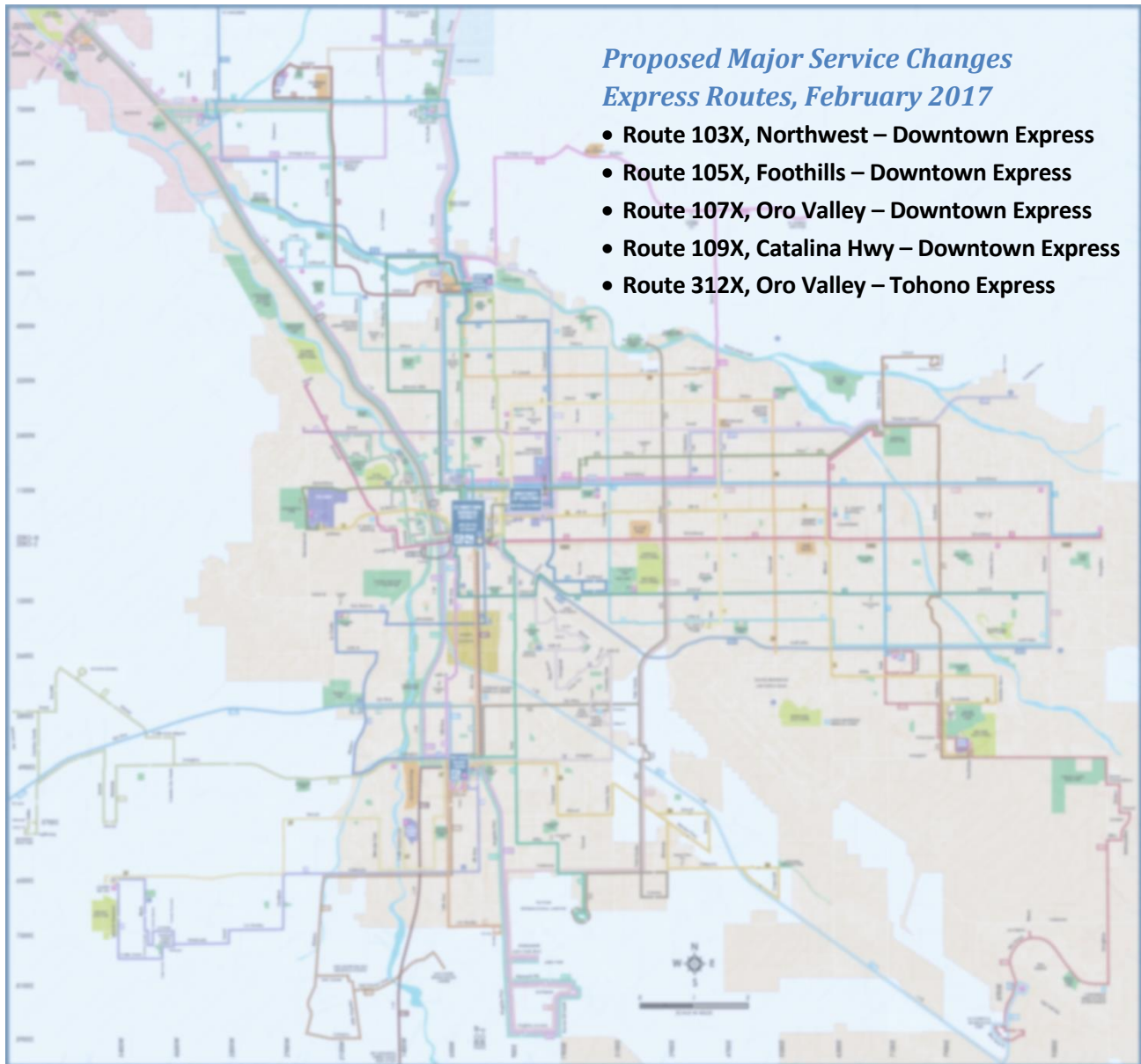


Title VI – Major Service Change Equity Analysis



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Scheduling and Service Development Department
On behalf of: Regional Transportation Authority (RTA)
City of Tucson, Department of Transportation,
Transit Services Division
As of: October 20, 2016



Table of Contents

Executive Summary and Purpose:	2
Background:	2
Title VI and Environmental Justice Considerations:.....	3
Current Route Service & Proposed Changes:	9
Route Level Analysis	13
<i>Northwest-Downtown Express 103X – Analysis of Proposed Service Elimination</i>	13
Foothills-Downtown Express 105X – Analysis of Proposed Service Change	15
Oro Valley-Downtown 107X & Oro Valley-Tohono Expresses 312X – Analysis of Proposed Service Change and Route Merge	17
Catalina Hwy-Downtown Express 109X – Analysis of Proposed Service Change	21
Conclusions:	24
Appendix A: City of Tucson, Resolution Number 22127 <i>Policy and Procedure for Solicitation and Consideration of Public comment on Fare Changes and Major Service Changes on Public Transportation</i>	
Appendix B: 2016 Tucson Onboard Survey	
Appendix C: FTA Circular 4702.1B, Appendix K Considerations for a Service Equity Analysis Checklist (App. K-1 – App. K-9)	

Executive Summary and Purpose:

Per the City's *Policy and Procedure for Solicitation and Consideration of Public comment on Fare Changes and Major Services Changes on Public Transportation*, the proposed service changes to the Express Routes 103X, Northwest-Downtown Express, 105X, Foothills – Downtown Express, 107X, Oro Valley – Downtown Express, 109X, Catalina Hwy – Downtown Express, and 312X, Oro Valley-Tohono Express, are "Major Service Changes"; therefore, they require a Title VI service equity analysis. Comparisons system-wide analyses, across the Sun Tran service area, show possible disparate impacts and disproportionate burdens in the proposed service changes. Service changes may still be accomplished if there is substantial legitimate justification for the change and there are no practical alternatives that would have less of an impact on the minority and/or low-income populations and still accomplish legitimate program goals.

The purpose of these service changes is to provide effective reliable service while being efficient and fiscally responsible.

Background:

The 2015 Pima Association of Governments (PAG) Short-Range Transit Implementation Plan identifies the need to develop performance measurements for RTA-funded transit projects in order to provide effective and meaningful service. Since 2006, the RTA in concert with jurisdictional partners has significantly expanded transit availability throughout the region, including longer operating hours, crowding relief, frequency improvements and service extensions.

During its June 2016 meeting, the PAG/RTA Transit Working Group approved performance measures and route design guidelines for the Sun Express system. The performance measures were applied to the FY 15 Express System performance data to create an initial list of routes in need of alignment or service adjustments.

Routes 103X, 105X, 107X, 109X, 202X, and 203X were identified for realignment in order to remove service duplication, remove unproductive route segments, and/or align routing to better serve target customers.

Routes 312X and 103X were identified to be discontinued. Recommendations to the route 103X were modified based on public feedback, and the route will be reduced from four (4) morning and four (4) evening trips to two (2) trips each, based on poor productivity and service duplication. The majority of the service now provided by route 103X and 312X will continue to be available to customers through alternate routes.

The proposed changes to Routes 103X, 105X, 107X, 109X, and 312X meet the defined requirements of a Major Service Change for the City of Tucson per the City's *Policy and Procedure for Solicitation and Consideration of Public comment on Fare Changes and Major Service Changes on Public Transportation* (Appendix A). To implement these changes, the Regional Transportation Authority (RTA) in coordination with the City of Tucson held multiple public input meetings and a public hearing to approve the proposed changes.

Title VI and Environmental Justice Considerations:

The FTA Title VI Circular 4702.1B, Chapter IV requires that, “transit providers that operate 50 or more fixed route vehicles in peak service and located in an urbanized area (UZA) of 200,000 or more in population” conduct a Title VI equity analysis whenever planning a major service change. The City of Tucson Resolution 22127 adopted August 6, 2013 demonstrates the City’s adoption of a *Policy and Procedure for Solicitation and Consideration of Public comment on Fare Changes and Major Service Changes on Public Transportation*. This policy and procedure states the requirement for an equity analysis when planning major services changes and consider adverse effects that may occur, defining the Disparate Impact (i.e. non-discrimination of race, color, or national origin) and Disproportionate Burden (i.e. low-income) policies.

A major service change for the City of Tucson transit is defined as any change in service that would add or eliminate:

- Twenty-five percent (25%) or more of the route revenue miles on any individual route, or
- Twenty-five percent (25%) or more of the route revenue hours on any individual route, or
- Twenty-five percent (25%) or more of the ridership on any individual route (based on the most recent route survey or sample)

Per FTA Title VI Circular 4702.1B, if a proposed service change meets the definition of a Major Service Change both the possibility of adverse effects and disparate impacts are to be evaluated. The *Fare Change and Major Service Change Policy* defines thresholds for determining whether potential fare and major service changes will have an adverse effect based on a disparate impact or disproportionate burden for and proposed service changes, which are to be evaluated:

- Disparate impact(s) is determined by an analysis of race, color, or national origin (minority) within the service area. The Disparate Impact Policy states that a proposed fare or major service changes should not have an adverse effect borne by twenty percent (20%) or more of a minority population than an adverse effect borne by the non-minority population.
- Disproportionate burden(s) is determined by an analysis of low-income populations within the service area. The Disproportionate Burden Policy states that a proposed fare or major service change should not have an adverse effect borne by twenty percent (20%) or more of a low-income population than an adverse effect borne by the non-low-income population.

If the equity analysis indicates that a disparate impact and/or disproportionate burden exist, alternatives to mitigate, provide opportunities to minimize, or avoid the effect should be identified and reanalyzed. The agency may implement the service change if there is substantial legitimate justification for the change and the agency can show there are no practical alternatives that would have less of an impact on the minority and/or low-income populations and would still accomplish the agency’s legitimate program goals.

Public Engagement Process that developed the major service change, disparate impact, and disproportionate burden policies

In addition to the public hearing on August 6, 2013, the following outreach activities were conducted prior to Mayor and Council's adoption of Resolution 22127 (*Policy and Procedure for Solicitation and Consideration of Public comment on Fare Changes and Major Service Changes on Public Transportation*)

- The policies and solicitation for comments was posted at www.suntran.com in English and Spanish, as well as on Facebook
- Open houses were conducted on July 17 & 23, 2013
- Strip cards in English and Spanish were placed on all buses and distributed to customers advising of the open houses and providing comments.
- Sun Tran's customer service representatives were provided talking points regarding the policies and were prepared for telephone inquiries and/or comments.
- Sun Tran's customer service department monitored emails at suntraninfo@tucsonaz.gov for any emailed comments.
- The draft policies were distributed to members of the Transit Task Force
- Public hearing notices were published.
- Interior bus advertising was placed in all buses advising of the Public Hearing and opportunity for public comment.

The comments were documented from sixteen (16) telephone calls received by Sun Tran's Customer Service and four comments returned from seventeen (17) attendees at the July 2013 Open Houses, summarized as:

- Doing a good job complying with the established regulations
- Support the use of 20% as the threshold for disparate impact and disproportionate burden
- Advocate for a lower threshold for major service change
- Go beyond the newspaper notice for announcing the public hearing
- Provide explanation of the "Title VI" in advertisements

The policies were reviewed prior to acceptance for the 2016 Title VI Program and public comments were solicited online and at public open-house meetings. There were five (5) new comments received during the 16 public meetings (May 3 to June 17, 2016), via customer service, social media, or email in regards to maintaining the current policies for Fare Change, Major Service Change, Disparate Impact, and Disproportionate Burden.

Comments that were documented included:

- Comments support the 20% thresholds for minority populations and for disproportionate burden on low-income populations, and doing a good job, complying with the established regulations
- Comments advocate lower thresholds for minority populations and for disproportionate burden on low-income populations
- Comments request for non-traditional advertising in addition to traditional required newspaper notices of Title VI and Public Hearing processes, including definitions for public notices

Goals and objectives of the Sun Tran System that influenced this analysis were:

- Provide safe reliable service to the community within the fiscal constraints determined by the City of Tucson via the City Manager's Office, Department of Transportation - Transit Services Division with guidance from the City of Tucson Department of Finance
- Maintain current coverage of the Sun Tran Service Area
- Maintain and improve when possible minimum frequencies for local routes (Routes 1-61)
 - Weekdays:
 - 30-minutes or better between the hours of 6:00 am through 6:00 pm on all routes
 - 15-minutes or better on selected routes identified in the emerging FTN
 - Weekends (Saturday and Sunday):
 - 60-minutes or better between the hours of 6:00 am through 6:00 pm on all routes
 - 30-minutes or better on selected routes identified in the emerging FTN

Goals and objectives of the Sun Express System that influenced this analysis were:

- Maintain the efficiency of the system by employing the following operating standards:
 - Passengers per Trip 15 or greater
 - Subsidy per Passenger \$12.00 or less
 - Farebox Ratio 15% or greater
- Maintain high quality service by employing the following service quality standards:
 - Reliability
 - On time performance – 90% or greater
 - Travel Time
 - Auto/Bus travel time ratio should not exceed 1.5
 - Frequency
 - Headway should not exceed 60 minutes
- **Design Guidelines** - Guidelines are intended to inform the structure of express routes, but are flexible based on circumstance.
 - Service should link a park and ride lot to a major employment or activity center
 - Routes should employ limited-access, higher speed roadways
 - Routes should not exceed 125% of shortest driving distance
 - Significant route deviations in excess of 10% of total travel time should result in significant ridership increases
 - Service span should align to the business hours of destination

Minority and Low-Income Fare Demographic Information

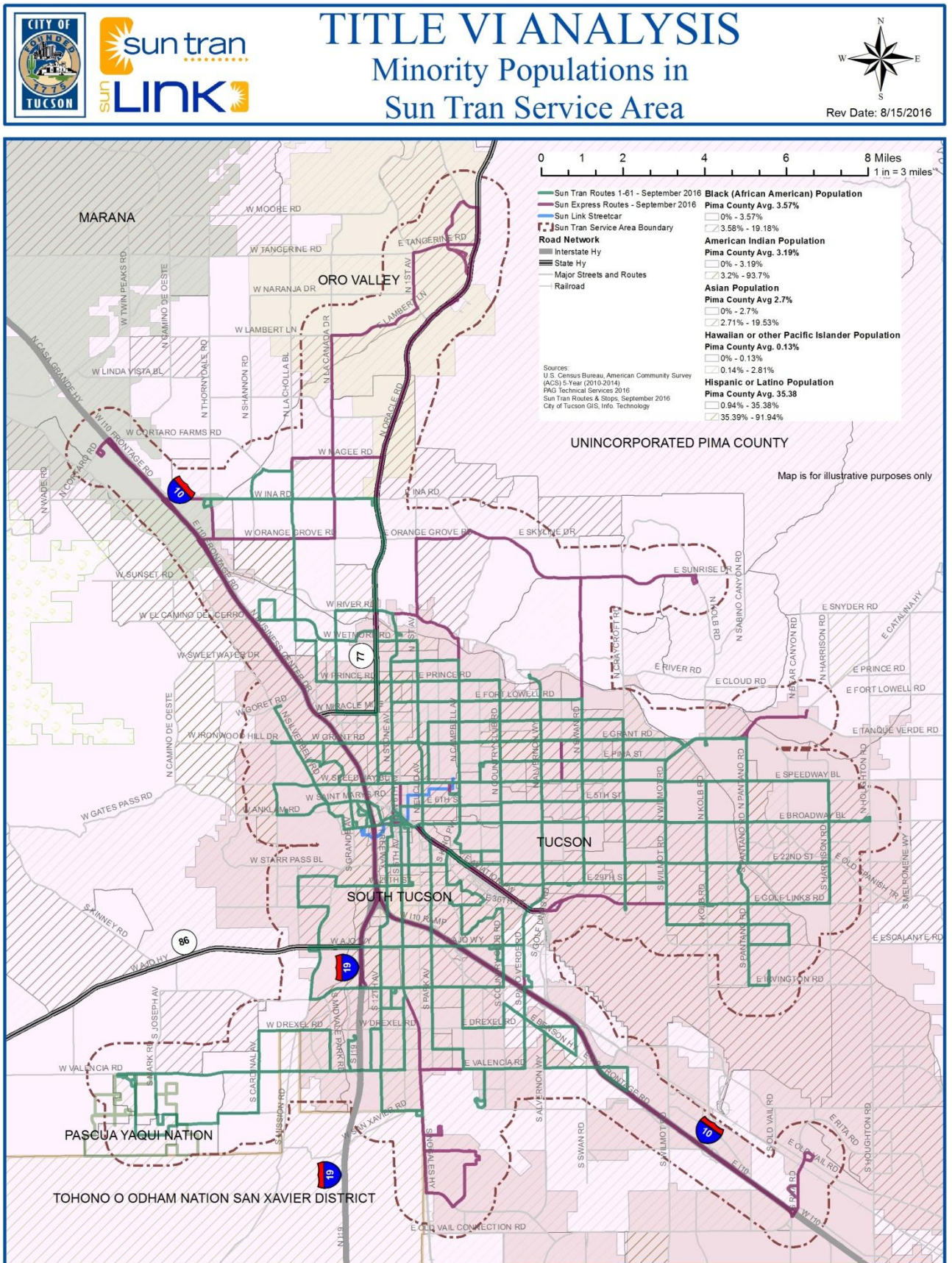
FTA circular 4702.1B defines minority persons to include American Indian and Alaska Native, Asian, Black or African American, Native Hawaiian or other Pacific Islander, and Hispanic or Latino, which includes persons of Cuban, Mexican, Puerto Rican, South, or Central American, or other Spanish culture regardless of race.

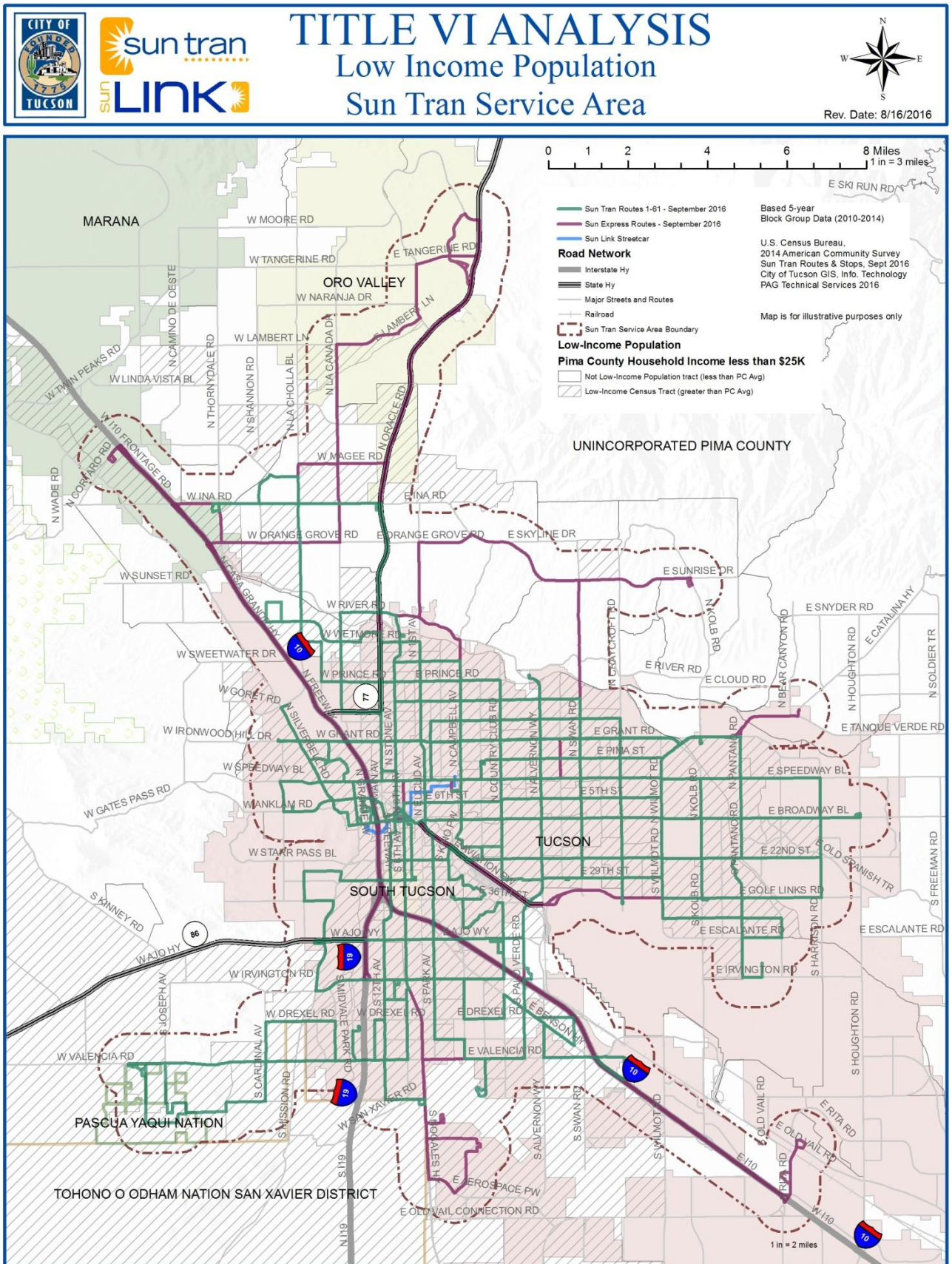
Individuals who responded to the 2016 On-Board Transit Survey, completed by ETC Institute on August 2016 on behalf of the City of Tucson and PAG (Appendix B), answered questions that identified their racial and ethnic categories. Based on the survey responses from Sun Tran system riders average percentages were determined for each race and/or ethnicity: 36.98 percent (36.98%) Hispanic, 12.57 percent (12.57%) Black or African American, 6.59 percent (6.59%) American Indian, less than two percent (2%) were Asian, with 44.54 percent (44.54%) identified as White/Caucasian with no other ethnicity or race included.

Additionally, survey respondents answered questions relating to household income. All survey respondents that identified their household incomes as \$25,000 or less determined the low-income passengers (population). Low-income households earning \$25,000 or less, is 54 percent (54.1%) of the median household income (in 2014 dollars), 2010-2014 ACS 5-year estimates data, of \$45,233 per the U.S. Census Quick Facts for Pima County, Arizona (8/16/2016). Sun Tran Special Services Office qualifies economy fare low-income users based on information from the Arizona Department of Economic Security, Social Security, or the U.S. Department of Labor Lower Living Standard Income Level (LLSIL) table. A family of two, yearly lower income standard level, is allowed a maximum household income of \$24,219. Economy fare low-income qualified users may have a household income greater than this threshold based on household size.

The percentage of respondents that identified themselves as minority was 55.46 percent (55.46%) and the number of respondents who identified their households as meeting the low-income thresholds were 61.3 percent (61.3%) for the overall Sun Tran system. Separating the Express Route system from the local/core routes, 23.96 percent (23.96%) of respondents identified themselves as minority and seven percent (7.11%) of respondents identified their households as meeting the low-income threshold.

Service equity analysis requires the route level be compared to the system as a whole, individual route changes may affect how other areas of the system operate. The maps following illustrate the Sun Tran Service area, with minority and low-income populations highlighted. Minority and/or low-income persons can access or be affected throughout all areas of the Sun Tran system discussed for changes in this equity analysis (before or after any changes proposed). Though the service changes to routes would affect minority persons in a notable manner, the analyses below indicate a disparate impact. On one route (105X), no rider in the survey identified themselves as part of a minority race or ethnicity and a second route (109X) has self-identified minority ridership of less than four (3.89%) of the total route ridership meeting the twenty percent (20.07%) threshold. The analyses also indicates a possible disproportionate burden for persons with low-income. Due to the nature of express routes, few express routes have significant ridership with a household income less than \$25,000.





Current Route Service & Proposed Changes:

Route 103X, Northwest - Downtown Express

Current Service: Operates between Ina at Thornydale via the University of Arizona (UA) by way of Ina Road, Oracle Road, River Road, Campbell Avenue, Speedway Boulevard, and Stone Avenue thru Downtown to the Ronstadt Transit Center at 6th Avenue and Pennington NE. The service has four (4) trips in the morning from 6:00 am – 8:00 am traveling south and four (4) trips late afternoon from 4:00 pm to 6:11 pm traveling north.

Proposed Change: Originally, the route was proposed to be discontinued. The 103X has a long record of poor performance when compared to the rest of the Sun Express system. The majority of the route is also duplicated along Ina Road, Oracle Road and Campbell Avenue. Most Route 103X riders would be able to use Sun Express Routes 102X, Northwest – UA Express, 107X, Oro Valley – Downtown Express, or Sun Tran Route 15, Campbell, as alternatives.

The revised change, based on community feedback at Open Houses held September 27 thru September 30, 2016, is to reduce the route service to two (2) trips in the morning from 6:00 am – 8:00 am traveling south and two (2) trips late afternoon from 4:15 pm to 6:11 pm traveling north

Route 105X, Foothills - Downtown Express

Current Service: Operates between Tohono T’adai Transit Center (TTC) by way of Stone Avenue, River Road, 1st Avenue, Sunrise to Kolb Road and back to Swan Road, Speedway Boulevard, and Stone Avenue thru Downtown to the Ronstadt Transit Center at 6th Avenue and Pennington NE. The service has three (3) trips in the morning from 5:50 am to 7:50 am traveling east and south and three (3) trips late afternoon from 4:40 pm to 6:56 pm traveling north and west.

Proposed Change: The proposed route change recommends that the route starts at Territory and Kolb roads and travel along Sunrise to Swan Road, continuing along its current routing on Swan, Speedway Boulevard, and Stone Avenue thru Downtown to the Ronstadt Transit Center at 6th Avenue and Pennington NE. The unproductive segment of the route from Tohono T’adai Transit Center to Swan Road and Sunrise would be discontinued. Stops on Orange Grove and Skyline would no longer receive service. The proposed service would have three (3) trips in the morning from 6:14 am to 7:50 am traveling west and south and three (3) trips late afternoon from 4:40 pm to 6:32 pm traveling east and north.

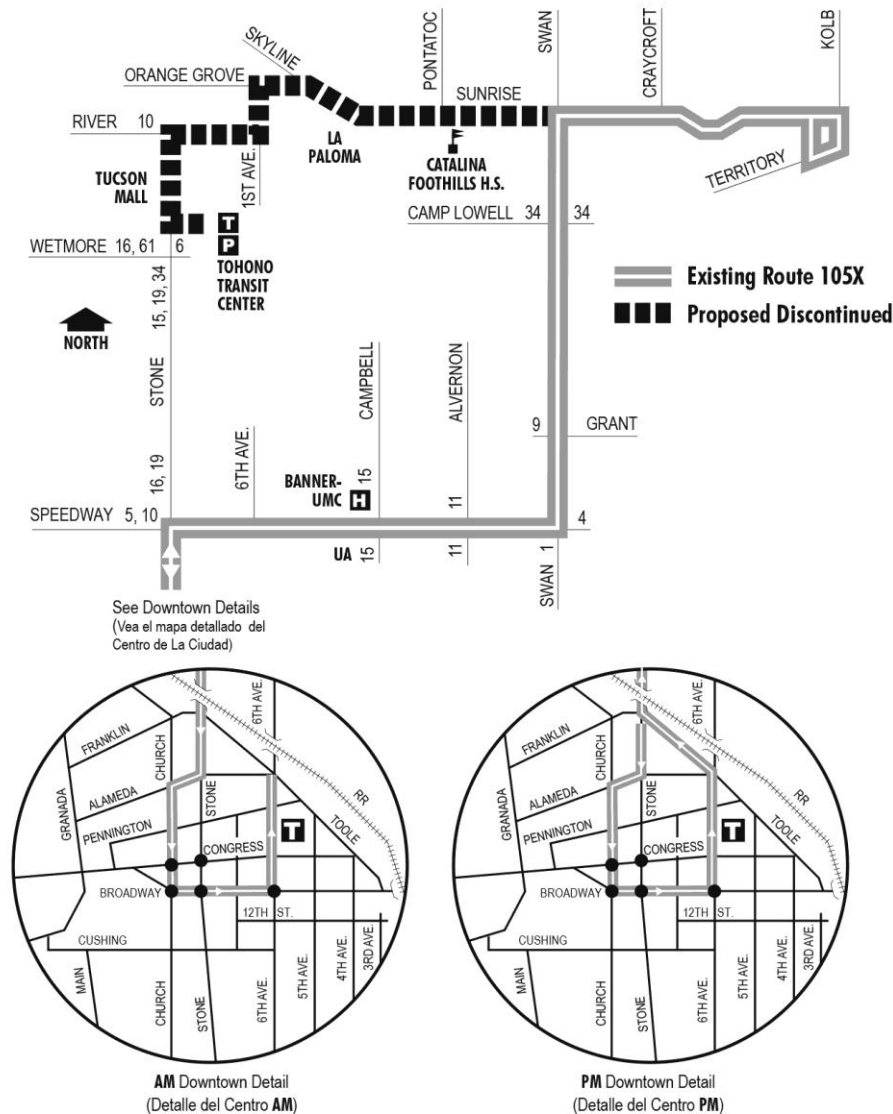


Figure 1: Route 105, Foothills-Downtown Express proposed route changes

Route 107X, Oro Valley - Downtown Express

Current Service: Operates between Rancho Vistoso Park and Ride in Oro Valley by way of Innovation Park Drive, Tangerine Road, Rancho Vistoso to Lambert, La Canada to Magee, Oracle Road and Stone Avenue thru Downtown to the Ronstadt Transit Center at 6th Avenue and Pennington NE. The service has three (3) trips in the morning from 5:57 am to 7:45 am traveling east and south and three (3) trips late afternoon from 4:40 pm to 6:38 pm traveling north and west.

Route 312X, Oro Valley - Tohono Express

Current Service: Operates between Tohono T'adai Transit Center and Rancho Vistoso Park and Ride in Oro Valley by way of Innovation Park Drive, Innovation Market Drive, Oracle and River Roads. The 312X has a long record of poor performance when compared to the rest of the Sun Express system. The service has six (6) trips in the morning from 5:18 am to 8:21 am and six (6) trips late afternoon from 3:43 pm to 6:51 pm traveling in both north and south direction, each period.

Proposed Change to Routes 107X and 312X: See (New) Route 117X, Oro Valley – Downtown Express

(New) Route 117X, Oro Valley – Downtown Express

Proposed Change: The proposed route change recommends merging the 107X with the 312X, eliminating the 312X. The 117X route is recommended to run in reverse-commute (bi-directional) and service most of the 312X bus stops north of Magee Road. The combined route would travel in both directions in the morning and late afternoon from Rancho Vistoso Park and Ride in Oro Valley by way of Innovation Park Drive, Innovation Market Drive and Oracle Road thru Downtown to the Ronstadt Transit Center at 6th Avenue and Pennington NE. The proposed service would have eight (8) trips in the morning from 5:50 am to 8:44 am and eight (8) trips late afternoon from 4:18 pm to 6:45 pm traveling in both north and south direction, each period.

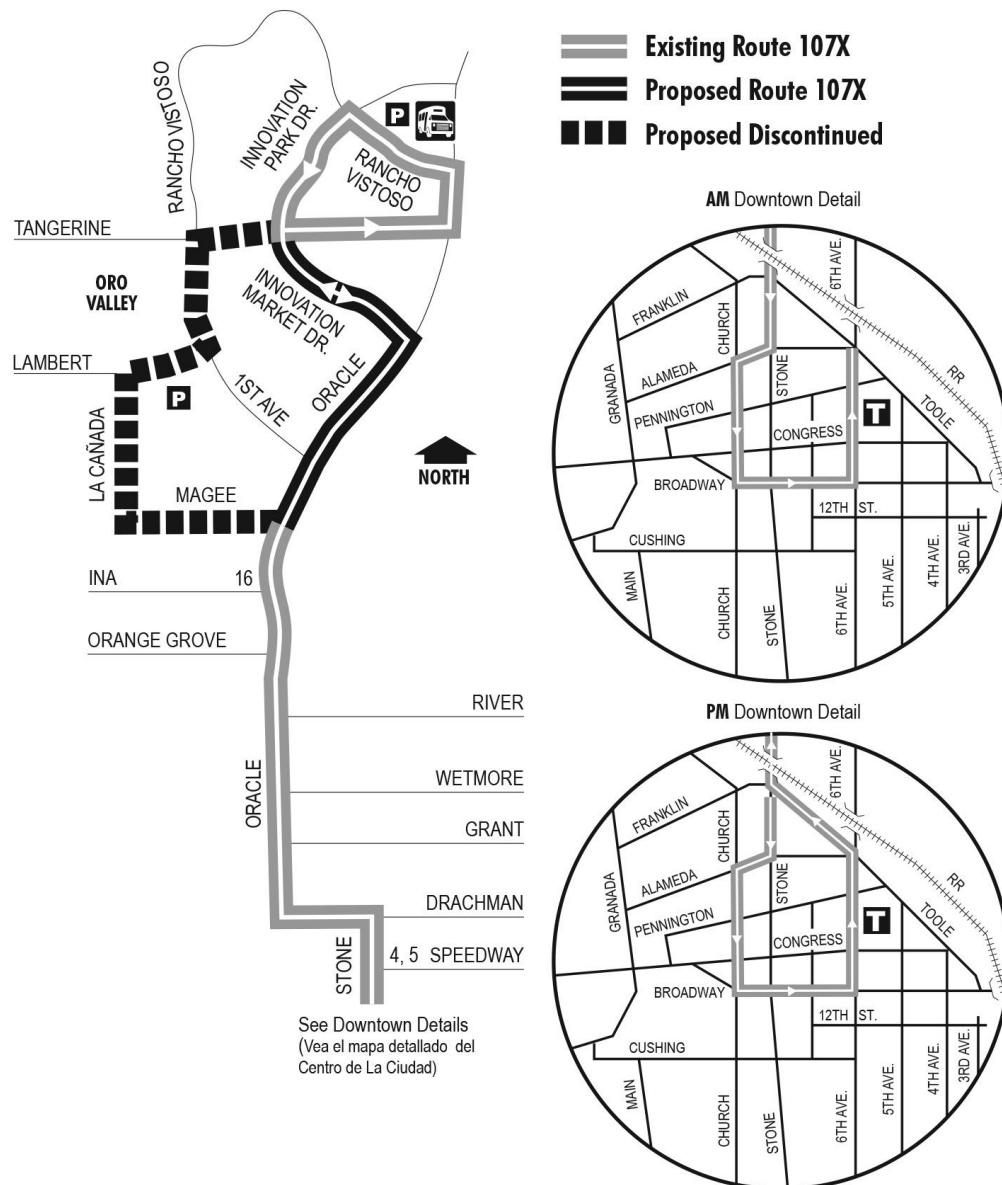


Figure 2: Route 117X, Oro Valley-Downtown Express (merge 107X and 312X) proposed route changes

Route 109X, Catalina Hwy - Downtown Express

Current Service: Operates between Catalina Highway at Tanque Verde by way of Tanque Verde, Grant, Swan and Columbus, Speedway Boulevard, and Stone Avenue thru Downtown to the Ronstadt Transit Center at 6th Avenue and Pennington NE. The service has three (3) trips in the morning from 6:34 am to 7:44 am traveling west and three (3) trips late afternoon from 4:40 pm to 6:27 pm traveling east.

Proposed Change: The proposed change recommends that the (New) Route 119X, Catalina Hwy – Downtown Express, route operate from Catalina Highway at Tanque Verde by way of Tanque Verde, Wilmot, 5th St/6th St, and Stone Avenue thru Downtown to the Ronstadt Transit Center at 6th Avenue and Pennington NE. The unproductive segment of the route from Tohono T’adai Transit Center to Swan Road and Sunrise would be discontinued. Stops on Orange Grove and Skyline would no longer receive service. The proposed service would have three (3) trips in the morning from 6:14 am to 7:50 am traveling west and south and three (3) trips late afternoon from 4:40 pm to 6:32 pm traveling east and north.

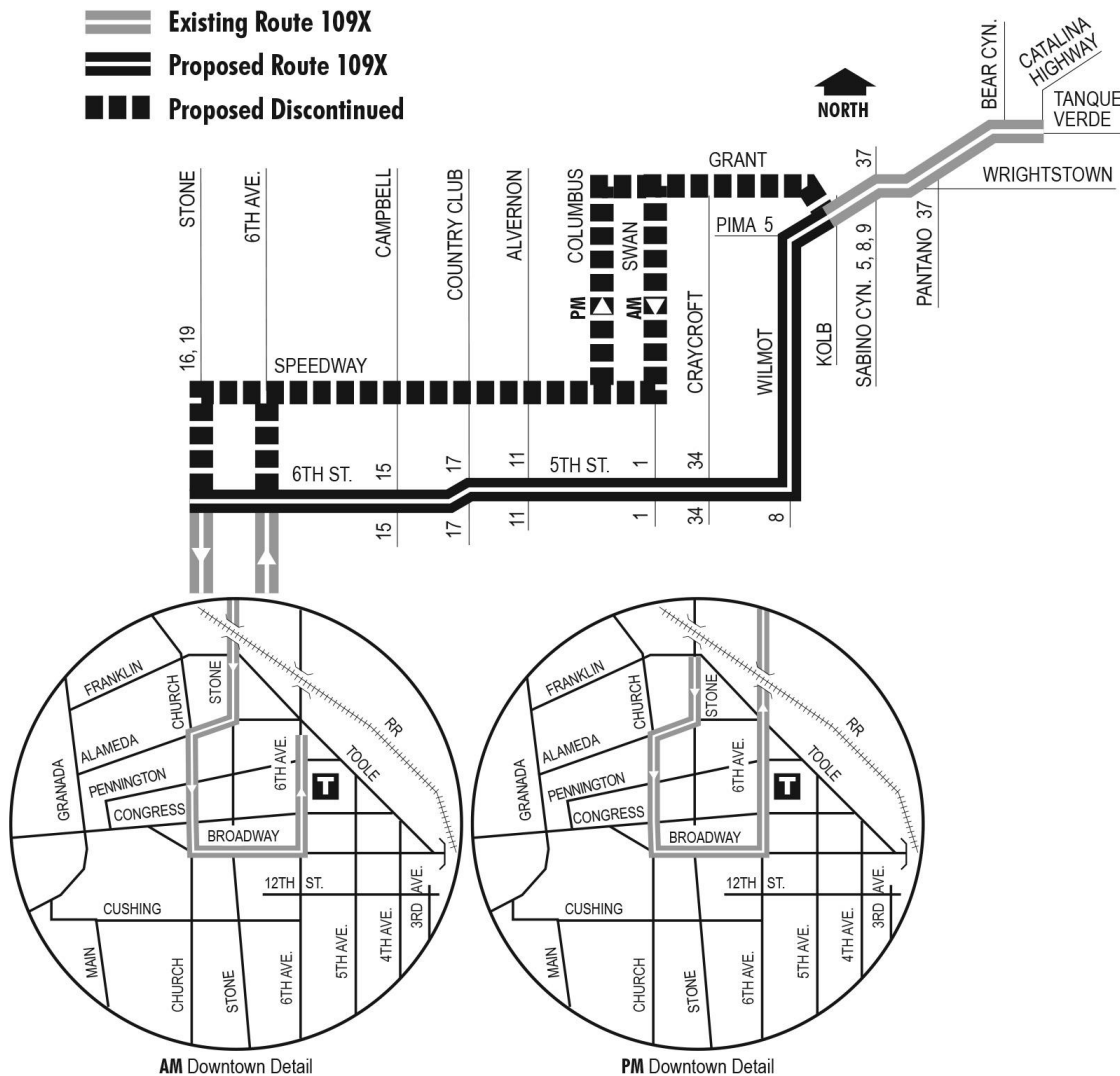


Figure 3: Route 109, Catalina Hwy-Downtown Express proposed route changes

Route Level Analysis

The following section analyzes the impact of the following proposed route changes identified as Major Service Changes:

- Reduction or elimination of the Northwest-Downtown Express 103X
- Segment elimination of the Foothills-Downtown Express 105X
- Merging of Oro Valley – Downtown and Oro Valley – Tohono Express routes 107X & 312X
- Route realignment of the Catalina Hwy – Downtown Express 109X

Northwest-Downtown Express 103X – Analysis of Proposed Service Elimination

This route was originally recommended to be eliminated. The revised (alternative) recommendation is to reduce the service based on feedback from the route community and significant road construction planned for the Interstate 10/Ina interchange.

Changes in Revenue Miles, Hours and Affected Ridership: The elimination of the express route would meet the thresholds of a major service change based upon revenue service miles (100% decrease in miles), revenue service hours (100% decrease in hours), and ridership affected (100%). Reducing the service instead of eliminating it would still meet the thresholds of a major service change with a 52.3 percent (52.3%) decrease in revenue service miles and 54.7 percent (54.7%) revenue service hours. Ridership would still be affected; however, it is anticipated that most of the current riders may remain with the route based on comments received during the open house period. The tables below evaluate the percentage of change represented by the reducing the number of overall trips from eight to four. The current revenue hours and revenue miles are based on daily miles for the May 2016 schedule and the proposed daily revenue miles and revenue hours are an estimate based on reducing the number of trips in half. The revenue miles and revenue hours also reflect the temporary shortening of the route due to the planned construction detours for the Interstate 10 (I-10) and Ina Road Interchange, requiring the route to end at Ina at Thornydale.

Revenue Miles				
Route	Current Miles	Proposed Miles	Change	Percent
103X, Northwest-Downtown Express	138.67	66.08	72.59	-52.3%
Revenue Hours				
Route	Current Hours	Proposed Hours	Change	Percent
103X, Northwest-Downtown Express	8.23	3.73	4.5	-54.7%

The analytical methodology^j used in determining the percentages of change and impact to the revenue hours, revenue miles, and impacted ridership is consistently applied to determine a percent change for the analyses.

Impact to Minority and Low Income: The demographic statistics regarding the evaluation to determine if a disparate impact upon minorities or disproportionate burden upon persons with low-incomes are below.

The system level (i.e. system-wide) percentages for these two groups are shown in following table. The threshold for disparate impact and disproportionate burden is the difference of 20 percent (20%) or greater between the Express Route minority or low-income ridership and the Express System minority or low-income ridership.

SUN TRAN PERCENTAGES FOR THE FIXED ROUTE SYSTEM	
PERCENT MINORITY	PERCENT LOW-INCOME
55.46%	61.30%
PERCENTAGES FOR THE SUN EXPRESS SYSTEM	
PERCENT MINORITY	PERCENT LOW-INCOME
23.96%	7.11%

In the tables below, Sun Tran has analyzed the cumulative impacts of the service change on minority populations and low-income populations in comparison to the overall Sun Express service.

Route Abbr.	Route Name	Percent Non-Minority Ridership	Percent Minority Ridership	Route Minority less Route Non-Minority	Route Minority less Express System Minority
103X	Northwest - Downtown Express	88.96%	11.04%	-77.93%	-12.92%
Route Abbr.	Route Name	Non Low-Income	Low-Income	Route Low-Income less Route Non-Low-Income	Route Low-Income less Express Syst. Low-Income
103X	Northwest - Downtown Express	66.67%	33.33%	-33.35%	26.22%

Table 1: Minority or Low-Income route ridership percentages compared with the system level percentages

Route 103X - Findings:

Service changes were reviewed on an individual express route basis and compared to the Sun Express system. **The service equity analysis determined there is not a resulting disparate impact upon minorities; however, there is disproportionate burden to persons with low-income for the proposed change.**

Not eliminating the route as originally proposed is a mitigating factor for any disproportionate burden for persons with low-income. The route will be continually reviewed and evaluated for improved performance. If the route performance for effective and efficient service and/or ridership increases, additional trips may be added back into the route as demand increases.

Foothills-Downtown Express 105X – Analysis of Proposed Service Change

This route is recommended to start at Territory and Kolb Roads and travel along Sunrise to Swan Road, continuing along its current routing on Swan and Speedway. The unproductive segment of the route from Tohono T’adai Transit Center to Swan and Sunrise would be discontinued. Stops on Orange Grove and Skyline would no longer receive service.

Changes in Revenue Miles, Hours and Affected Ridership: The elimination of the express route segment along Orange Grove and Skyline would meet the thresholds of a major service change based upon revenue service miles (42.73% decrease in miles), revenue service hours (33.87% decreases in hours). The percentage of ridership affected does not meet the threshold of a major service change for ridership affected (14 %). The tables below evaluate the percentage of change represented by the reducing the revenue miles and revenue hours driven. The ridership affected is based on Automatic Passenger Counters (APC) data collected during October and November 2015.

Revenue Miles				
Route	Current Miles	Proposed Miles	Change	Percent
105X, Foothills-Downtown Express	151.53	86.78	64.75	-42.73

Revenue Hours				
Route	Current Hours	Proposed Hours	Change	Percent
105X, Foothills-Downtown Express	6.85	4.53	2.32	-33.87

The analytical methodologyⁱⁱ used in determining the percentages of change and impact to the revenue hours, revenue miles (shown in the table above), and impacted ridership is consistently applied to determine a percent change for the analyses in this and previous documents. Per each step, Sun Tran verified the values calculated. The impacted riders and percentage for impacted riders is estimated based on the percent change shown in the table below. The value calculated to determine the number of impacted riders from the whole, is based on the change in the number of trips, assuming no other variables or redistribution of ridership. Additionally, the percent of minority and low-income riders came from the 2016 On-Board survey and was used to estimate the possible ridership affected by the proposed changes.

105X, Foothills - Downtown Express							
Bus Stop Name			Average Boardings	South	Bus Stop Name	Average Boardings	
North	1st Av/Orange Grove	0		1st Av/Via Entrada	0		
	6th Av/Pennington	1		Congress/6th Av	0		
	Church/Pennington	6		Congress/Church	0		
	Skyline/Campbell	0		Congress/Granada	0		
	Speedway/Alvernon	1		Skyline/Campbell	0		
	Speedway/Campbell	0		Speedway/Alvernon	0		
	Speedway/Highland Underpass	1		Speedway/Campbell	0		
	Speedway/Stone	0		Speedway/Highland Underpass	0		
	Speedway/Stone	0		Speedway/Olive Underpass	0		
	Speedway/Warren Underpass	0		Speedway/Warren Underpass	0		
	Stone/Alameda	0		Sunrise Dr/Campo Abierto	0		
	Stone/Franklin	1		Stone/Speedway	0		
	Stone/River	0		Sunrise Dr/Kolb	3		
	Sunrise Dr/Kolb	0		Sunrise Dr/La Paloma Club House	0		
	Sunrise Dr/Pontatoc Road	0		Sunrise Dr/Pontatoc Road	0		
	Sunrise Dr/Swan	1		Sunrise Dr/Swan	2		
	Sunrise Dr/Via Palomita	0		Sunrise Dr/Via Palomita	1		
	Swan/Camp Lowell	1		Swan/Camp Lowell	0		
	Swan/Grant	1		Swan/Grant	0		
	Swan/River Road	0		Swan/Sunrise Dr	0		
	Swan/Speedway	0		Territory Dr/Kolb	1		
	Territory Dr/Kolb	0		Tohono Transit Center	6		
	Tohono Transit Center	0		Toole/7th Av	0		
nb boardings			12	sb boardings			13
affected stops boardings			0.3	affected stops boardings			3.3
				11 of 46	Total Average Boardings	25	
					affected stops boardings	3.6	
					percent affected	14%	

Impact to Minority and Low Income: The demographics of the route were evaluated to determine if a disparate impact upon minorities or a disproportionate burden upon persons with low incomes results from the proposed change. Minority and low-income populations specifically for the Route 105X compared to the system ridership are shown in the table below. Sun Tran analyzed the impacts of the service change on minority populations and low-income populations in comparison to the overall service area. The threshold for disparate impact and disproportionate burden is the difference of 20 percent (20%) or greater between the Express Route minority or low-income ridership and the Express System minority or low-income ridership.

SUN TRAN PERCENTAGES FOR THE FIXED ROUTE SYSTEM	
PERCENT MINORITY	PERCENT LOW-INCOME
55.46%	61.30%
PERCENTAGES FOR THE SUN EXPRESS SYSTEM	
PERCENT MINORITY	PERCENT LOW-INCOME
23.96%	7.11%

In the tables below, Sun Tran has analyzed the cumulative impacts of the service change on minority populations and low-income populations in comparison to the overall Sun Express service.

Route Abbr.	Route Name	Percent Non-Minority Ridership	Percent Minority Ridership	Route Minority less Route Non-Minority	Route Minority less Express System Minority
105X	Northwest - Downtown Express	100%	0%	-100.00%	-23.96%
Route Abbr.	Route Name	Non Low-Income	Low-Income	Route Low-Income less Route Non-Low-Income	Route Low-Income less Express Syst. Low-Income
105X	Northwest - Downtown Express	100.00%	0.00%	-100.00%	-7.11%

Table 2: Minority or Low-Income route ridership percentages compared with the system level percentages

Per the 2016 On-Board survey, respondents did not reflect any minority or low-income riders for the 105X. As such, though the table above indicates a possible disparate impact, none is found for the proposed changes to the Route 105X.

Route 105X – Findings:

Service changes were reviewed on an individual express route basis and compared to the Sun Express system. **The service equity analysis determined there is no resulting disparate impact upon minorities and no disproportionate burden to persons with low-income, for the proposed change.**

Oro Valley-Downtown 107X & Oro Valley-Tohono Expresses 312X – Analysis of Proposed Service Change and Route Merge

The proposed route change recommends merges the Routes 107X with the 312X, eliminating the 312X. These changes would create the new Route 117X, Oro Valley – Downtown and recommended to run in reverse-commute (bi-directional) and service most of the 312X bus stops north of Magee Road. The combined route would travel in both directions in the morning and late afternoon from Rancho Vistoso Park and Ride in Oro Valley by way of Innovation Park Drive, Innovation Market Drive and Oracle Road thru Downtown to the Ronstadt Transit Center at 6th Avenue and Pennington NE. If approved all Route 107X stops along Lambert and La Canada would be serviced by the Route 102X, Northwest-UA Express, additionally a new stop would be activated on Oracle at Wetmore to accommodate riders that currently transfer to the 312X or utilize the park-and-ride at Tohono T’adai Transit Center.

Changes in Revenue Miles, Hours and Affected Ridership: The merging of the two express routes would meet the thresholds of a major service change based upon combined revenue service hours (25.16% increase in hours) and possible affected ridership (26%). The percentage of revenue service hours (4.97% increase in miles) does not meet the threshold of a major service. The tables below evaluate the percentage of change represented by the revenue miles and revenue hours driven. The ridership affected is based on Automatic Passenger Counters (APC) data collected during October and November 2015.

Revenue Miles				
Route	Current Miles	Proposed Miles	Change	Percent
107X, Oro Valley -Downtown Express	151.53	-	-	-
312X, Oro Valley-Tohono Express	155.61			
Total Miles – Routes Combined	275.96	289.67	-13.71	4.97%

Revenue Hours				
Route	Current Hours	Proposed Miles	Change	Percent
107X, Oro Valley -Downtown Express	5.18	-	-	-
312X, Oro Valley-Tohono Express	7.10			
Total Miles – Routes Combined	12.28	15.37	-3.09	25.16

The analytical methodologyⁱⁱⁱ used in determining the percentages of change and impact to the revenue hours, revenue miles (shown in the table above), and impacted ridership is consistently applied to determine a percent change for the analyses in this and previous documents. Per each step, Sun Tran verified the values calculated. The impacted riders and percentage for impacted riders is estimated based on the percent change shown in the table below. The value calculated to determine the number of impacted riders from the whole, is based on the change in the number of trips, assuming no other variables or redistribution of ridership. Additionally, the percent of minority and low-income riders came from the 2016 On-Board survey and was used to estimate the possible ridership affected by the proposed changes.

107X / 312X Oro Valley - Downtown Express & Oro Valley - Tohono Express Routes			
North	Bus Stop Name	Average Boardings	Note: Alternative Stop or Route available
107X	6th Av/Pennington	1	
	La Canada/Magee	0	Alternative Route 102X
	Lambert/La Canada	0	Alternative Route 102X
	Lambert/Riverfront Park	0	Alternative Route 102X
	Magee/La Oesta Av	0	Alternative Route 102X
	Magee/Oracle	0	Alternative stop at Oracle/Magee
	Oracle/Ina	0	
	Oracle/Orange Grove	0	
	Rancho Vistoso/Pusch Mountain View	0	
	Stone/Alameda	4	
312 X	Stone/Franklin	10	
	Stone/Speedway	0	
	Toole/7th Av	0	
	Oracle/1st Av (OroValley)	0	
	Oracle/C Concordia	0	
	Oracle/El Conquistador Wy	0	
	Oracle/Hardy Rd	0	
	Oracle/Honeywell	1	
	Oracle/Ina	0	
	Oracle/Linda Vista	0	
	Oracle/Magee	0	
	Oracle/Orange Grove	0	
	Oracle/Suffolk Dr	0	
	Rancho Vistoso/Pusch Mountain View	0	
	River/Stone	0	Alternative stop at Oracle / Wetmore
	Tohono Transit Center	4	Alternative stop at Oracle / Wetmore
	nb boardings	22	
	affected stops boardings	4.7	

South	Bus Stop Name	Average Boardings	Note: Alternative Stop or Route available
107X	6th Av/Pennington	0	
	La Canada/Lambert	2	Alternative Route 102X
	Lambert/Riverfront Park	2	Alternative Route 102X
	Magee/La Canada	0	Alternative stop La Canada/Magee
	Oracle/Ina	0	
	Oracle/Magee	1	
	Oracle/Orange Grove	1	
	Rancho Vistoso/Pusch Mountain View	2	
	Stone/Alameda	0	
	Stone/Franklin	0	
	Stone/Speedway	0	
	312X Innovation Pk Dr/Tangerine Rd	0	
	Innovation Pk Dr/Vistoso Commerce Pl	1	
	Oracle/1st Av (OroValley)	1	
	Oracle/8851 N Oracle	0	
	Oracle/El Conquistador Wy	0	
	Oracle/Hanley Blvd	0	
	Oracle/Honeywell	0	
	Oracle/Ina	0	
	Oracle/Magee	0	
	Oracle/Mountain Vista	0	
	Oracle/Orange Grove	0	
	Oracle/Suffolk Dr	0	
	Oro Valley Marketplace	1	Alternative Stop Innovation Market Dr/Oracle Rd
	Rancho Vistoso/Pusch Mountain View	1	
	Stone/River	0	Alternative stop at Oracle / Wetmore
	Tohono Transit Center	0	Alternative stop at Oracle / Wetmore
	wb boardings	15	
	affected stops boardings	5.0	
14 of 53	Total Average Boardings	37	
	affected stops boardings	9.8	
	percent affected	26%	

As noted above all stops proposed to be eliminated from this route have a replacement bus stop and/or Express route.

Impact to Minority and Low Income: The demographics of the routes were evaluated to determine if a disparate impact upon minorities or a disproportionate burden upon persons with low incomes results from the proposed change. Minority and low-income populations specifically for the Routes 107X and 312X compared to the system ridership are shown in the table below. Sun Tran analyzed the impacts of the service change on minority populations and low-income populations in comparison to the overall service area. The threshold for disparate impact and disproportionate burden is the difference of 20 percent (20%) or greater between the Express Route minority or low-income ridership and the Express System minority or low-income ridership.

SUN TRAN PERCENTAGES FOR THE FIXED ROUTE SYSTEM	
PERCENT MINORITY	PERCENT LOW-INCOME
55.46%	61.30%
PERCENTAGES FOR THE SUN EXPRESS SYSTEM	
PERCENT MINORITY	PERCENT LOW-INCOME
23.96%	7.11%

In the tables below, Sun Tran has analyzed the cumulative impacts of the service change on minority populations and low-income populations in comparison to the overall Sun Express service.

Route Abbr.	Route Name	Percent Non-Minority Ridership	Percent Minority Ridership	Route Minority less Route Non-Minority	Route Minority less Express System Minority
107X	Oro Valley - Downtown Express	84.03%	15.97%	-68.06%	-7.98%
312X	Oro Valley - Tohono Express	54.68%	45.32%	-9.37%	21.36%
Route Abbr.	Route Name	Non Low-Income	Low-Income	Route Low-Income less Route Non-Low-Income	Route Low-Income less Express Syst. Low-Income
107X	Oro Valley - Downtown Express	100.00%	0.00%	-100.00%	-7.11%
312X	Oro Valley - Tohono Express	50.00%	50.00%	0.00%	42.89%

Table 3: Minority or Low-Income route ridership percentages compared with the system level percentages

Per the 2016 On-Board survey, the respondents for the Route 312X meet the thresholds for both the disparate impact (minority) and the disproportionate burden (low-income). The respondents for the 107X do not meet the thresholds for either the disparate impact or disproportionate burden. However, there is a possible impact on minority or low-income riders with the merging of these two routes, all stops will continue to be serviced and the times for the new route have reflected the times needed for those passengers that participated in the public outreach and open houses. Staff feels that there will no or minimum impact for the riders of the 312X upon implementation of the new routing and in some cases may be more effective and efficient reducing or eliminating transfers with the route initiating at Ronstadt Transit Center (RTC) for northbound trips. The stops with that will be affected the greatest by this change are stops used by current riders of the 107X, who will be asked to change routes to the 102X, Northwest-UA Express. The Route 102X travels to downtown before completing (or starting) its trips at the University of Arizona (UA). Riders currently driving to the Riverfront Park-and-Ride may also continue to access the 107X from either the Rancho Vistoso Park-and-Ride or the Innovation Marketplace stop.

Route 107X – Findings:

Service changes were reviewed on an individual express route basis and compared to the Sun Express system. **The service equity analysis determined there is no resulting disparate impact upon minorities and no disproportionate burden to persons with low-income, for the proposed change for the 107X. The Route 312X met the threshold of 20 percent or greater for a disparate impact upon minority and a disproportionate burden to persons with low-income for the 312X. However, it is anticipated that the proposed changes to the new routing will be more beneficial to both minority and low-income riders.**

Catalina Hwy-Downtown Express 109X – Analysis of Proposed Service Change

This route is recommended to be re-routed to travel down Wilmot and along 5th/6th Streets to downtown. This routing would eliminate duplicated service along Speedway with Route 105X, Foothills-Downtown Express, and open Sun Express service to new customer. The service to the University of Arizona would be along the southern boundary instead of the northern boundary if riders decide not to transfer or use other available routes. All stops along the eliminated section of the current routing are also being serviced by other routes.

Changes in Revenue Miles, Hours and Affected Ridership: The re-routing of the express route meet the thresholds of a major service change based upon ridership affected (32 %). The percentage of change for revenue service miles and revenue service hours do not meet the threshold of a major service change for the 109X. The tables below evaluate the percentage of change represented by the reducing the revenue miles and revenue hours driven. The ridership affected is based on Automatic Passenger Counters (APC) data collected during October and November 2015.

Revenue Miles				
Route	Current Miles	Proposed Miles	Change	Percent
109X, Catalina Hwy-Downtown Express	78.62	75.31	3.31	4.21%

Revenue Hours				
Route	Current Hours	Proposed Hours	Change	Percent
109X, Catalina Hwy-Downtown Express	6.4.8785	4.17	0.7	14.37%

The analytical methodology^{iv} used in determining the percentages of change and impact to the revenue hours, revenue miles (shown in the table above), and impacted ridership is consistently applied to determine a percent change for the analyses in this and previous documents. Per each step, Sun Tran verified the values calculated. The impacted riders and percentage for impacted riders is estimated based on the percent change shown in the table below. The value calculated to determine the number of impacted riders from the whole, is based on the change in the number of trips, assuming no other variables or redistribution of ridership. Additionally, the percent of minority and low-income riders came from the 2016 On-Board survey and was used to estimate the possible ridership affected by the proposed changes.

109X, Catalina Hwy - Downtown Express			
East	Bus Stop Name	Average Boardings	Note:
	6th Av/6th St	0	Alternative Stop or Route available
	6th Av/Pennington	1	
	Catalina Hy/Tanque Verde	0	
	Church/Pennington	13	
	Grant/Craycroft	2	Alternative Route 9, Grant Road
	Grant/Devon Gables	0	Alternative Route 9, Grant Road
	Grant/Rainbow Vista	0	Alternative Route 9, Grant Road
	Grant/Sahuara	0	Alternative Route 9, Grant Road
	Grant/Swan	3	Alternative Route 105X at Swan/Grant
	Grant/Wilmot	0	Alternative Route 9, Grant Road, or stop on Wilmot at Pima

	Pantano/Wrightstown	0	
	Speedway/6th Av	0	Alternative Route 105X or bus stop on 6th Street
	Speedway/Alvernon	0	Alternative Route 105X or bus stop on 6th Street
	Speedway/Campbell	1	Alternative Route 105X or bus stop on 6th Street
	Speedway/Highland Underpass	6	Alternative Route 105X or bus stop on 6th Street
	Speedway/Olive Underpass	2	Alternative Route 105X or bus stop on 6th Street
	Speedway/Warren Underpass	1	Alternative Route 105X or bus stop on 6th Street
	Stone/Alameda	1	
	Stone/Franklin	10	
	Tanque Verde/Cmo Pio Decimo	0	
	Tanque Verde/Cmo Principal	0	
	Tanque Verde/Indian Ridge	0	
	Tanque Verde/Kolb	0	
	Tanque Verde/Pso Rancho Esperanza	0	
	Tanque Verde/Sabino Canyon	0	
	eb boardings	42	
	affected stops boardings	15.2	
West	Bus Stop Name	Average Boardings	
	6th Av/Pennington	0	
	Catalina Hy/Tanque Verde	10	
	Church/Pennington	0	
	Grant/Craycroft	1	Alternative Route 9, Grant Road
	Grant/Rainbow Vista	1	Alternative Route 9, Grant Road
	Grant/Sahuara	0	Alternative Route 9, Grant Road
	Grant/Tanque Verde	1	Alternative stop on Tanque Verde/Grant
	Grant/Wilmot	0	Alternative Route 9, Grant Road, or stop on Wilmot at Pima
	Speedway/Alvernon	0	Alternative Route 105X or bus stop on 6th Street
	Speedway/Campbell	0	Alternative Route 105X or bus stop on 6th Street
	Speedway/Highland Underpass	0	Alternative Route 105X or bus stop on 6th Street
	Speedway/Olive Underpass	0	Alternative Route 105X or bus stop on 6th Street
	Speedway/Swan	0	Alternative Route 105X or bus stop on 6th Street
	Speedway/Warren Underpass	0	Alternative Route 105X or bus stop on 6th Street
	Stone/Alameda	0	
	Stone/Franklin	0	
	Stone/Speedway	0	
	Swan/Grant	1	Alternative Route 105X at Swan/Grant
	Tanque Verde/Dos Hombres	4	
	Tanque Verde/Indian Ruins	1	

	Tanque Verde/Pso Rancho Esperanza	1
	Tanque Verde/Sabino Canyon	2
	wb boardings	23
	affected stops boardings	5.5
24 of 47	Total Average Boardings	65
	affected stops boardings	20.7
	percent affected	32%

As noted above all stops proposed to be eliminated from this route have a replacement bus stop and/or route.

Impact to Minority and Low Income: The demographics of the routes were evaluated to determine if a disparate impact upon minorities or a disproportionate burden upon persons with low incomes results from the proposed change. Minority and low-income populations specifically for the Routes 107X and 312X compared to the system ridership are shown in the table below. Sun Tran analyzed the impacts of the service change on minority populations and low-income populations in comparison to the overall service area. The threshold for disparate impact and disproportionate burden is the difference of 20 percent (20%) or greater between the Express Route minority or low-income ridership and the Express System minority or low-income ridership.

SUN TRAN PERCENTAGES FOR THE FIXED ROUTE SYSTEM	
PERCENT MINORITY	PERCENT LOW-INCOME
55.46%	61.30%
PERCENTAGES FOR THE SUN EXPRESS SYSTEM	
PERCENT MINORITY	PERCENT LOW-INCOME
23.96%	7.11%

In the tables below, Sun Tran has analyzed the cumulative impacts of the service change on minority populations and low-income populations in comparison to the overall Sun Express service.

Route Abbr.	Route Name	Percent Non-Minority Ridership	Percent Minority Ridership	Route Minority less Route Non-Minority	Route Minority less Express System Minority
109X	Catalina Hwy - Downtown Express	96.11%	3.89%	-92.22%	-20.07%
Route Abbr.	Route Name	Non Low-Income	Low-Income	Route Low-Income less Route Non-Low-Income	Route Low-Income less Express Syst. Low-Income
109X	Catalina Hwy - Downtown Express	85.57%	14.43%	-71.14%	7.32%

Table 4: Minority or Low-Income route ridership percentages compared with the system level percentages

Per the 2016 On-Board survey, the respondents for the Route 109X meet the thresholds for disparate impact (minority) and do not meet the threshold for disproportionate burden (low-income). The changes in routing for the 109X do not eliminate any bus stops. All stops affected are served by another route, depending on where the rider boards and alights, there are alternative stops and/or routes to

maintain service and reduce duplication with other routes. These changes still service all of the destinations currently reached by the 109X routing with one or no transfers.

Route 109X – Findings:

Service changes were reviewed on an individual express route basis and compared to the Sun Express system. **The service equity analysis determined there is no resulting no disproportionate burden to persons with low-income. There is a disparate impact upon minorities.** However, no stop was eliminated from service and all destinations are able to be reached with possible transfer if needed.

Conclusions:

Disparate impact for minority passengers and/or Disproportionate burden for low-income passengers were found for major service changes on Routes 103X, 109X and 312X. Mitigations of reducing trips as opposed to eliminating the Route 103X were implemented as well as improving service to 312X passengers with the merging of the 107X and 312X. Route 109X passengers still have opportunities and access with one or no transfers to still reach the destinations previously available, improving the overall Express Service and reducing duplication of routes.

ⁱ The analytical methodology used in determining the percentages of change and impact to the revenue hours, revenue miles, and impacted ridership is consistently applied to determine a percent change for the analyses in this and previous documents. Each step Sun Tran verified the values calculated. The percent of the change used the “current” and “proposed” as an “initial” and “final” value. Percentage change equals the change in value divided by the absolute value of the original value, multiplied by 100. Percentage change = $(\Delta V / |V_1|) * 100 = ((V_2 - V_1) / |V_1|) * 100$ whereas V = value. (<http://www.calculatorsoup.com/calculators/algebra/percent-change-calculator.php>) A positive change is expressed as an increase amount of the percentage value while a negative change is expressed as a decrease amount of the absolute value of the percentage value. ⁱⁱ Same calculations as used in footnote i

ⁱⁱⁱ Same calculations as used in footnote i

^{iv} Same calculations as used in footnote i