



► Sustainable Transportation & Land Use Integration Study

Key Recommendations and Tools

July 2013



SUSTAINABLE TRANSPORTATION
& LAND USE INTEGRATION STUDY



1. Project Overview

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DEFINITION

SUSTAINABLE TRANSPORTATION

“A transportation system that supports prosperity in Maricopa County by providing a variety of mobility options, offering walkable communities throughout the region and locating high capacity transit that will be chosen by households and businesses seeking excellent access to local and regional destinations.”

ST-LUIS Stakeholder Group

The **Sustainable Transportation and Land Use Integration Study (ST-LUIS)** highlights the potential to move the region towards greater use of sustainable transportation modes – transit, walking and biking.

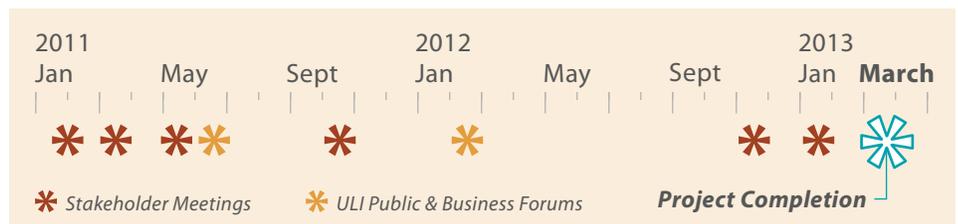
The study provides a fresh look at ideas for transit investments and services that have been under previous consideration, and supports the creation of walkable and transit-oriented communities. The uniqueness of the ST-LUIS is the holistic approach taken to investigating transit’s potential, by integrating real estate market analysis with transit corridor assessment and ridership modeling. The Study’s focus on transit and supportive land use is joined up with recommendations for creating compact walkable places throughout the region.

ST-LUIS asks how the region can **move toward sustainable transportation** in ways that:

- Reflect market reality
- Recognize the high cost of high capacity transit, and
- Are consistent with the values and aspirations of member communities.

ST-LUIS was completed in three phases undertaken from 2010-2013, complemented by the stakeholder activities shown in Figure 1. These activities included two business/public forums coordinated by the Arizona Chapter of the Urban Land Institute (ULI). The perspectives of participants from these forums were integral to understanding the market realities in local communities. This document presents key study recommendations, findings, and a summary of the project’s research and analysis activities, scenario planning, and tools and strategies development.

Figure 1: ST-LUIS Meetings and Forums



2. Achieving Sustainable Transportation - Key ST-LUIS Recommendations

Based on the ST-LUIS investigation of market realities and research findings, and the study's testing of high capacity transit (HCT) scenarios in the MAG region, the overarching recommendation from the ST-LUIS is to:

Provide a high quality, productive transit system supported by compact walkable and transit-oriented places.

The ST-LUIS has created tools and implementation strategies for the region and local agencies to move to a more sustainable transportation system in the future. These are discussed further on pages 18-21.

3. Key ST-LUIS Findings

Out of the research and analysis, five key findings helped set the stage in testing illustrative high capacity transit networks in conjunction with land use modifications, and created tools and strategies for the region and local agencies to assess sustainable transportation options with appropriate land uses.

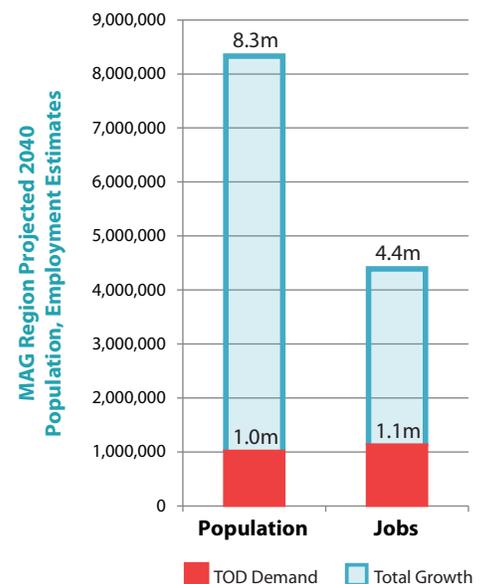
3.1 TOD Demand Will Be Driven by Projected Regional Growth in Population and Jobs, and Supported by Demographic Shifts

Overall regional growth is the fundamental factor fuelling demand for Transit-Oriented Development (TOD) and walkable communities. Growth in knowledge-based industries and demographic changes are the two key factors for growth in transit-oriented place types. Figure 2 illustrates the projected demand for TOD within the future regional growth of population and jobs. These trends are discussed in the 4.1 *Research & Analysis* section, and in greater depth in project background documents.

3.2 Transit-Supportive and Compact Walkable Development is Achievable, with Distinct Opportunities in Different Parts of the Region

The outlook for transit-oriented and compact walkable places in the MAG region is good with specific forms depending largely on market conditions. The ST-LUIS market analysis and financial feasibility analysis demonstrate that the strongest locations for new higher density development are mixed use employment centers in the core locations of Downtown Phoenix, Downtown Tempe, and Downtown Scottsdale. These employment centers can support the densities

Figure 2: Regional Population and Employment Projections



Source: Woods and Poole; MAG; Strategic Economics 2011

that correspond to **HCT Oriented** place types, ranging from 2-3 story townhomes to 5-7 story mixed use buildings.

There are other places in central locations—such as Camelback Corridor—that can offer relatively dense, walkable, bike-friendly environments, but that command slightly lower prices than the large employment centers. In these locations, the **Transit Served** place type will typically be achievable with likely product types including 2-3 story townhomes, 2-3 story apartments, and 3-4 story office buildings.

The market conditions necessary to support compact walkable development are far more widespread than are locations with the market strength required to support Transit Served and HCT Oriented development. There are many locations that have promise as places that could transition from conventional large-lot single family housing to the **Compact Walkable** place type that supports sustainable transportation.

The place types convey the development characteristics that need to be present on an area- or corridor-wide basis in order to support transit productivity and increased walk and biking. However, these characteristics will be found elsewhere in localized cases as well. The densities and the characteristics described are likely to continue to be found in contexts where higher densities and walkable character are valuable components of placemaking and identity, such as mixed use downtowns in places with low centrality that may not be directly served by high capacity transit.

3.3 Strategic Corridor Modifications Improve Transit Productivity

Adjustments to the planned corridors and networks made during upcoming planning phases are very likely to improve forecast productivity relative to the ST-LUIS projections. Careful modification and evaluation of specific alignments, stop locations, corridor length, connecting pedestrian improvements, land use shifts, and mode will be part of subsequent stages of planning for an Enhanced Transit system, with likely productivity gains.

3.4 Regional Transit Mode Share and Regional Access Increase with a Mix of LRT and Upgraded Bus Services

To increase regional transit use and productivity, a mixed network of both LRT and high quality bus services will generate the greatest transit productivity share as well as giving more households and communities improved options for travel throughout the region. LRT alone does not meaningfully increase the regional transit mode share. A high quality bus system that complements rail services, walk, bike and land use strategies is essential to shifting people from single occupant vehicles to transit. While upgraded bus services may include “true” Bus Rapid Transit (BRT) with exclusive guideways, lower-cost upgrades to provide all-day reliable and fast service can provide the quality envisioned by the study.

3.5 Existing Conditions Drive the Pathway for Future HCT Service

The HCT Supportiveness Analysis assessed existing corridor conditions such as land use, transit-supportive densities, and current transit demand to gauge a corridor’s potential to support future HCT service. Corridors with transit-supportive jobs and populations as well as demographic characteristics supporting transit ridership generally performed well in the corridor-level analysis for each scenario. Current transit-supportive conditions play a significant role in whether a corridor can sustain and support upgrades to HCT service in the future. Increased presence of the factors listed as HCT screening criteria will, over time, improve conditions for productive transit service and for TOD.

Continuing attention to existing conditions is particularly important because ridership of existing low-income and transit-dependent populations is taken into account most strongly in this part of the study.

PRIMARY HCT SCREENING CRITERIA

Total Residents

Percent Minority Population

Percent Low-Income Households (under \$20,000 per year)

Total Jobs

Transit-Supportive Job Density (jobs / acre)

Transit-Supportive Density (jobs + residents / acre)

Average Daily Weekday Boardings

Average Daily Weekday Boardings / Mile

4. Project Summary

The ST-LUIS effort was organized into three broad components. Each is summarized in this section.

4.1 RESEARCH & ANALYSIS

The *Research and Analysis* component provided the foundation of the Sustainable Transportation and Land Use Integration Study, set the parameters for the *Scenario Planning* component, and informed the development of the *Tools & Strategies* component.

Investigating the Opportunity for TOD

ST-LUIS included a range of activities to investigate the opportunity to create TOD, as shown in Table 1.

Through this investigation it was found that:

- **The commute trip is a critical factor in transit productivity.** Though work trips are less than

20% of total trips, work trips make up close to 60% of transit trips nationally.

- **Some business sectors are more likely to be near transit than others.** Jobs in industry sectors that have a tendency to cluster near transit include: Government; Information; Finance and Insurance; Real Estate; Professional, Scientific and Technical Services; Management of

Companies and Enterprises; Arts, Entertainment, and Recreation; and Accommodation and Food Services (based on national studies from the Center for Transit-Oriented Development).

- National research shows that **higher job density at station areas has a greater impact on increasing ridership** than does higher residential density, though both factors build transit use.

Table 1: ST-LUIS Activities and Outcomes

ST-LUIS ACTIVITIES				OUTCOMES
Transit-Oriented Development (TOD) and walkable communities	Research	Best Practices	Local Precedents	ST-LUIS Place Types and Local Toolkit
Understanding the real estate market	Development feasibility	Regional growth	Forecast Demand (jobs & housing)	Estimate of demand for jobs and housing in station areas
Corridor Potential	Current Conditions	Past Plans and Studies	Services and Modes	Corridor screening results and Transit Service Characteristics

“The Phoenix Metro region has historically ignored the business community in this conversation. ST-LUIS has been instrumental in moving this conversation forward in terms of understanding the role that employment plays in public transportation.”

Dena Belzer
ULI Forum 2

Key Factors Impacting Transit Ridership

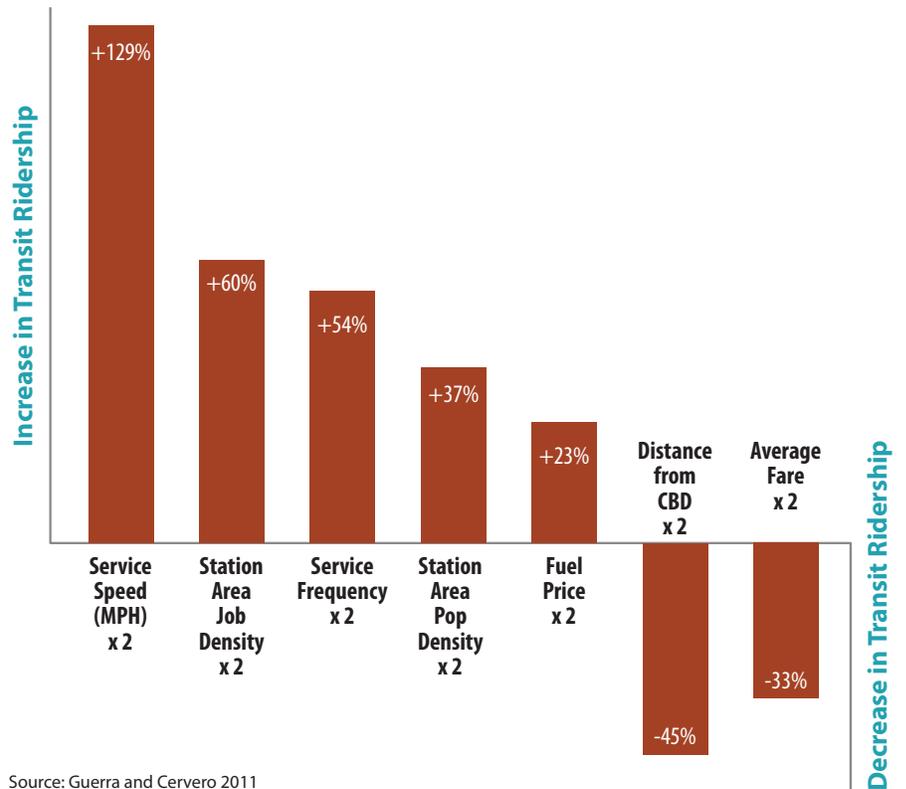
Academic research and practical experience have identified factors having significant impact on transit ridership.

These factors include service speed and frequency, station area job and population density, and distance from the central business district (CBD). Increasing values for these key factors results in either an increase or decrease in ridership, as shown in Figure 3.

Many of the factors supporting transit use have been shown to support walking and cycling as well. These include:

- Mixed use neighborhoods and districts at compact densities
- Local street networks with high connectivity
- Travel demand management/ incentives, including parking management

Figure 3: Change in Transit Ridership Resulting from Doubling Key Factors



Source: Guerra and Cervero 2011

Shifting Demographic Trends

A variety of trends, both locally and nationally, will support the success of walkable communities in the region.

National studies have demonstrated a growing demand for housing in compact, “walkable” neighborhoods near transit. Many households are interested in compact housing types in pedestrian-oriented neighborhood with good access to amenities, transportation options, and shorter commutes. TOD demand nationally in

the coming decades will be influenced by a variety of trends:

1. **An increasing number of smaller households:** 79 million Baby Boomers (who prioritize public transportation, walkability, and access to amenities, and are more receptive to living in smaller housing units on smaller lots) are approaching retirement.
2. **Changing consumer preferences among Millennials and knowledge workers toward authentic**

places and convenient lifestyles:

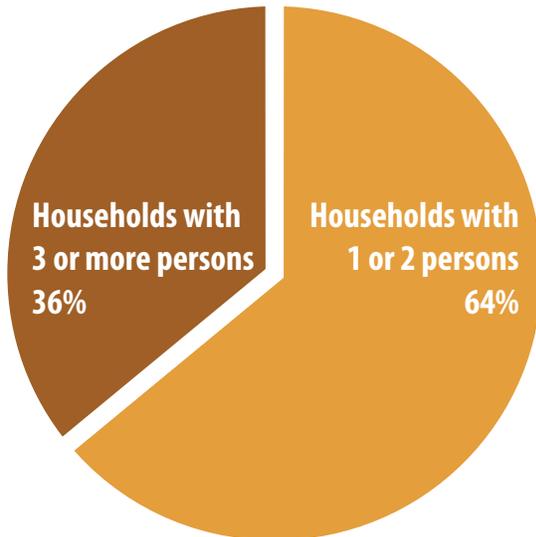
85 million Echo Boomers (who prefer walkable, mixed use neighborhoods short commutes) will enter the housing market for the first time.

3. **Disincentives to driving** including high gas prices, drive the search for alternatives to single-occupancy vehicle trips/commutes.

Local demographic shifts will support the growth of walkable communities in the region, as shown in Figure 4.

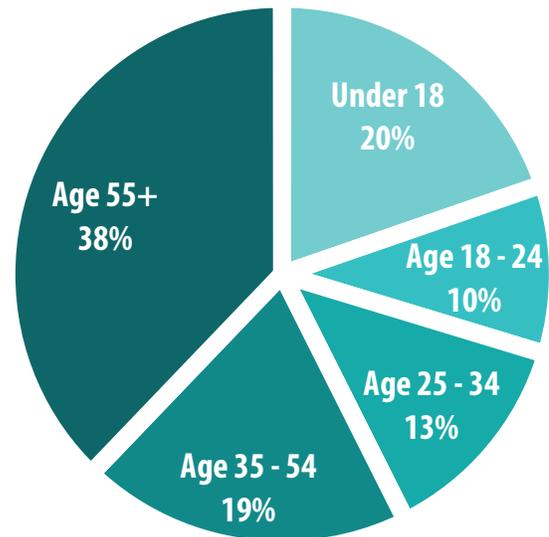
Figure 4: 2010-2040 Regional Growth Characteristics

Population Growth by Household Type Maricopa County 2010-2040



Source: Woods and Poole, Strategic Economics 2011

Population Growth by Age Maricopa County, 2010-2040



Sources:

Belden Russonello & Stewart, *The 2011 Community Preference Survey* (Washington D.C.: National Association of Realtors, March 2011).
Ibid and Joint Center for Housing Studies of Harvard University. *State of the Nation's Housing, 2011*.

Future Success Means Responding to Today's Challenges

The region faces a number of challenges to creating transit-supportive communities. Today, existing and planned development patterns are largely low density, as seen in Figure 5.

Infill development at TOD and walkable densities is hindered in some locations by zoning that allows densities in excess of those currently supported

by the real estate market. In addition, the region has significant supply of underutilized built space as well as vacant properties available which may slow TOD development.

Success requires regional collaboration in investment decisions, so regional assets—those attracting many people, such as major medical, educational and cultural institutions—will locate in places where high capacity transit can be provided efficiently and linked to the region.

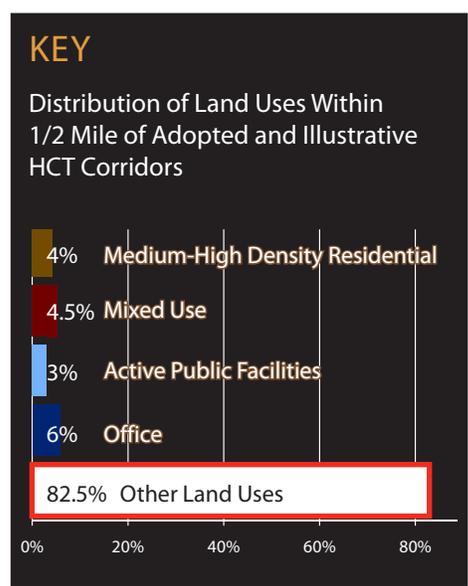
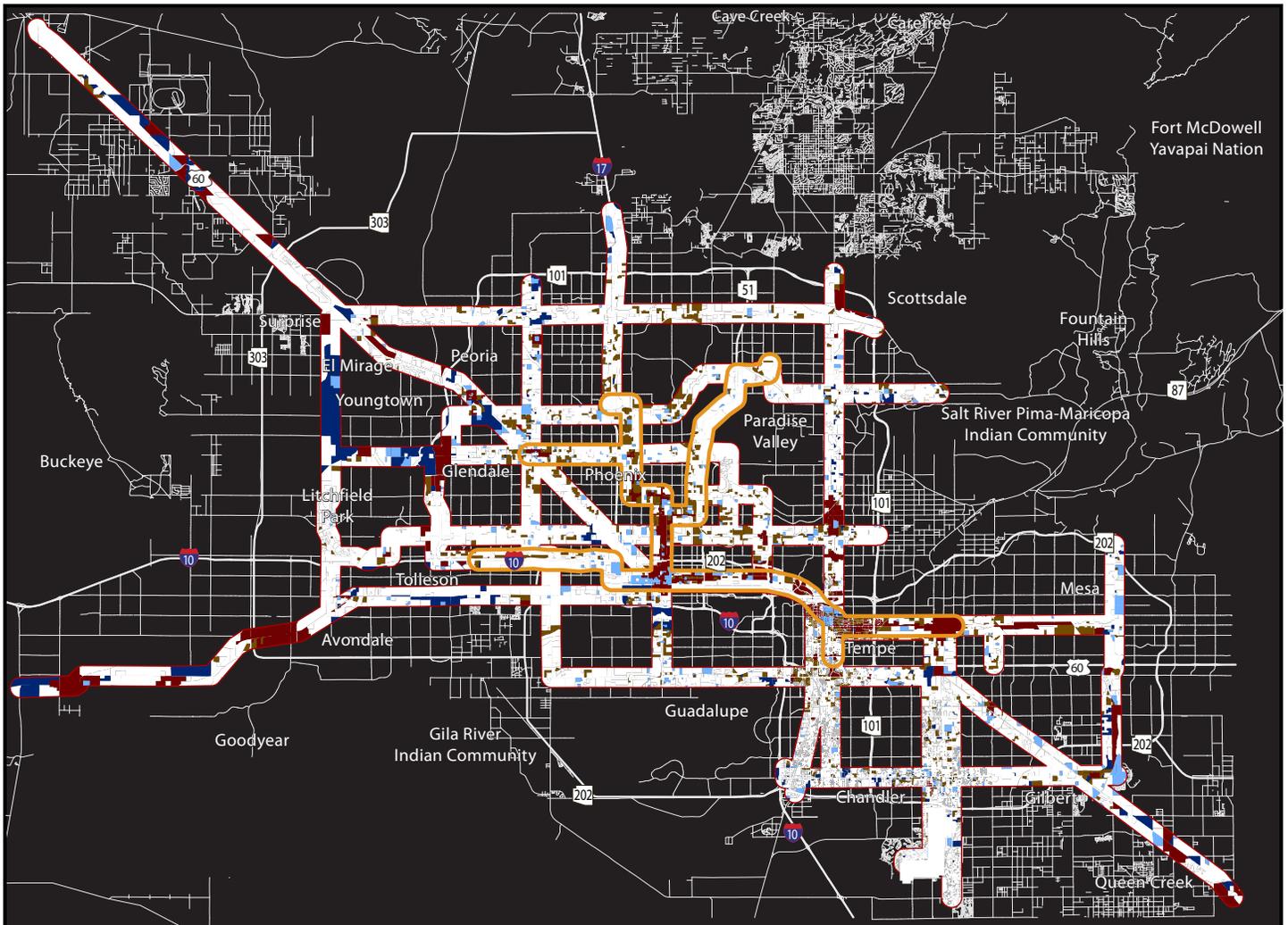


Figure 5: 2010 Regional Transportation Plan (RTP) Illustrative HCT Corridors & 2009 General Plan Land Uses



4.2 SCENARIO PLANNING AND MODELING

A central part of the ST-LUIS is the use of Scenario Planning to investigate: *What would happen if the region made changes to development patterns with the specific objective of supporting transit productivity and non-motorized transportation, while meeting market demand for TOD? Scenario planning offers the opportunity to envision the region’s future land uses and the productivity of its high capacity transit network.*

The ST-LUIS scenarios offer three visions for future land uses, high capacity transit networks, transit ridership and transit productivity, using the project’s market demand forecasts for TOD jobs and housing. The results of the scenario planning exercises provide high-level results rather than specific local recommendations.

Transit performance was analyzed through coordinated use of two modeling tools. Together they **reflect the influence on transit ridership of localized features** including development density, walkability and feeder bus service.

ST-LUIS Scenario Planning has been a valuable tool for investigating policy and investment options. MAG and partner agencies may wish to address some of the limitations of Scenario

Planning in future activities. Table 2 explains what ST-LUIS Scenario Planning does and doesn’t accomplish.

Shared Scenario characteristics

Each of the three scenarios matches a high capacity transit network with assumptions for station-area land uses that use ST-LUIS place types that illustrate three different sets of development characteristics that support walkable communities with different levels of transit investment.

The scenarios reflect:

- Expected regional population growth to over 8 million people
- Results of ST-LUIS analysis of candidate HCT corridors (from the Regional Transit Framework Study—RTFS)

- Investigation of real estate market, transit-supportive job sectors, location and density of existing job centers
- Use of ST-LUIS place types to streamline scenario design

“The winning strategy is about differentiation rather than everybody doing standard out-of-the-box TOD. The path of success is different for every community.”

Ellen Greenberg
ULI Forum 2

Table 2: What Does ST-LUIS Scenario Planning Accomplish?

ST-LUIS SCENARIO PLANNING	
DOES...	DOESN'T...
Test three land use and transit corridor patterns	Test additional scenarios of interest
Incorporate MAG socioeconomic data and ST-LUIS market findings	Reflect location-specific opportunities
Use MAG’s Regional Transit Framework Study (RTFS) corridors as input	Evaluate all corridor combinations
“Imagine” population and job growth directed to HCT station areas	Reflect localized existing conditions
Use a hybrid modeling method: Direct Ridership Model (DRM) and MAG 4-step model	Reflect benefits of compact walkable development outside station areas
Provide generalized results and recommendations	Make specific corridor recommendations
Include HCT corridors and assumptions for feeder bus services	Include specific local transit proposals

ST-LUIS Place Types

The place types were created to reflect threshold densities and development patterns supportive of different transit modes, and were “applied” to station areas in the scenario planning process. Figure 6 provides an overview of each place type. Additional detail regarding place types is included on pages 15 and 16.

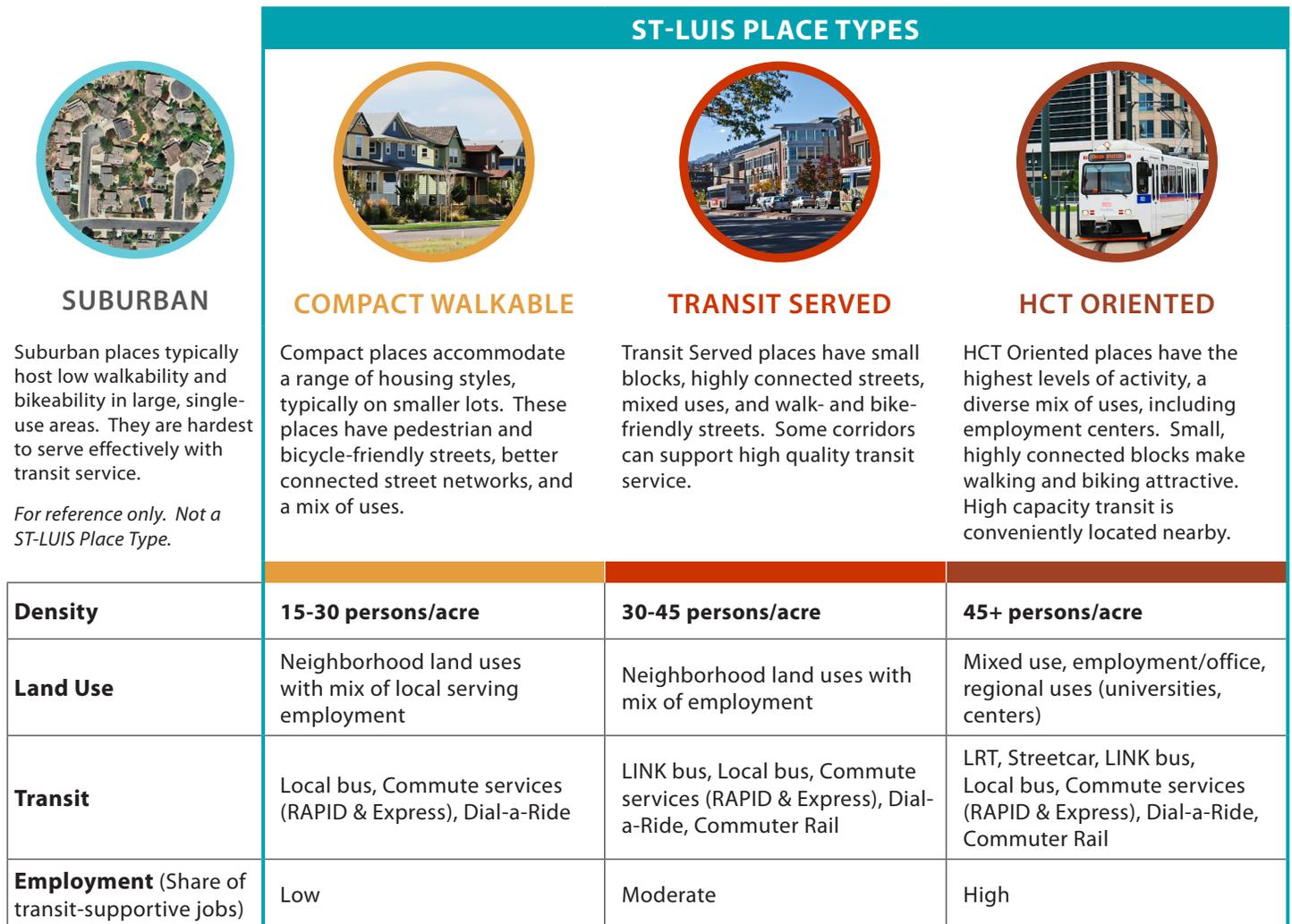
Factors in designing place types:

- Densities supportive of different travel choices and modal productivity
- Densities supported by regional real estate market demand
- Existing and planned densities (especially in core sub-areas)
- Transit-supportive job sectors

Factors in applying place types:

- Centrality (proximity to the region’s core)
- Location in specific core sub-areas (custom densities)
- Location in or out of employment cluster
- Inner or outer station area (1/4 or 1/2 mile radius)
- Special uses (e.g., Arizona State University)

Figure 6: ST-LUIS Place Type Overview



ST-LUIS Scenarios

The three ST-LUIS scenarios—*Enhanced Transit*, *Transit Supply*, and *Refined Transit Supply*—are compared in Figure 7, which shows the relative transit network size of each scenario, as well as each transit corridor’s service type.

Figure 7: ST-LUIS Scenario Corridor Maps by Corridor Service Type

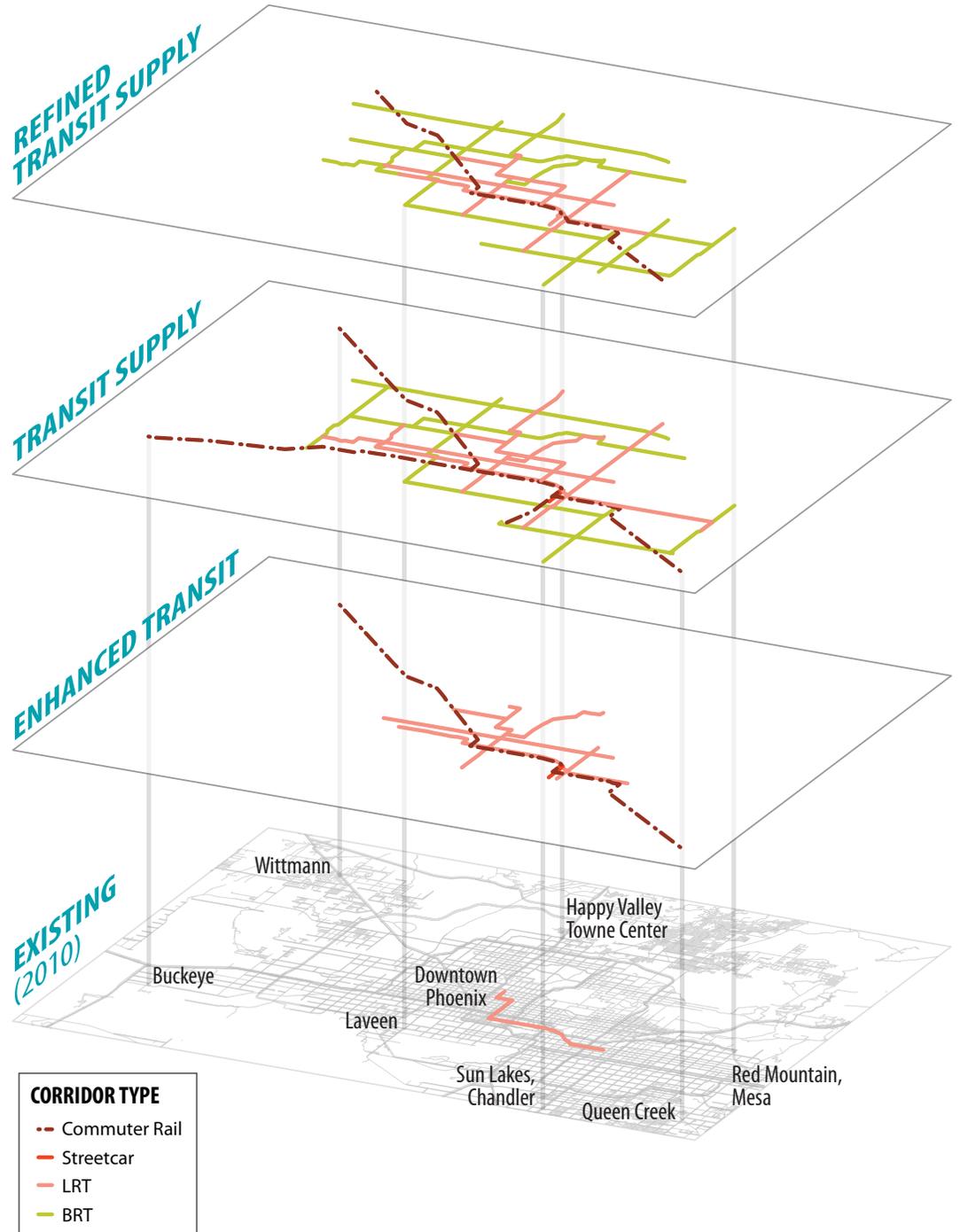
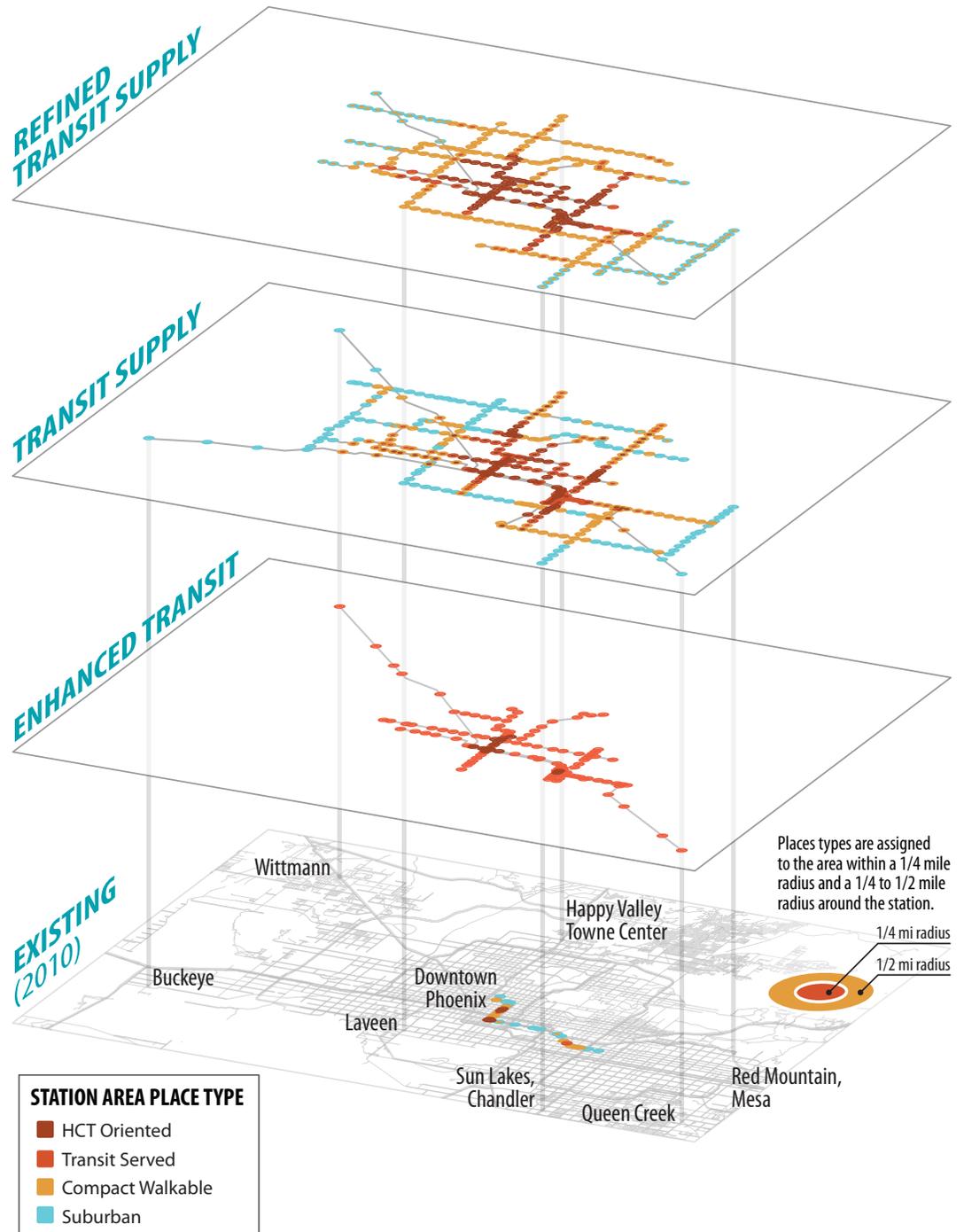


Figure 8 depicts the station area place type assignments for each scenario. Place types for may differ between the inner (1/4 mile radius) and outer (1/4 to 1/2 mile radius) station areas.

Figure 8: ST-LUIS Scenario Station Area Maps by Place Type



Scenario Modeling Results

Three transit network scenarios were tested in this study: Enhanced Transit, Refined Transit Supply and Transit Supply. Table 3 summarizes the transit network characteristics and station area place types by scenario.

The ST-LUIS market analysis, ridership productivity and mode share findings indicated a finite demand for transit-oriented and transit-supportive land use in the region. The Transit Supply scenario included a total of 352 stations along 24 HCT corridors. The TOD market demand was able to supply about half of the stations with TOD Place Types (HCT Oriented or Transit Served). The remaining 180 stations were assigned to compact walkable and/or suburban land uses since the TOD demand

was fully absorbed. This imbalance between supply and demand for TOD contributes to the lower productivity of the larger HCT systems.

ST-LUIS Scenario Modeling revealed that the small, compact, and selective strategic HCT network in the Enhanced Transit Scenario was the most productive, had the best fit with regional TOD demand, and represented the lowest capital cost. The projected annual average boardings per vehicle revenue hour decreased by 23% when the number of rail corridors was expanded from 10 to 24. The Enhanced Transit Scenario also maximizes land use integration with transit investments, due to a good fit between station area acreage and projected TOD demand.

PLACE TYPES

The ST-LUIS uses three 'place types' to categorize different areas in the region into groups with shared transportation and land use characteristics. These are described in detail on pages 15-16.

SUBURBAN *(Not a ST-LUIS Place Type)*
 NON-TOD

COMPACT WALKABLE
 CW

TRANSIT SERVED
 TOD

HCT ORIENTED
 TOD

Table 3: Scenario Characteristics

	TRANSIT				STATION AREA PLACE TYPES		
	Modes	Corridors	Miles	Stations	TOD 	TOD+CW  	Non-TOD  
Enhanced Transit Scenario 1	Rail Corridors (LRT, Streetcar, Commuter Rail)	10	160	124	124	-	-
	BRT Corridors	-	-	-	-	-	-
	Total	10	160	124	124	-	-
Transit Supply Scenario 2	Rail Corridors (LRT, Streetcar, Commuter Rail)	15	268	193	106	66	21
	BRT Corridors	9	167	159	-	-	159
	Total	24	435	352	106	66	180
Refined Transit Supply Scenario 3	Rail Corridors (LRT, Streetcar, Commuter Rail)	10	158	123	111	3	9
	BRT Corridors	14	209	200	1	32	167
	Total	24	366	323	112	35	176

Table 4 summarizes the characteristics of each scenario its modeling results.

Scenario Modeling Key Findings

- Upgraded bus services will complement HCT, feed the rail network and provide a needed increase in regional access.
- BRT services can range from “BRT-light” similar to the current LINK service, to full BRT with dedicated guideway. HCT modes are expected to include LRT, streetcar and commuter rail.
- Optimizing the transit system, relocating or consolidating stops, and truncating unproductive line segments can improve productivity.
- Downtown Phoenix station areas will have the highest sustainable mode share in the region (about 20% of trips with origins or destinations in the station areas) and can serve as a benchmark for measurement.

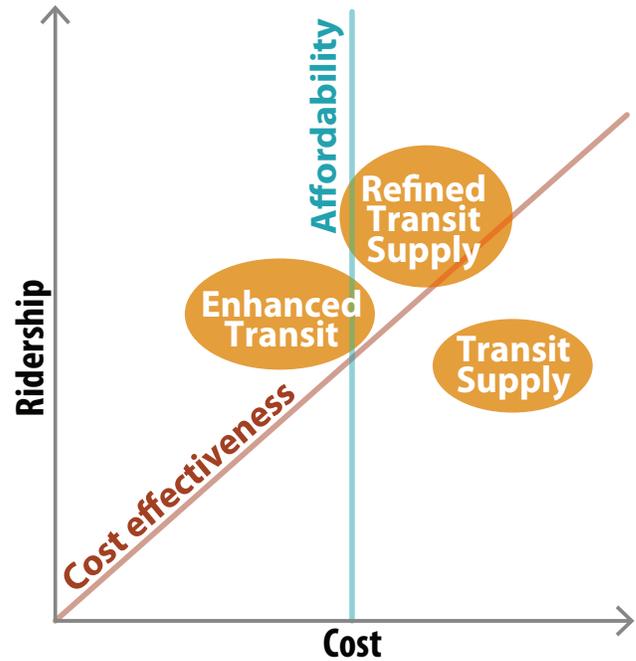


Figure 9: Conceptual Scenario Cost Effectiveness and Affordability Curves

Table 4: Scenario Summary

ST-LUIS SCENARIO	COMPARISON TO 2013 HCT NETWORK	MODE IN ST-LUIS NETWORK	STATION AREA PLACE TYPES	WHAT WE LEARNED FROM THE MODELING RESULTS
Enhanced Transit	Modest Expansion	HCT (LRT, Streetcar, Commuter Rail) Feeder bus	Transit served and high capacity transit oriented place types forecast by ST-LUIS Market Analysis	<ul style="list-style-type: none"> • Highest productivity • Best fit with TOD demand • Lowest cost • Least geographic coverage • Lowest total ridership
Refined Transit Supply	Generous Expansion	HCT (LRT, Streetcar, Commuter Rail)	Transit served and high capacity transit oriented place types forecast by ST-LUIS Market Analysis	<ul style="list-style-type: none"> • 2nd highest productivity • 2nd poorest fit with TOD demand • 2nd highest cost • Good geographic coverage • 2nd highest ridership
Transit Supply	Very Generous Expansion	BRT (with and without dedicated guideway) Feeder bus	Compact Walkable and/or suburban land uses where TOD land uses unlikely to be achieved	<ul style="list-style-type: none"> • Lowest productivity • Poorest fit with TOD demand • Highest cost • Excellent geographic coverage • Highest total ridership

4.3A TOOLS - ONE SIZE DOESN'T FIT ALL

The ST-LUIS tools support local and regional stakeholders in advancing plans for transit investments and services, supporting walkable and bikeable communities, enacting policies that support sustainable transportation, and guiding transit-oriented development. The three tools work together and recognize that there is not a *One Size Fits All* solution, allowing the region and local agencies to evaluate transportation and land use options in a market-based and data-driven approach.

ST-LUIS Place Types

The ST-LUIS place types describe and illustrate three kinds of places that offer the best opportunities for supporting sustainable transportation in the MAG region, based on the study's investigation of research findings, best practices and local precedents.

The place types can be used:

- To characterize **existing conditions**,
- To describe an **ideal condition**, and
- To communicate a **future vision** as a basis for actions.

Some characteristics are common to all three place types. All depend on

appropriate density and land use mix to support walkability, and a high level of street network connectivity. In successful walkable communities, these measurable characteristics are paired with the less-tangible qualities of authentic character, attractive public realm, and placemaking that contribute to identity and value. Figure 10 (see following page) provides information on some of the features that are distinct for the different place types.

As noted in Figure 10, the market conditions necessary to support Compact Walkable development are far more widespread than are locations with the market strength required to support Transit Served and HCT Oriented place types.

ST-LUIS market analysis and continuing national trends suggest that the places where new TOD is most likely will be in the region's central core because it has the advantages of existing density, mix of uses, and a central location. In place with these assets, high capacity transit can reinforce and strengthen the region's opportunity for economic development involving knowledge based industries and the subset of employees who will work for these businesses and who want an urban life style. Although not every part of the region will be able to directly support this type of activity, the entire region will benefit from a strong core and a thriving knowledge based economy.



COMPACT WALKABLE

15-30 persons/acre



TRANSIT SERVED

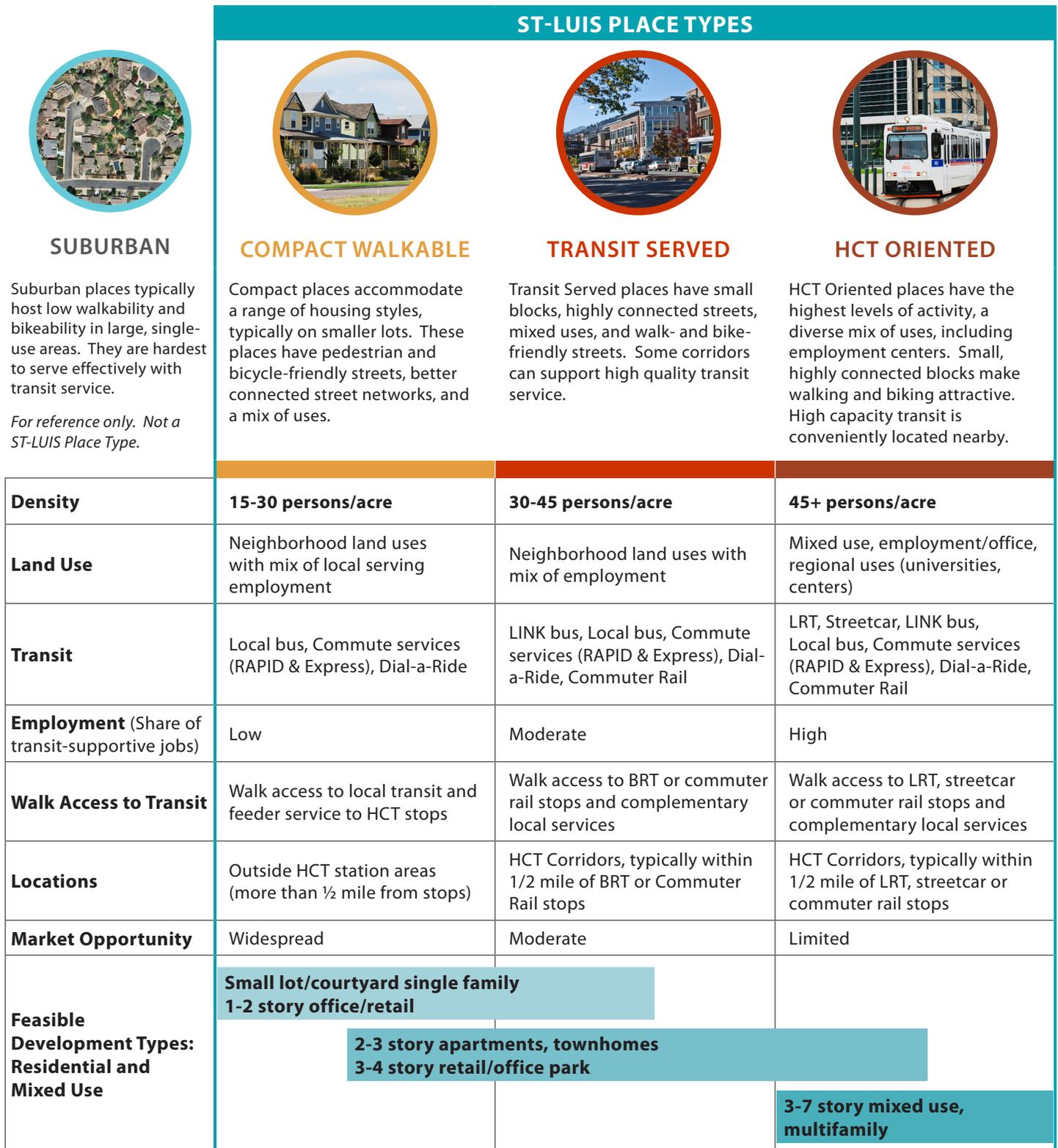
30-45 persons/acre



HCT ORIENTED

45+ persons/acre

Figure 10: Place Type Characteristics



Local Toolkit: Pathway Tools

The ST-LUIS provides two tools to assist local users in the region “synch up” transportation and land use plans. *Pathway Tool 1* allows practitioners to explore place type characteristics, consider a specific community’s present status and future vision for development, and review pathways to move toward more sustainable transportation solutions and development patterns. *Pathway Tool 2* provides design and development prototypes that synch up with the three recommended ST-LUIS place types.

Pathways support the transition to places that support sustainable transportation while responding to demographic and market trends. ST-LUIS Pathways are about...

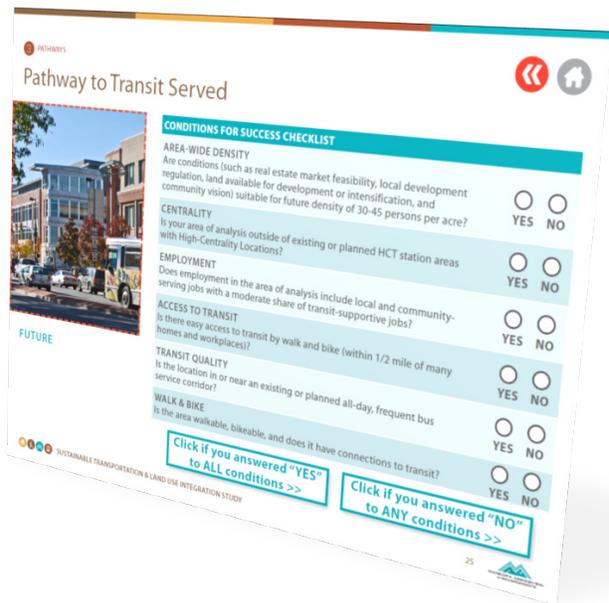
- ... Communities choosing to transition to integrated land use, urban design and mobility systems,
- ... Responding to market demand
- ... And supported by the actions of regional agencies,
- ... With the aim of moving toward sustainable transportation.

One size doesn’t fit all. Successful Pathways will reflect:

- Local conditions
- Community values and future visions
- Strength of local real estate market
- Location in the region
- Regional growth projected
- Regional plans for transit investments and services

Pathway Tool 1: Community Pathways to Sustainable Transportation Interactive Tool

- Pathway choices
- Place Type Profiles
- Place Type Dashboards
- Reference Materials



Pathway Tool 2: Development Prototypes Catalogue

- Prototypes
- Local Precedents
- Fit with ST-LUIS Place Types

Regional HCT Corridor Evaluation and Scenario Planning Process

ST-LUIS formulated a methodical High Capacity Transit (HCT) scenario planning process. The process was used to screen the various HCT corridors. The HCT corridor evaluation for this study was done in a two-step process that focused heavily on demographic, land use conditions, market demand, transit/bus ridership criteria, and commute conditions.

The STLUIS HCT Corridor Evaluation and Scenario Planning Process included:

- Screening and selection of candidate HCT corridors
- Specification of transit service characteristics
- Real estate demand forecasting
- Assignment of place types to station areas
- Modeling of transit ridership
- Evaluation of results

The screening process is flexible and can be modified accordingly for future regional decision-making efforts and used in further design and testing of regional land use and HCT networks. The evaluation criteria in the HCT corridor evaluation and the scenario planning process can both be changed in the future to meet regional goals/objectives, and/or federal directives.

4.3B STRATEGIES - MOVING TOWARD SUSTAINABLE TRANSPORTATION

Moving forward with the ST-LUIS will mean advancing the following strategies.

Strategy 1: Redefine Regional Projects

ST-LUIS recognizes that projects that advance sustainable transportation locally have value to the entire region—by enabling safe, active transportation, supporting transit use, and walkable communities.

The region should continue and expand regional support for projects that have a local focus, including:

- Complete Streets
- Safe routes to school
- Trails and bikeways
- New car ownership/share models
- First / last mile transit access projects, and
- Local transit services.

Strategy 2: Integrate the ST-LUIS findings and tools into RTP Planning Process

The Regional Transportation Plan (RTP) update should move forward with HCT network planning based on ST-LUIS results. Implementing activities include:

- Convene discussions with municipalities and the regional agency regarding local land use and transit commitment and HCT corridors
- Model a combined HCT and upgraded bus system
- Evaluate transit projects as part of overall multi-modal corridor mobility, considering highway, streets, intelligent transportation

systems (ITS), bicycle and pedestrian networks.

- Conduct more detailed corridor planning
 - Targeted corridor modifications (extent and alignment)
 - Recognize existing conditions
 - Reconcile ST-LUIS evaluation criteria with federal funding guidelines
- Complement corridor-level planning with strategic planning for nodal development
- Address commuter rail place types and appropriate densities/land use

“Phoenix’s light rail is already a success. We should be looking at TOD as an opportunity to plan long term.”

Mayor Scott Smith (Mesa)
ULI Forum 1

“My suggestion to MAG and Valley Metro is to embrace the development community more actively, as well as the brokerage community, learn where the employment centers are, where those employees live, and create appropriate mechanisms to move those people that would encourage them to take mass transit.

Look at the airlines. Do they have one size plane for every market? No. Look at our bus system, how many different bus sizes do we have?”

Mark Singerman
ULI Forum 2

Strategy 3: Upgrade Transit Services

Implementing the ST-LUIS Recommendations for upgraded transit services means improving transit quality, offering a mix of complementary services, and enabling easy, safe and comfortable multi-modal trips.

High quality transit is bus or rail service that provides all day (peak and off-peak) service with a long span of service and frequencies of at least 15 minutes during daytime hours, with high reliability, safety and customer experience, providing access to job centers and other major regional destinations. In conjunction with quality transit service, transit signal priority, queue jump lanes, bulb outs,

stop consolidation, in-line management strategies, and technology upgrades can aid network productivity. Table 5 describes key characteristics for ST-LUIS transit modes. These high quality services should be complemented by an array of services serving local and focused markets such as those in the list below. The complementary services will not all have the characteristics of all-day frequent service.

A mix of services that complement high capacity transit will extend the system’s reach and respond to specific needs. These services may include community bus for smaller communities, local feeders to rail stops, and continued and expanded peak-oriented express services. BRT services may also have varying levels of investment, with both all day, frequent rapid-type

services similar to LINK, as well as more capital-intensive BRT with dedicated guideways and rail-like amenities.

The transit system should be designed and operate so multi-modal trips are easy and attractive relative to the choice of driving alone. Multi-modal trips include trips on multiple transit modes as well as trips accessing transit by foot or bike. Supportive strategies include reliable and widely available route and schedule information, comfortable and safe walk and bike access to bus and rail stops, easy transfers with coordinated schedules and stop design, provision for bikes on transit vehicles and secure bike parking at transit stops, and fare integration throughout the network regardless of operator or mode.

Table 5: ST-LUIS Transit Service Characteristics Assumptions

	PEAK HEADWAY (MINUTES)	OFF-PEAK HEADWAY (MINUTES)	SPEED (MPH)	PEAK HOURS/DAY	OFF-PEAK HOURS/DAY
LRT	12	12	20	6 hours	15 hours
BRT	15	30	17.5	6 hours	15 hours
Commuter Rail	30	0	45	6 hours	0 hours
Streetcar	15	15	15	6 hours	15 hours

“We can plan all we want. The market decides where development goes.”

“If you want to build higher density urban infill in this region you’re going to have to change the way government thinks. All of the incentives today are in place to encourage growth on the urban fringe.”

Participants

ULI Forum 1

Strategy 4: Support Municipal Action

Local government action is essential in supporting a move to sustainable transportation. The ST-LUIS tools provide support for local decisions about development design, characteristics and transportation types.

1. Support transition to walkable communities with densities, transportation and urban form characteristics included in the ST-LUIS place types. The ST-LUIS Community

Pathways to Sustainable Transportation interactive tool (see page 17) focuses on these strategies, highlighting the following factors:

- Density (jobs + housing)
- Mixed land uses
- Connectivity
- Complete Streets
- Parking management
- Transit, walk and bike networks and services appropriate to their place types

2. Form partnerships between municipalities and transit operators to start transit service as appropriate, and prioritize services and investments that support pathways to sustainable transportation. Coordinated investments can increase the speed and reliability of transit trips, for instance.

3. Use “policy levers” identified in ST-LUIS to improve the feasibility outlook for higher density housing: reduced parking requirements in station areas, higher site coverage, and allowing horizontal mixed use.

“If local governments really want to see the shift to the urban core, as sought after by the new demographics, then they have to get with it and be more sophisticated in their ability to support good projects and their ability to make it more difficult to just go build houses in the next cotton field.”

James Lundy

ULI Forum 1

Table 6: First Steps to Prioritize Services and Investments Supporting Sustainable Transportation

	FIRST STEPS
Improve walkability	<ul style="list-style-type: none"> • Remove barriers to transit stops and stations • Develop contiguous walking paths and sidewalks that connect to local and regional networks • Provide clearly marked pedestrian crossings and traffic signals with countdown signals • Provide bulb outs and wider medians to reduce effective crossing distance
Increase speed and reliability	<ul style="list-style-type: none"> • Include signal priority, in-lane transit stops, and transit-only lanes in corridor planning and capital investments • Synchronize traffic signals with bus schedules to improve speed and reliability • Improve coordination between traffic operations control centers and transit operators
Improve waiting areas	<ul style="list-style-type: none"> • Invest in covered shelters, seating, landscaping, and other rider amenities • Provide real-time transit arrival information • Prioritize maintenance and upkeep of waiting areas

4. Tailor regulations and design guidelines for infill opportunities.

Real estate industry representatives who participated in the study emphasized the need for regulations and guidelines specifically addressing

typical infill conditions, such as small parcel sizes that may not satisfy standard on-site parking standards. Locations within HCT station areas will warrant reduced parking requirements.

Table 6 outlines a number of possible first steps for local governments to take toward prioritizing services and investments supporting sustainable transportation.

Beyond the Study - Next Steps

MAG and municipalities are already involved in many supportive activities that move the recommendations and strategies of the ST-LUIS forward. The region will need to continue to move

forward and answer questions not resolved through the project. These include:

- More detailed planning activities
- Continued emphasis on implementation activities

supporting the transition to walkable communities and TOD

- Implementation of a walk/bike/transit system that supports transitions to walkable communities and sustainable transportation

Glossary

TERM	DEFINITION
Bikeability	The comfort, safety, and appeal of cycling in a given place. Highly bikeable places have “comfortable” (or safe, pleasant, and convenient) environments for cyclists, including nearby destinations, a network of bicycle lanes, vehicle door buffers, protected turn lanes, high visibility signage and pavement markings to alert drivers to the presence of cyclists, secure bicycle parking (e.g. bicycle racks, lock boxes), and well-lit streets and sidewalks.
Bus Rapid Transit (BRT)	A rubber-tire based transit mode that is more reliable, is faster, and has a higher capacity than traditional rubber-tire services due to implementation of transit priorities measures such as transit signal priority, bulb outs, queue jump lanes, off-fare boarding, etc. BRT in the context of the ST-LUIS is similar to the existing Valley Metro LINK bus service. Full BRT with significant capital infrastructure including dedicated bus lanes and guideways, similar to the Health Line in Cleveland, Ohio, or the EmX in Eugene, Oregon, is not assumed as part of the ST-LUIS.
Centrality	A place’s proximity to the core of the metropolitan area, the densest concentration of jobs and housing near the geographic center of the region, or other job center. Places with high centrality have a significant number of jobs in transit-supportive categories (see Glossary 2 of 2). The highest centrality places are downtown employment centers like Downtown Phoenix or places with major institutional uses like Tempe.
Commuter Rail	Rail transit operating on a fixed guideway during peak periods in peak directions, typically having fewer stops than LRT and Streetcar and covering longer distance trips. Commuter rail train capacity is typically significantly higher than LRT and vehicles are designed for longer-distance trips (often with seats and tables).
Density	The number of residents and/or jobs in a given area; defined as “people per acre” for this study, combining the number of residents and jobs together. Density is typically regulated through controls on units per acre for residential development or floor area ratio (FAR) for commercial development.
Development Prototype	An illustrative building description that fits the density and urban design parameters of one or more specific Place Type(s).
Dwelling Units per Acre (DU)	The number of residential units divided by the number of acres of property on which they are located. This is a measure of residential density.
Floor Area Ratio (FAR)	The ratio between the area of a building and the area of the parcel on which it sits, typically measured in square feet. This is a measure of commercial density.
High Capacity Transit (HCT)	A frequent, reliable, high-speed, and high capacity form of transit that operates in a fixed guideway (such as rails), typically within a semi- or fully-segregated right-of-way. HCT systems have enhanced and branded passenger stations that may include amenities such as level boarding, real-time information provision, and off-board fare payment. HCT systems are considered more “permanent” and have the potential to generate land use and development impacts at stations and along corridors. In 2013, the types of HCT under consideration for the ST-LUIS are Light Rail Transit (LRT) and Streetcar.

Glossary (*continued*)

TERM	DEFINITION
High Quality Transit Service	Bus or rail service that provides all day (peak and off-peak) service with a long span of service and frequencies of at least 15 minutes during daytime hours, with high reliability, safety and customer experience, providing access to job centers and other major regional destinations.
Local Serving Employment	Jobs associated with local serving businesses and services, including schools, local retail businesses, personal services, medical offices not associated with major hospitals, real estate offices and bank branches. Home-based businesses and small-scale craft-based businesses may also be included.
Light Rail Transit (LRT)	LRT is a frequent, reliable, high-speed, and high capacity form of transit that operates in a fixed guideway (e.g. rails), typically within a semi- or fully-segregated right-of-way. LRT systems have enhanced and branded passenger stations that may include amenities such as level boarding, real-time information provision, and off-board fare payment. LRT systems are considered more “permanent” and have the potential to generate land use and development impacts at stations and along corridors.
Neighborhood Land Uses (or “land use mix”)	Housing mixed with local serving uses, including parks, schools, places of worship, community centers and child care, and neighborhood retail and services.
Place Type	Classification of an area based on its dominant land use, design, and transportation system characteristics. Describes current conditions and/or future vision, and helps guide local planning decisions with regional goals.
Station Area	An area with a radius of 1/4 or 1/2 mile around a transit station. A 1/2 mile station area covers approximately 500 acres.
Streetcar	Streetcar is a form of rail transit with similar amenities and characteristics to LRT, but typically provides localized circulation, for instance within a downtown or business district. Streetcar stops more frequently than LRT, operates slower than LRT due to its operating environment (which may include pedestrian malls and urban arterials), and generally operates with shorter train cars and thus lower capacities than LRT.
Transit-Oriented Development (TOD)	<p>Transit-Oriented Development (TOD) is a type of community development that includes a mixture of housing, office, retail and/or other commercial development and amenities integrated into a walkable neighborhood or district and located within a half-mile of quality public transportation.</p> <p><i>Adapted from the Center for Transit-Oriented Development, http://www.ctod.org</i></p>
Transit-Supportive Jobs	Jobs in industry sectors that have a tendency to cluster near transit, based on national studies from the Center for Transit-Oriented Development. Sectors include: Government; Information; Finance and Insurance; Real Estate; Professional, Scientific and Technical Services; Management of Companies and Enterprises; Arts, Entertainment, and Recreation; and Accommodation and Food Services.
Walkability	The comfort, safety, and appeal of walking in a given place. Highly walkable places have “comfortable” (or safe, pleasant, and convenient) environments for pedestrians, including features like very close-together destinations, small blocks, continuous sidewalks, shade, safe street crossings, and buffers from adjoining traffic (e.g. planting strips, street furniture).



ST-LUIS Project Materials

Related ST-LUIS project materials are available online. Use the following links to access these documents.

ST-LUIS PROJECT WEBSITE

<http://www.bqaz.org/sustainOverview.asp?mS=m16>

RESOURCES: LOCAL TOOLKIT

Community Pathways to Sustainable Transportation Interactive Tool
Development Prototypes Catalogue

<http://www.bqaz.org/sustainResources.asp?mS=m16>

WORKING PAPERS & MEMORANDA

Working Paper One - Regional Transportation Framework and Issues

Working Paper Two - Moving Toward Sustainable Transportation

Working Paper 3A: Supportive High Capacity Transit (HCT) Corridor Technical Analysis, Scenarios 1 & 2

Working Paper 3B: Supportive High Capacity Transit (HCT) Corridor Technical Analysis, Scenario 3

Working Paper Four: Study Recommendations Report

MAG ST LUIS – Market Study Memorandum

MAG ST LUIS – Employment Analysis Memorandum

<http://www.bqaz.org/sustainPapers.asp?mS=m16>

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