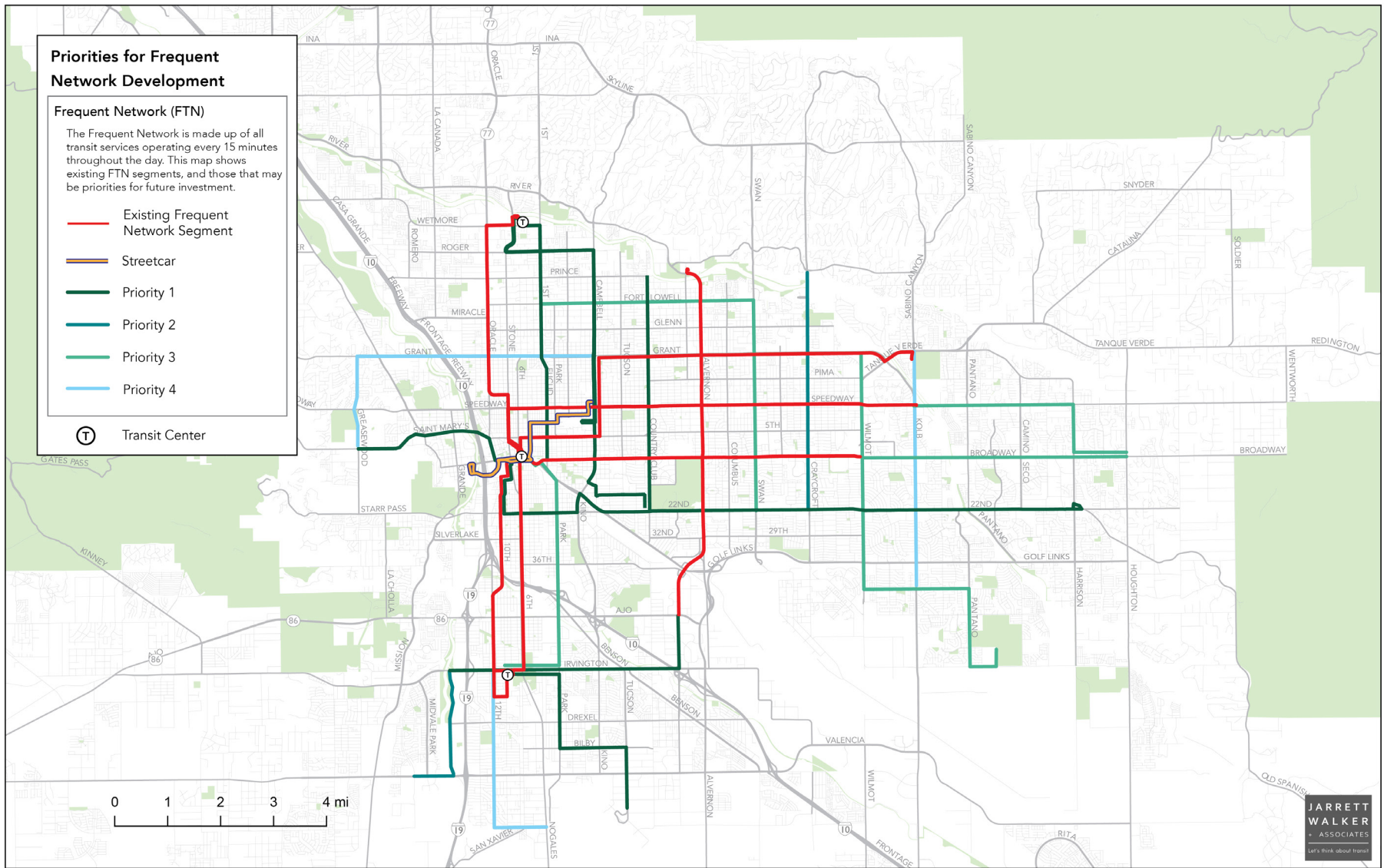


Figure 3: Priorities for Future Transit Development Map

2. Fictional City Game

2. Fictional City Game

The first activity was a transit planning game called Prairieville. This game introduces players to the principles and tradeoffs of transit network planning, using a map of a simple fictional city. Prairieville is designed as a generic city containing features that are common to many urban areas, and posing questions about transit that people in any community may encounter when thinking about their system. This game provides an opportunity to learn about and consider these high-level questions in the abstract.

The Prairieville map is shown in Figure 4. This map shows the population and employment density of different areas of the city, and labels a number of typical major destinations – for instance, downtown, the university, shopping centers, and a hospital. The groups were also advised that income follows latitude, declining toward the south and rising toward the north. They were also informed that the old port area in the south near the river is the target of a future redevelopment scheme, though not one with any committed funding at this stage.

At each table, four to five participants cooperated to design a network of transit routes of varying frequencies, within a limited budget. The game is played by

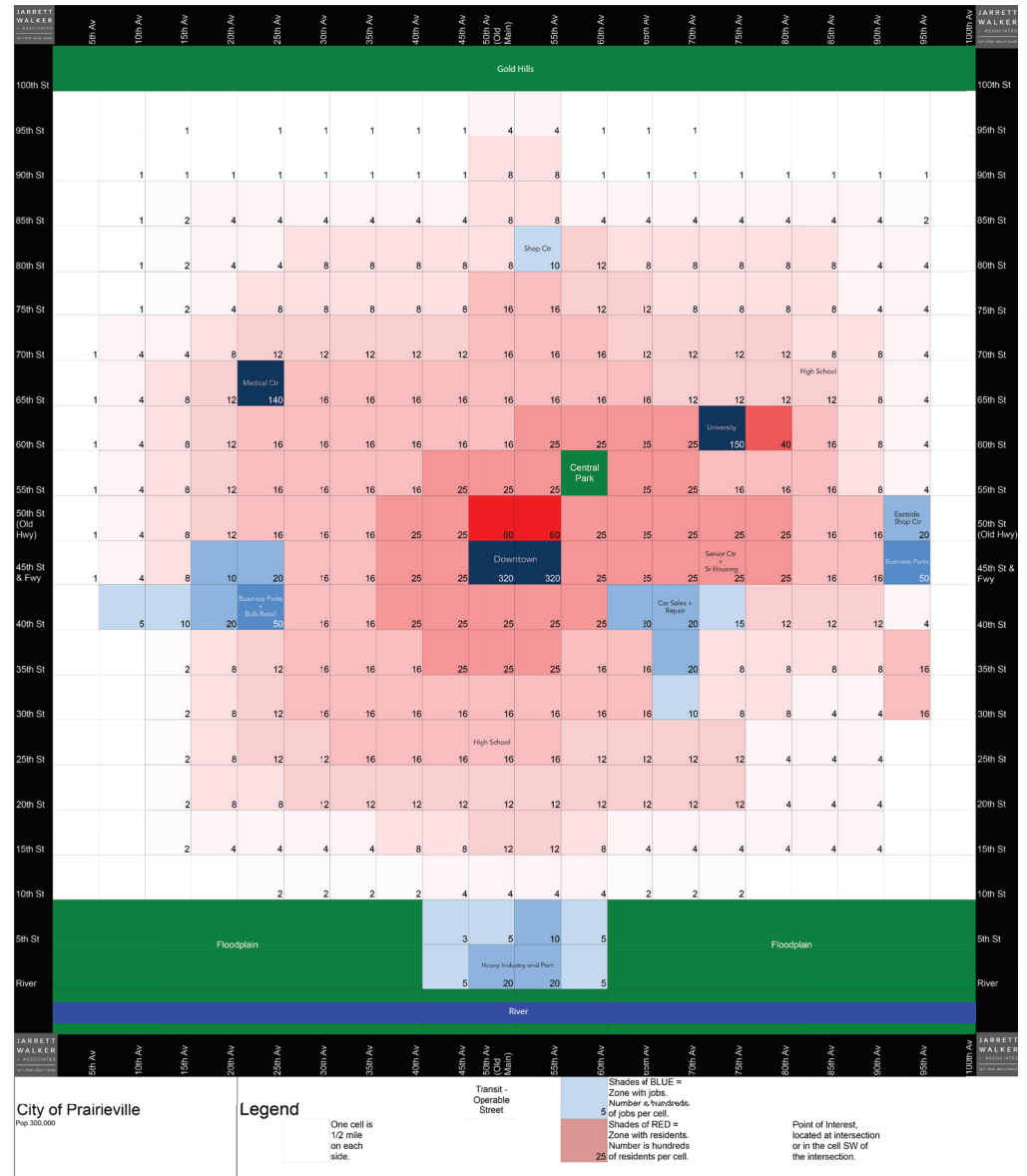


Figure 4: Prairieville Game Map

2. Fictional City Game

using flexible sticks of waxed string of different colors to indicate different frequencies. Players place a stick on a road on the map to show transit service of a particular frequency:

- Red = every 15 minutes
- Blue = every 30 minutes
- Green = every 60 minutes

While each group is given an initial budget of a mixture of frequency types, each type can be exchanged for any other. For instance, 1 red stick (representing the distance that can be served by one bus at 15-minute frequency) can be exchanged for 1 blue stick that is twice as long (representing the distance that can be served by one bus at 30-minute frequency). A bus operating at 30-minute frequency can serve twice the distance, since it only comes half as often. Thus, a core tradeoff of transit planning – that at a fixed budget, transit can either be extensive or intensive – is immediately evident to players as they place service onto the map.

Then, the group had the opportunity to pin their new network maps up on the wall and compare their work. Stakeholders were then invited to discuss which networks might best serve different goals transit is

often asked to achieve. Some typical goals include:

- Generating high ridership
- Providing some level of service to everyone
- Serving low-income people
- Serving the university or medical center
- Serving downtown businesses
- Stimulating dense or walkable development

As intended, the networks produced by the groups varied substantially in the type of transit service provided. By comparing this variation in fictional transit systems in a fictional city, participants were able to get a sense for the consequences of choices based on different transit values.

Prairieville Results

The Prairieville game is designed to generate many different solutions to the same problem, reflecting not only different ideas but also different mixes of values that participants bring. The collaboration at the tables requires a degree of consensus, but the results are still usually highly contrasting, as they were here. The contrast is the

whole point.

At the end of the exercise, in a pin-up session, all participants reviewed all the maps and we had a discussion about what we could learn from the similarities and differences among the maps.

In the discussion, we asked the group a series of informal questions about which table would likely generate different outcomes, including (a) approval by various interest groups, (b) best access to all parts of the city, and (c) total ridership. This section presents some highlights from that discussion. The six Prairieville maps are presented side by side in Figure 5 on page 10.

Ridership vs Coverage

One of the most obvious differences between the groups' maps is the extent to which the transit network serves the land area of Prairieville.

Some groups, like groups 1 and 5, concentrated service very heavily in the center of the city. Group 1's map shows an intense network of red lines representing 15-minute service, mainly concentrated in the dense core of the city around downtown, with connections to each of the major destinations. These frequent routes are typically

2. Fictional City Game

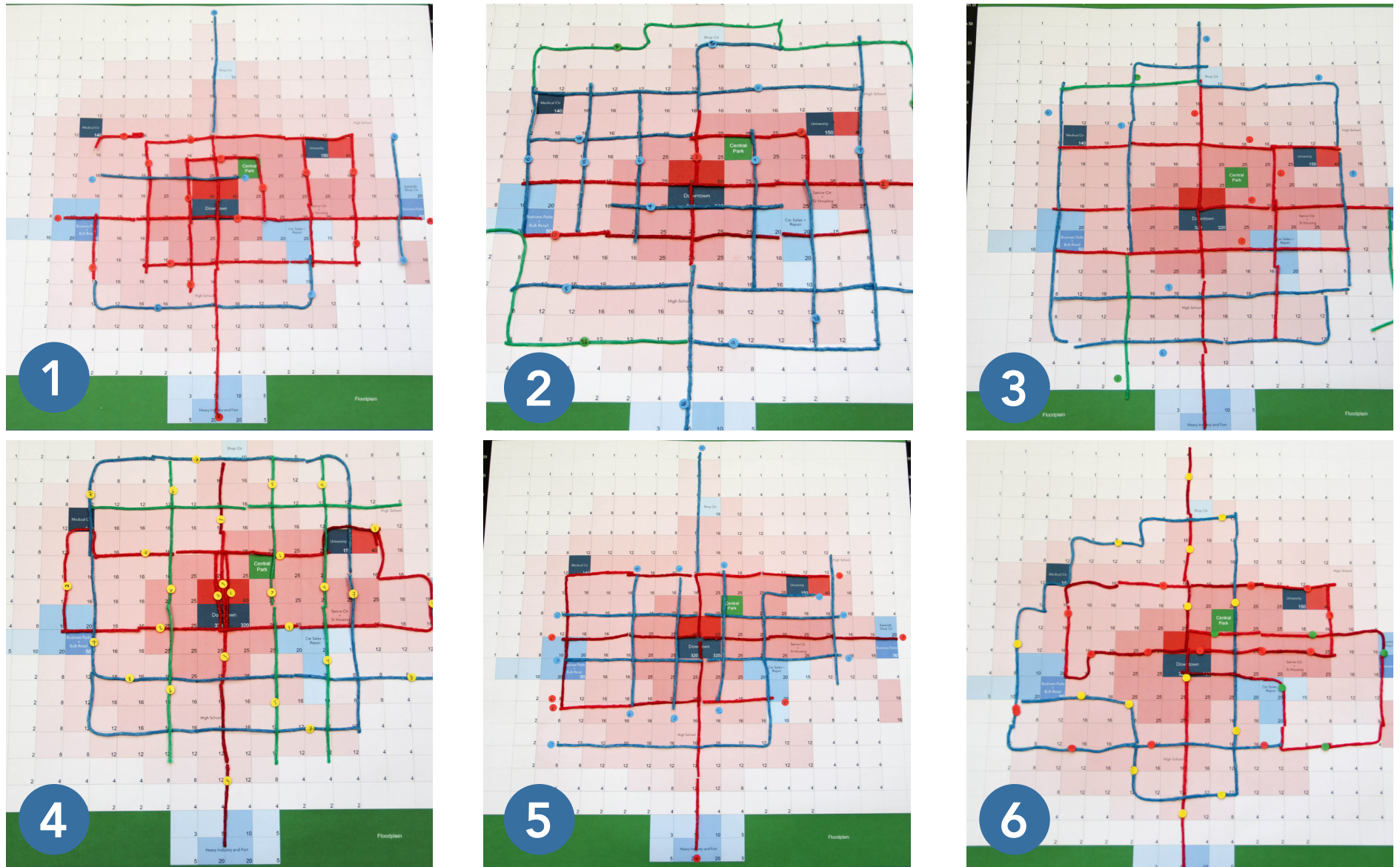


Figure 5: Prairieville Game Results

2. Fictional City Game

located every 1 mile (2 map cells), except near downtown where a spacing is tighter to serve the most dense area. This type of network provides a high level of convenience and mobility for residents of the urban core, but offers almost nothing to people located outside of the dense central area; for instance, the entire NE and NW quadrants of the map are without transit service of any kind.

Group 5's network (shown in Figure 6) spreads the network out a bit further, into a grid of alternating 15-minute and 30-minute routes. This is a service design reminiscent of the east-west frequent routes of Sun Tran's network, where 15-minute lines run on arterials every mile, with 30-minute routes serving the streets in between.

When we asked the participants to share which network they thought would generate the highest ridership, 35% said "Group 5", and 20% said Group 1. The results of this question are shown in Figure 8.

35% also said "Group 4", which is an interesting case as a network that provides extremely high (sub-five-minute) frequency through the downtown. Group 4's network is shown in Figure 9. Over short distances, it can often be faster to walk then to wait even 5 or 10 minutes for a bus. This

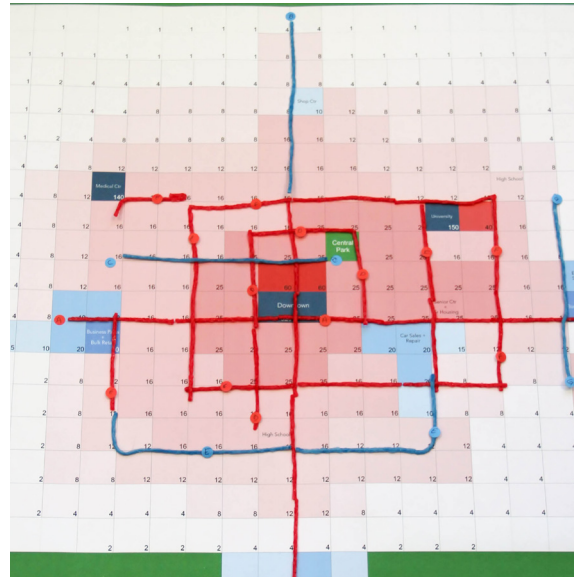


Figure 7: Group 1 Prairieville Map

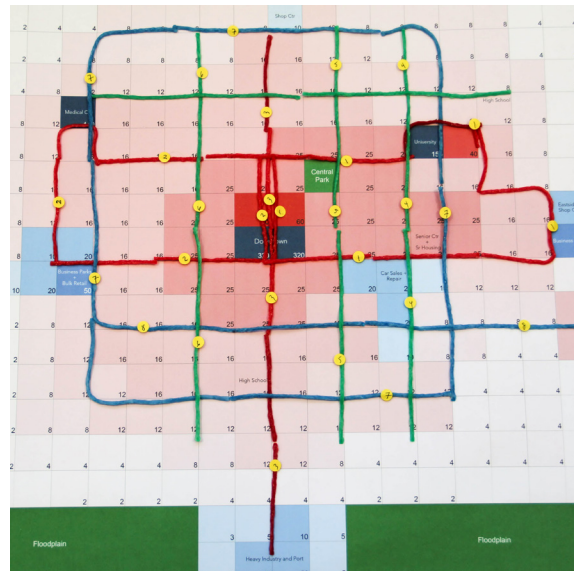


Figure 9: Group 4 Prairieville Map

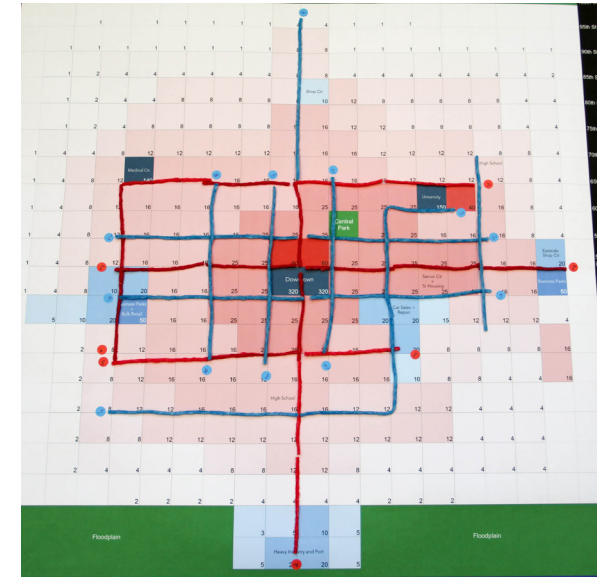


Figure 6: Group 5 Prairieville Map

Which Network will have the highest ridership?

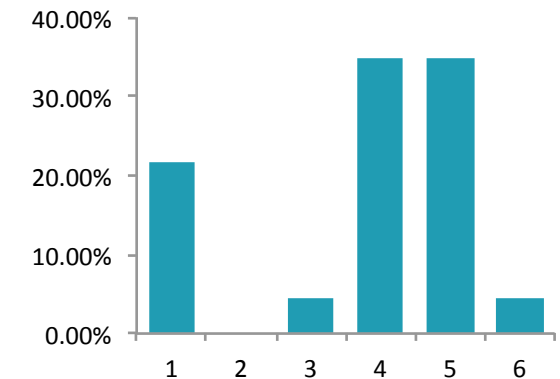


Figure 8: Prairieville Ridership Question

2. Fictional City Game

network invests in downtown frequency to the level required to be competitive with walking over short distances, in the most dense part of the city.

However, this very intense investment in the core means that the rest of the service is generally lower frequency.

By contrast, groups 2 and 3 designed transit networks more focused on extending service across the area of the city. These networks look quite different from those of Groups 1 or 5: they contain many more lower-frequency blue and green lines, and their routes touch more of the parts of Prairieville that 1 and 5 didn't serve at all. These networks offer service to a greater sheer area and number of people, but more of this service is less convenient, since lower frequencies mean longer waits.

When we asked the group to identify the network they thought was best at getting a little service to everyone in Prairieville, 75% answered "Group 2", with the second most frequent response "Group 3".

Grids

When we discuss network structure in transit systems, we typically draw a distinction between radial networks, where routes converge downtown, and grid networks,

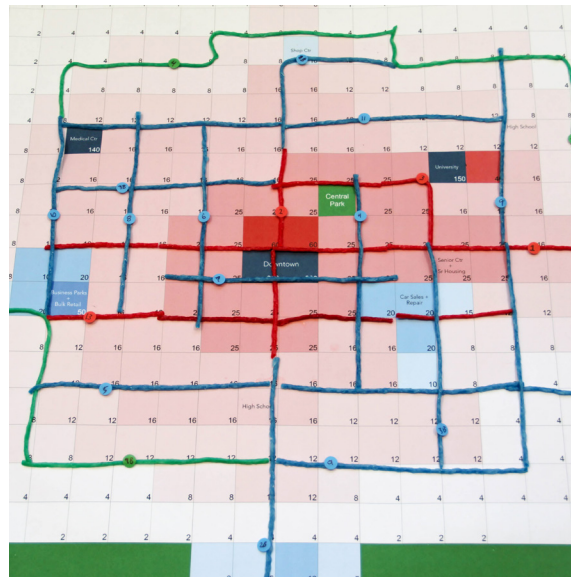


Figure 10: Group 2 Prairieville Map

where perpendicular routes cross throughout the city. The key difference is that in a grid network, it is possible to move around the city without going downtown by transferring between intersecting routes, so long as the frequency is high enough to prevent a long wait time.

Each of the maps we've looked at so far include intersection routes arranged in a grid, and in fact all but one group designed a network with many interconnecting routes. However, the utility of grid connections is largely determined by their frequency. Where two red lines cross, a connection is possible in four different

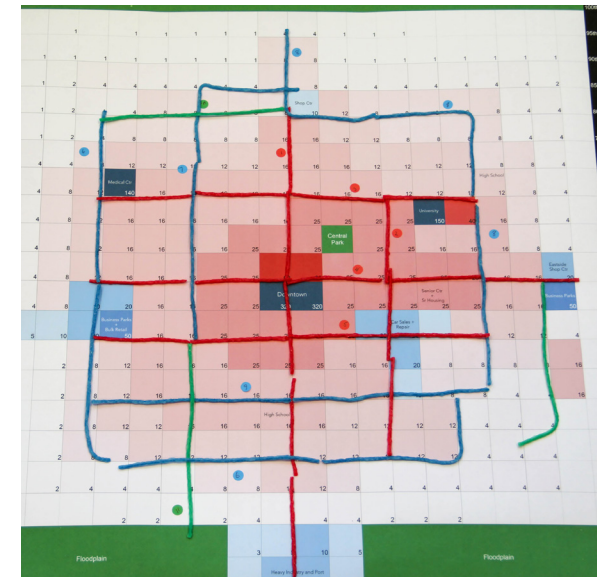


Figure 11: Group 3 Prairieville Map

Which network is best at getting a little service to everyone, no matter where they live?

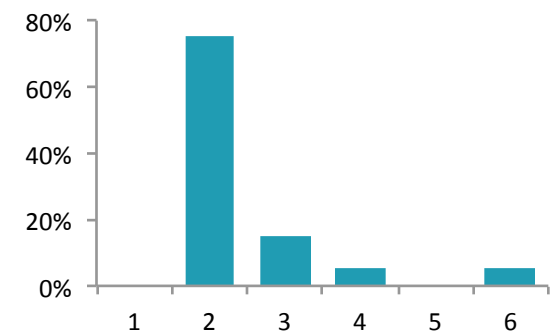


Figure 12: Prairieville Coverage Question

2. Fictional City Game

directions, with an average wait time of 7.5 minutes (half the headway). But if the frequency is lower, waits are longer, and the connection becomes much less useful. In Group 4's network (Figure 9), it is technically possible to connect between a number of green and blue grid lines, but these connections will require average waits of 15, or even 30 minutes.

Sun Tran's network, and the networks of Groups 1 and 5, have elements that can thus be described as part of a Frequent Network Grid, a network design that employs intersecting frequent routes to make it easier to travel around a multi-centered urban area.

Loops

It is common, in Prairieville, to see very short routes ("circulators") and routes consisting of loop patterns. Loops are very common in interest-group-driven design, because they focus tightly on a favored area. However, they have two geometric problems. First, very few people want to travel in circles, so they do not match the actual desire line for many actual customer trips. Second, they turn away from the larger city in a way that makes many other trips impossible.

The very short route or circulator has a

similar issue. Extremely short routes must be extremely frequent. A route that is only a mile long needs to be extremely frequent to be faster than walking. Even at a 15-minute frequency, you need only walk a brisk 4 miles per hour to get to the other end of the line before the bus comes. This is why very short circulators are usually not all that successful, unless they can be run with vastly higher frequency than this game's resources provided.

Among the participants, only Group 6 drew many loops. This network features a core north-south frequent axis, but nearly every other route encircles the city. These loops hit many destinations, but have the disadvantages described above. For instance, travel from the west to east sides of the city (between the two Business Park areas) would require a wait for the yellow-marked 30-minute route, a long out of direction trip around the loop, a transfer to the green-marked 15-minute route, and then another out of direction trip around its loop.

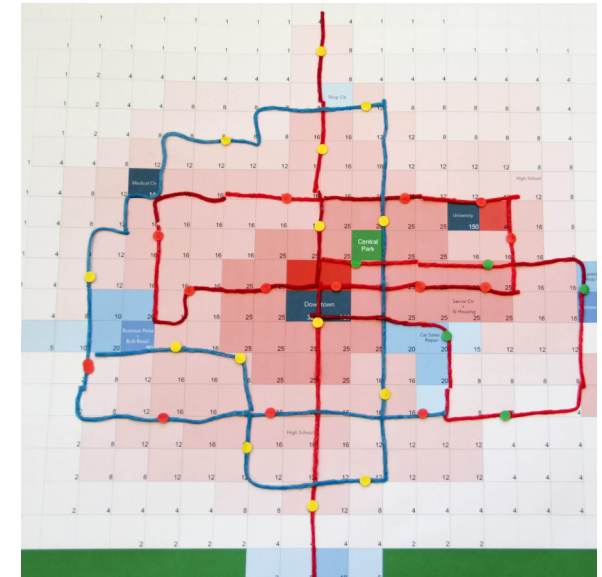


Figure 13: Group 6 Prairieville Map

3. Tucson Planning Game

3. Tucson Planning Game

After playing Prairieville, the participants had been acquainted with a basic set of transit network design tools, and were ready to use those tools to share ideas about their visions for transit in Tucson. The second exercise asked them to show what they would do if the budget for transit increased by 25%.

Participants were given a map of Tucson similar in style to that of Prairieville, showing existing transit, density, and ridership. Each group was given a fixed budget of wax sticks to create new transit routes, or add frequency to existing routes. Figure 14 shows the basemap used in this exercise. The pink and blue shading represents population and employment density, while the colored lines show existing Sun Tran routes by frequency.

Each group was given a budget of red sticks representing 15-minute bus service. They could trade these red pieces in for blue or green similar to the Prairieville game, or use an additional set of white pieces to delete existing segments of routes (for each white piece placed on the map, they would receive one additional red piece).

Groups also had the opportunity to spend their new resources on increasing the weekend service level on the existing

network, by placing an equivalent number of red pieces into Saturday and Sunday piles such that the necessary resources had been spent to run each weekend day as a weekday.

After spending their budget of new resources, and making any other changes to the existing network, each group had one final task: show where they would put Tucson's next High-Capacity Transit line. It is important to note that this portion of the exercise was strictly technology-agnostic; instead, stakeholders were solely asked to show which corridor they thought was important for some type of investment.

Each group took a unique approach to service design and HCT corridor prioritization. However, some common themes emerge when the six maps are combined and examined together, as explored in the next section.

Please note that the 6 Tucson exercise maps are presented side by side in Appendix B.

3. Tucson Planning Game

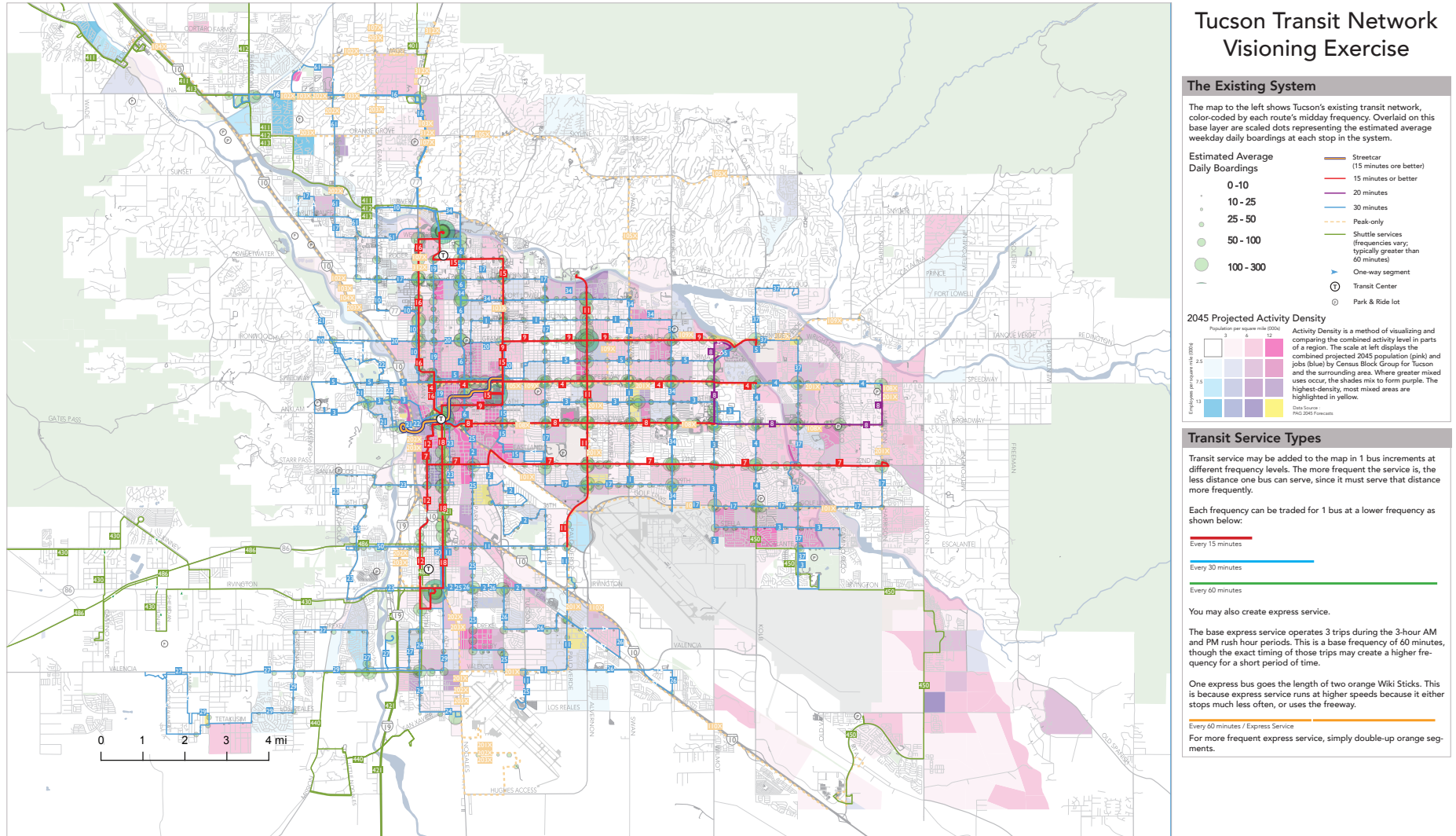


Figure 14: Tucson Transit Network Planning Game Map

3. Tucson Planning Game

Frequent Network

Every group used all or the vast majority of their budget for transit expansion to enrich the Frequent Network in Tucson and South Tucson. Stakeholders increased frequency on a variety of corridors, enriching the existing network by adding new frequent crosstown routes similar to the 11-Alvernon, or extending frequency to important destinations like the airport.

Figure 15 shows a map of where groups placed their Frequent Network segments. Where lines are thicker, more groups included frequent service (even in addition to existing frequency) in that corridor. The existing Frequent Network is drawn in brown lines beneath the stakeholders' additions.

Euclid/N. 1st Ave

The only corridor included in all 6 groups' maps was Euclid/1st Avenue between downtown and Tohono Tadaí Transit Center. This segment is currently served by the 6-Euclid/N. 1st Ave., a relatively productive route averaging over 30 boardings per revenue hour. The Euclid/1st corridor is located approximately 1 mile from Frequent Network routes to the east and west. Adding frequency here would create a similar 1-mile spacing of frequent routes

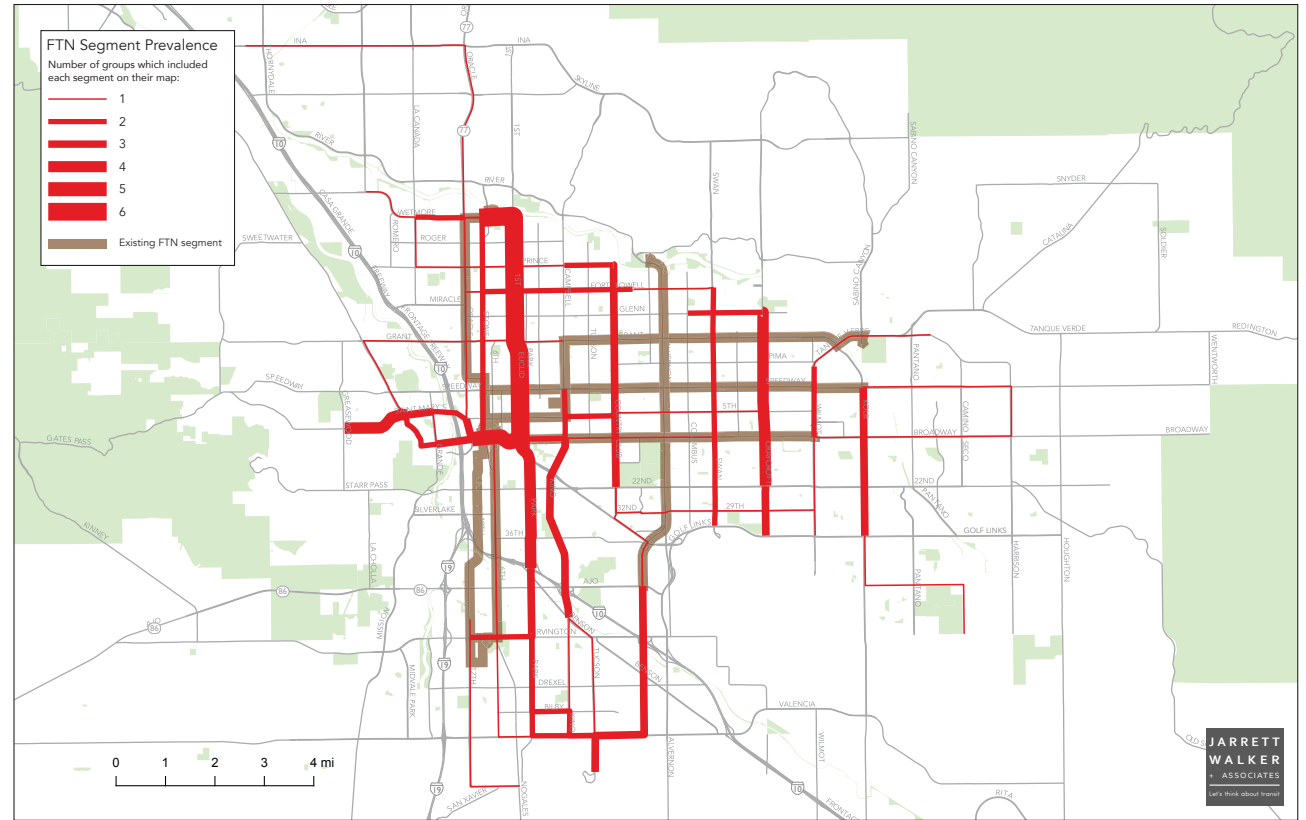


Figure 15: Frequent Network Segment Prevalence

as is found on the east side of Tucson.

New Destinations for Frequent Service

A few common destinations for frequent service stand out from the combined stakeholder responses:

- The Pima Community College West

Campus, located at Greasewood and Anklam. 5 of 6 groups provided frequent service to PCC via Anklam, and the 1 group that did not terminated a HCT line at the campus. There was some variation in how the groups served the area between I-10 and Silverbell. Two simply added frequency to St. Mary's Rd., while other groups

3. Tucson Planning Game

increased frequency on Silverbell or Grande.

- The passenger terminal of Tucson International Airport. Every group extended frequent service to the airport, with some running as many as three lines south to the airport via Park, Campbell, or Palo Verde (the most common segment).

Frequent Network Grid

Every group used at least some of their budget to create new north-south cross-town routes similar to the 11-Alvernon on Tucson's east side. Figure 15 on page 17 displays how stakeholders filled in gaps in the existing frequent grid.

Generally, stakeholders created new frequent crosstowns on streets preserving a 1-mile spacing of frequent grid routes. However, exactly which streets were used, and how many, varied substantially from group to group.

The most common new north-south crosstowns were:

- Craycroft
- Country Club
- Kolb

- Swan

Alvernon and Campbell already have north-south frequent service, and no group created a frequent crosstown east of Kolb.

Though not every table was in agreement as to which streets should be added to the Frequent Network, stakeholders clearly indicated a desire for additional service of this type at a 1-mile spacing, extending approximately between Oracle and Kolb.

South Tucson

All groups added frequent service in South Tucson, often oriented towards the airport as described earlier. The most common corridors for this were Park and Palo Verde, with others using South Kino Parkway and one or both of Campbell or Tucson.

While the stakeholders all added frequent service in South Tucson, the service they designed was entirely north-south running. Currently, transit service in South Tucson is mostly oriented towards feeding people to Laos Transit Center and connections to north-south frequent routes. In the future, if additional frequent routes were added to South Tucson, there would also be an opportunity to reconsider the service design of this area more broadly in order to best take advantage of such an investment.

Other Frequent Network Additions

Several other additions to the Frequent Network were found on only one or two groups' maps, but are worth acknowledging as important stakeholder suggestions.

One group chose to increase the frequency of the longline segment of the 16-Oracle/Ina out Ina, providing 15-minute service to Foothills Mall, and all the way to Thornydale and the commercial and employment area near Old West Business Park.

Several groups made small extensions of the Frequent Network into the far eastern parts of Tucson. One sent the frequent routes on Speedway and Broadway all the way out to Harrison at 15-minute headways. Another included frequent service on Kolb south of Golf Links, turning east on Escalante and south on Camino Seco to terminate at Irvington. While most groups spent most of their resources west of Wilmot, at least a few considered service expansion to further to the east.

New Coverage

The stakeholders were typically much more focused on enriching the Frequent Network than on expanding the coverage area. In general, stakeholders did not spend substantially on new coverage. Between all six

3. Tucson Planning Game

groups, only two included large new coverage segments.

The first was in the far southeast area of the region east of Houghton, which according to current land use projections is likely to see substantial population growth in the coming decades. This area is currently served very infrequently by a Sun Shuttle route, the 450. One group added a 30-minute all-day route serving the area similarly, via Houghton.

The second new coverage segment was found in Group 5's map. Group 5 added 30-minute all day service in the northwest along River Rd. between Tohono Tadaï TC and the shopping and employment area near Ina and Thornydale. Those segments are currently served by the 411,412, and 413 Sun Shuttle routes, each operating every 60 minutes or worse. The main impact of this coverage expansion would be to improve the frequency and span available, rather than provide new transit service where none had existed previously. This group also extended frequent service to the same destination via Oracle and Ina.

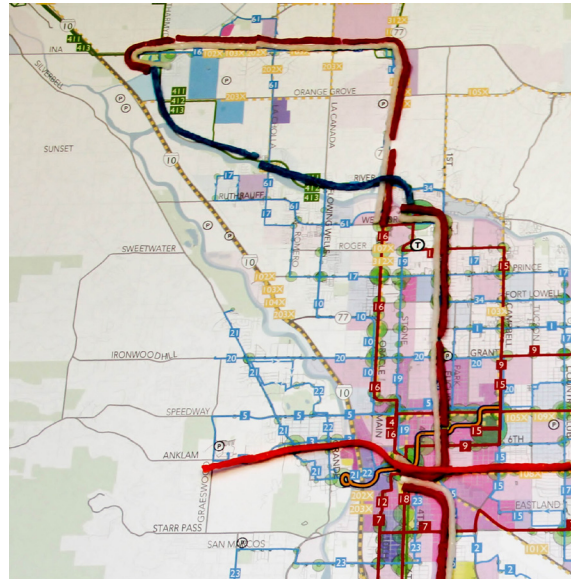


Figure 16: New coverage in NW area (Group 1)

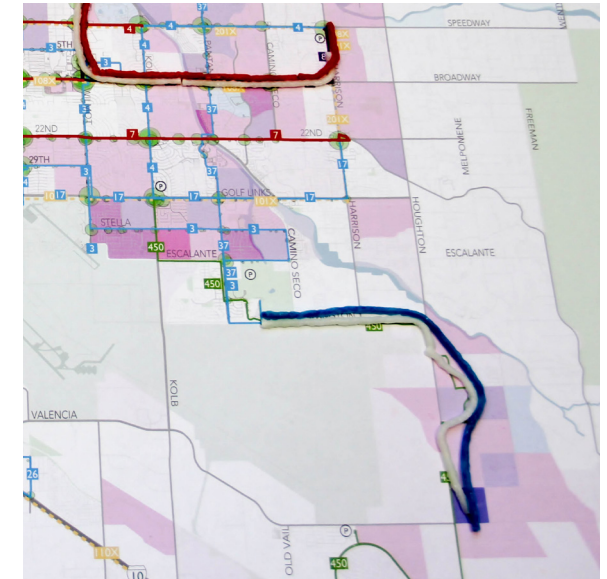


Figure 17: New coverage in SE area (Group 1)

3. Tucson Planning Game

High Capacity Transit

In the last step of the Tucson exercise, each group had to decide where to place 12 miles of HCT infrastructure. HCT refers not to a particular technology or vehicle, but simply to an investment in a capital project that would result in capacity, speed and reliability improvements to transit in that corridor.

The map shown in Figure 18 displays the location of each HCT segment groups of stakeholders placed on the map, shaded by how prevalent each segment was among the various maps.

Four of the six groups placed HCT on Broadway. Broadway is the location of Sun Tran’s most productive frequent bus route, and is a place where a very large transit market is proven to be in place. A HCT line in the corridor would capitalize on existing ridership, improving speed and reliability, as well as connections to intersecting grid routes.

Exactly how far out Broadway HCT should extend was a subject of some disagreement. While all four of the maps that included Broadway HCT ran it as far as Wilmot, three continued HCT to Kolb, and two sent it to Pantano. Any future HCT corridor study would revisit this issue.

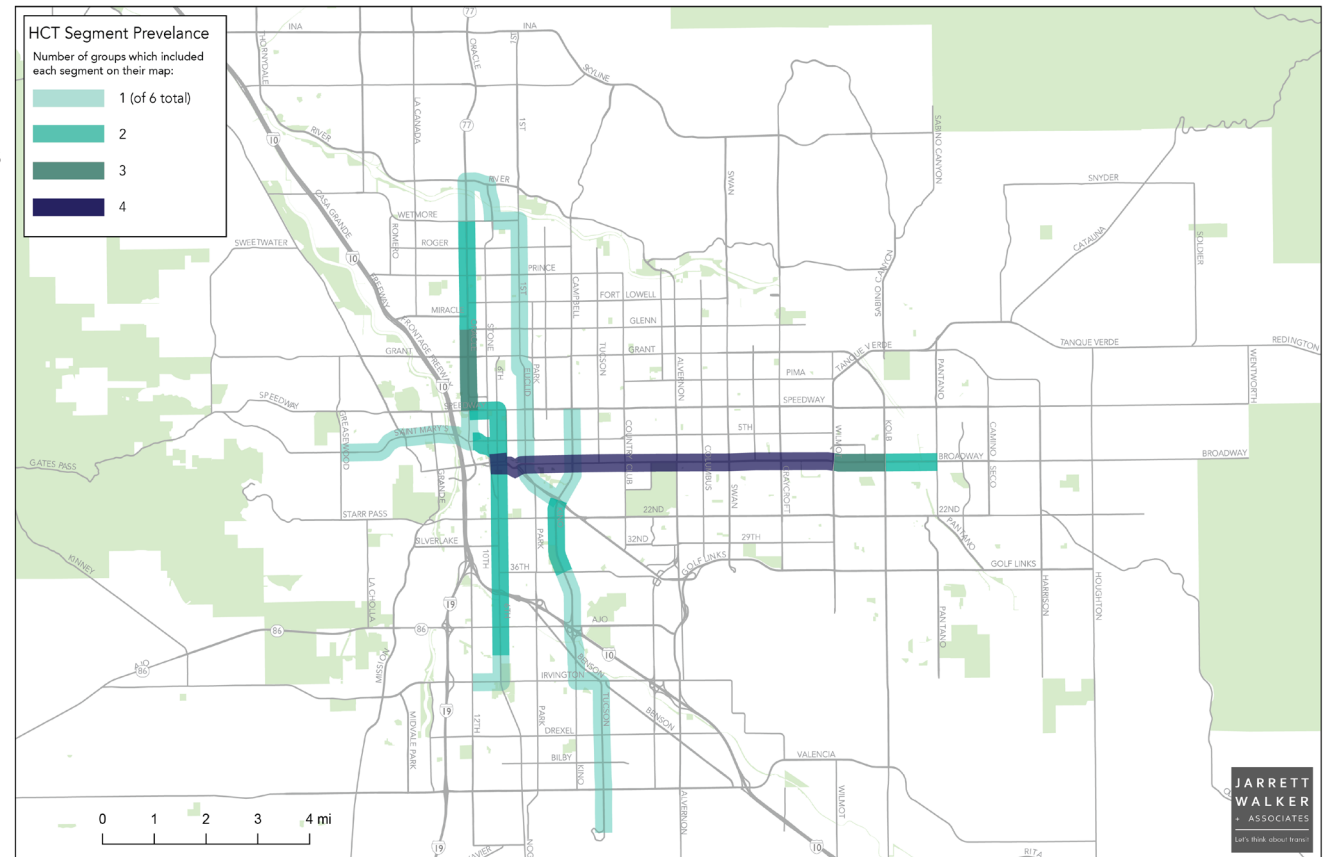


Figure 18: High Capacity Transit segment prevalence

All but one group also placed HCT along at least one north-south corridor. Three groups’ maps included some HCT on Oracle, while one used Euclid/1st to reach Tohono Tadaí TC. South of downtown, two groups placed transit infrastructure on S. 6th, while two put the line on Kino (one running HCT all the way to the airport).

One group each extended HCT to the airport and to Pima Community College west of downtown. Overall, though, many more groups provided frequent service than HCT to these locations.

While stakeholders were split on the exact placement of any future HCT infrastructure,

3. Tucson Planning Game

it is clear that at the high level, they favor a combination of a Broadway line and accompanying north-south alignment. Sun Tran’s existing Frequent Network is already present in most of these corridors, and is already used by many people for trips that would be made faster and more reliable by a future HCT investment.

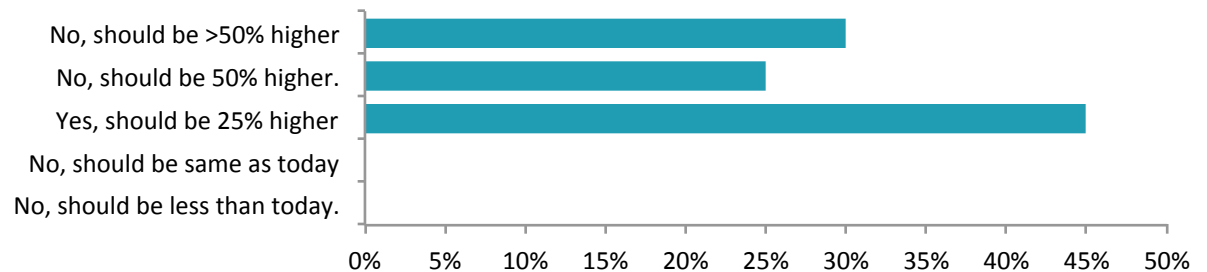
Polling

After concluding the Tucson planning exercise, stakeholders were asked general questions about their views on transit, having now had the opportunity to confront some of the big questions both abstractly and in their own city.

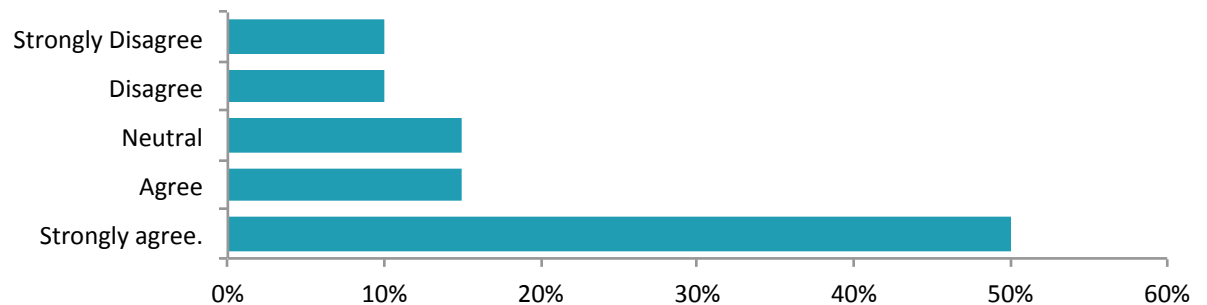
The first question asked stakeholders about the resource level available. The game asked them to spend a budget equal to a 25% increase in Sun Tran service. They were then asked whether that amount was enough, too little, or too much.

45% of participants said that the resources available in the game (+25% from today) were a level they would support, while all other respondents picked an even higher answer. All stakeholders expressed a view that in the future, it is desirable that there be more transit than there is today in Tucson.

The level of resources (+25% from existing) available in the game is the level I would support.



Our next High Capacity Transit line should happen in the next 10 years. This will require even more revenue.



The second question asked stakeholders for their view on High Capacity Transit. A new HCT line would require even more revenue on top of the 25% each group was able to spend on new service. Despite this, 65% of respondents strongly agreed or agreed that Tucson should build a HCT

line in the next ten years, even if it required new revenue. 20% disagreed or strongly disagreed, and 15% were neutral.

4. Future Transit Vision

4. Future Transit Vision

After evaluating the input received from the stakeholder exercises, in combination with land use and ridership data and network planning principles, we have created a sketch of priorities for the growth of Tucson's transit network. These priorities fall broadly into three groups:

- **Prioritized future Frequent Network segments** (Figure 20 on page 25).
- **Study corridors for a possible future High Capacity Transit investment** (Figure 22 on page 30).
- **Study areas for future Coverage expansion** (Figure 23 on page 32).

In the workshop, stakeholders were given an arbitrary 25% service increase to allocate. This was provided as a way of eliciting the group's vision for what a larger and more useful transit system might look like, but in reality, the actual pace of transit expansion will depend on the growth of existing funds and development of new funding sources.

Future Frequent Network Prioritization

As described in Chapter 3, a major focus for the stakeholders was to add new elements to today's grid of Frequent Network

routes. They expressed a high level of comfort with a 1-mile spacing between grid routes, and generally designed this type of service in the area bounded by Oracle, Kolb, Fort Lowell, and 22nd.

Figure 20 on page 25 presents a series of Frequent Network segments, color-coded in priority order. While the stakeholders' exercise gave them the freedom to imagine a large expansion of transit happening at one time, this map translates that into a sketch of how such improvement might occur more gradually, depending on resources.

This priority map is not simply the stakeholder segment prevalence map (Figure 15 on page 17) discussed earlier in the report. Starting from their work, we then evaluated FTN segments based on four main criteria:

- **Stakeholder prevalence.** Did many stakeholders include this segment on their maps?
- **Development and street pattern.** Does existing density indicate that frequent service would be highly successful? Is the street network designed in a way that allows people to access transit easily?

- **Current ridership.** Is there strong ridership on existing service in the corridor, given the present service level?
- **Network continuity.** Is the segment important to improving the usefulness of the network for many different types of trips? (For example, new Frequent Network grid segments are very important to network continuity).
- **Major destinations.** Does the segment provide service to a major regional destinations, such as large employers or educational institutions?

A simple table of this assessment is shown in Figure 21 on page 26.

Based on this assessment, we arranged FTN segments into four tiers of priority, from the most immediately important onward. This structure offers a guide to inform future decision making on the expansion of the Frequent Network.

Priority 1

Priority 1 contains the segments that should be considered for immediate promotion of the Frequent Network as resources become available. We have included 7 segments into this tier, based on the factors described previously. In Priority 1, the main focus is on network

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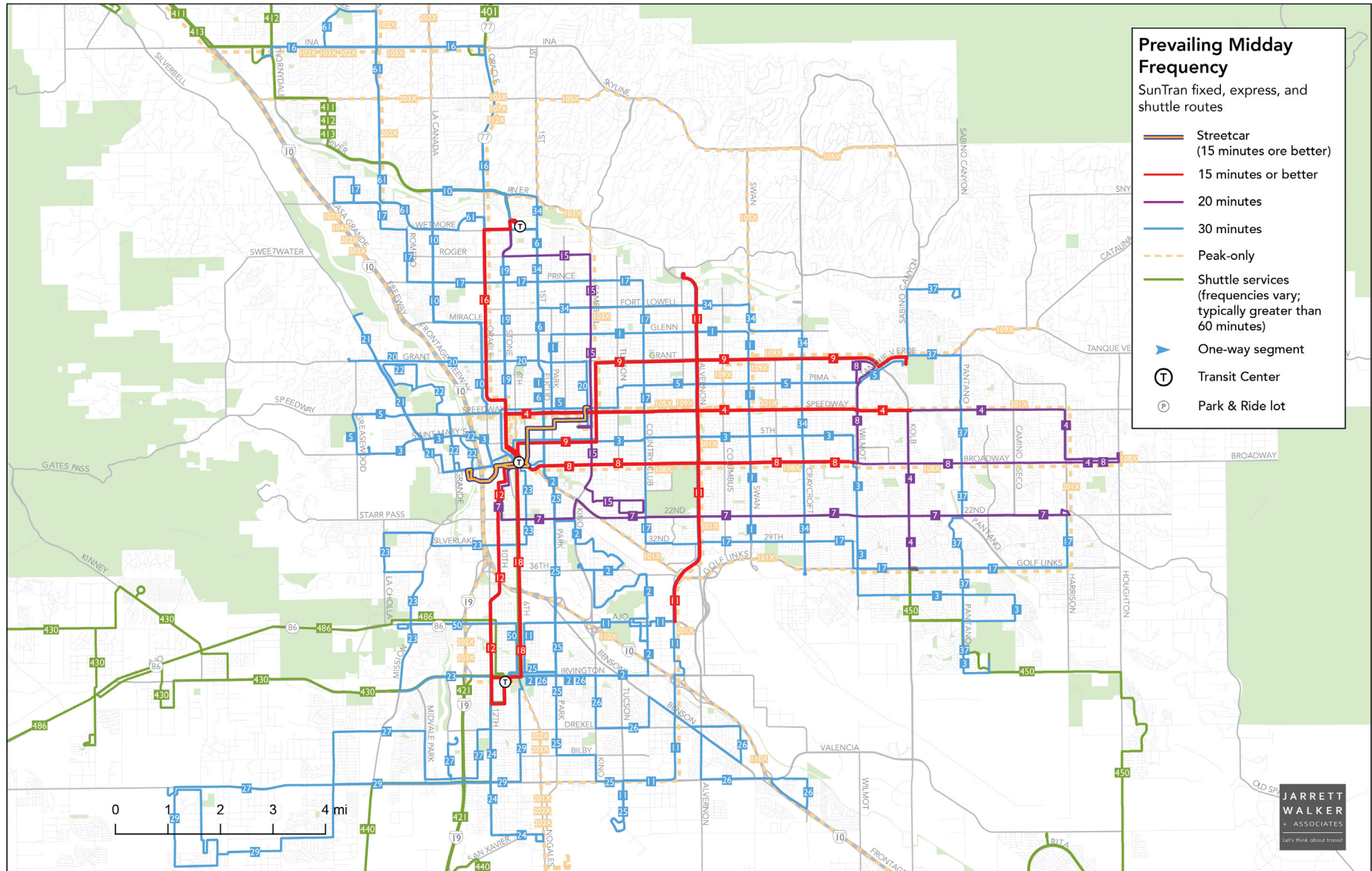


Figure 19: Existing Network Map (May 2015)

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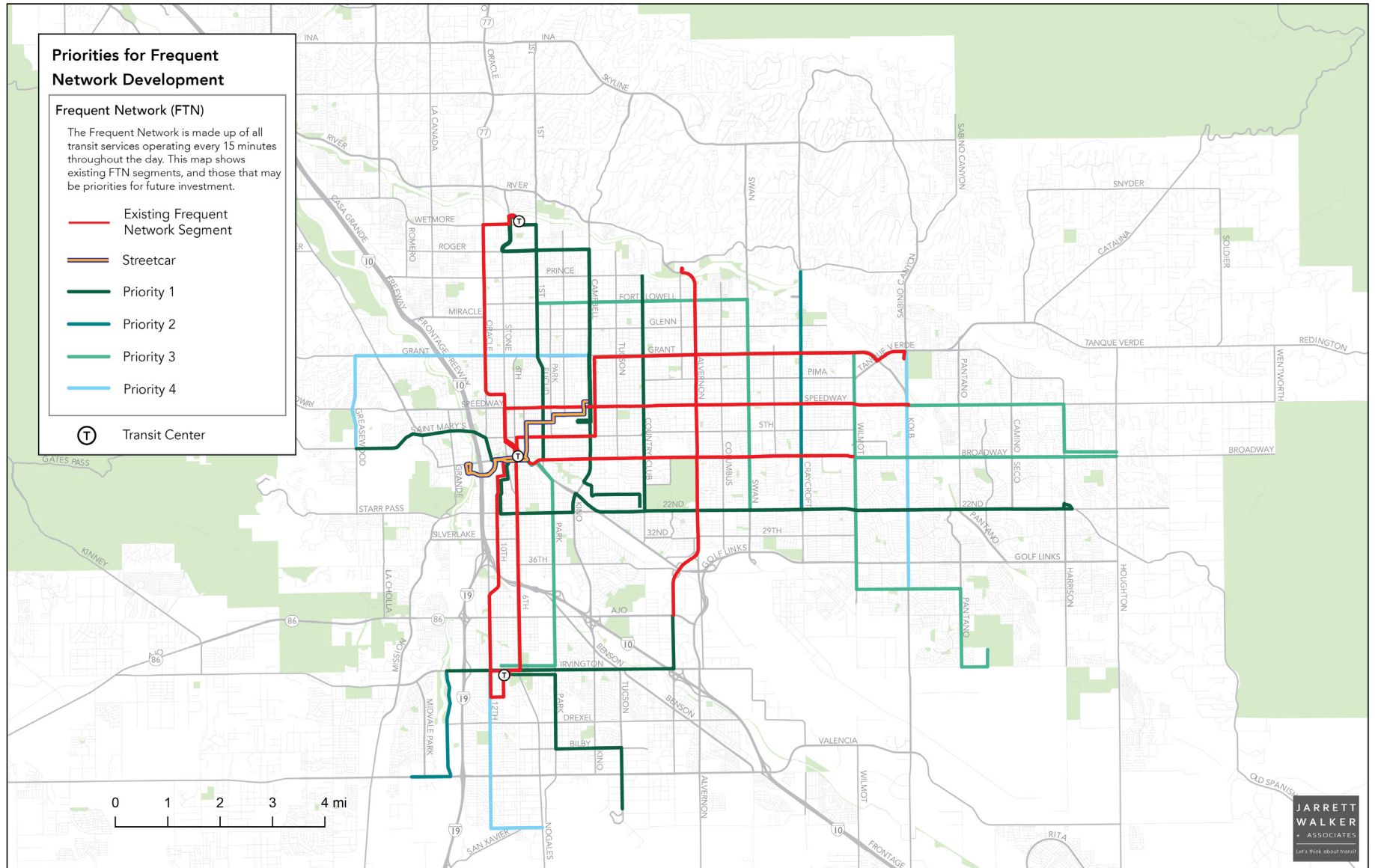


Figure 20: Priorities for Future Transit Development

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intensification in the dense, high-demand central area of Tucson, by adding more routes to a Frequent Network grid where a bus is coming every 15 minutes.

Two existing routes operating at 20 minute frequency, the 7-22nd and 15-Campbell, should be brought to Frequent Service as soon as possible. Both of these routes are important grid elements, where the ease of

connections is an important driver of their utility.

In the case of the 15-Campbell, service was recently changed to every 20 minutes

FTN Segment	Stakeholder Agreement	Land Use	Existing Ridership	Network Continuity	Major Destination	Priority
22nd		√	√	√	√	1
Campbell		√	√	√	√	1
Euclid / 1st	√	√	√	√	√	1
Country Club	√	√	√	√		1
Anklam (to PCC)	√		√		√	1
Palo Verde - Irvington	√	√		√	√	1
S. Park - Bilby (to Airport)	√		√	√	√	1
Calle Santa Cruz (Irvington to PCC Desert Vista)	√	√		√	√	2
Craycroft	√	√	√	√		2
Wilmot	√	√		√	√	3
S. Park (downtown to Laos TC)	√			√		3
Fort Lowell	√		√	√		3
Swan	√	√	√	√		3
Broadway (Wilmot to Harrison)		√	√	√		3
Kolb	√			√		4
W. Grant / Greasewood				√		4
S. 12th (south of Laos TC)		√				4

Figure 21: FTN Corridor Priority Assessment

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along the entire route, from the previous structure of 15-minute service north of the University, with 30-minute service to the south. It is important to restore the previous 15-minute frequency level in the future, since ridership tends to be especially sensitive to frequency changes in this range.

Euclid/N. 1st Ave was the only segment included on all stakeholder exercises. It serves dense land uses, has strong existing ridership, and if promoted to the Frequent Network, would add a new and important grid element between Oracle and Campbell. Subsequently, this would establish one-mile spaced frequent radial grid routes in Tucson's north side, similar to the current network structure on the east side of the city.

Similar to Euclid, Country Club is another north-south grid element serving dense land uses, with substantial existing ridership. With both Euclid and Country Club added to the Frequent Network, a 1-mile frequent grid would be fully in place across Tucson's inner east side, an area of extremely high ridership potential.

Nearly every group of stakeholders included a frequent element on Anklam, serving the PCC campus at Anklam and Greasewood. This is an important destination that generates many trips between its

employees and students. Given the proximity of the campus to downtown, transit could be competitive for many of these trips if sufficient frequency to make them convenient were available.

There are two Priority 1 elements located in South Tucson. All stakeholders included Frequent Network elements in this area, but typically oriented them toward the airport. While the airport is certainly an important destination, when it comes to South Tucson, we are concerned that stakeholder consensus may not have fairly represented the area's needs, as South Tucson was underrepresented in the workshop. It is not clear that South Tucson's public transit needs are as oriented toward the airport as they appear from the outcome of the stakeholder process.

South Tucson is certainly dense enough to support extensions of the Frequent Network. In Priority 1, airport service is provided from Laos TC via Irvington, Park, Bilby, and Tucson (this is identified in the table as "S. Park - Bilby (to Airport)"). This segment serves a number of areas of high residential and employment density in South Tucson, and if operated as an extension of existing frequent routes on S. 12th/10th or S. 6th, would provide a new frequent connection to downtown from the

airport and throughout the south area.

Additionally, Priority 1 includes an initial grid crosstown element in South Tucson, along Irvington to the commercial area just west of I-19. In the table, this segment is referred to as Palo Verde - Irvington.

Promotion to frequent service would dramatically improve the ease of travel both within South Tucson and between this area and the eastern side of the city. Finally, this first grid element would prepare the network to take advantage of connections possible with lower-priority FTN elements that may be implemented later.

Depending upon when a frequent crosstown was implemented in South Tucson, Ajo Way may also be worth consideration, as it is currently served as a branch of the frequent 11-Alvernon. Frequent service on Ajo would thus be easier to implement, and also has transit-supportive land uses through much of the corridor.

Priority 2

Priority 2 is mainly focused on beginning to expand the frequent grid eastward, by adding Craycroft. Craycroft was a very popular segment among stakeholders, and boasts relatively strong existing ridership and density. While there are also

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arguments for frequent service on Swan in this priority tier, the principle here is to first establish a wider two-mile grid (Alvernon, Craycroft, Kolb), and then increase the frequency of intermediate segments later on. This is similar to how Country Club is dealt with in Priority 1.

Also included in Priority 2 is the extension of the west end of the Irvington frequent segment south along Calle Santa Cruz and west along Valencia to serve the PCC Desert Vista campus, WalMart, and the Casino. This would dramatically expand access to this area, both from downtown, via a connection at Laos TC, and directly from eastside Tucson as this route flows through into the Alvernon crosstown.

Priority 3

Priority 3 fills in some of the remaining missing inner grid elements, adds new grid elements in the eastern area of the city, and extends frequency further east on Broadway and Speedway.

In central Tucson, Swan and Fort Lowell would be added to the Frequent Network. This would complete the 1-mile grid throughout most of the city, with one gap along Grant between Oracle and Campbell (this gap is discussed in Priority 4).

This tier also includes frequent service on S. Park between downtown and Laos TC. This was a common segment among the stakeholders, and an obvious choice for network connectivity, though it lacks the ridership and density indicators of other corridors.

Wilmot is added as a frequent grid element between Grant and the PCC East campus just east of Irvington and Pantano. In addition to grid connections to east-west radial routes, a frequent route on Wilmot would also provide a high level of service for north-south trips in the corridor, which includes several nodes of substantial residential and employment density, as well as intense commercial activity: Broadway & Wilmot (Park Place Mall), St. Joseph's Hospital, smaller shopping centers and multifamily residential development near Wilmot & Speedway, and other dense housing along Wilmot between Pima and Grant.

South of 22nd, the Wilmot frequent route would continue south to Stella, then turn east to Pantano, and continue south along Pantano before terminating at the PCC campus just east of Pantano & Irvington. This area is less dense and has fewer commercial centers than between 22nd and Grant, but PCC East is a major destination which is likely to generate significant

ridership when connected at high frequency with other frequent routes.

With a Frequent Network route serving Wilmot, it would be possible to consider extending frequency east on Broadway to Harrison. This would imply the deletion of the north Wilmot branch of the 8-Broadway (now redundant, given the new easy transfer to the frequent service on Wilmot), and reallocation of those resources to focus on the eastern Broadway corridor.

This would provide frequent service to the densest areas east of the limit of the grid, as well as a foundation for any additional Frequent Network expansion (such as Kolb) depending on the nature of future development in the area.

Priority 4

Tiers 1, 2, and 3 largely complete a Frequent Network grid across most of the area of Tucson that currently has the density and street network capable of supporting it. However, by the time when tier 4 is actionable (with the majority of higher-priority improvements in place), there may be new, pressing needs that are not apparent today.

With that in mind, three segments are shown in Priority 4. The first extends

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frequent service on Grant west from Campbell to Greasewood, and then south to PCC. This would complete the grid across Tucson's north side. While this segment is important from a network continuity standpoint, and would serve a moderately dense market, more detailed design would be necessary to decide whether this new segment would terminate at U of A similar to the existing route 20, or flow through across Grant. The latter would disrupt the direct connection between outer Grant and the U of A, but at that point in the development of the frequent grid, connections may be so convenient that this direct radial service design is no longer necessary.

A final eastside grid route, on Kolb, is included in Priority 4. Kolb is not currently sufficiently dense to be a high priority for frequent service, but is projected to continue to grow over the next two decades. A Kolb crosstown would extend the grid another mile further east, enabling another set of useful anywhere-to-anywhere connections. Finally, current City of Tucson plans would extend Kolb north to connect to Sabino Canyon Rd., offering the possibility of an anchoring destination at Colonia Verde shopping center. This provides a common endpoint with the high-frequency service on Grant, which means that the

Grant and Kolb line could potentially be combined to reduce the need to transfer.

Priority 4 could also include new extensions of the Frequent Network outside of the limits of grid routes. S. 12th south of Laos is one such example. While only one stakeholder group drew a route there, the corridor contains similarly dense (smaller-lot single family homes, with a mixture of two-story apartments and commercial) land uses to the rest of South Tucson, oriented around a connected street grid.

High Capacity Transit Study Corridors

The process of building any sort of HCT is always a long-term effort requiring the cooperation of all agency and stakeholder partners, bolstered by a robust public process and strong voter approval of new funding. Of course, all of these elements are only prerequisites for a federal funding application that is never guaranteed.

With these cautions in mind, at least three corridors appear to be well-suited for further study. These corridors are all currently served by high-frequency routes, so future investment would capitalize on existing ridership while reinforcing the utility of key grid elements. Figure 22 on page 30 shows these study corridors.

We present these corridors as general indications of alignments that possess land use, ridership, and network continuity advantages that position them as candidates for infrastructure investment.

BROADWAY CORRIDOR

Broadway is the existing transit corridor with the highest level of investment, generating the strongest ridership. The corridor has dense land uses throughout, particularly between downtown and Wilmot, and

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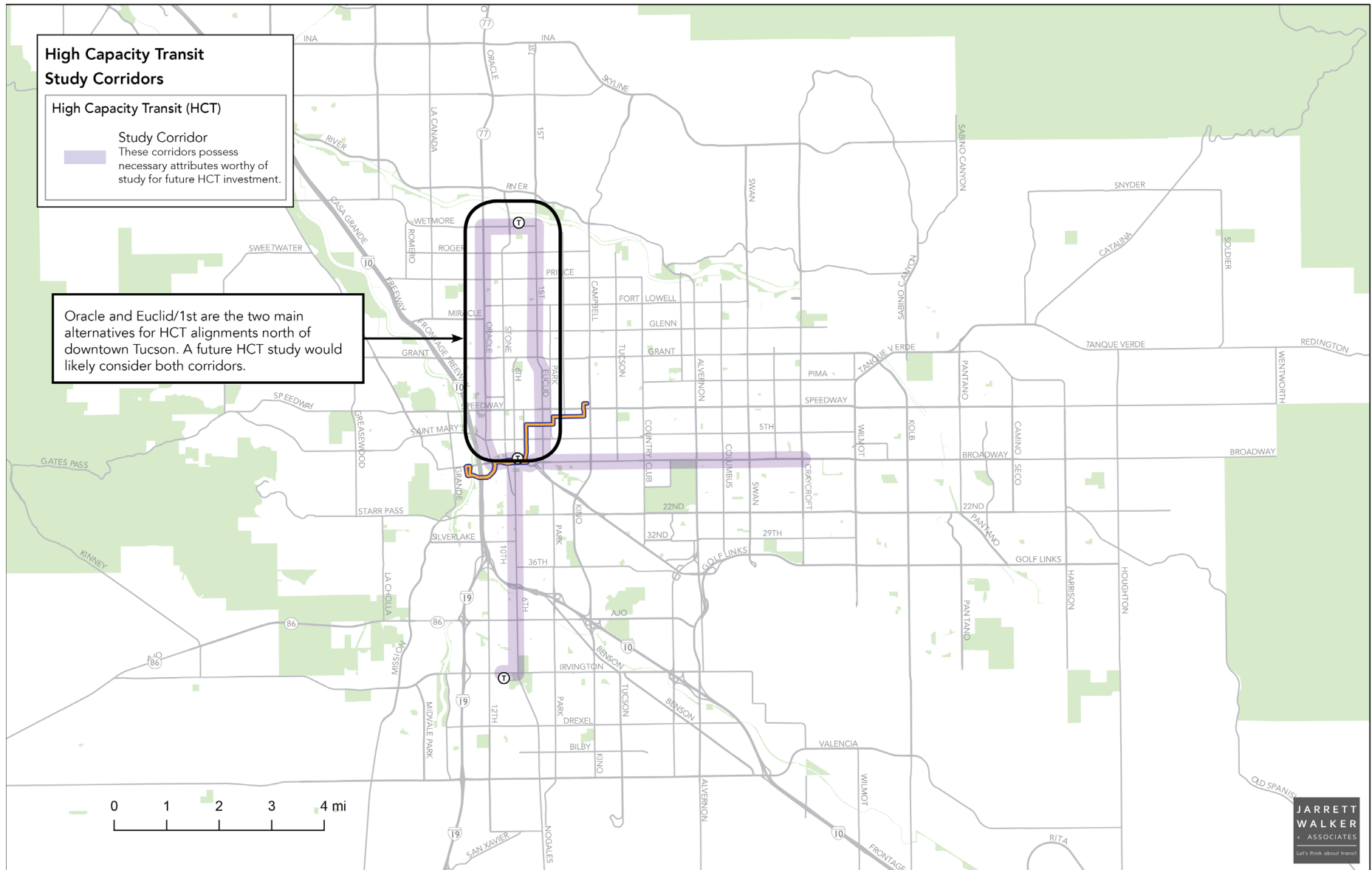


Figure 22: High Capacity Transit Study Corridors

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has proven to be a market in which transit can be quite competitive. This was also the most common place where the stakeholders told us they would place a future HCT line.

NORTH CORRIDOR

Figure 18 on page 20 showed the prevalence of HCT segments across the six groups. One area of strong agreement was that a future HCT alignment should form a north-south axis from South Tucson through downtown, and north to Tohono Tadaí TC. North of downtown, Oracle was the most popular choice for this purpose, and it has proven ridership (29 boardings per revenue hour in FY 2014) and relatively dense land uses.

However, Oracle is not the only possibility for HCT in northwest Tucson. Euclid has comparable or higher-density land use, and passes the university, but would compete with the streetcar for some trips. The existing route 6-Euclid is also a strong performer (32.2 boardings per revenue hour in FY 2014), one that we identify as a high priority for frequent service regardless of whether any infrastructure is located there.

SOUTH CORRIDOR

South of downtown, we have included S.

6th Avenue as a study corridor. This was the most frequent HCT segment in this area created by stakeholders. S. 6th has reasonably dense surrounding land uses compared to parallel streets, and existing ridership on the segment is much stronger than on the route on S. 10th/12th St., to the west.

Coverage Expansion Study Areas

While the stakeholders did not create many new coverage routes, future expansion of transit would certainly require consideration of this issue. Coverage service is crucial to achieving the type of equity-focused goals transit is often asked to pursue, particularly in future planning efforts.

Sun Tran's network offers relatively comprehensive coverage across most of the urbanized area of Tucson, generally at 30-minute frequency. The main "coverage area" of Sun Tran's network is the area served by all-day, fixed route service. Some very-low density, or outlying areas, are connected to the transit system via Sun Shuttle services.

We have identified three initial study areas for the extension of the 30-minute coverage area. These are shown in Figure 23 on

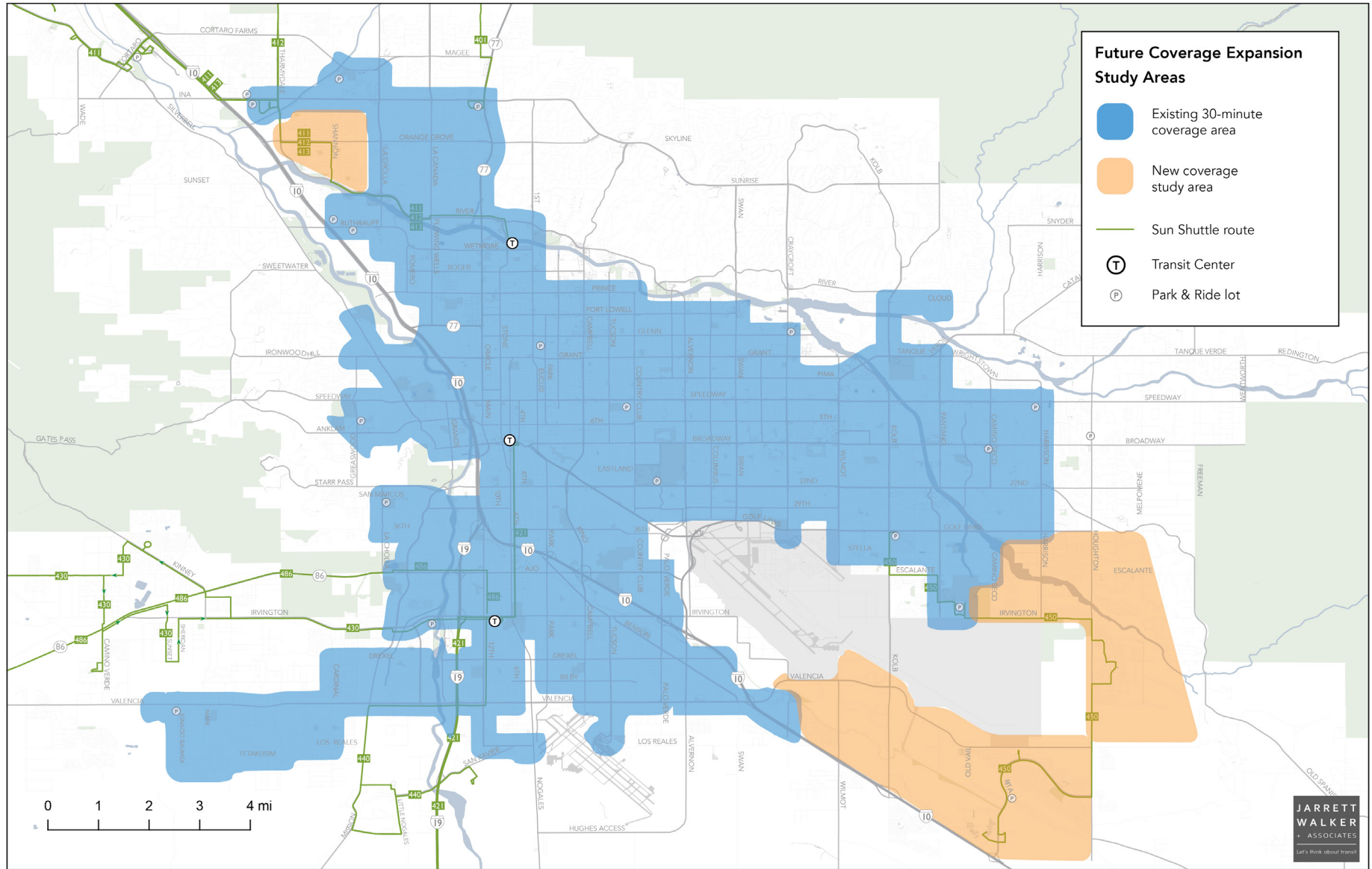
page 32; the stakeholder maps featuring service in this area were described on page 15 and 16. The blue area on this map is the approximate extent of the existing 30-minute coverage area; the areas shaded in orange are where study may be required to decide whether new 30-minute routes should be added in future. Sun Shuttle routes are shown on this map as well. These infrequent routes provide a very basic level of coverage access to a large area outside of the core Tucson area.

The first is in the northwest, where currently all-day routes are only spaced every two miles. A potential coverage increase could include 30-minute all-day service on Shannon or La Canada, or along River as one of the stakeholder groups drew.

The second study area is in the far southeast, where current population and employment projections indicate substantial growth potential in the future. Obviously development in this area is very limited presently, but as that changes in the future, study will be required to determine if coverage service is needed.

The third study area is the area approximately north of I-10 and south of Davis-Monthan Air Force Base. While the stakeholders did not provide coverage service in this area, Sun Tran staff have

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Figure 23: Coverage Expansion Study Areas

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noted a number of important destinations (such as the UA Tech Park and Air and Space Museum) and potential future residential and commercial development. For these reasons, this may be an additional area requiring future study to determine how to serve these emerging transit needs.

A Vision for Transit

This document is not intended to be a plan for the future transit network of Tucson. Instead, it presents a preliminary vision of a transit system where buses come more often, waits are shorter, connections are easier, and ultimately transit is more useful.

In the workshop, the stakeholders expressed a strong sense that transit should focus on ridership, and that it should do that by investing in a rich Frequent Network, providing a high level of service to the parts of Tucson where density and urban form suggest that it can be most competitive with other modes of transportation.

The stakeholders' strongest point of agreement was a rich and extensive Frequent Network for Tucson. The existing network has already introduced this principle across a wide area of the city. Where it exists, frequent service is able to offer a high degree

of freedom of movement, and thus access to opportunity, without requiring complete reliance on a personal automobile.

People who want to live in transit-intensive areas where this is possible should be able to do so at any price point. This is why the network is extensive, encompassing many parts of Tucson where density, walkability, street connectivity and linear transit paths combine to present a strong market for service. For those who do not care about having this type of transit mobility, many areas of Tucson offer an urban form and level of density more suited to their travel choices.

The existing Sun Tran network proves that in Tucson, frequent service to supportive land uses can generate high transit ridership, as people make the choice to use a travel option that is convenient and well-suited to their everyday life. This is the case today on routes like the 8-Broadway, 4-Speedway, and of course along the streetcar route. The network sketched here extends this principle to more people in more parts of the city, inviting a larger portion of the citizens of Tucson to share in the type of transit mobility that already exists in core areas.

The point of such a network is to grow ridership by making transit more useful

and liberating, especially in areas where the pattern of development is favorable to transit's success. The point is not just the ridership, of course, but all of the benefits to the community that flow from that: greater mobility with less congestion and emissions, increased access to jobs and education, and ultimately the potential to grow the city in a more sustainable form in which every resident, business or institution, at any price point, has the option to reduce their dependence on cars by choosing to locate on the Frequent Network.

Appendix A : Prairieville Results

Appendix A : Prairieville Results

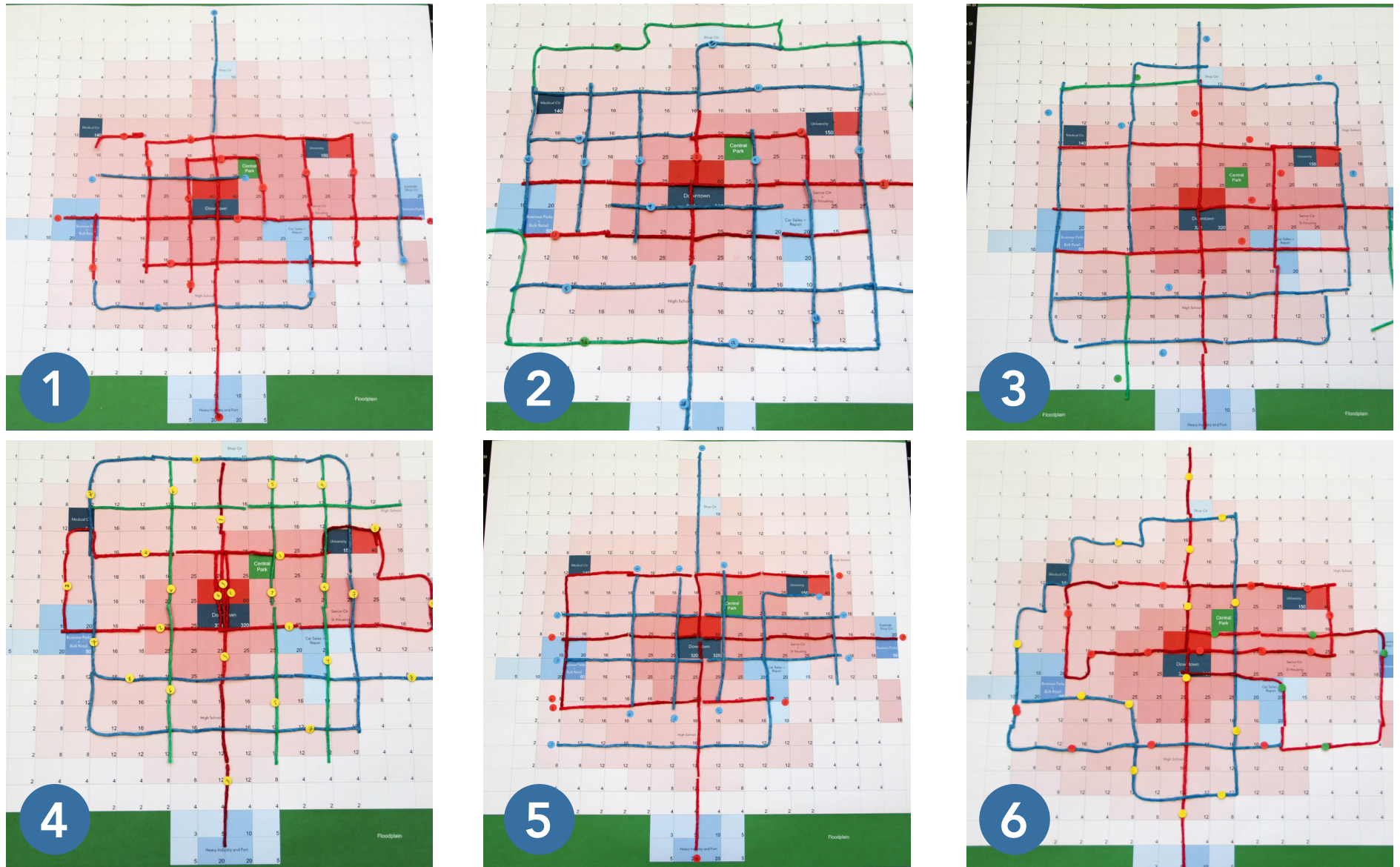
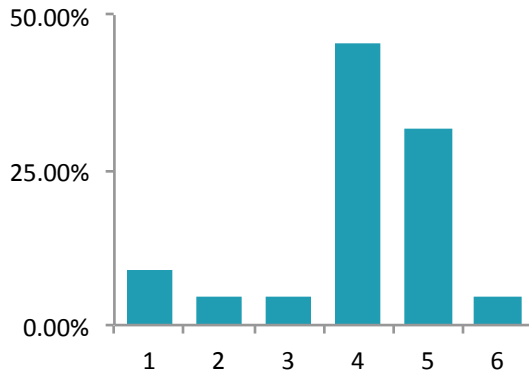


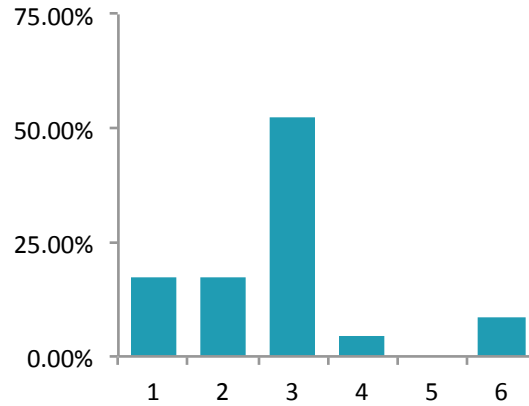
Figure 24: Prairieville Game Results (labeled by group)

Appendix A : Prairieville Results

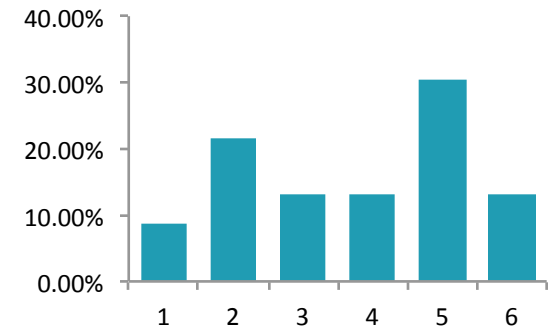
Which network is best for encouraging dense and walkable development?



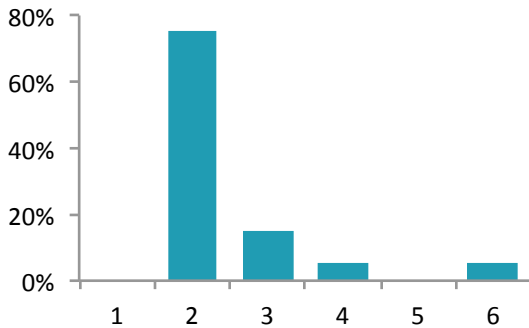
Which network is best for low income people?



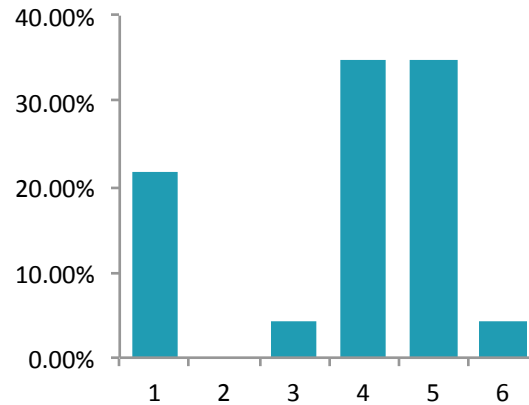
Which network makes it easiest to travel between any two points in the network?



Which network is best at getting a little service to everyone, no matter where they live?



Which network will have the highest ridership?



The numbers shown on the x-axis of each graph refer to the stakeholder Prairieville maps, as numbered in "Figure 24: Prairieville Game Results (labeled by group)" on page 35.

Figure 25: Complete Stakeholder Polling Responses (Prairieville Questions)

Appendix B : Tucson Exercise Results

Appendix B : Tucson Exercise Results

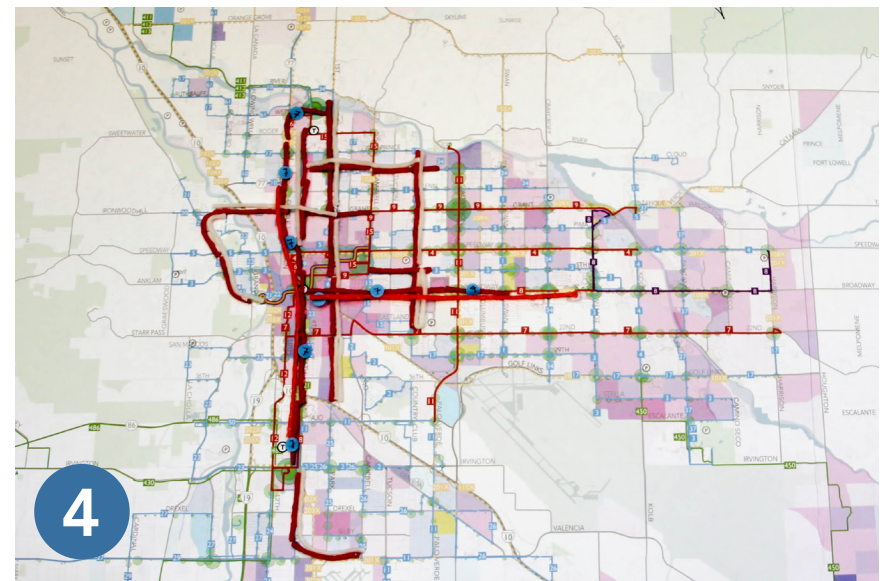
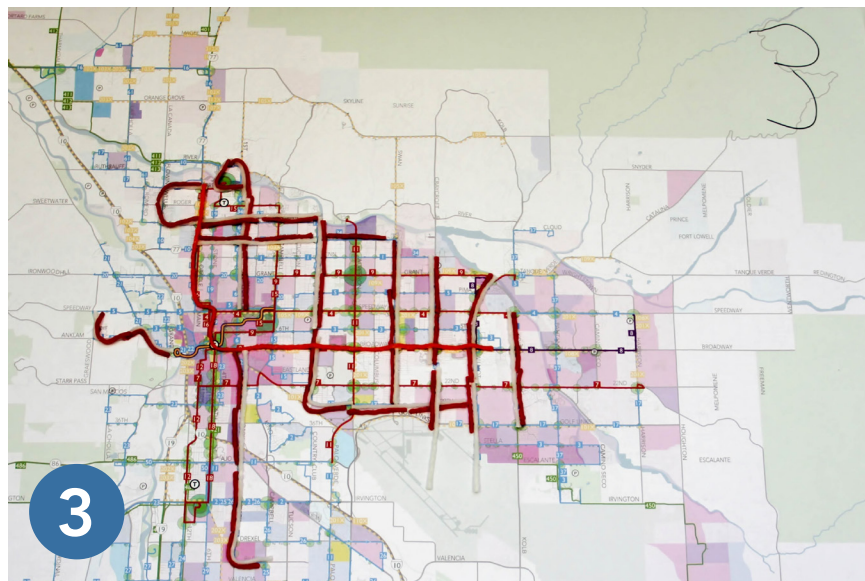
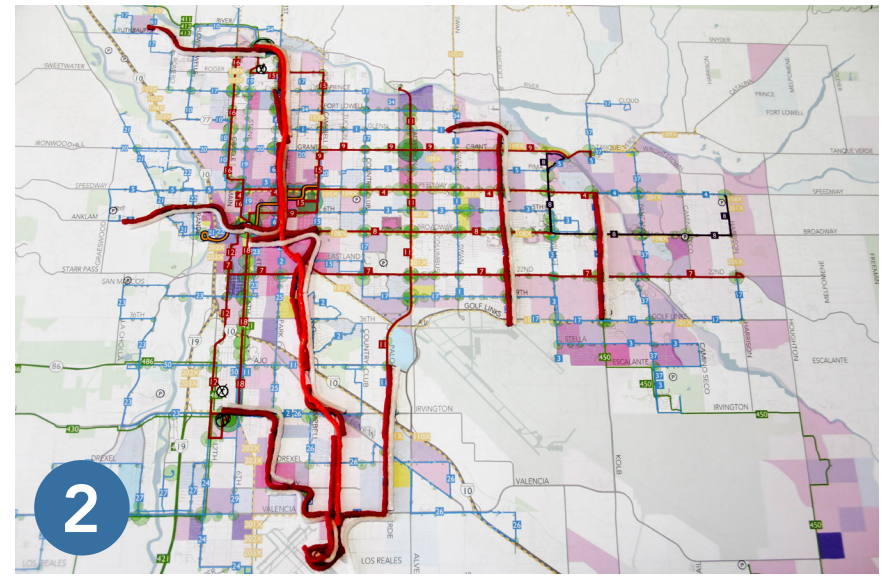
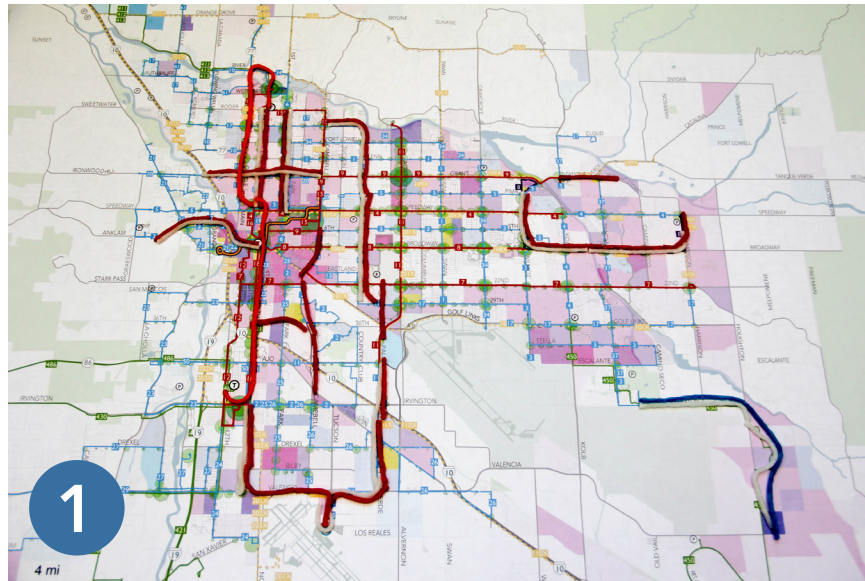


Figure 26: Tucson Exercise Results by Group (Groups 1-4)

Appendix B : Tucson Exercise Results

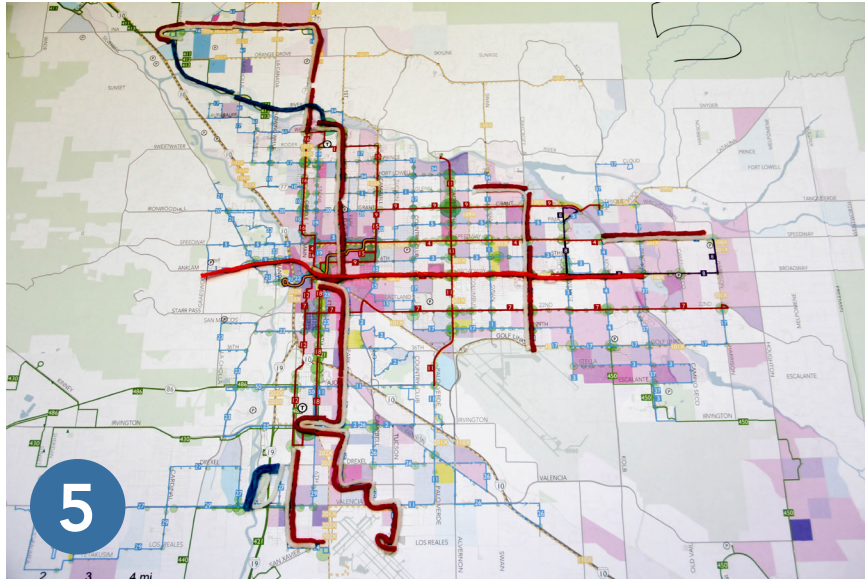
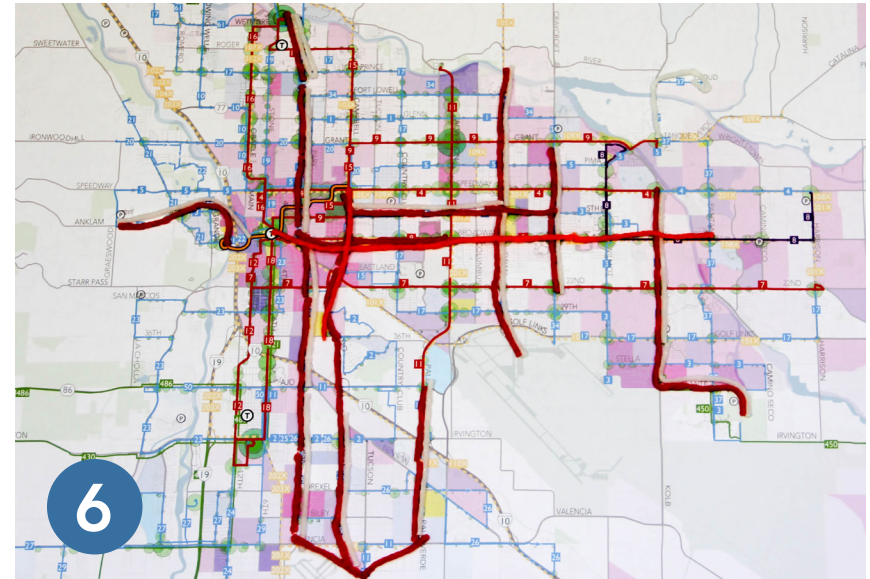
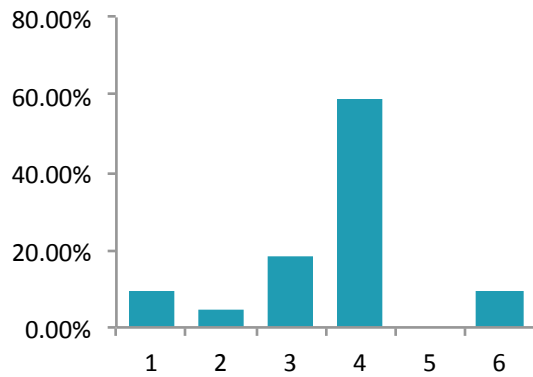


Figure 27: Tucson Exercise Results by Group (Groups 5-6)

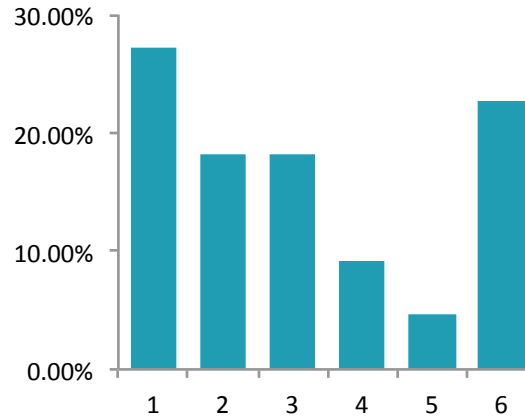


Appendix B : Tucson Exercise Results

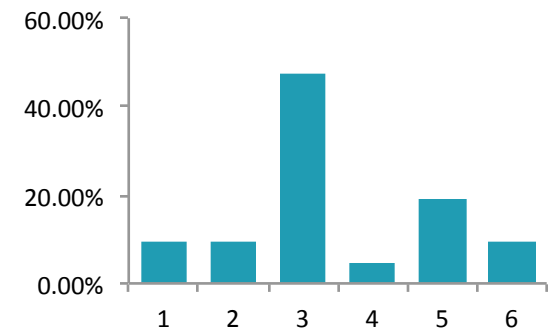
Which network is best for encouraging dense and walkable development?



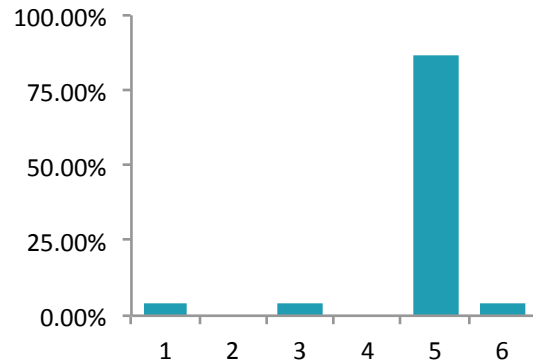
Which network is best for low income people?



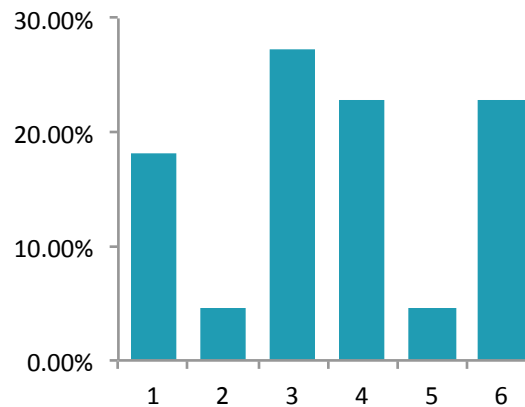
Which network makes it easiest to travel between any two points in the network?



Which network is best at getting a little service to everyone, no matter where they live?



Which network will have the highest ridership?



The numbers shown on the x-axis of each graph refer to the stakeholder Tucson exercise maps, as numbered in Figure 26 and Figure 27 on the preceding pages.

Figure 28: Complete Stakeholder Polling Responses (Tucson Exercise Questions)

Appendix C : May Workshop Summaries

Appendix C : May Workshop Summaries

PAG offered additional transit visioning workshops open to the public, which included the Tucson Transit Network Visioning Exercise. Thirty participants attended three workshops on May 13, 19 and 21st, with eight groups in total. Workshop exercises focused on a discussion of the competing goals of ridership and service coverage, including route frequencies and accessibility.

Each group was given an additional 25% budget of nine blue sticks (representing 30-minute bus service) and nine red sticks (representing 15-minute bus service). They could trade in these pieces for different frequencies. Groups also had the opportunity to spend their new resources on increasing the weekend service level on the existing network.

Most groups used all or most of their available budget for transit expansion. A few groups chose to not use the additional budget, and instead used the sticks to realign the existing system.

Although approaches from participants in each workshop varied, there were several common themes that emerged among the three public outreach workshops. The workshop maps are presented in Figure 31 on page 46 and Figure 32 on page 47.

Common approaches included completing the current transit network grid, creating a core of frequent service, reducing frequency on routes outside the core, matching frequencies on North-South routes to current East-West routes, connecting currently split routes with increased 15 minute frequency, more connections to intersections with existing high ridership, and increasing on ridership by focusing on frequent service to shopping centers (which can be good locations for park and ride lots).

Frequent network additions

Groups increased frequency on several common corridors, and extended frequency to important destinations such as the airport, hospitals, transit centers, and shopping centers (Bridges, La Encantada, and Williams Center).

Figure 29 on page 43 displays the prevalence of FTN segments among the groups from the May workshops.

Frequent Network segments that were common among many groups included:

- Country Club
- 7.5-minute service on Alvernon
- 7.5-minute service on Oracle

- Speedway east of Kolb
- Broadway east of Wilmot and Kolb
- Kolb
- Euclid
- Grant west of Campbell

New coverage

- Houghton Road needs service to support density – 30 minute service along Houghton and Tanque Verde
- New 60 minute route to La Encantada
- Express service to airport
- Express service between transit centers
- Extend route 3 and 16
- East/West connection between Campbell and Oracle
- Additional service on routes 4 and 8 farther east

Weekend Service

Most groups expressed the need for additional weekend service. Two groups chose to spend their new resources on increasing some service to 15 minute frequency on Saturday only, while another group chose

Appendix C : May Workshop Summaries

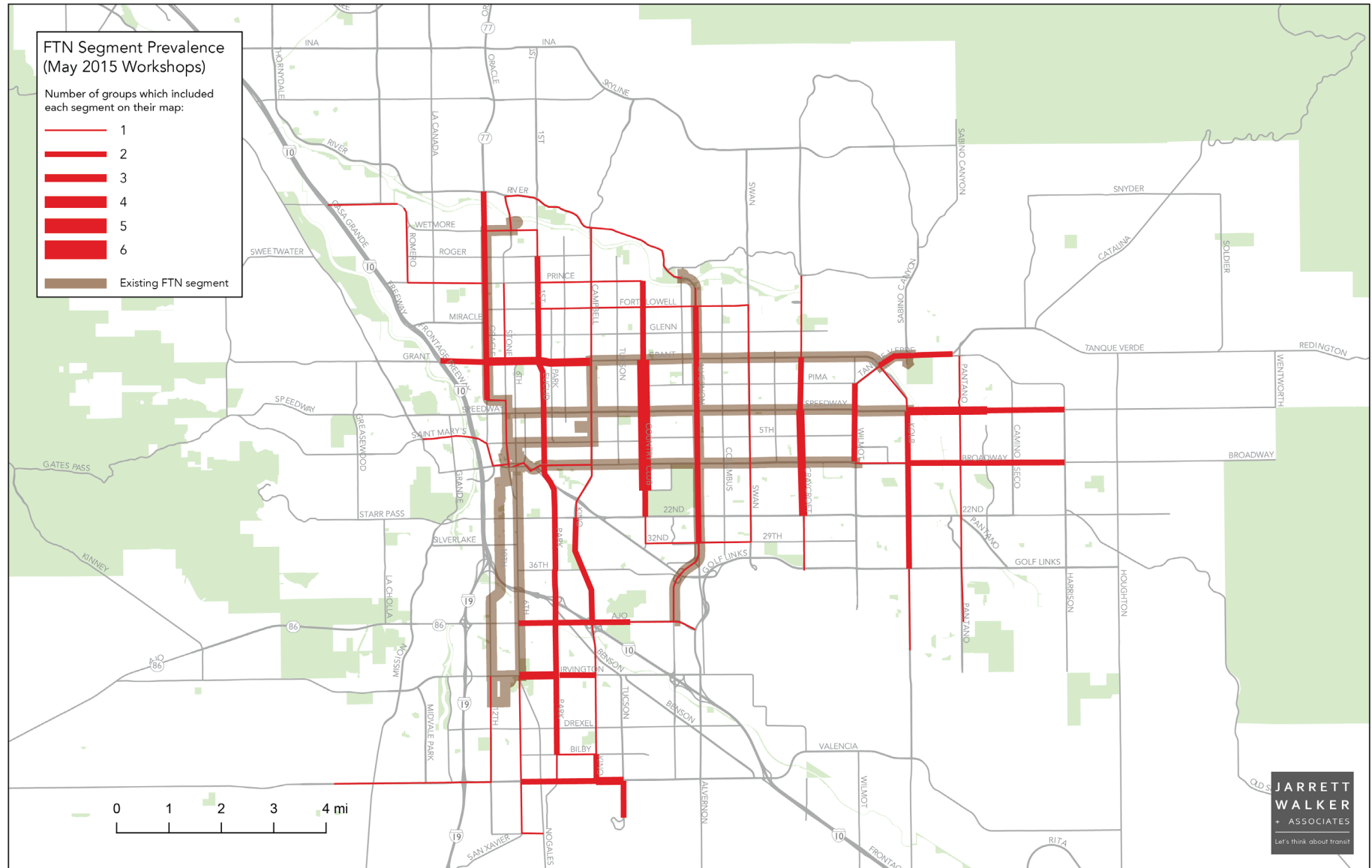


Figure 29: Frequent Network segment prevalence (May 2015 workshops)

Appendix C : May Workshop Summaries

to increase some service to 15 minute frequency on both Saturday and Sunday. Two groups chose to increase all weekend service to 15 minute and 30 minute frequencies. Three of eight groups chose to not increase weekend service span or frequency. Several groups also highlighted the need for expanded evening service.

High Capacity Transit

Groups were also given the task of showing where they would put Tucson's next high capacity transit line. Figure 30 on page 45 shows the prevalence of high-capacity transit segments among the groups in the May workshops.

The following corridors were selected:

- Airport
- Campbell Avenue
- Broadway Boulevard (to Pantano and to Williams Center)
- Speedway Boulevard
- South 6th Avenue
- Grant
- Oracle

One group suggested converting express

routes to light rail service.

After concluding the exercise, participants were asked a series of questions to encourage discussion on their approaches to the exercise and their views on transit. The majority of groups from all of the workshops agreed that they support more funding than the current level of resources available.

Appendix C : May Workshop Summaries

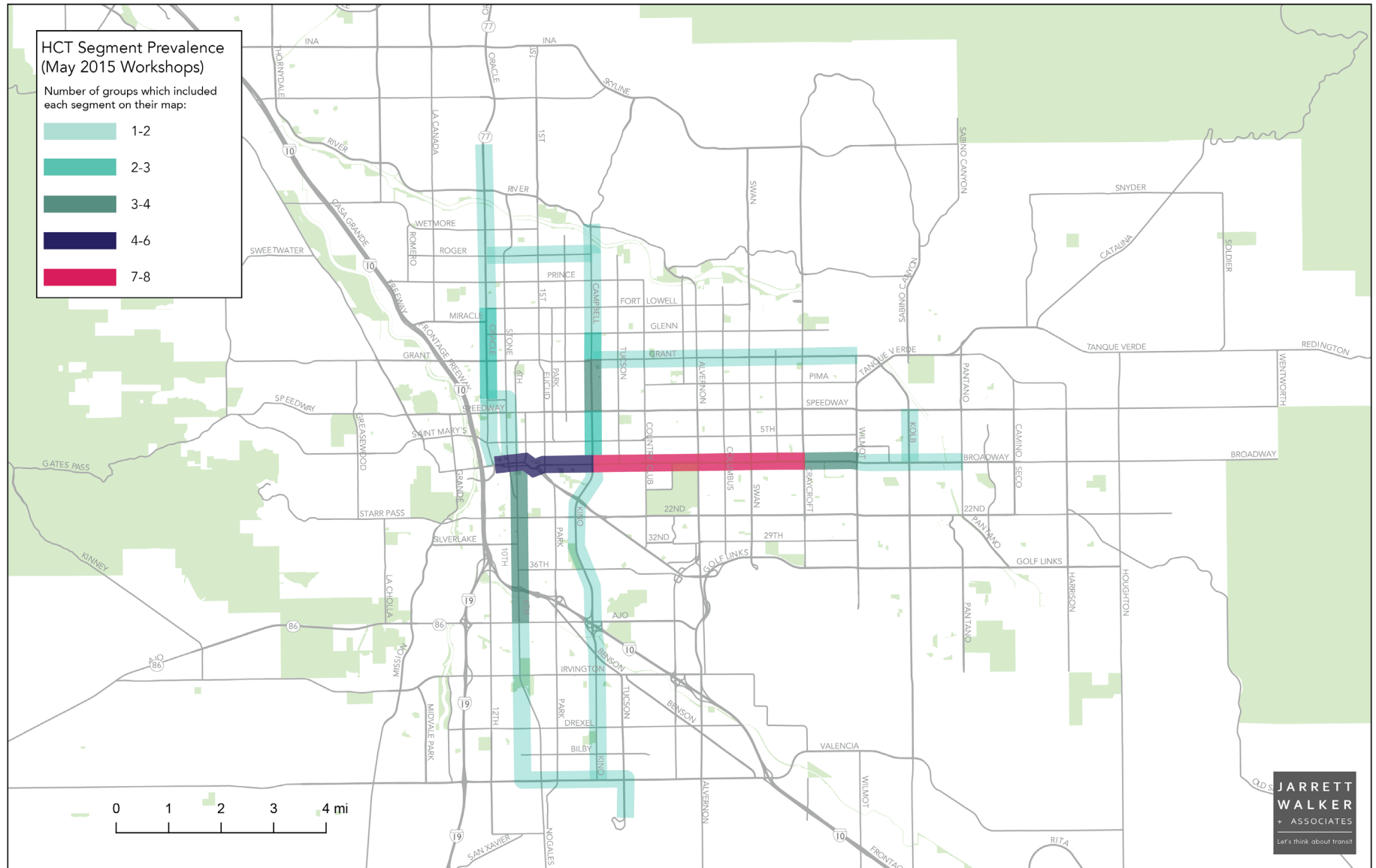


Figure 30: High Capacity Transit segment prevalence (May 2015 workshops)

Appendix C : May Workshop Summaries

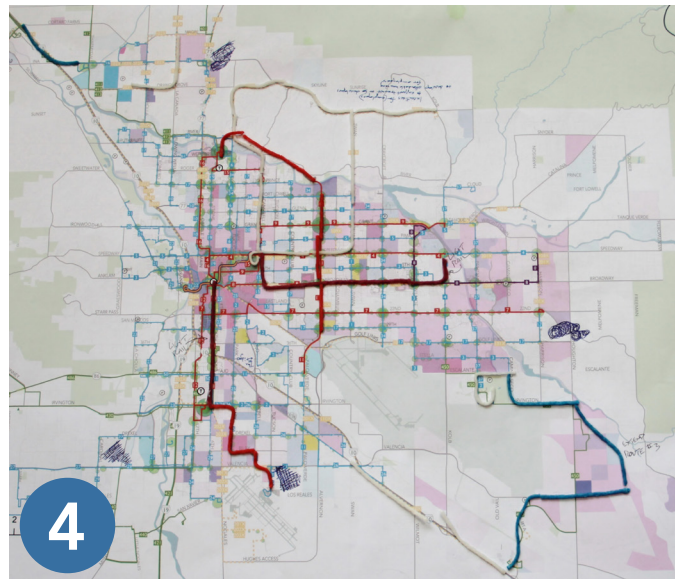
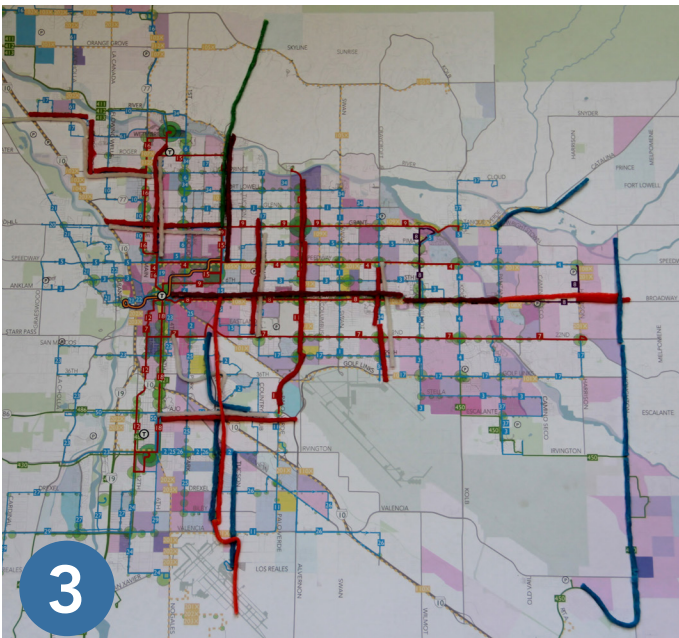


Figure 31: May Workshop maps (Groups 1-4)

Appendix C : May Workshop Summaries

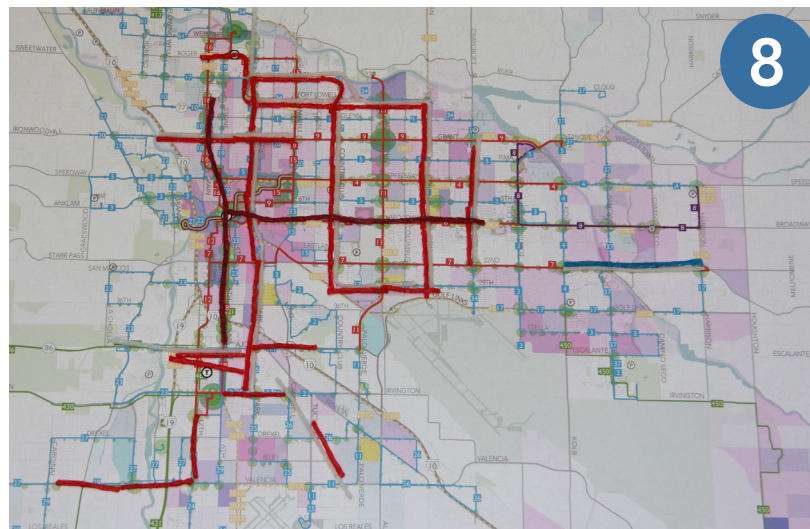
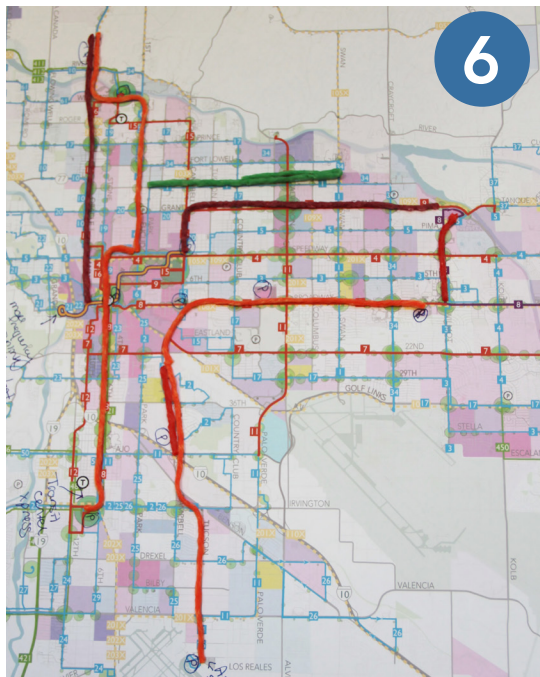
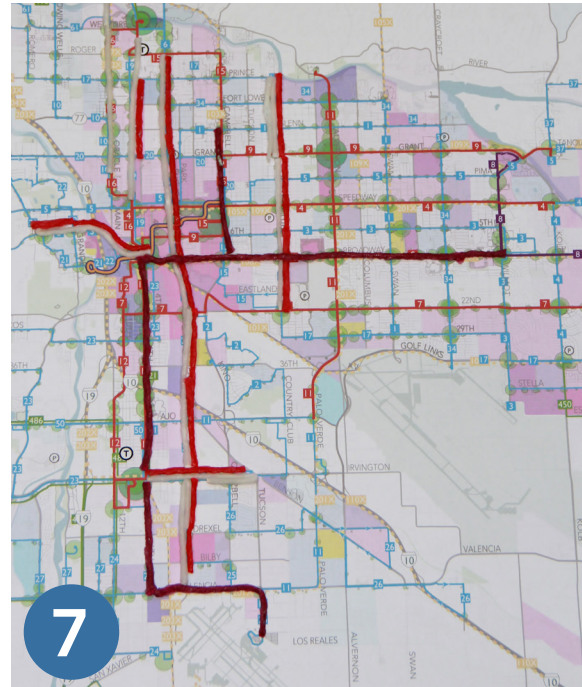
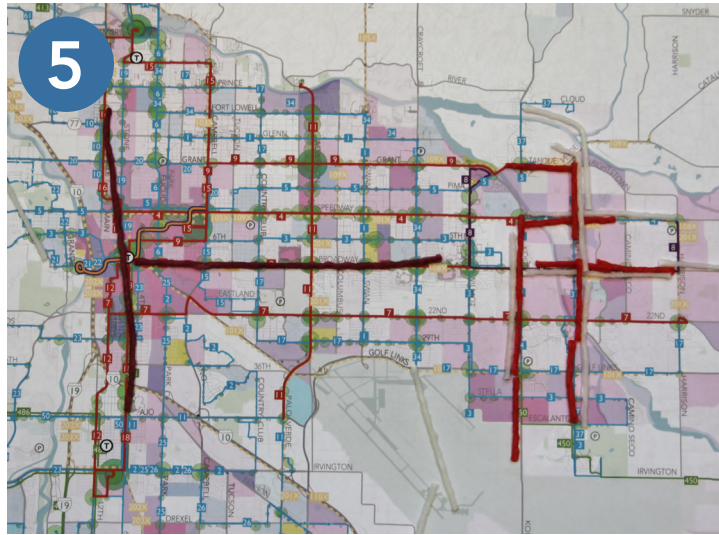


Figure 32: May Workshop maps (Groups 5-8)