APPENDIX C

Ogden Transit Project Land-Use Evaluation

MEMORANDUM

Ogden Transit Project Land Use Evaluation

TO: Heidi Spoor, Project Manager, HDR
FROM: Alex Joyce, Fregonese Associates Inc.
DATE: February 2015
RE: Ogden Transit Project Land Use Evaluation

The purpose of this memo is to summarize the transit project land use evaluation of Central Ogden completed by Fregonese Associates in December 2014, and briefly describe potential planning strategies to increase the competitiveness of the area for federal transit funding.

This memo describes the importance of the connections between transit, land use and economic development for attracting federal transit funding, and gives an overview of Ogden's strengths and weaknesses relative to those connections. This is followed by a brief background of the factors influencing travel patterns, and how those factors are manifested in different parts of Central Ogden.

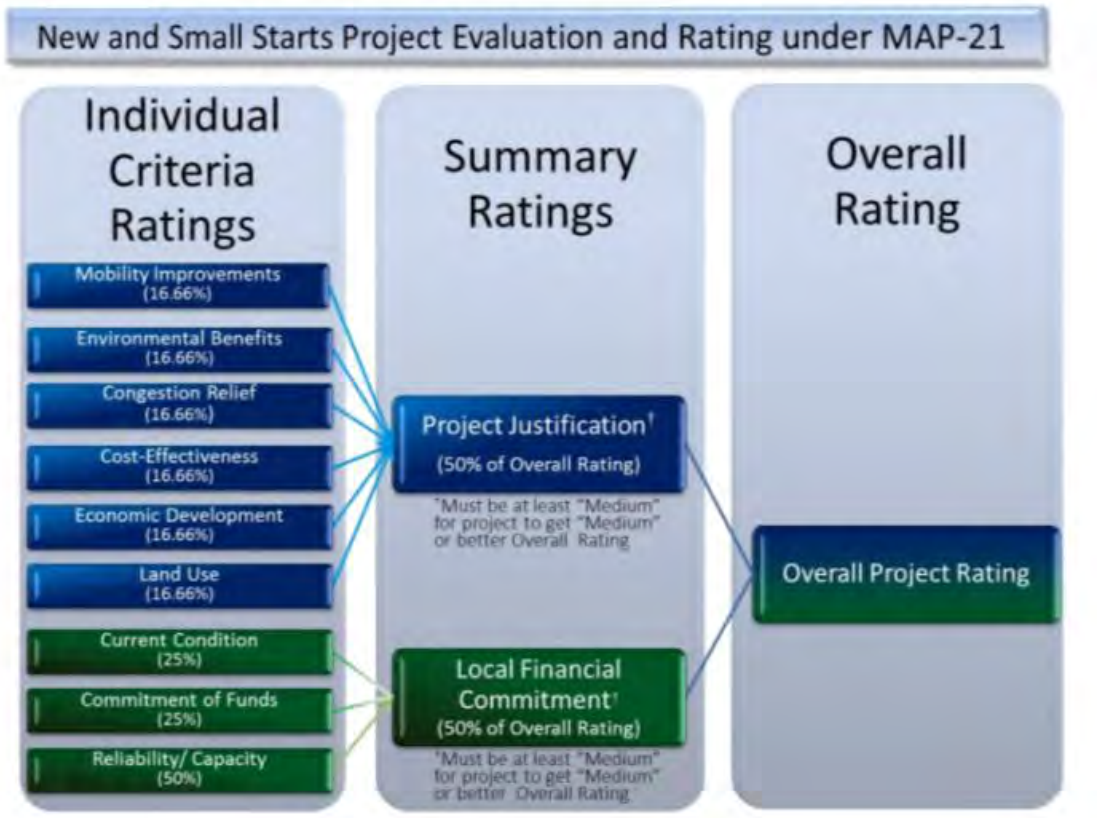
Next is a section briefly describing the process of using the Envision Tomorrow suite to test how transit-supportive zoning and alternative transit alignments would impact development and redevelopment potential in the area.

Themes affecting new development and re-development identified during developer interviews are summarized, and, finally, conclusions about strategies for increasing funding competitiveness related to land use and economic development are presented.

Why is Land Use and Economic Development Important?

At the same time as federal funding for transit projects has become increasingly competitive, the criteria have become increasingly focused on the connection between transit investments, land use and economic development, rather than transit in isolation. Today, these criteria comprise one third of the project justification evaluations assessed by federal agencies for small and new starts-funded projects. This is because the federal government wants to have confidence that tax dollars will

leverage substantive private investment through new and re-development, increasing the rate of community revitalization. Thus, evaluating current policies and making targeted changes where needed is critical to accessing federal transit funding.



The plans and policies that will be evaluated and are recommended for city action are:

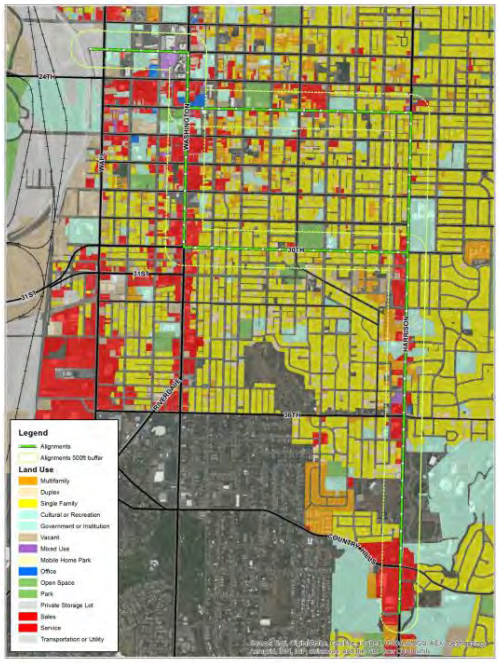
- Implement transit-supportive corridor policies
- Apply supportive zoning near transit
- Develop plans and implement policies to support affordable housing
- Develop a feasible list of tools to implement transit supportive plans and policies
- Demonstrate high performance of transit supportive plans and policies

Central Ogden's Strengths and Weaknesses

Ogden has many strengths that contribute to a mutually beneficial relationship between transit, land use and economic development. By building on those strengths while simultaneously addressing select areas of weakness, the area will increase its competitiveness for federal transit funding.

Land Use Diversity

Walking and transit usage are significantly higher in neighborhoods with a diversity of land uses – where people can live, work and shop for basic services. Because Central Ogden was built around historic streetcar lines, it has compact neighborhoods with diverse land uses.



The East Central area centered on 25th has the highest level of land use diversity outside of downtown, with a wide range of residential densities, housing types and land uses (though some are non-conforming under current code). The land use pattern becomes markedly less mixed along other legs of the alignments, where either single family (30th and Harrison north of 30th) or commercial (Washington and Harrison south of 30th) predominate.

Residential Density

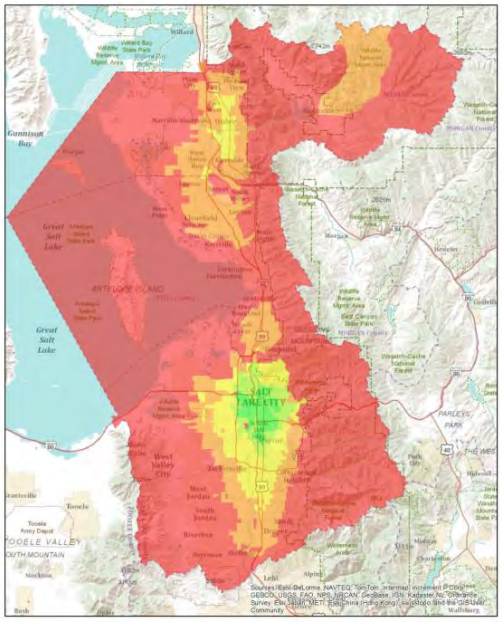
Residential densities in the East Central neighborhood are among the highest in Ogden today. Again this is a legacy of the neighborhood's orientation around the original streetcar system.

Increasing residential density also increases walking and transit usage. For instance, doubling housing density can reduce vehicle miles traveled (VMT) by 4% and increase walking and transit usage by 7%.

A density of 20 or more units per acre can support high quality transit. There are currently a few apartments within the East Central, particularly around 25th, that are over 20 units per acre in density, but most of the district is 6 or fewer units per acre –

approximately a 5,000 square foot single family lot. Allowing additional density close to the chosen alignment will be needed to maximize the transit investment.

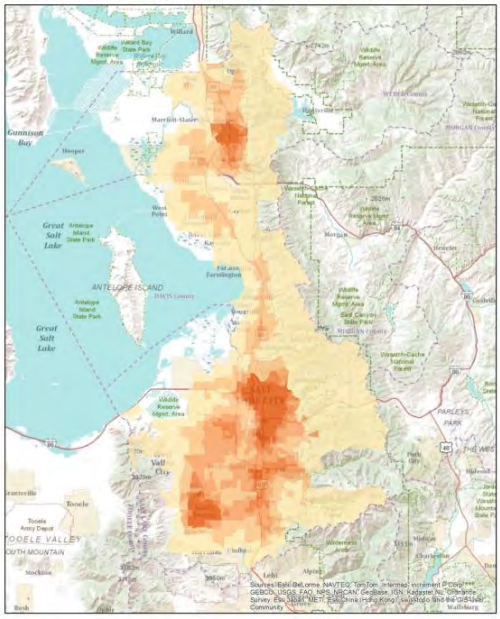
In central Ogden, relatively high housing density is found around 25th and Harrison, south of 30th. This area contains legacy apartments and larger single family residences that have been converted to multi-unit housing. Student apartments surrounding Harrison south of 30th also contribute to localized transit-supportive housing density.



Regional Employment Accessibility

When nearby transit options connect residents with a large share of the region's jobs, those residents are far more likely to use the transit. In the transportation research literature, this is known as "employment accessibility."

Central Ogden has the highest level of regional employment access via transit of any city north of Salt Lake City. The Frontrunner station in downtown Ogden provides speedy access to downtown Salt Lake City, where a large percentage of the region's jobs are located. The proposed alignments will extend this regional accessibility beyond central Ogden and could tie in the Central Eastside, Weber State and McKay Dee Hospital.



Transit Access

Easy access to transit stations is a strong predictor of how well it will be used. Central Ogden has the highest level of transit access and transit options relative to other cities north of Salt Lake City, as shown by a map of the transit stop density within one mile.

By expanding the network of high quality outside of the core of downtown Ogden, many more residents and employees will be able to choose to use transit – and the research indicates many people will likely make that choice.

Developer Interviews

The goal of conducting interviews with five local development firms was to understand the local market through firsthand accounts of development experiences in a range of locations and product types.

A mixture of small and large firms were interviewed and represented both the private and non-profit sectors working in the residential, commercial and construction industries. A synthesis of the interview findings led to the following conclusions:

- Today's market is still a challenge, but there was general agreement that the market is improving as it continues to rebound from a difficult recession.

- There is a changing perception of Ogden contributing to demographic shifts; younger singles and families being added to the population as they are attracted by affordable homes and access to nature and outdoor recreation opportunities.

- The city is the primary "developer" in Ogden, collaborating on single family residential development and large-scale partnerships (Junction, for example). New construction is not feasible without city partnership or some other subsidy, such as low income tax credits.

- Zoning is overly restrictive and prescriptive – changes could make it more market-friendly, and also result in higher quality projects.

- Regulatory challenges include the development review and permitting process. It works well for some, but not across the board. It is still relationship-based, "small town" system.

- It is not currently possible to achieve transit-friendly densities in most zones. But a high-quality transit project could strengthen the market and provide more certainty for developers.

Scenario Evaluation of Alignment Routes and Zoning Policy

Fregonese Associates used the Envision Tomorrow scenario planning software to model the economic development impact of the transit alignments as well as possible changes to development regulations, such as zoning. A total of four scenarios were modeled in detail with direction from the Technical Advisory Committee (TAC).

The scenarios helped the project team and stakeholders understand how each alignment and policy changes would impact the number of residential units that could be developed. This is a direct measure of economic activity as well as a measure of potential new transit riders near the alignment.

Envision Tomorrow Scenario Process

Envision Tomorrow is suite of planning tools that accommodates a building-level approach to planning. This allows market realities (including land costs, market-rate rents, and construction costs) and regulatory restrictions (zoning requirements, permitting and development fees, tax rates) to be integrated into a land use scenario built to model what impact different patterns of development could have on the city in the future.

Buildings Calibrated to Ogden Market

- 20 buildings were modeled, both physically and financially, and calibrated to the Ogden market
- The buildings included single family, multifamily, townhomes, duplex, retail, office, flex space, and mixed-use
- About half were calibrated to comply with zoning standards and the other half were designed for transit-supportive densities and market-feasible design

Identification of redevelopment parcels

Parcels deemed viable for redevelopment were identified using a combination of the following criteria:

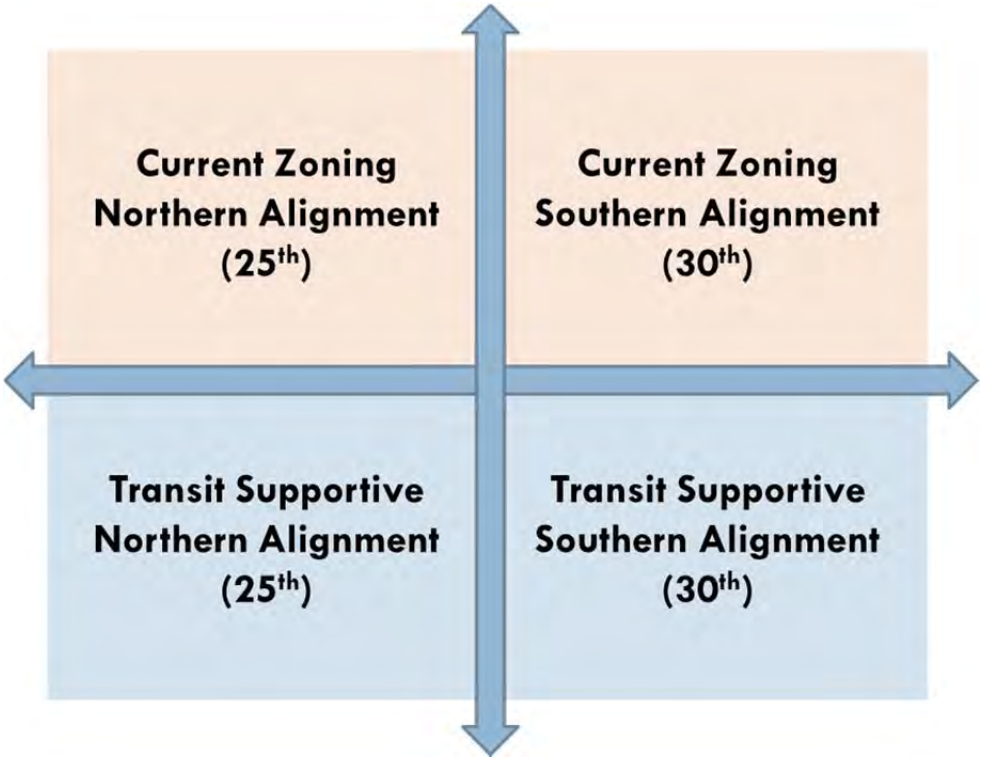
- Low efficiency/low density current uses
- Older, lower value buildings
- Promising retail locations
- Vacant parcels
- Large, sub-dividable lots

Qualitative factors were also considered to reflect the reality that though physically viable for redevelopment, parcels in less attractive neighborhoods with lower residential rents would be less viable than those in more desirable neighborhoods with higher rents.

A workshop with the TAC facilitated a screening of the redevelopment parcels with local knowledge to identify areas that should be prioritized for increased density – a.k.a. "hot spots."

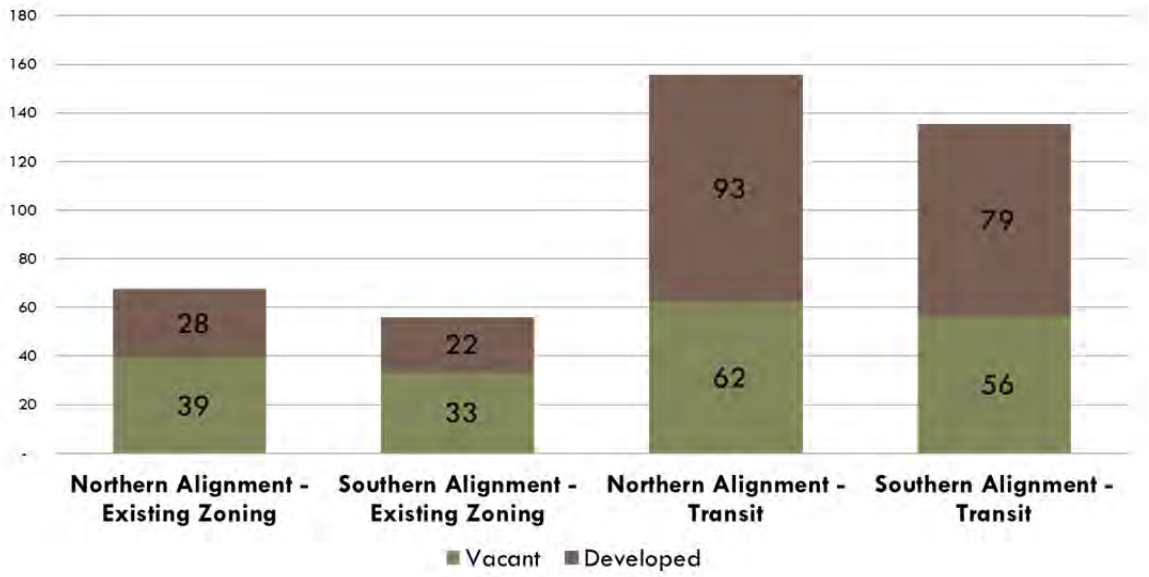
Scenarios tested

Four different scenarios were tested to understand the impact of both the individual transit alignments as well as transit-supportive zoning changes. The illustration below shows the matrix of four scenarios. Two scenarios were completed for each alignment option, one using only buildings that could be built under current zoning and two using buildings that assume the zoning was modified to allow for buildings that were dense enough to support the transit investment.

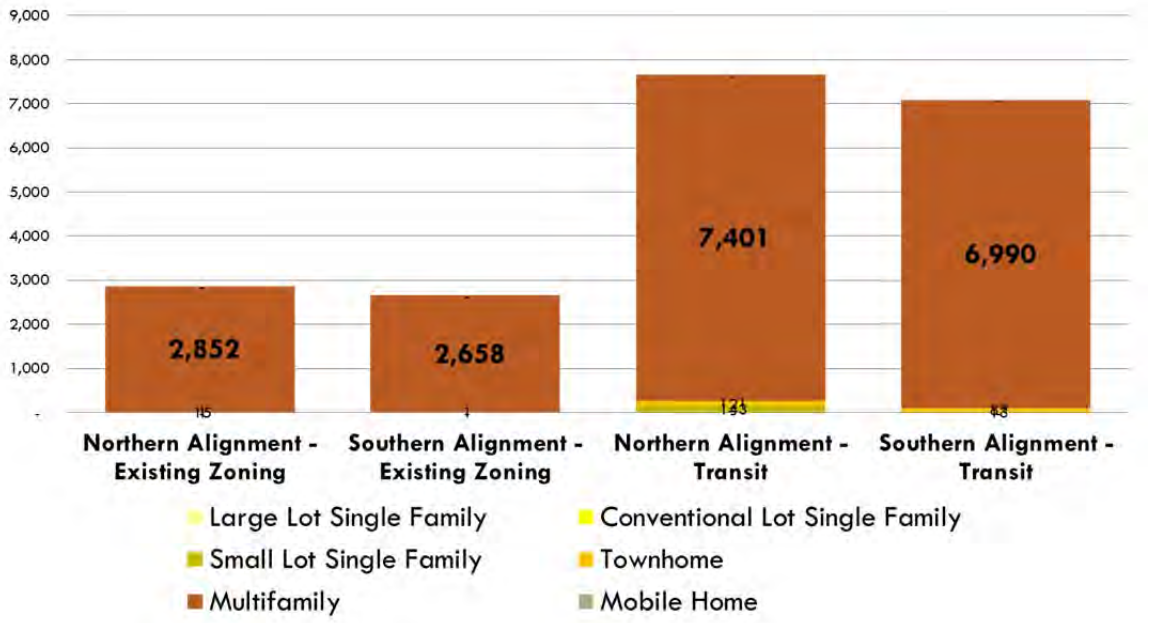


Scenario Performance

Acres of Infill and Redeveloped Land

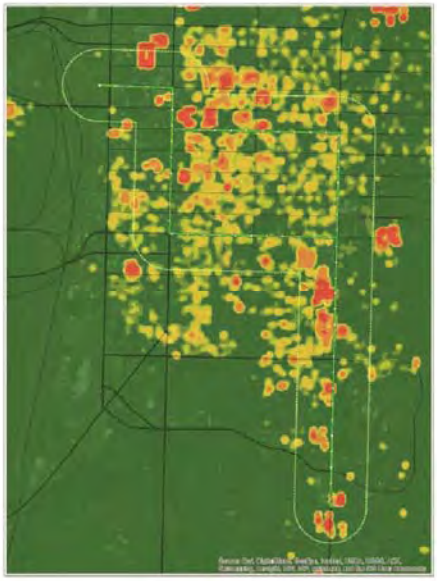


New Residential Units by Type

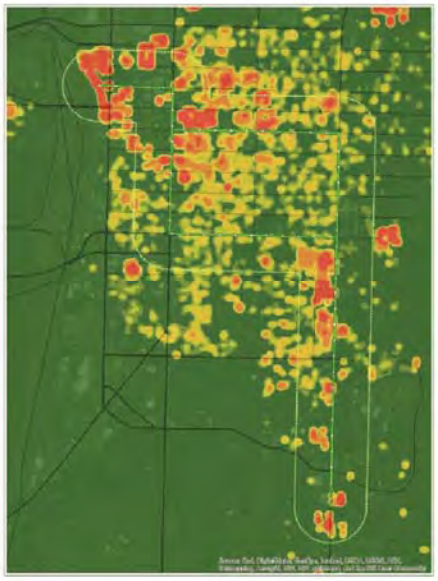


Changes in Residential Density

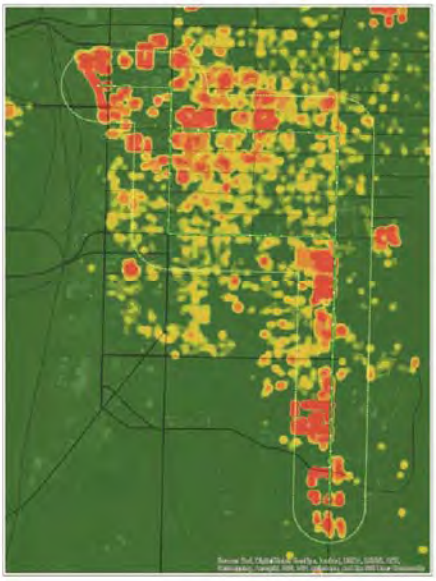
Current Residential Density

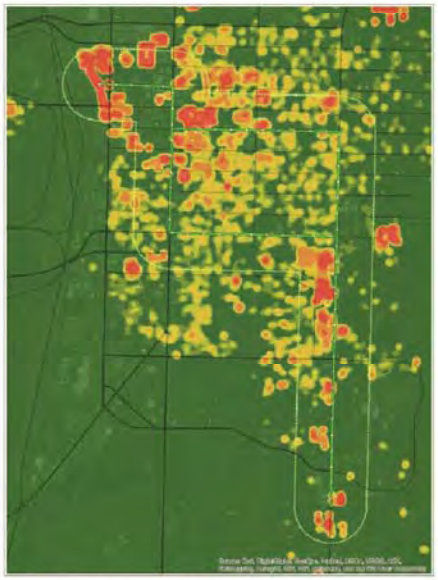


Northern Alignment (25th)
Current Zoning

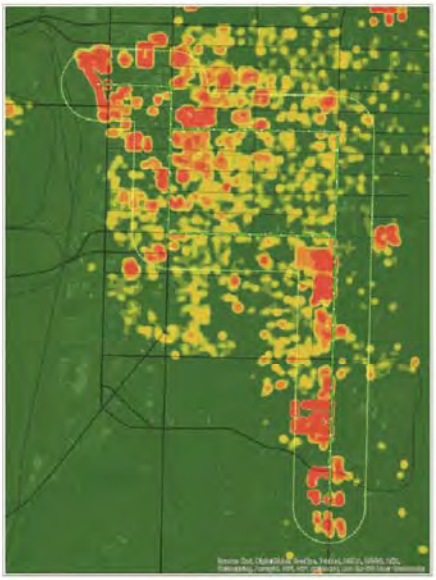


Northern Alignment (25th)
Transit-Supportive Zoning





Southern Alignment (30th)
Current Zoning

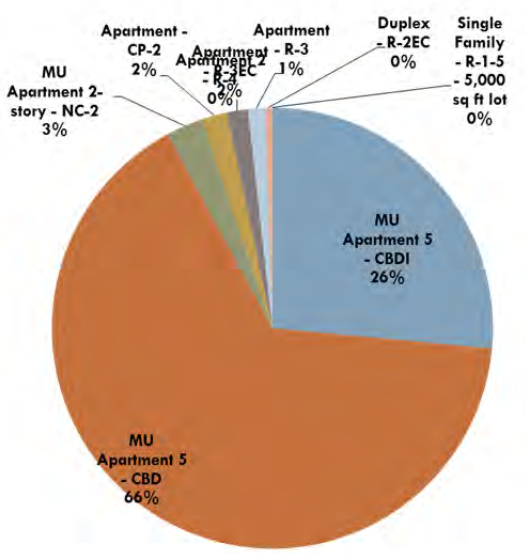


Southern Alignment (30th)
Transit-Supportive Zoning

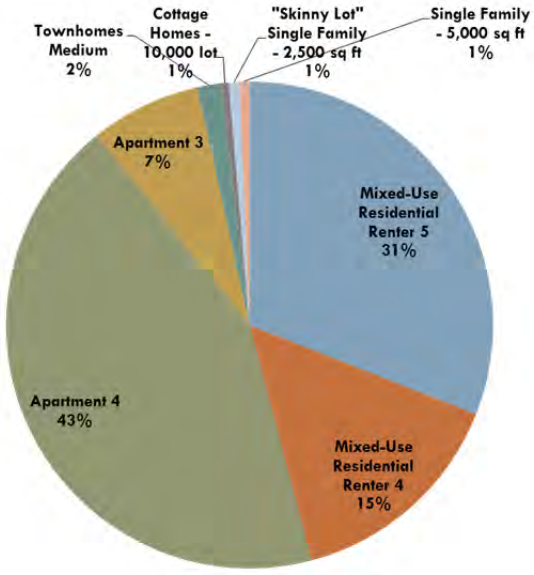
Building and Residential Diversity

The mix of residential building types is significantly different across the scenarios. Under current zoning policy the mix is heavily influenced by the types of buildings allowed in the CBD zone downtown – 5 story apartments. By allowing more flexibility in the zoning outside of downtown the mix of buildings is much wider in the scenarios that use transit-supportive zoning standards.

Allowing a wide range of building types and residential units allow the market to respond to the housing needs of more residents and allows flexibility for changes in the economy, wages or household composition over time. Just like a personal investment strategy for retirement, diversity is the key to resilience.



Existing Zoning Buildings

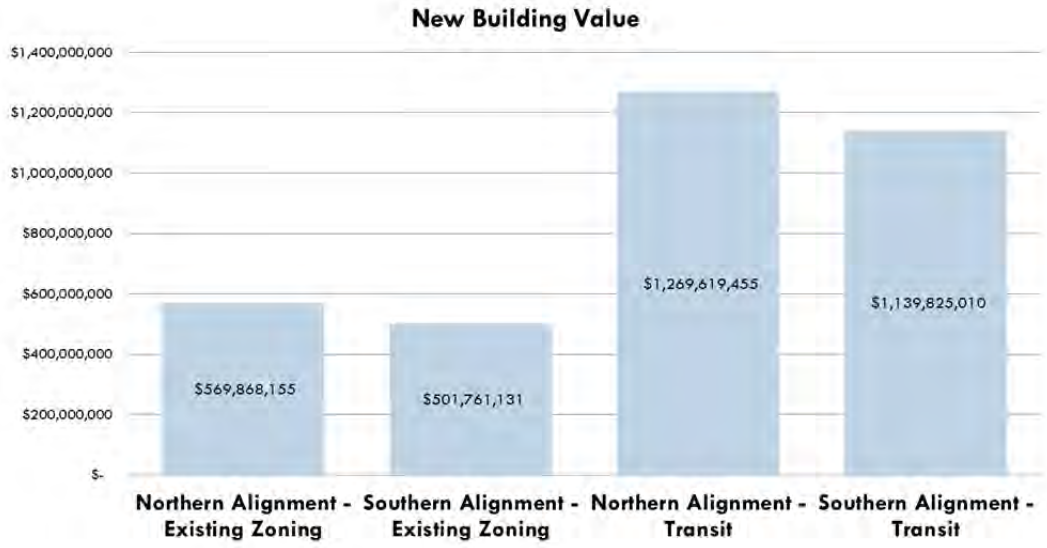


Transit Supportive

Population within Quarter Mile of Alignments

Population and Households			Quarter Mile Around Alignment	
			A	B
Existing	2010 Census	Population	10,018	11,706
		Households	4,084	4,464
New Development	Existing Zoning	Population	6,218	5,624
		Households	2,938	2,659
	Transit Supportive Zoning	Population	15,819	14,572
		Households	7,665	7,091
Total	Existing Zoning	Population	16,236	17,330
		Households	7,022	7,123
	Transit Supportive Zoning	Population	25,837	26,278
		Households	11,749	11,555

Total Value of New Construction



Building-Level Zoning Policy Testing

Using the Envision Tomorrow building-level pro forma, Fregonese Associates tested the financial and urban form impact of current zoning regulations compared to transit-supportive alternatives. The results were striking. Current zoning limits development intensity to levels below what is required to support a high quality transit line. These limits also make infill and redevelopment not financially viable without significant subsidy, such as low income tax credits.

Specific recommendations are made in the recommendations section of this memo, but below is an example of an apartment building that was modeled under current zoning and another modeled with transit-supportive standards. It is clear that there are significant efficiencies that could be achieved with modifications to the current zoning.

Current Zoning

Transit-Supportive

Site Characteristics	Current Zoning		Transit-Supportive	Change
Lot Size	12,000 sq ft		12,000 sq ft	0%
Lot Cost	$100,000		$100,000	0%
Height	2 Stories		3 Stories	+50%
Parking Spaces	6 (2 per Unit)		15 (1 per Unit)	+150%
Density	12 DU / Acre		56 DU / Acre	+367%
Floor Area Ratio	0.43		1.13	+163%
Project Value	$0.9 Million		$2.2 Million	+144%
Average Unit Size	1,100 sq ft		750 sq ft	-32%
Unit Rent w/o Subsidy	$1,727/month		$893/month	-48%
OR Subsidy Required	30%		18%	-40%

Conclusions

The northern alignment along 25th Street has a competitive advantage when compared to the southern alignment that travels along 30th Street, at least in the short-to-medium term. That said, changes to zoning regulations have a far greater impact on the economic development outcomes than either of the two alignment routes.

Regulations have a larger impact than the alignment

The potential for economic development from this transit investment is far more sensitive to the regulatory environment than either of the two alignments. The existing zoning and permitting system is restricting redevelopment opportunities substantially. Suburban parking standards, low lot coverage limits, high average unit size requirements and low density limits make redevelopment financially infeasible without substantial subsidy, such as low income tax credits. Changing the zoning to allow for development that can support high quality transit would yield 2-3 times the investment potential than could occur under current zoning limits.

Market potential differs between areas

The fundamental rule of real estate is that value is determined by "location, location, location." This is true in Ogden as well. Currently, the market in the inner Central Eastside is significantly stronger than the market surrounding Washington south of 25th. The level of desirability (measured in terms of rents and sales prices) in the inner Central Eastside could support infill and redevelopment, whereas achievable rents along and around Washington between 25th and 30th cannot. In the short-to-medium term and without significant investment in streetscape improvements along Washington, a transit investment of this scale is likely to leverage larger private investments surrounding the northern alignment option along 25th Street.

The existing street grid is a major strength

Central Ogden has a strong street grid and connectivity, particularly in the East Central neighborhood centered on 25th Street and surrounding Washington Street north of 30th. Both the 25th leg and the Washington north of 30th leg of the alignments benefit from the legacy of the streetcar-oriented design of the neighborhood. The traffic speeds and volumes on Washington make the pedestrian experience somewhat less desirable currently. However, if streetscape improvements were made on Washington, like curb extensions, street lights, marked on-street parking and widened sidewalks, it could become just as desirable, if not more desirable for investment than 25th.

Roadway design is limiting redevelopment potential along Washington

Staff and developer expertise and the Envision Tomorrow modeling demonstrate that both the Washington and 25th segments of each alignment have many opportunities,

while 30th and Harrison (25th to 30th) have relatively few. In the Envision modeling, the somewhat higher performance of 25th/Northern transit alignment reflects the low traffic volume, walkable street network and higher level of desirability today (measured in achievable rents). Streetscape and bicycle/pedestrian investments on Washington could increase the competitiveness of this alignment, and increase the viability of short-term redevelopment opportunities, perhaps even beyond those along 25th.

Recommendations

Short-term zoning changes

The City should develop a plan to address major zoning shortcomings quickly, but also consider undertaking a comprehensive zoning update, particularly in the neighborhoods adjacent to the preferred alignment. Federal evaluation guidelines require a proactive action plan to address development regulations that do not support transit.

Specific recommendations and transit-supportive standards are suggested below. These standards are consistent the standards other communities have adopted in areas served by high quality transit. In addition, the standards are consistent with recommended standards from professional planning and real estate organizations such as the Urban Lands Institute.

Parking standards should be limited to a maximum of 1.25 per residential unit or 2 per 1,000 square feet of commercial.

Current parking standards in areas around the two alignments are too high for urban areas with access to transit and walking distance to jobs and services. Parking needs are different in different parts of the city. The current parking requirements are "one size fits all" and do not acknowledge that parking needs are lower in the central part of Ogden, where housing, goods and services are nearby or accessible by transit.

The city has taken the first step and is nearing completion of a parking study for downtown Ogden. The city should consider adopting lower parking standards for walkable areas, well served by transit, with a variety of housing and commercial activity. The market is remarkably efficient at determining the appropriate level of parking for a given project. Requiring more parking than the market needs or can afford will further impede redevelopment as it greatly increases project costs, reduces density, and is a detractor to urban form.

Focus on building form, not use.

Current zoning policy strictly limits the uses of buildings, even in historically mixed-use neighborhoods, such as East Central. In a transit supported neighborhood, city policy

should support a wide variety of activities such as restaurants, residential, offices all on the same parcel. To maximize market flexibility and reduce costs, these uses should be permitted by right, not by exception.

The aim of zoning and development regulations should focus on the desired form of the buildings, not necessarily the uses which may need to change or adapt over time to react to market changes. Form-based zoning is one vehicle to achieve this type of flexible policy while also preserving the basic urban form elements that make the neighborhood attractive.

Minimum lot sizes should be reduced or eliminated.

The city's minimum lot size requirements should be evaluated and changed. Strictly limiting the minimum lot size limits redevelopment potential on smaller or oddly shaped parcels. In addition, by reducing or eliminating minimum lot size requirements allows developers to be creative in their design and also reduces the project costs, which can translate into more affordable housing and commercial space.

Average unit sizes should be eliminated.

Current zoning policy requires that new residential buildings achieve an average unit size of over 1,000 square feet. Currently, market rate apartment buildings are averaging anywhere from 700 to 900 square feet per unit, which is a mix of studios, 1 and 2 bedroom apartments.

This policy is motivated by an admirable desire to avoid tenement flats; however, the consequence is to increase development costs significantly. These increased costs can make infill projects infeasible unless they are significantly subsidized. Or the increased costs are passed onto the renter or home buyer, which reduces affordability.

Density limits should be increased or eliminated within residential zones.

Low density limits restrict the ability of a developer to respond to a changing market and economy by limiting the type and mix of units they can provide. Low density restrictions make it hard for a developer to purchase land and create sufficient rentable units to make a project "pencil." Low density limits also impact affordability because the costs of land and construction are spread over only a few units. The R-2(EC) zone is currently limited to 7 dwelling units per acres, but should be increased to at least 20. The R-3(EC), R-4(EC) and R-5 zones are currently limited to 16 units per acre but should be increased to at least 60.

Do not link permitted number of units to lot size.

Linking the number of units to the lot size greatly limits residential density allowances. In addition, the policy increases development costs and limits the redevelopment potential of smaller parcels.

Lot coverage allowance should be increased and landscaping standards should be less prescriptive.

The lot coverage limits within the current code are too low. Many limit lot coverage to below 50%, but typical urban standards for lot coverage are 80-85%. Reducing the rear setback and landscaping requirement allows rear areas to be used for surface parking rather than unused grass that increases water usage and reduces the revenue-generating area of a parcel. A 10-15% landscaping standard is typical in the urban setting, and encourages creative use of vegetation and native species to enhance the local habitat and add capacity for rainwater detention.

Height allowances should be increased in key areas.

This will increase cost efficiency and thus development potential for areas where construction is currently more expensive due to height restrictions. The height allowance should be increased to 55-60 feet in the C-1, CP-1. CP-2, CP-3, NC-1, NC-2, R-3, R-4 and R-5 zones.

FAR allowances should be increased or restrictions should be eliminated.

Current restrictions limit redevelopment potential. FAR allowances should be raised to at least 2.0 in the C, CP, NC, and R-3 (and all higher-density R) zones.

Pursue regional funding for zoning updates

The Wasatch Front Regional Council (WFRC) Local Planning Resource Program "provides local jurisdictions with technical assistance to integrate land use and regional transportation plans." With the goal of supporting local governments in creating livable communities, resources are available in the form of funding for staff time or consulting firm assistance, training to use the 2040 Toolbox, ET+, and the Form-Based Code Template, and technical support for GIS or scenario modeling. The program makes $460,000 available to all of Salt Lake with $140,000 dedicated to the Ogden-Layton urbanized area. Eligible projects include revisions to ordinances or land use regulations and require only a 7% local match.

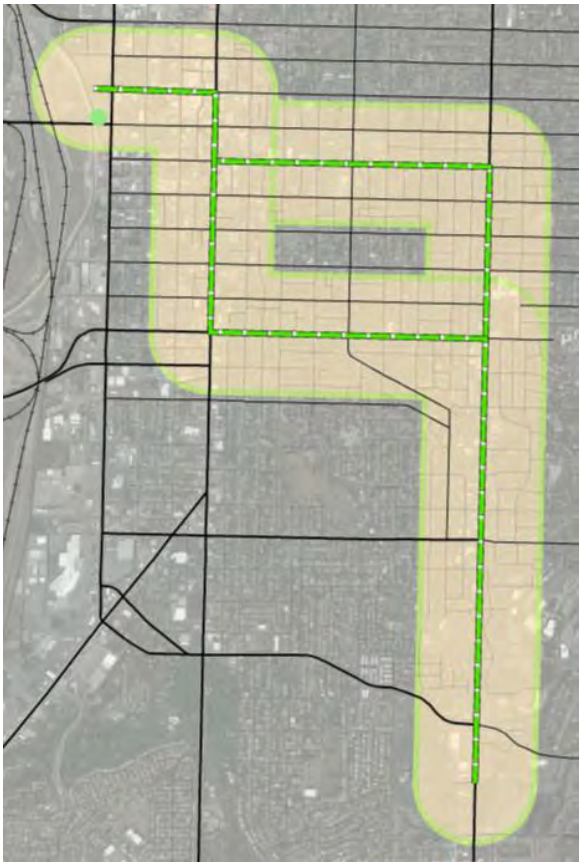
Consider adopting form-based code

One service the Local Planning Resource Program can help pay for is a process to customize and adapt the regional form-based code template for a local jurisdiction or sub-area with the city. The template is a free, easily-accessible resource for City staff that can help streamline the process of developing form-based code (rather than starting from scratch). A form-based code connects design principles with community planning and zoning. It is also more responsive and adaptable to mixing uses and creating walkable places than traditional zoning.

Expand TIF districts

TIF districts can allow cities to target funding for development support as well as streetscape, bicycle and pedestrian improvements in order to attract investment and development.

Consider expanding current tax increment financing (TIF) districts or creating a new TIF district at key development nodes along the adopted alignment, such as the area surrounding the corner of 25th and Monroe.



Focus within two blocks of preferred alignment

Zoning changes and other efforts to enhance transit and land use connections in support of redevelopment should be focused within a quarter mile of the transit alignment alternatives. A quarter mile is equivalent to two city blocks. This distance is a 5-10 minutes' walk - the maximum distance most people are willing to walk to access transit.

Inventory and preserve high-quality historic structures

Ogden, and specifically the East Central neighborhood, has many high quality historic structures. These structures are valued by the community and should be preserved. Building codes and zoning should be flexible enough to allow these buildings to be adapted for modern use.

Land Use Capacity Around Alignment Alternatives

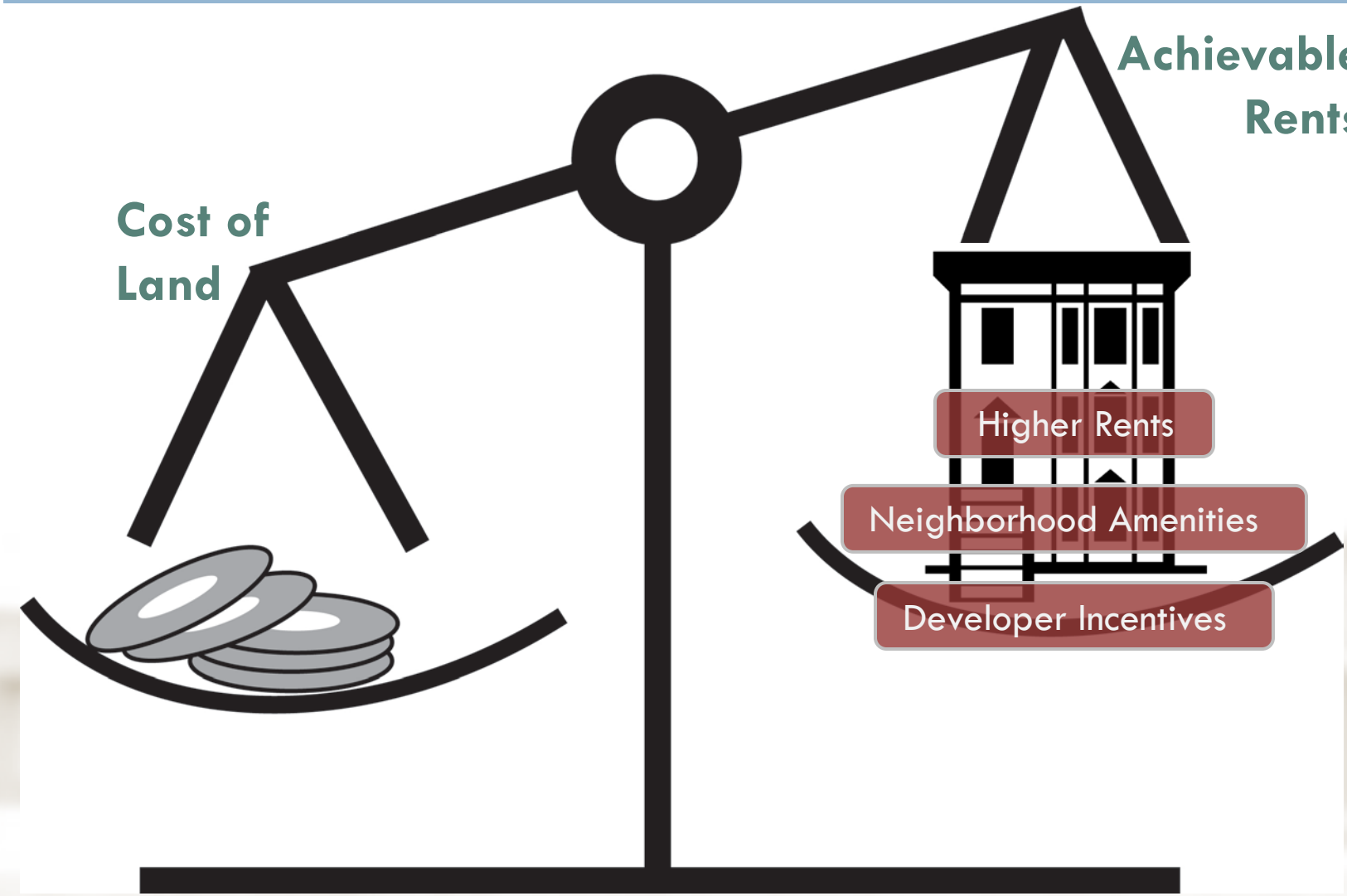
Ogden Transit Project :: TAC Meeting :: 11-19-14

Overview of Presentation

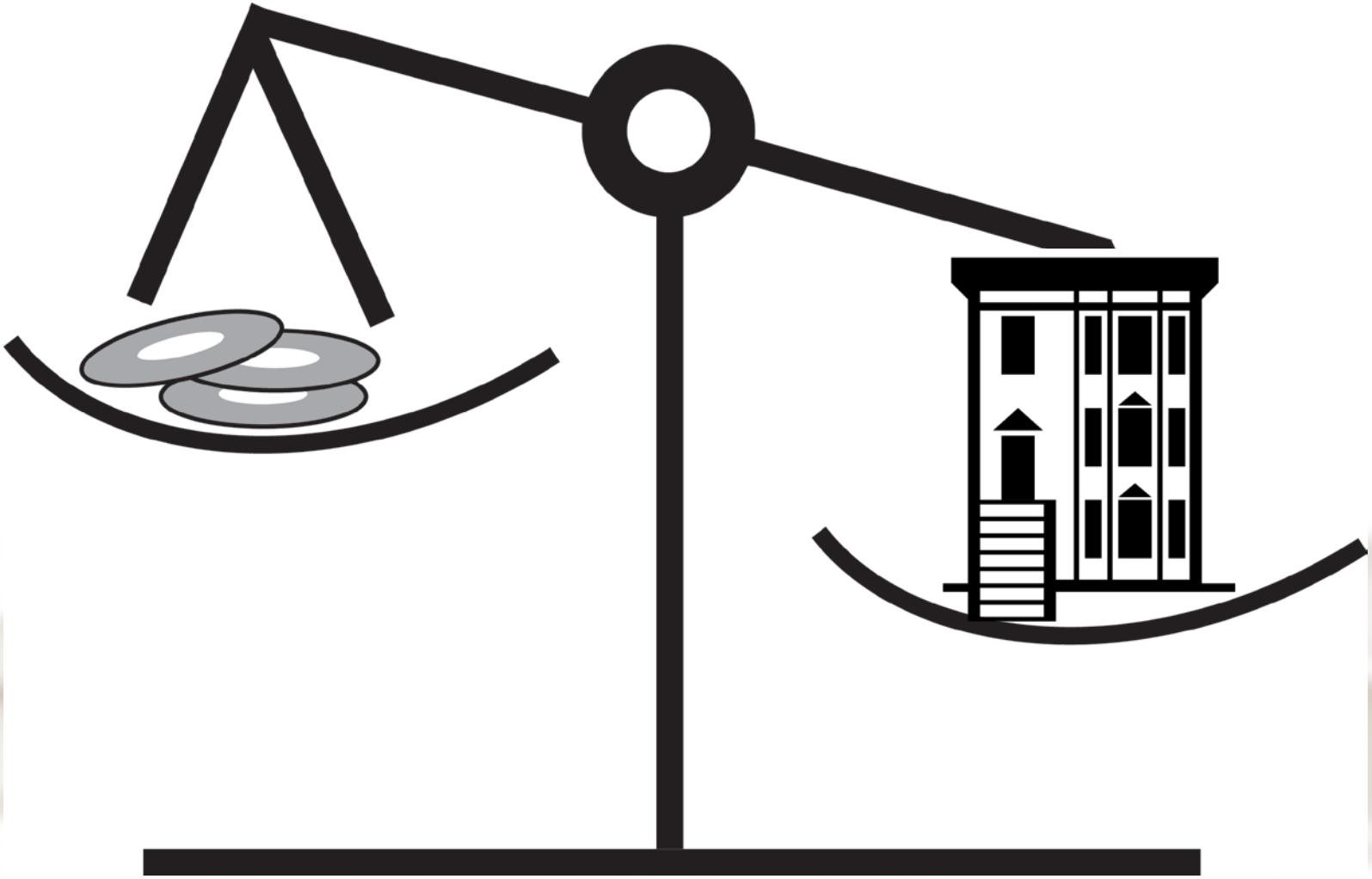
- Tipping Point Analysis
- Redevelopment Parcels
- Land Use Scenarios
- Next Steps and Recommendations

“TIPPING POINT” CAPACITY ANALYSIS

Illustration of "Tipping Point" Concept:
Cost of land is too great for 3-story apartment



Tipping point achieved



Amenities Increase Desirability, Strengthen Market and Expand Investment

- Parks and Open Space
- Transit
- Commercial Amenities
- Traffic Calming
- Walkability
- Bicycle Connectivity

Amenities can Increase Desirability and Achievable Rents 10-20%

Source: Keith Bartholomew and others

Development Feasibility Spectrum Changes with Increase in Desirability

What Can Be Built?








Amenity Level

Today's Rents & Sales Prices

10% Increase in Average Rent

20% Increase in Average Rent

Ogden Building Library

- Some calibrated to zoning
- Some calibrated to market-feasiblity

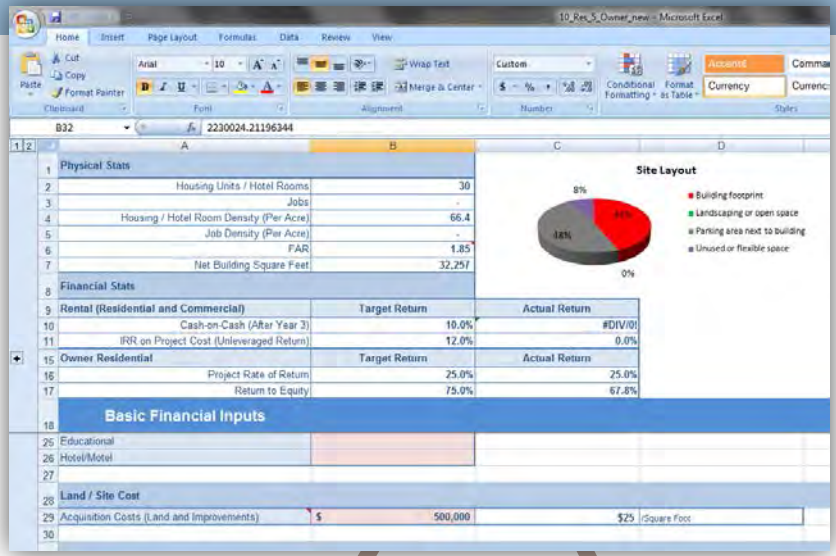
Two Sets of Buildings

Current Zoning Buildings	Transit-Supportive Buildings
MU Apartment 5 - CBDI	Mixed-Use Residential Renter 5
MU Apartment 5 - CBD	Mixed-Use Residential Renter 4
MU Apartment 2-story - NC-2	Apartment 4
Apartment - CP-3	Apartment 3
Apartment - CP-2	Townhomes Medium
Apartment 2 - R-4	Cottage Homes - 10,000 lot
Apartment - R-3EC	"Skinny Lot" Single Family - 2,500 sq ft
Apartment - R-3	Single Family - 5,000 sq ft
Duplex - R-2EC	Traditional Main Street Retail
Single Family - R-1-5 - 5,000 sq ft lot	
Main Street Retail - NC-1	

Prototype Builder (ROI Model):

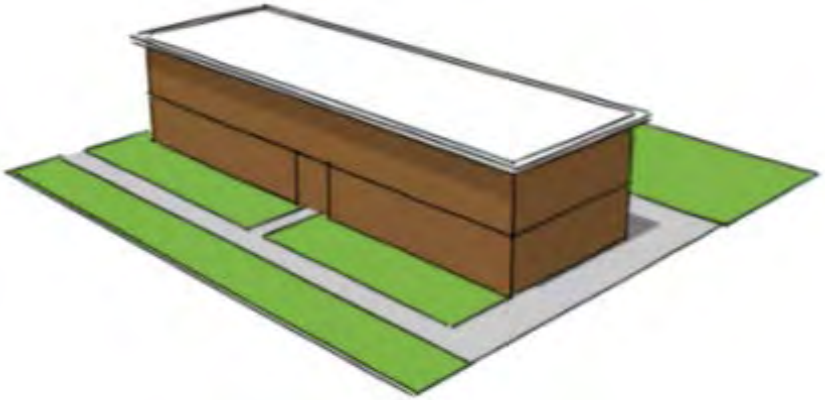
Quick Building Modeler: Physical & Financial

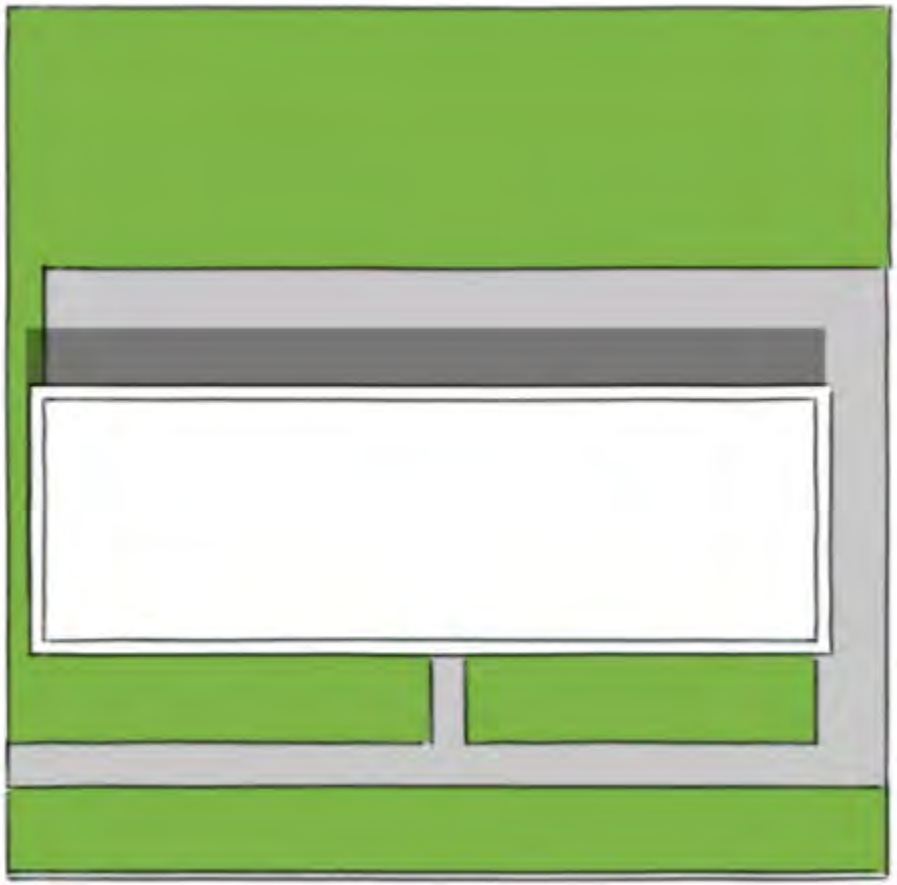
- Powerful as standalone tool or integrated with Scenario Builder
- Test existing regulations for financial feasibility
- Test impact of new development regulations
- Experiment with sensitivity of key variables



R-3: Apartment Building

Current Zoning

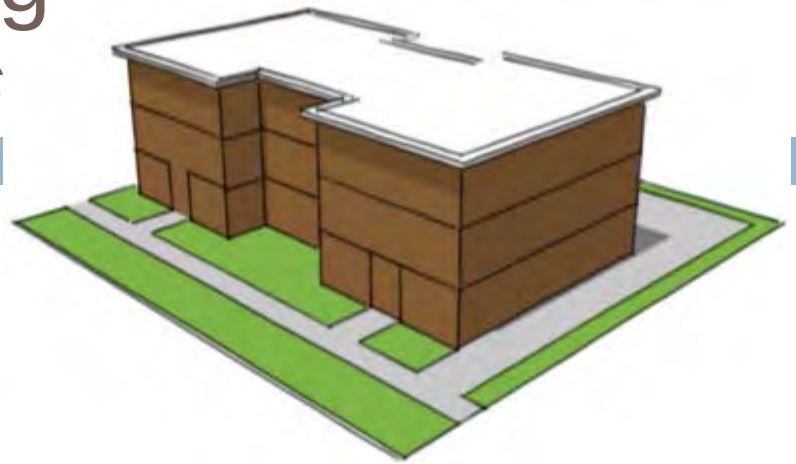


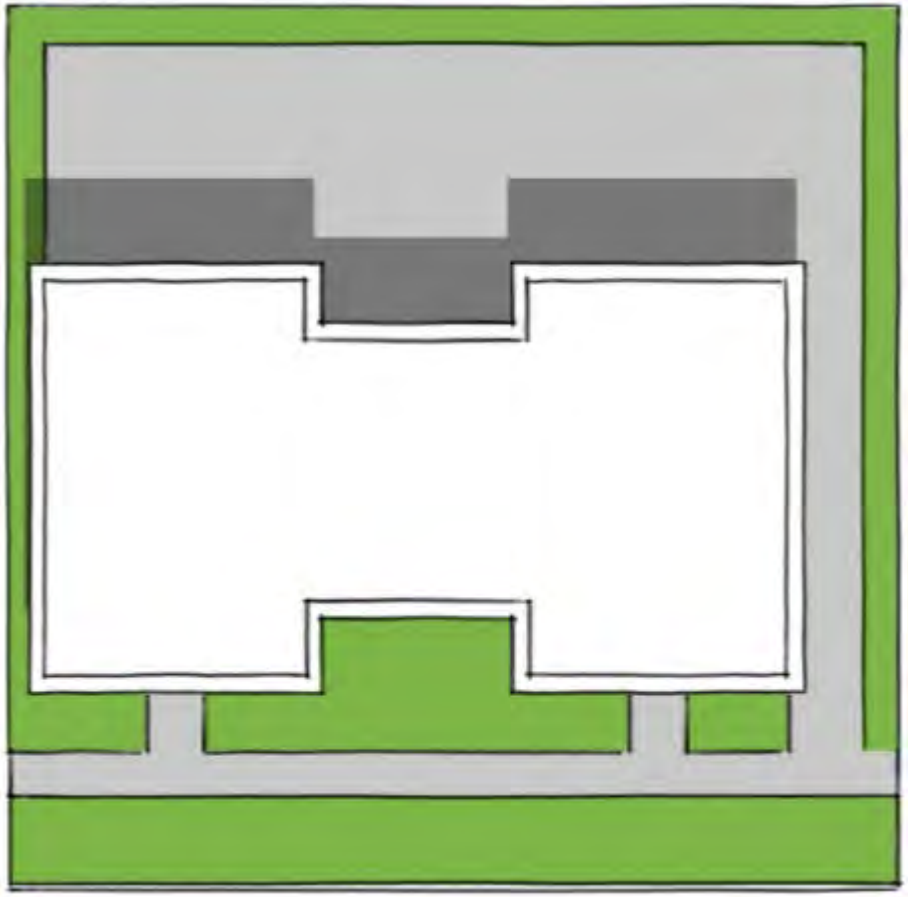


Site Characteristics	Current Zoning
Lot Size	12,000 sq ft
Height	2 Stories / 22 ft
Landscaping	49%
Parking Ratios	2 per Unit
Average Unit Size	1,100 sq ft
Density	12 DU / Acre
Floor Area Ratio	0.43
Project Value	$0.9 Million
Unit Rent w/o Subsidy	$1,727/month
OR Subsidy Required	30%

R-3: Apartment Building

Transit-Supportive Standards

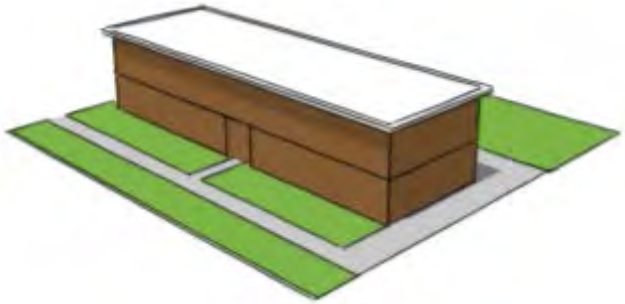




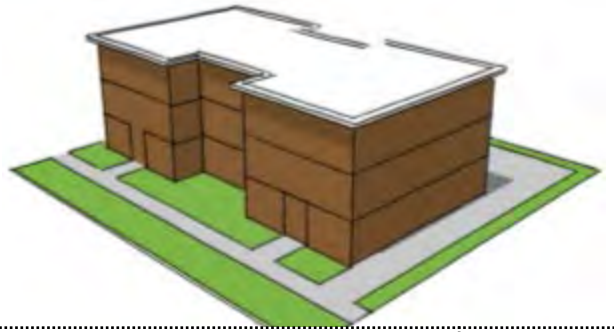
Site Characteristics	Current Zoning
Lot Size	12,000 sq ft
Height	3 Stories / 35 ft
Landscaping	15%
Parking Ratios	1 per Unit
Average Unit Size	750 sq ft
Density	56 DU / Acre
Floor Area Ratio	1.13
Project Value	$2.2 Million
Unit Rent w/o Subsidy	$893/month
OR Subsidy Required	18%

R-3: Apartment Building

Current Zoning

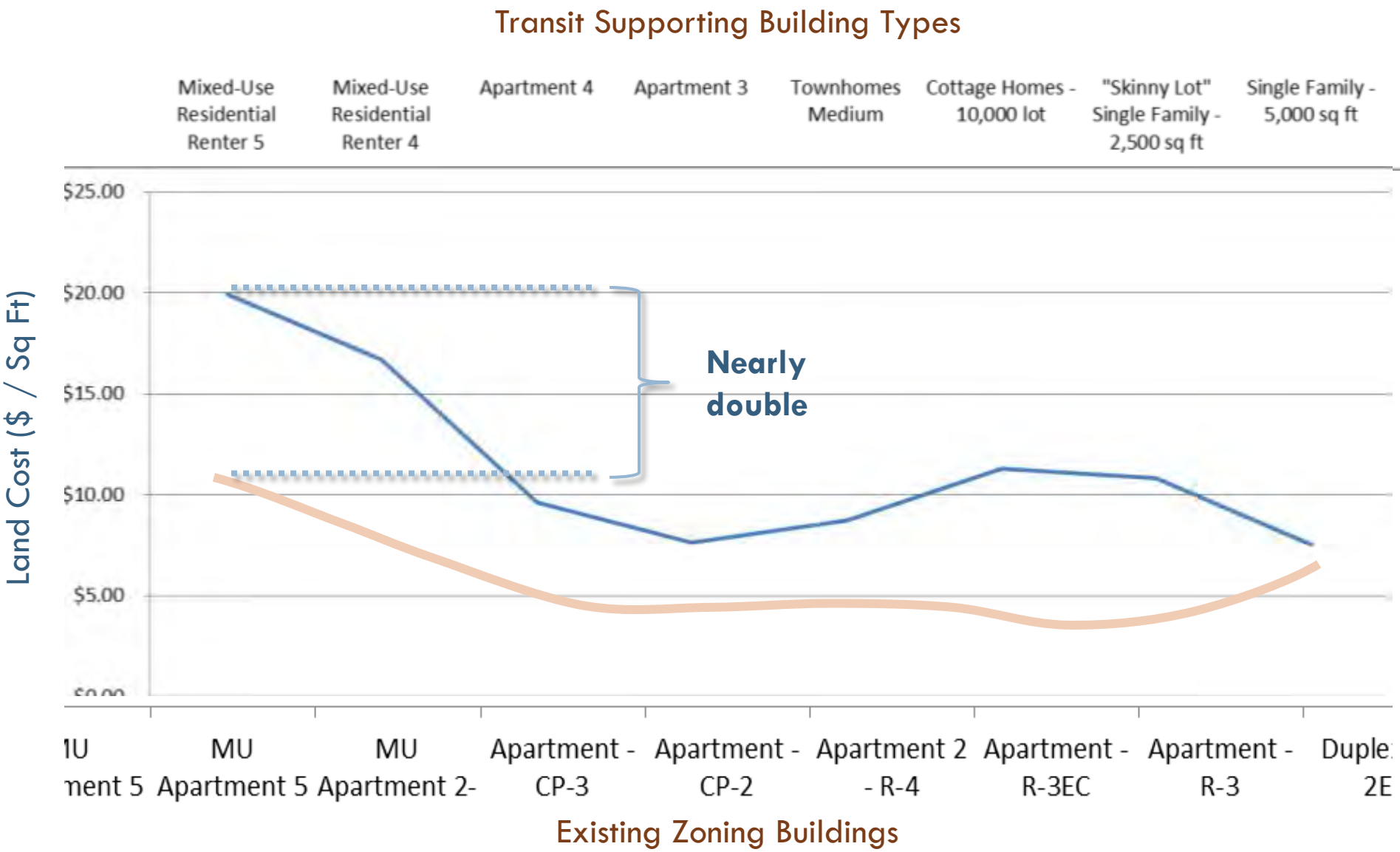


Transit-Supportive



Site Characteristics	Current Zoning		Transit-Supportive	Change
Lot Size	12,000 sq ft		12,000 sq ft	0%
Lot Cost	$100,000		$100,000	0%
Height	2 Stories		3 Stories	+50%
Parking Spaces	6 (2 per Unit)		15 (1 per Unit)	+150%
Density	12 DU / Acre		56 DU / Acre	+367%
Floor Area Ratio	0.43		1.13	+163%
Project Value	$0.9 Million		$2.2 Million	+144%
Average Unit Size	1,100 sq ft		750 sq ft	-32%
Unit Rent w/o Subsidy	$1,727/month		$893/month	-48%
OR Subsidy Required	30%		18%	-40%

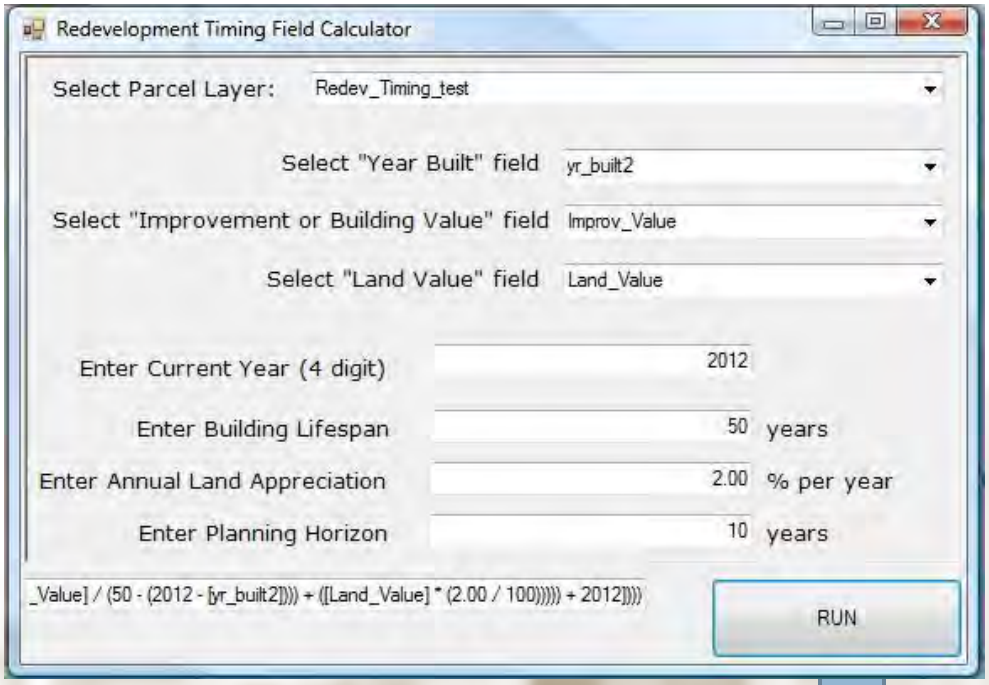
Residual Land Value



REDEVELOPMENT PARCELS

Where is change most likely?

Redevelopment Readiness Analysis



Redevelopment Timing

Low Value and Low FAR

- Low efficiency / density
- Older, lower value buildings
- Ideal retail location

Vacant

Subividable

- Large enough to accommodate additional buildings, while maintaining current buildings

Not All Parcels Created Equal

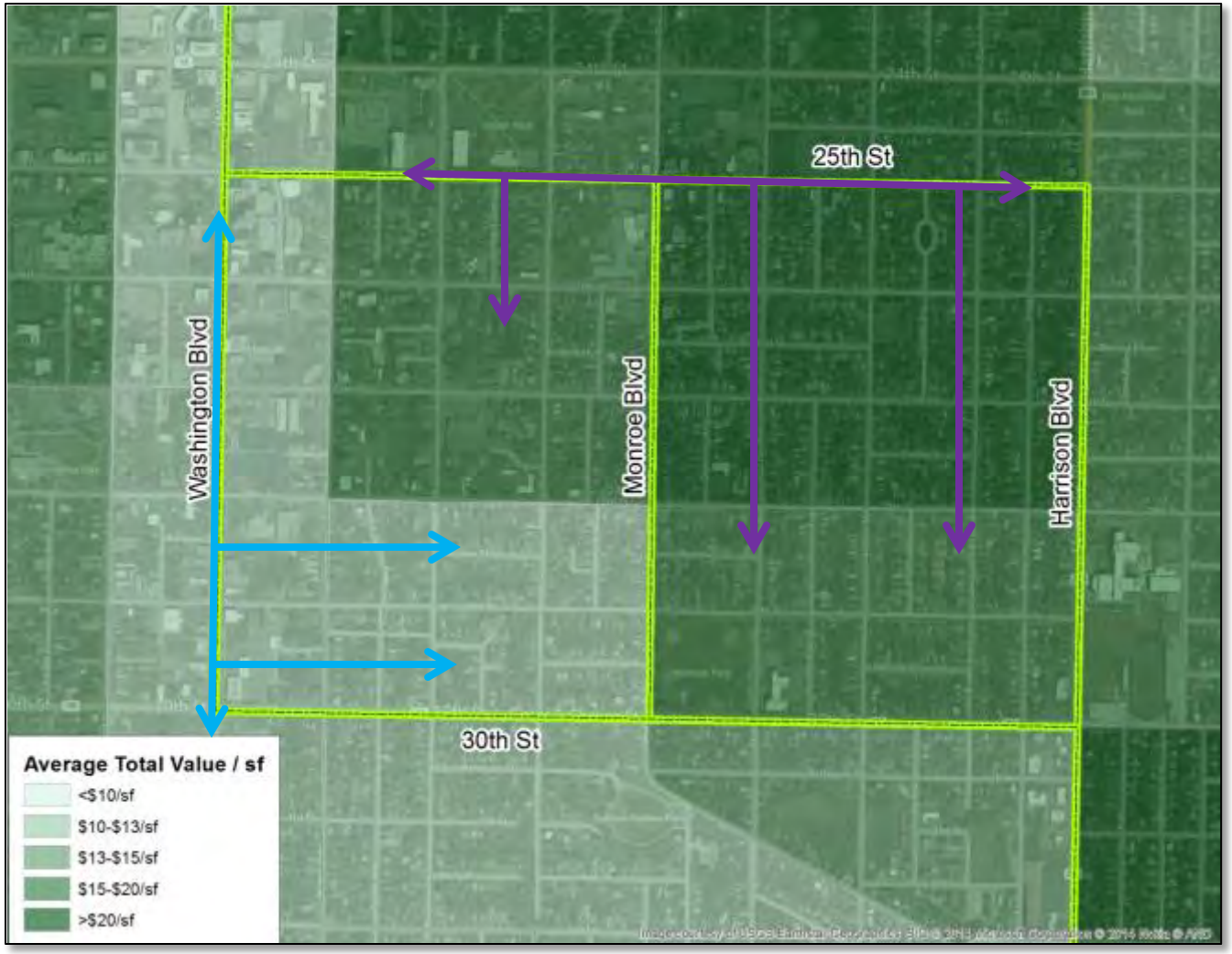
"Location, Location, Location"

Less attractive neighborhood

Lower residential property values

More attractive neighborhood

Higher residential property values



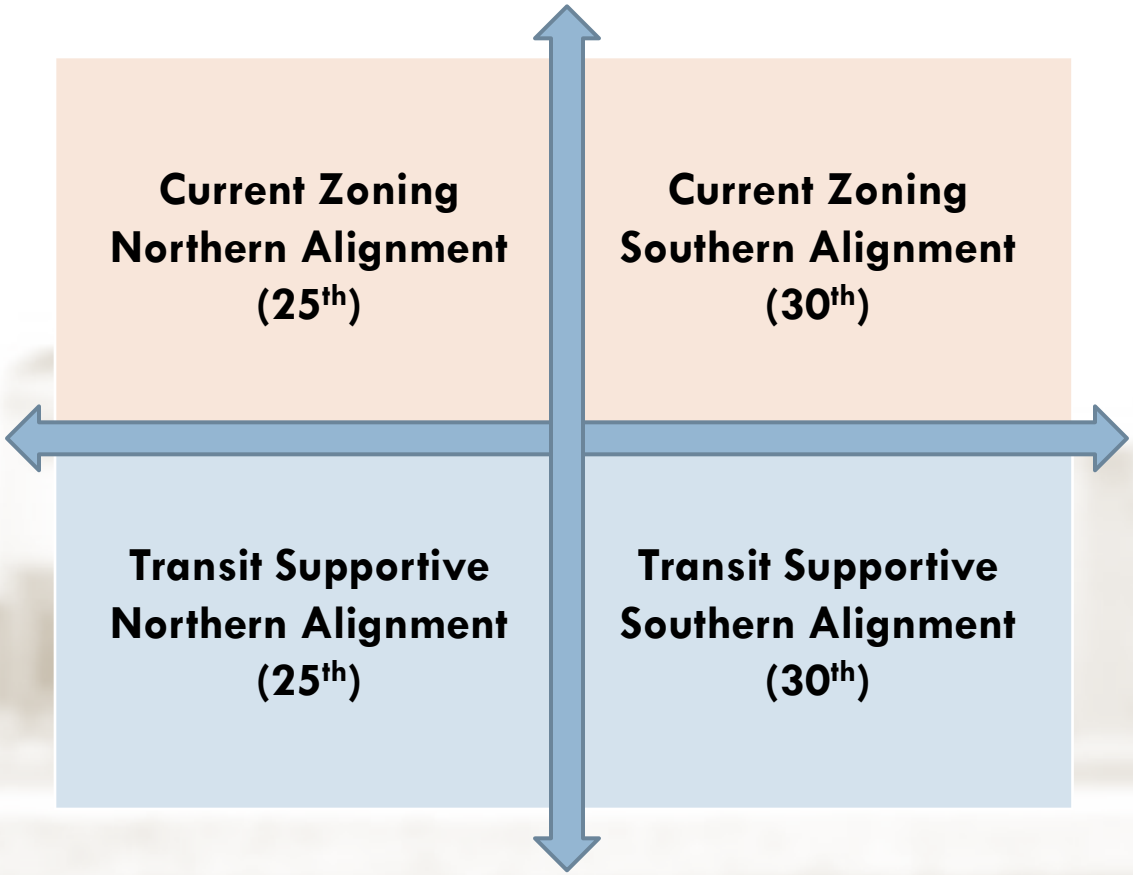
Potential Redevelopment

- Vetted with TAC

LAND USE SCENARIOS

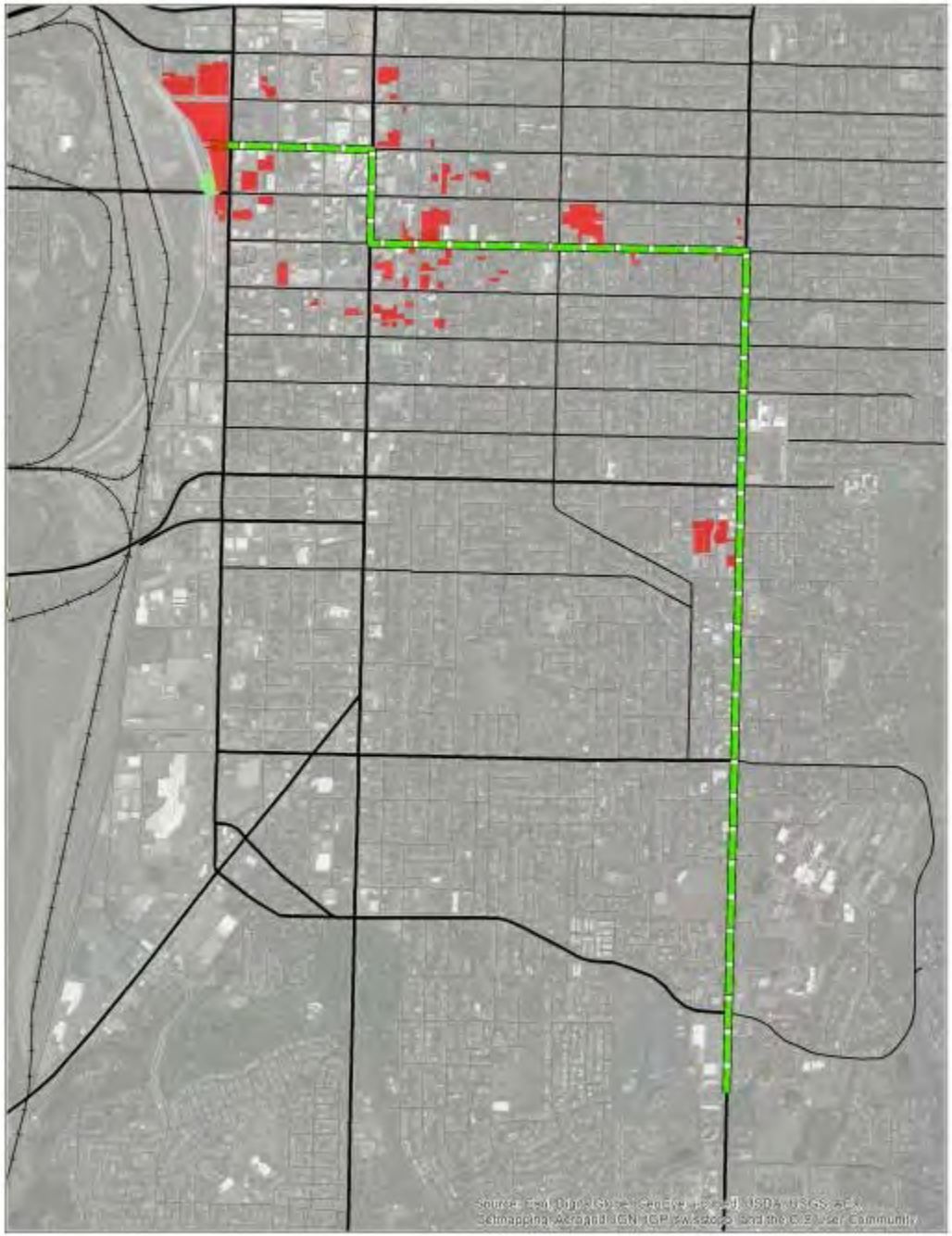
4 Capacity Scenarios

- 2 Alignments
- 2 Sets of Buildings



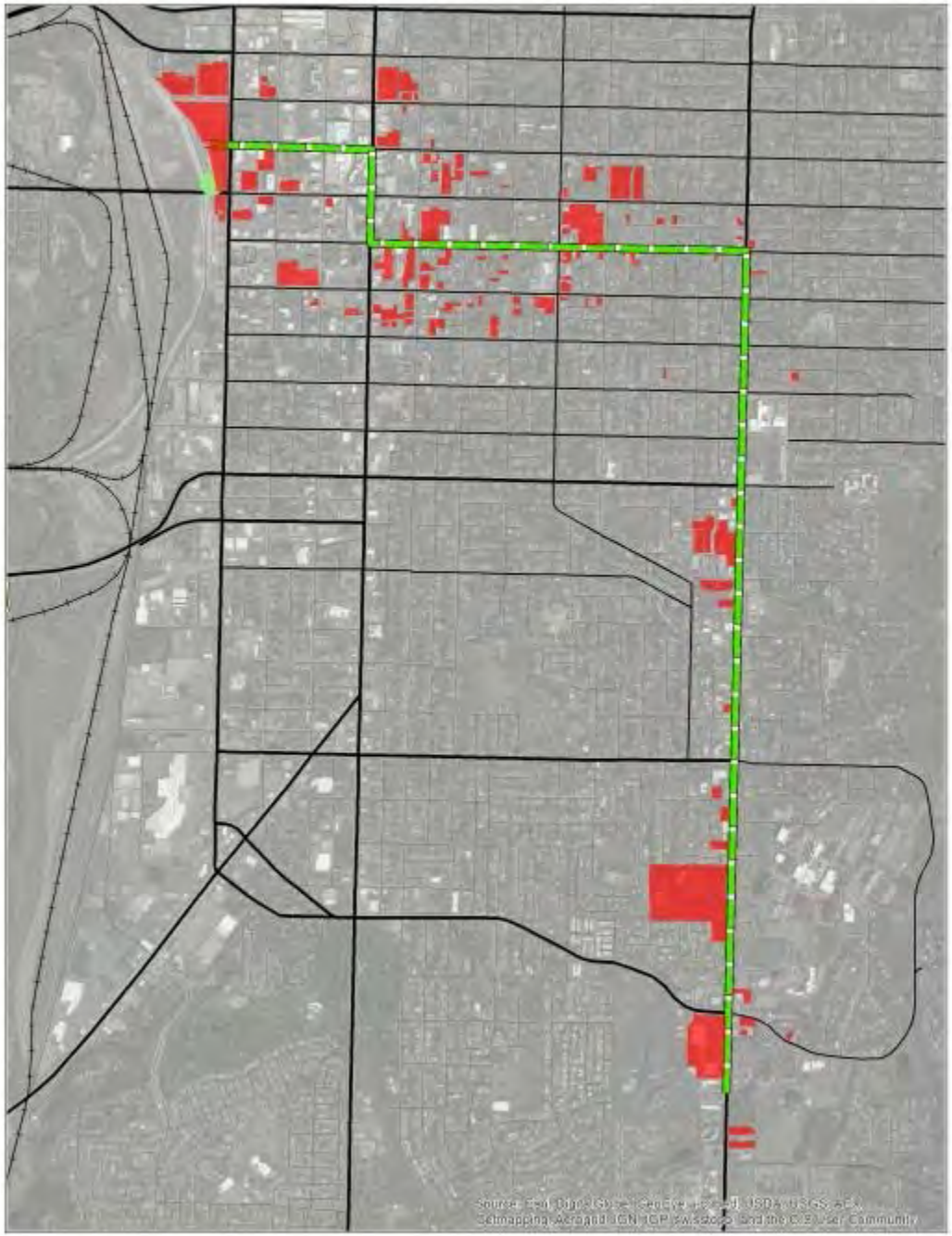
Current Zoning Northern Alignment

- Development Areas



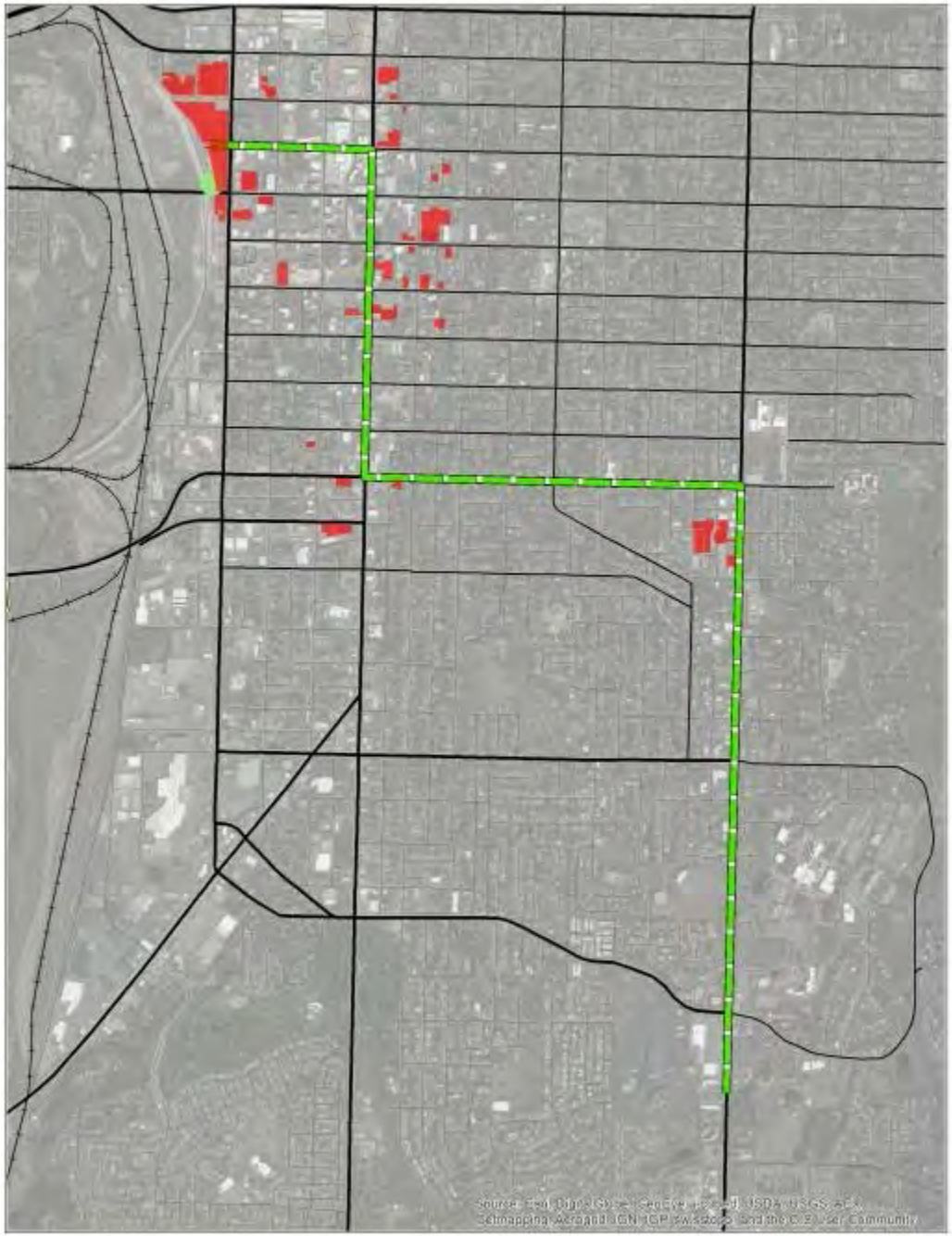
Transit Supportive Northern Alignment

- Development Areas



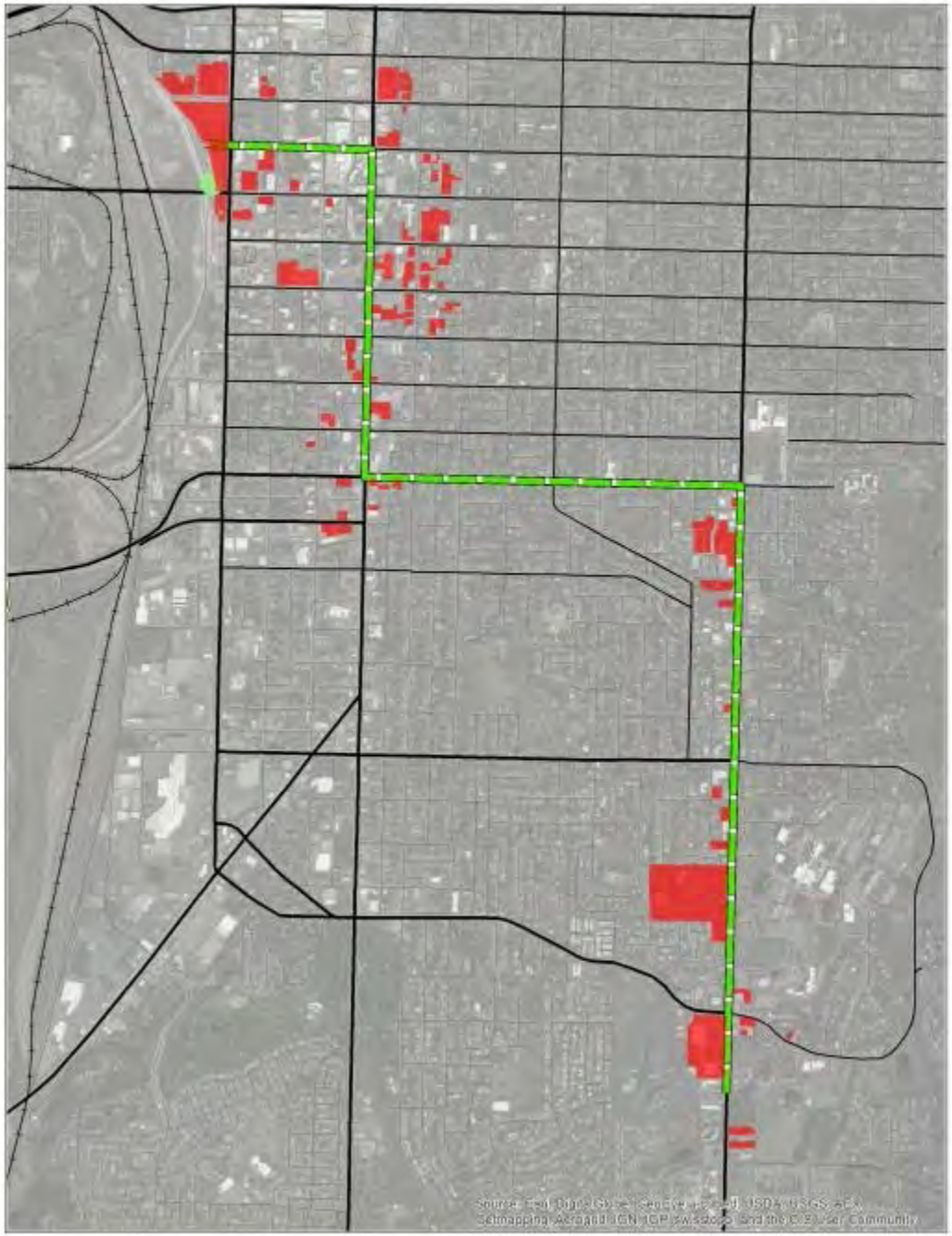
Current Zoning Southern Alignment

- Development Areas



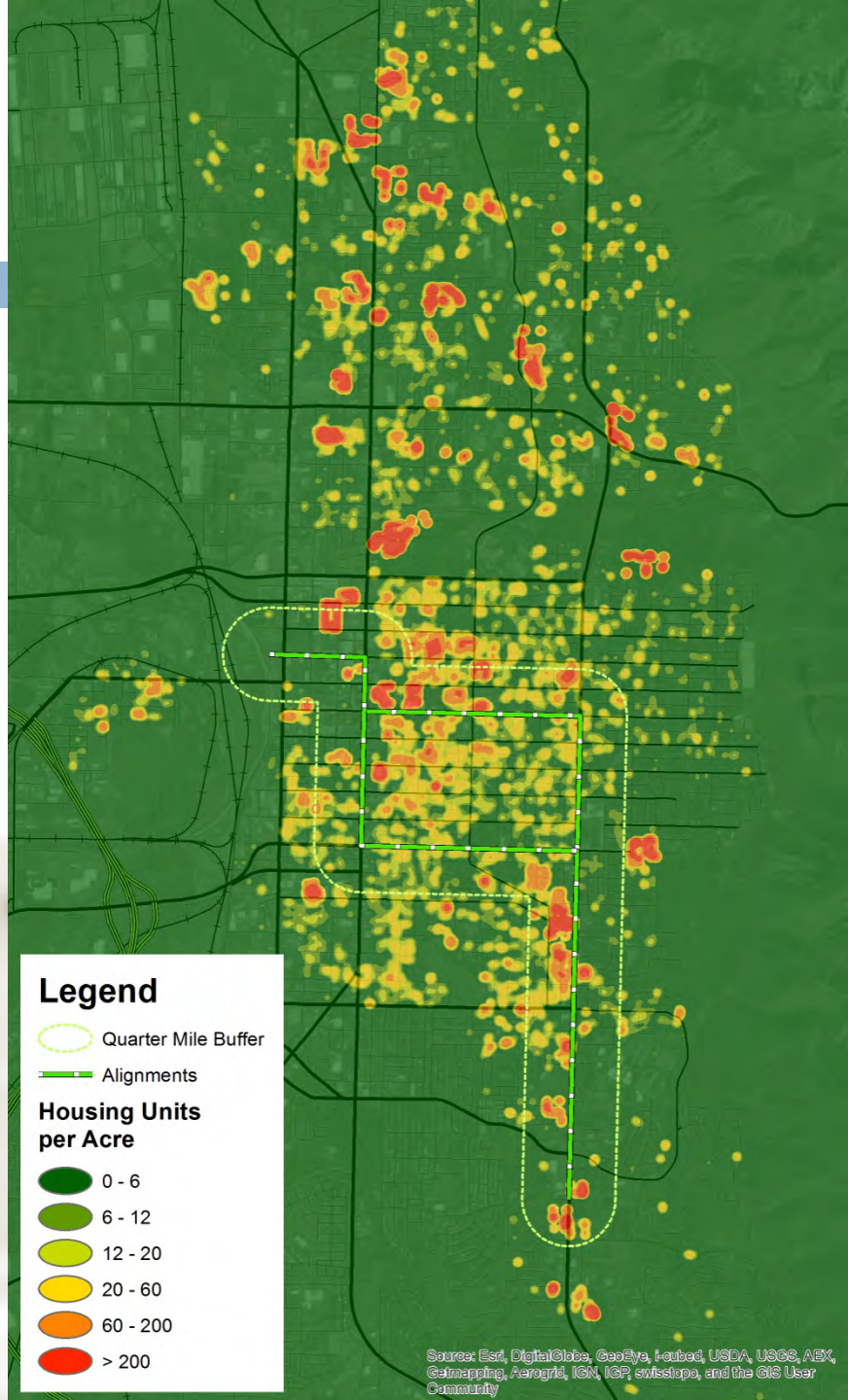
Transit Supportive Southern Alignment

- Development Areas



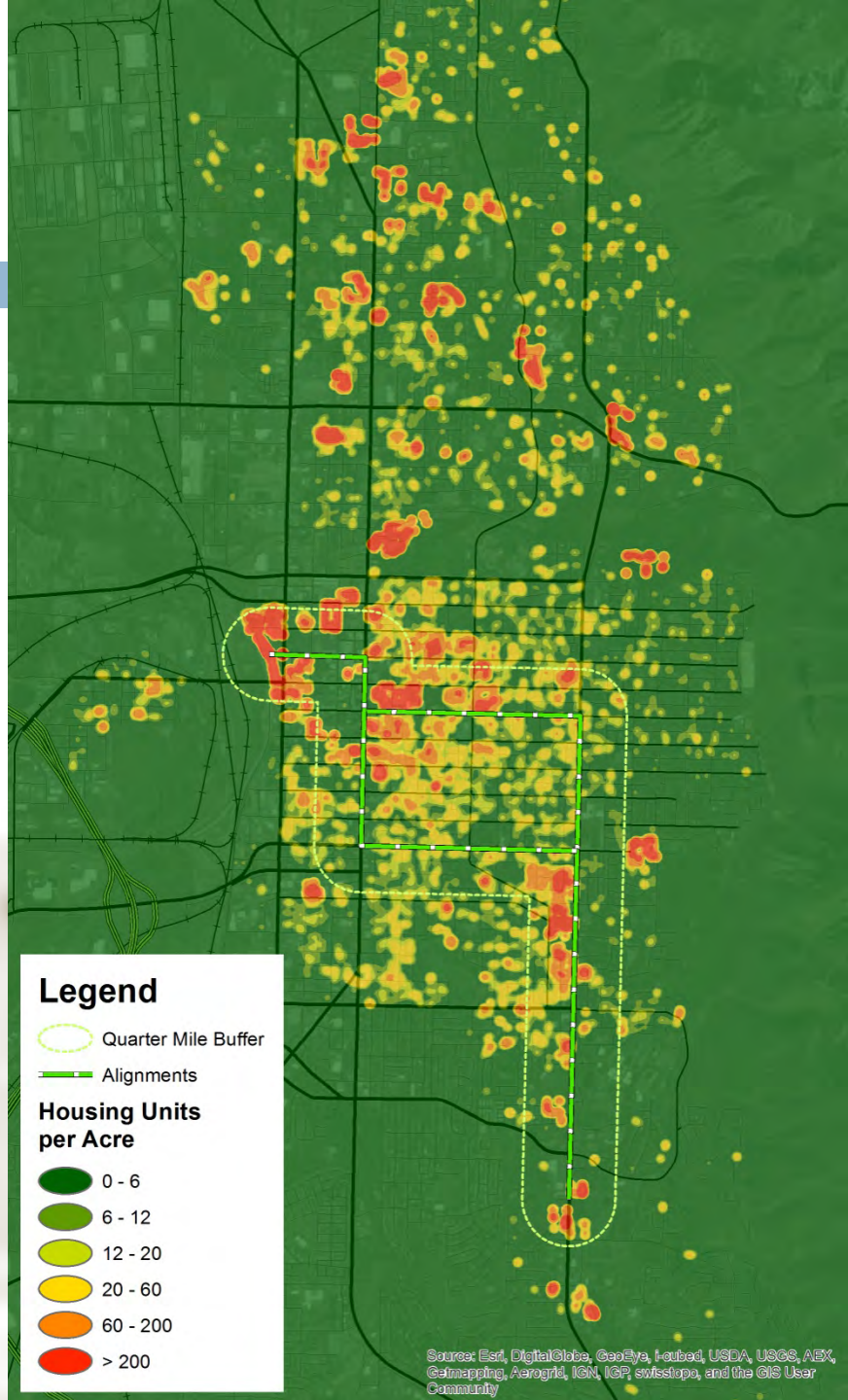
Current Residential Density

- Higher density residential surrounding 25th and Harrison south of 30th
- Legacy apartments and larger single family converted to multi-unit
- Student apartments around Harrison south of 30th



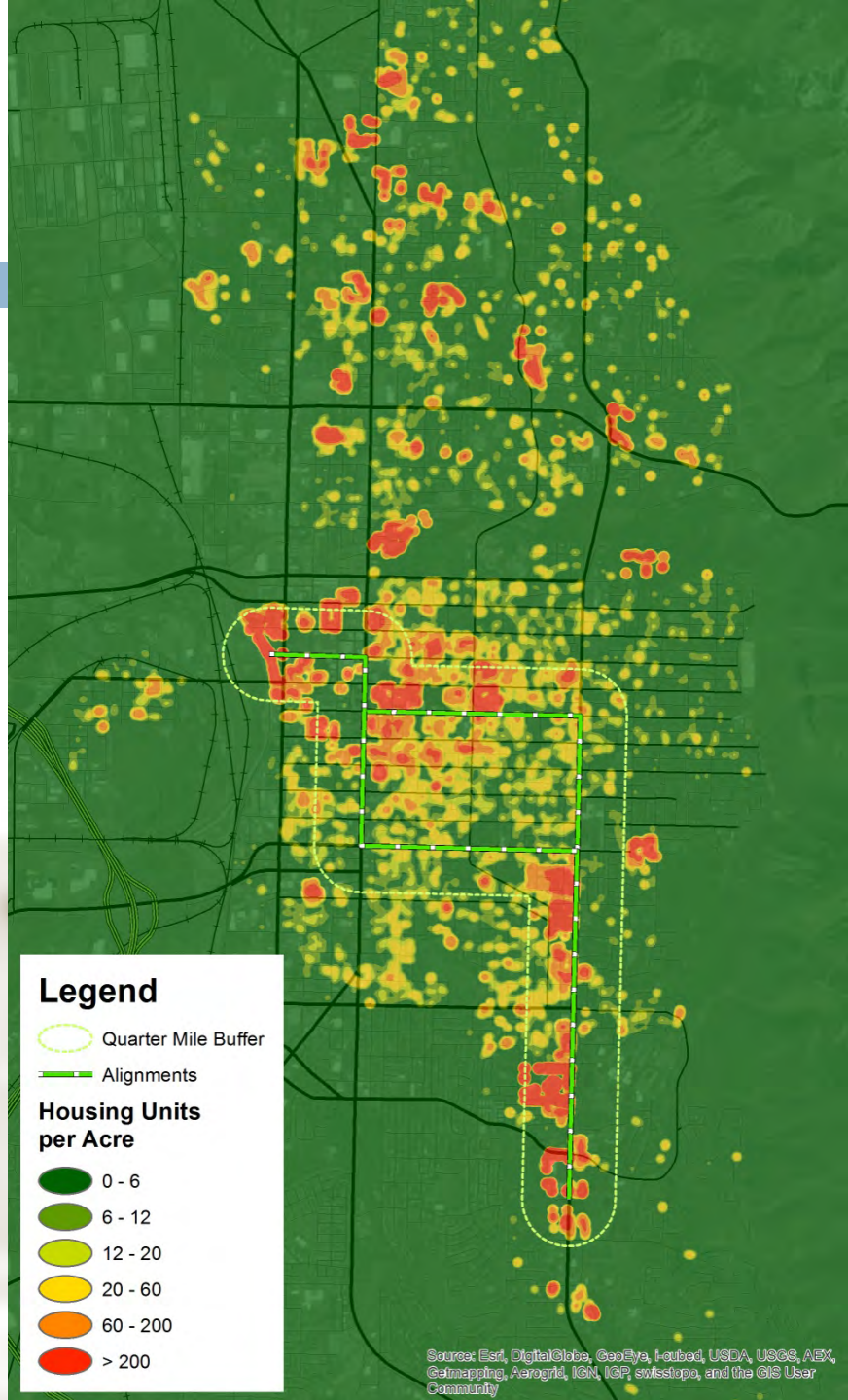
Current Zoning Northern Alignment

Potential Residential Density



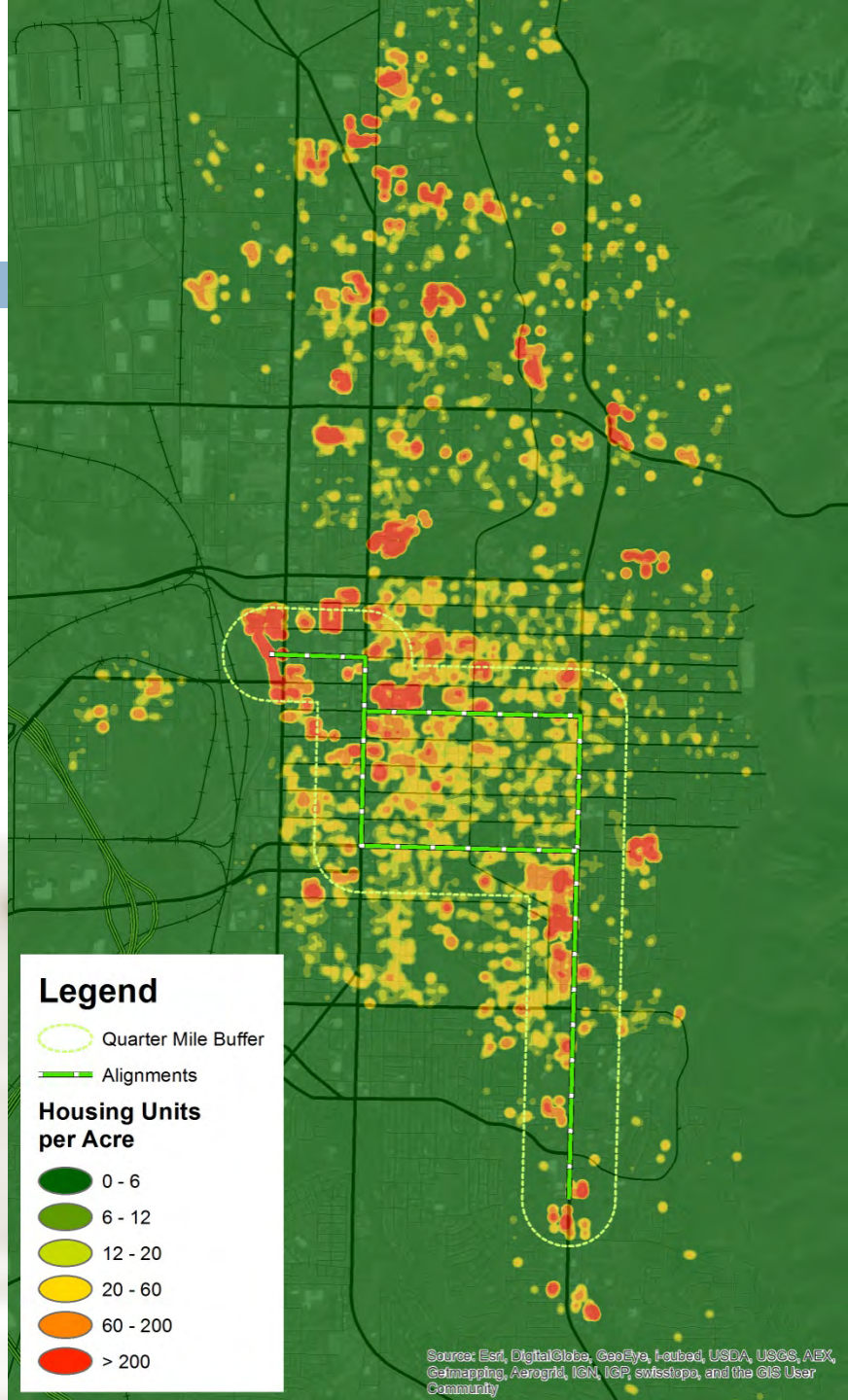
Transit Supportive Northern Alignment

Potential Residential Density



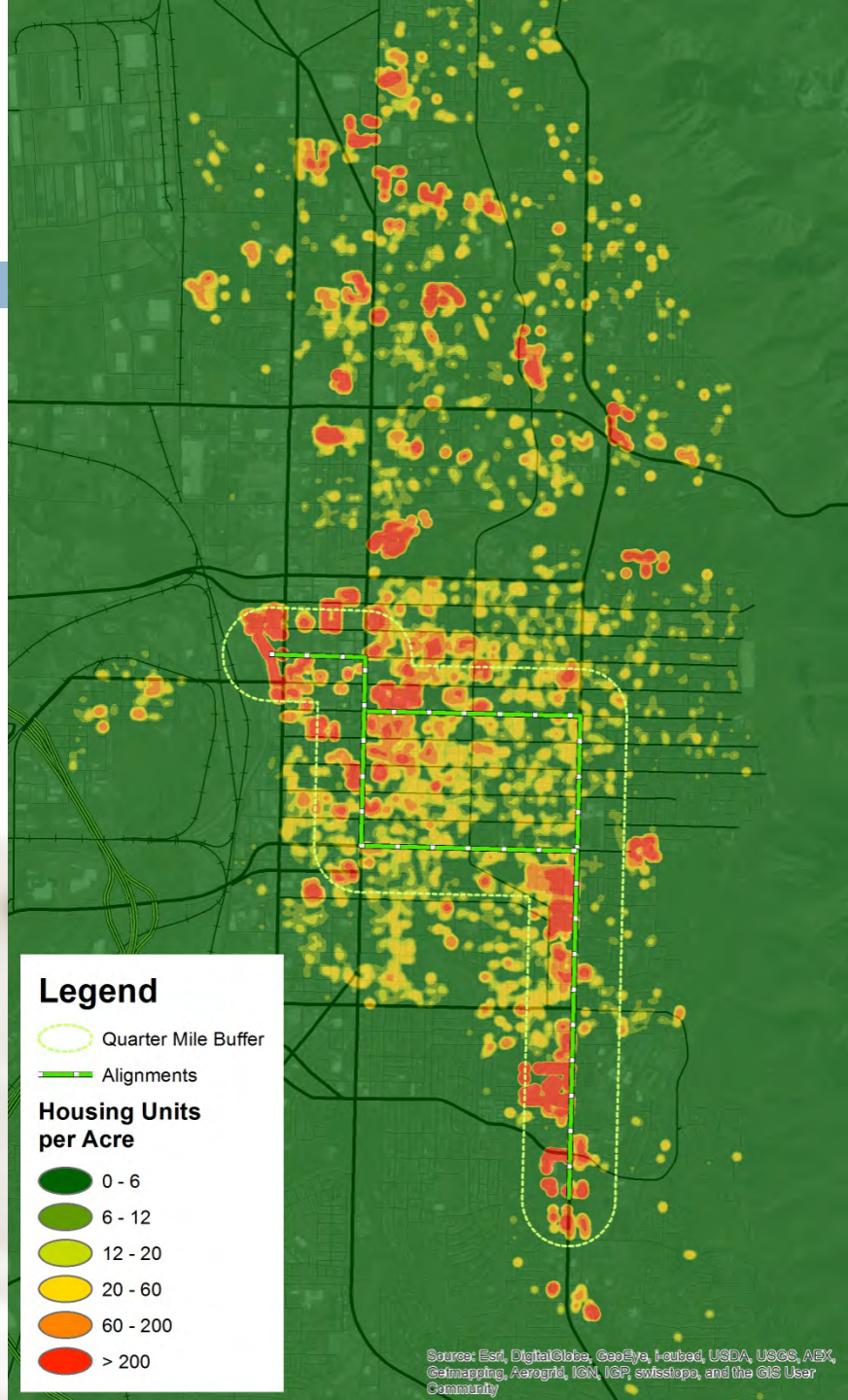
Current Zoning Southern Alignment

Potential Residential Density

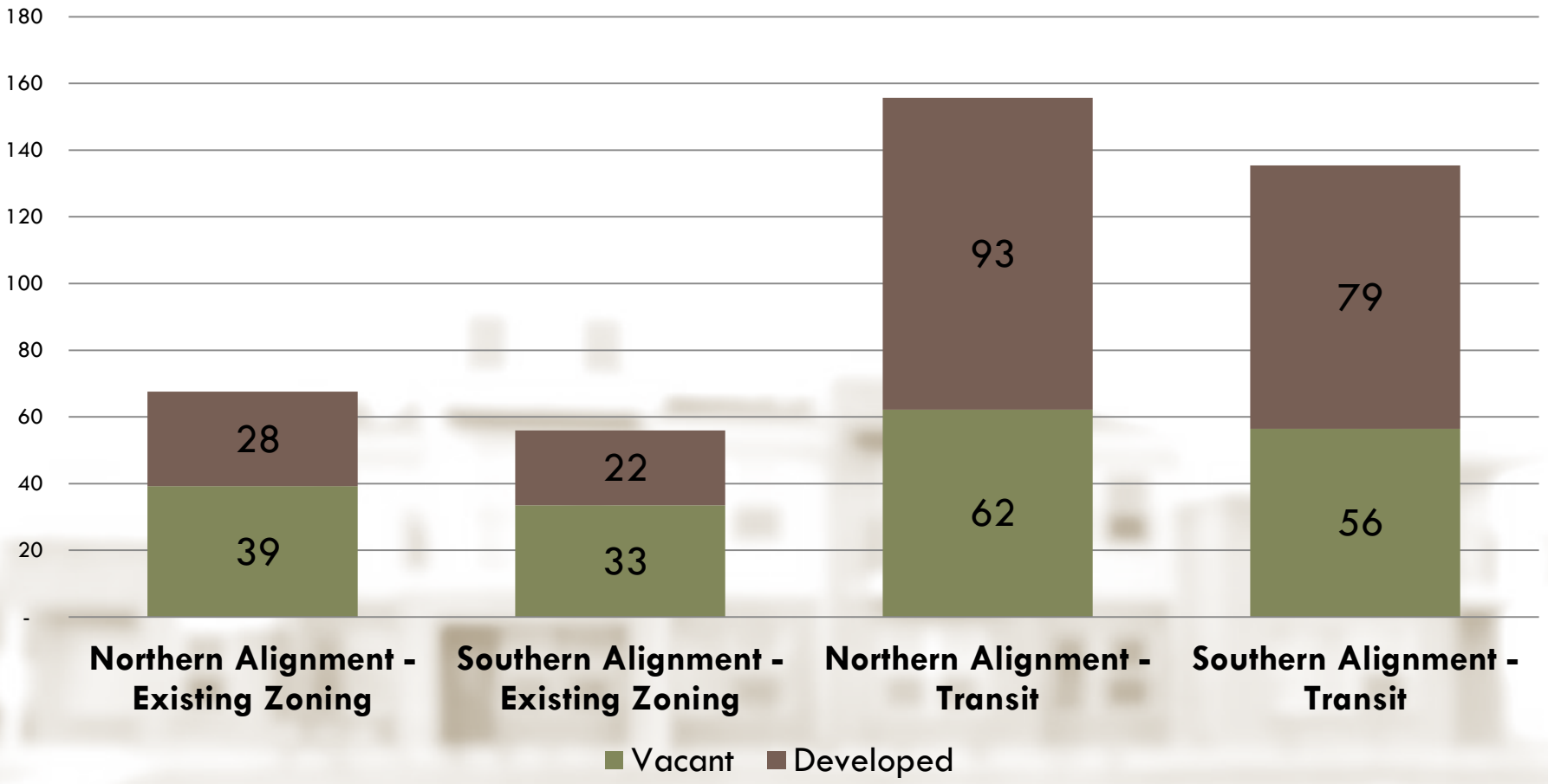


Transit Supportive Southern Alignment

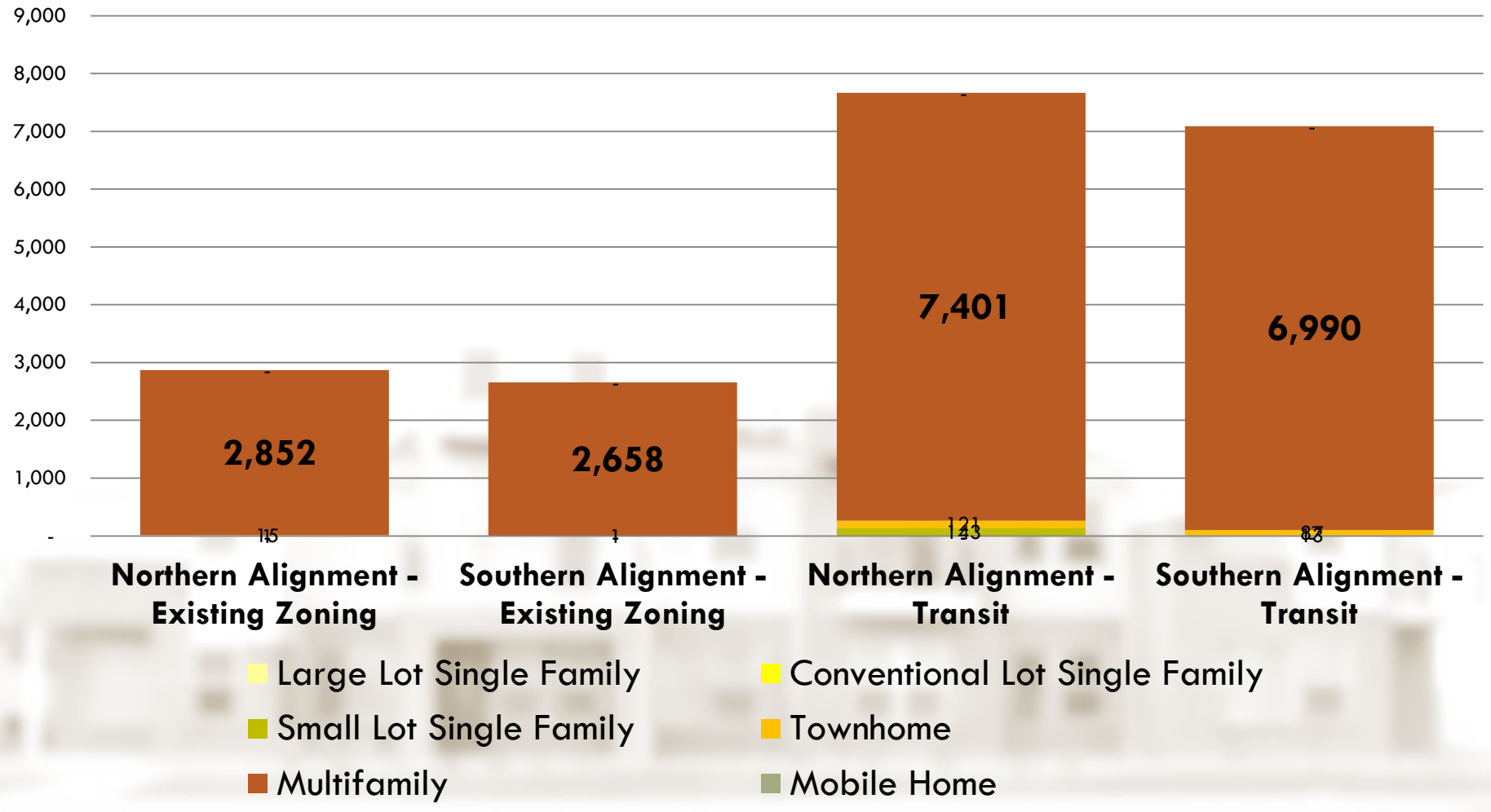
Potential Residential Density



Acres (Re)developed in Each Scenario



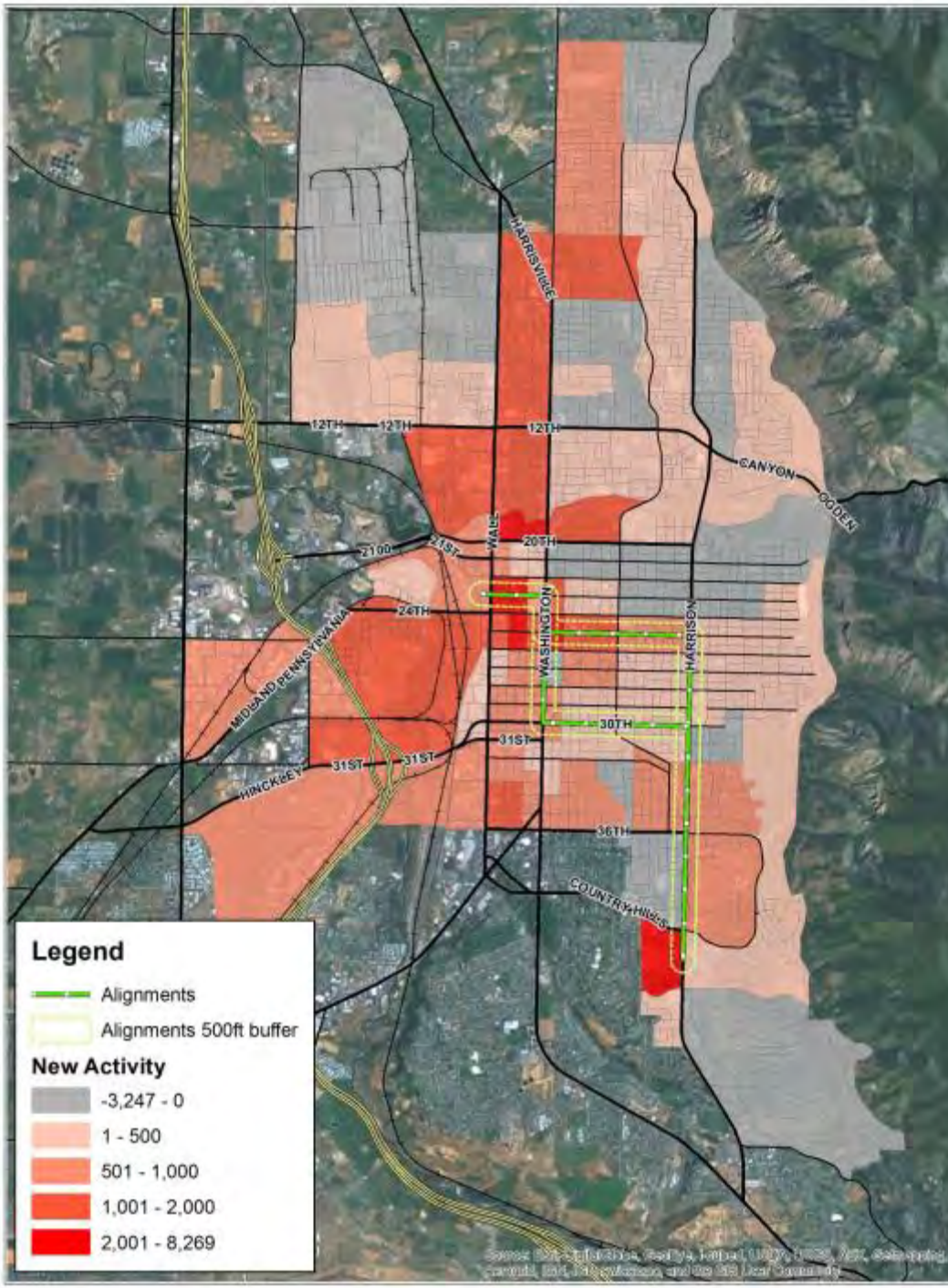
New Housing Unit Capacity



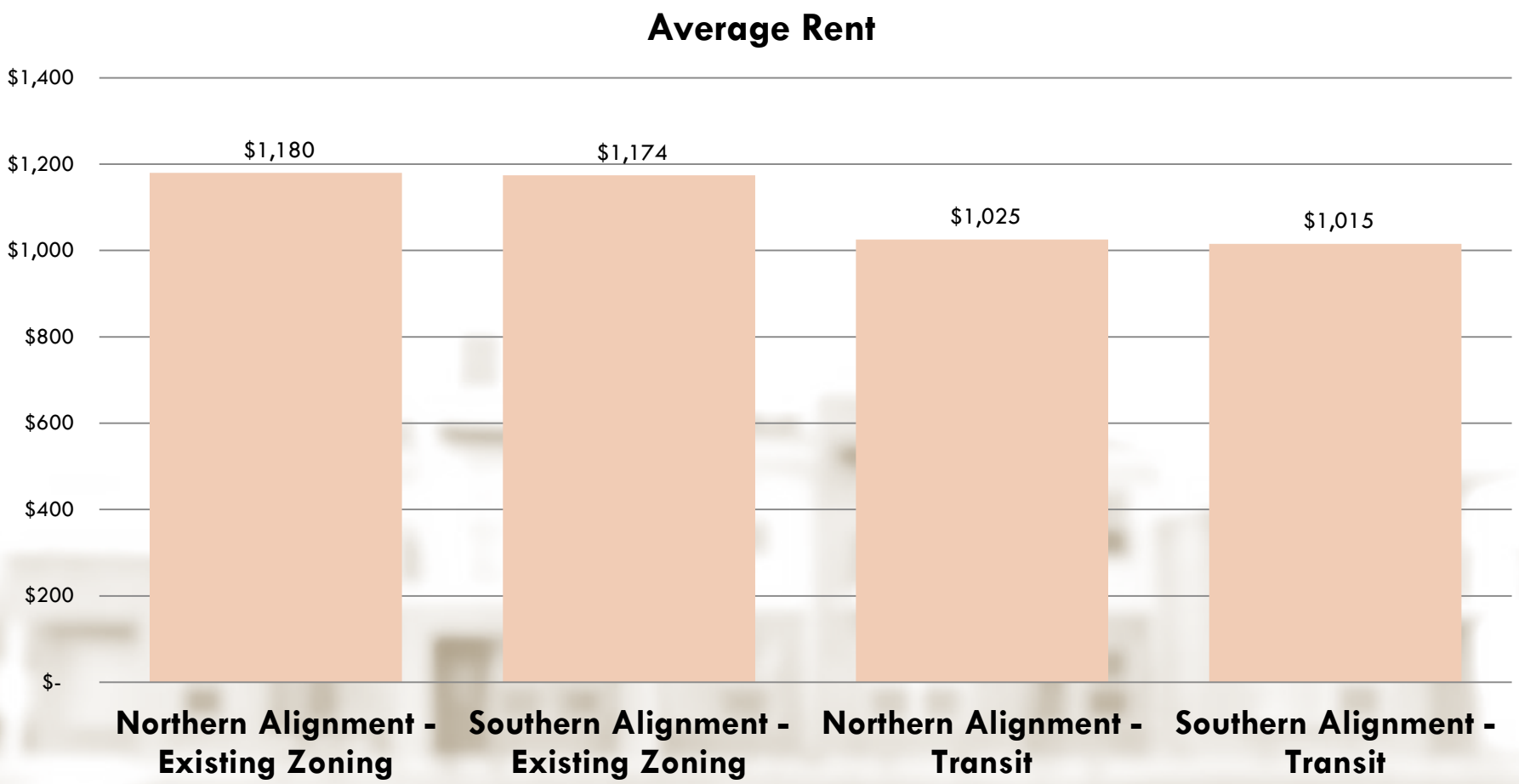
Forecasted Growth

- *Activity Change (population and jobs)*
  - *2011-2040*
- WFRC Adopted Forecast

	New Growth (2011-2040)		
	Population	Households	Employment
City-wide	27,554	16,584	33,528
Alignment Area (Quarter Mile)	13,594	7,501	24,287
Percent of New Growth	**49%**	**45%**	**72%**

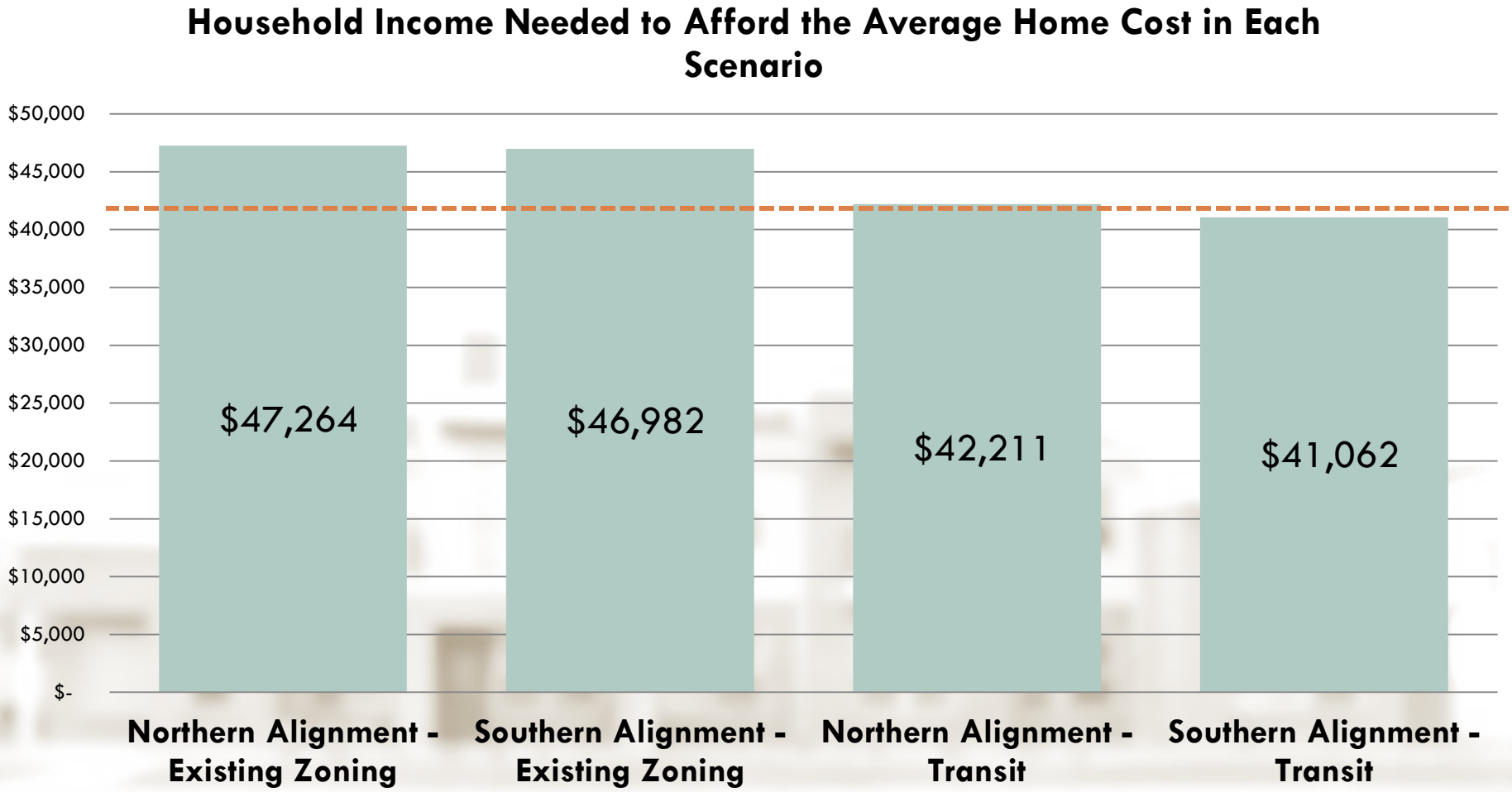


Affordability:
13% lower housing costs



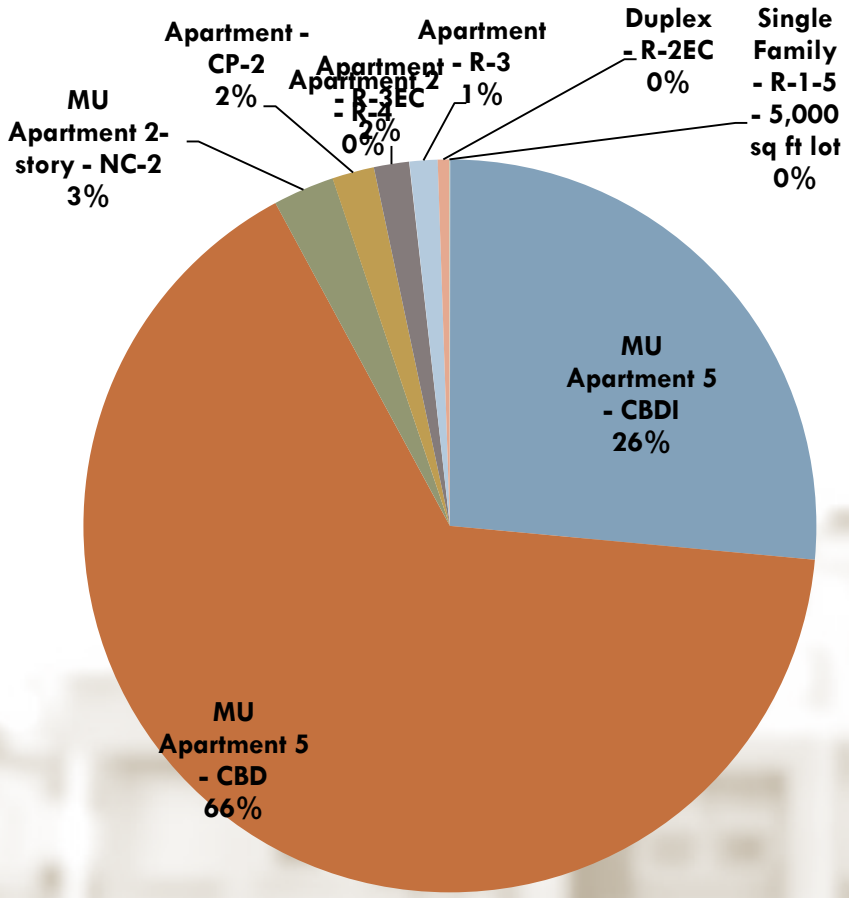
Affordability:

Median HH Income: $42,162

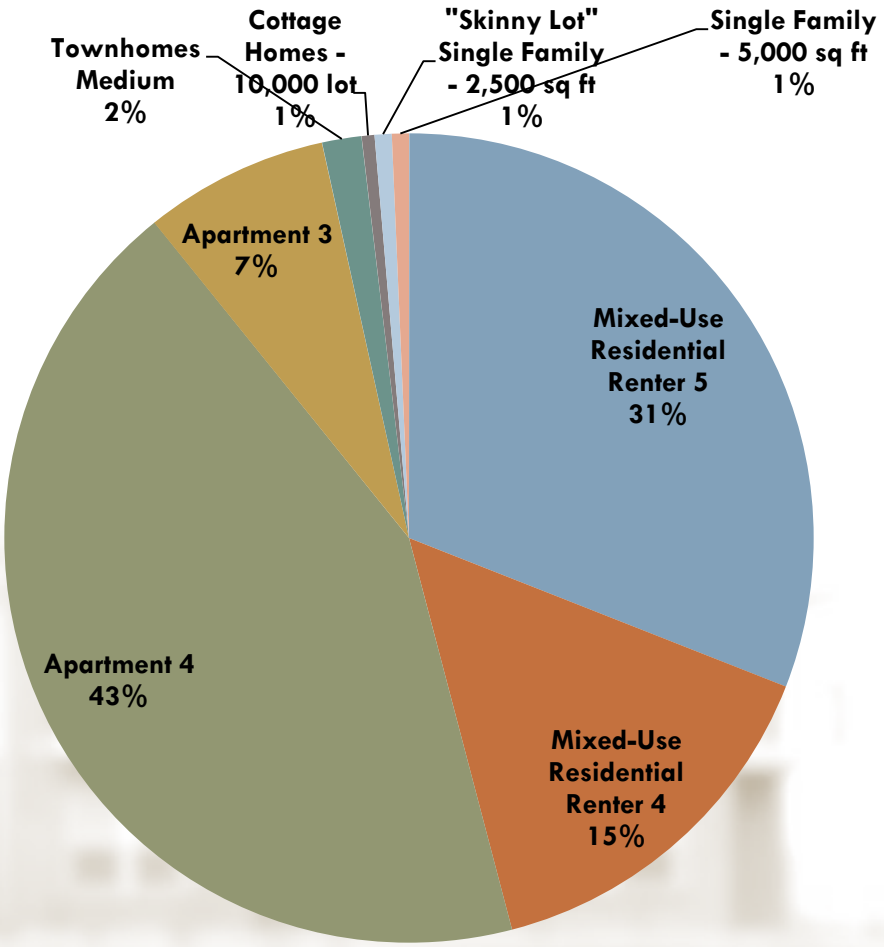


Unit Mix by Building

More Diverse Development Styles

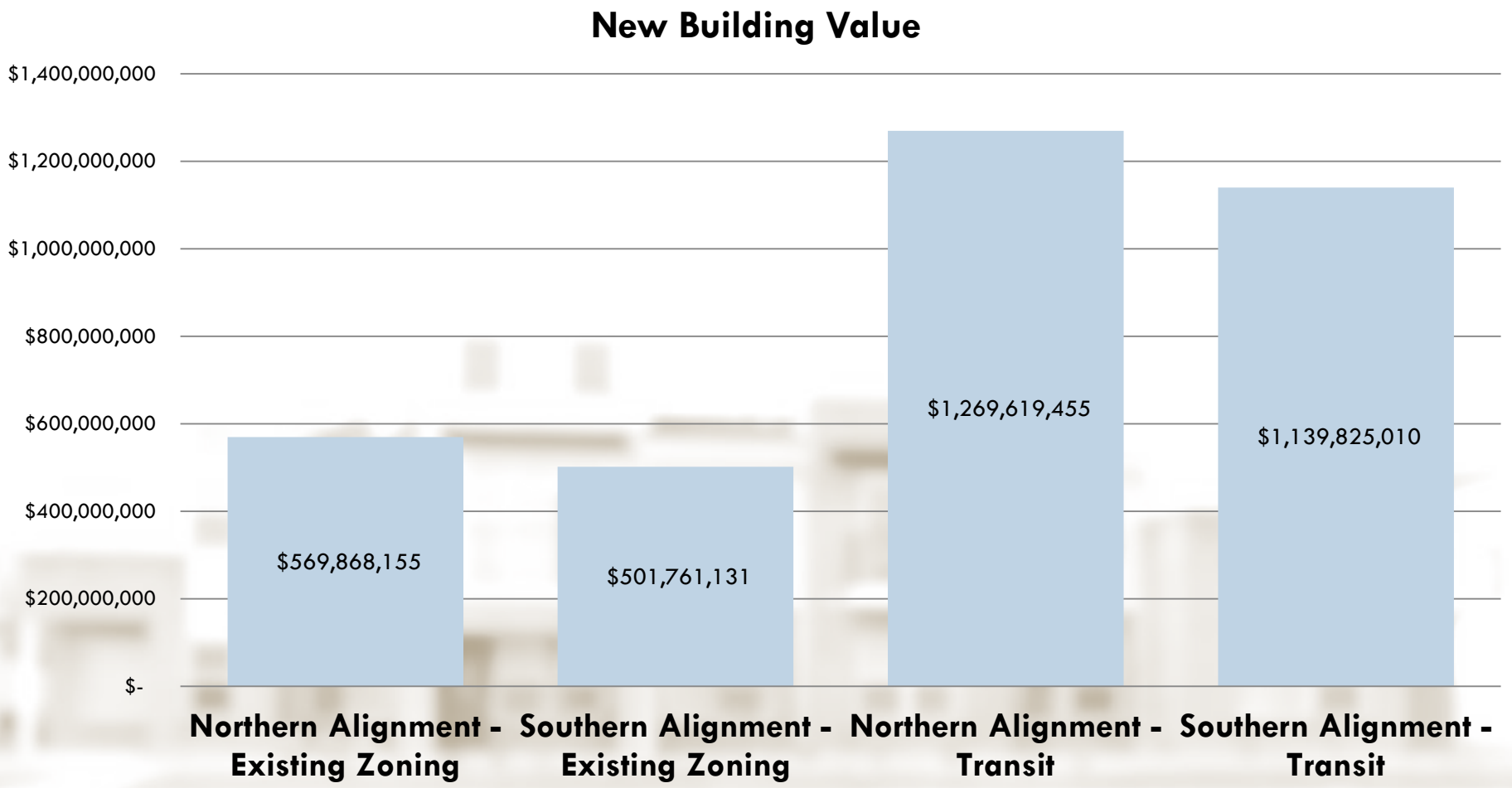


Existing Zoning Buildings

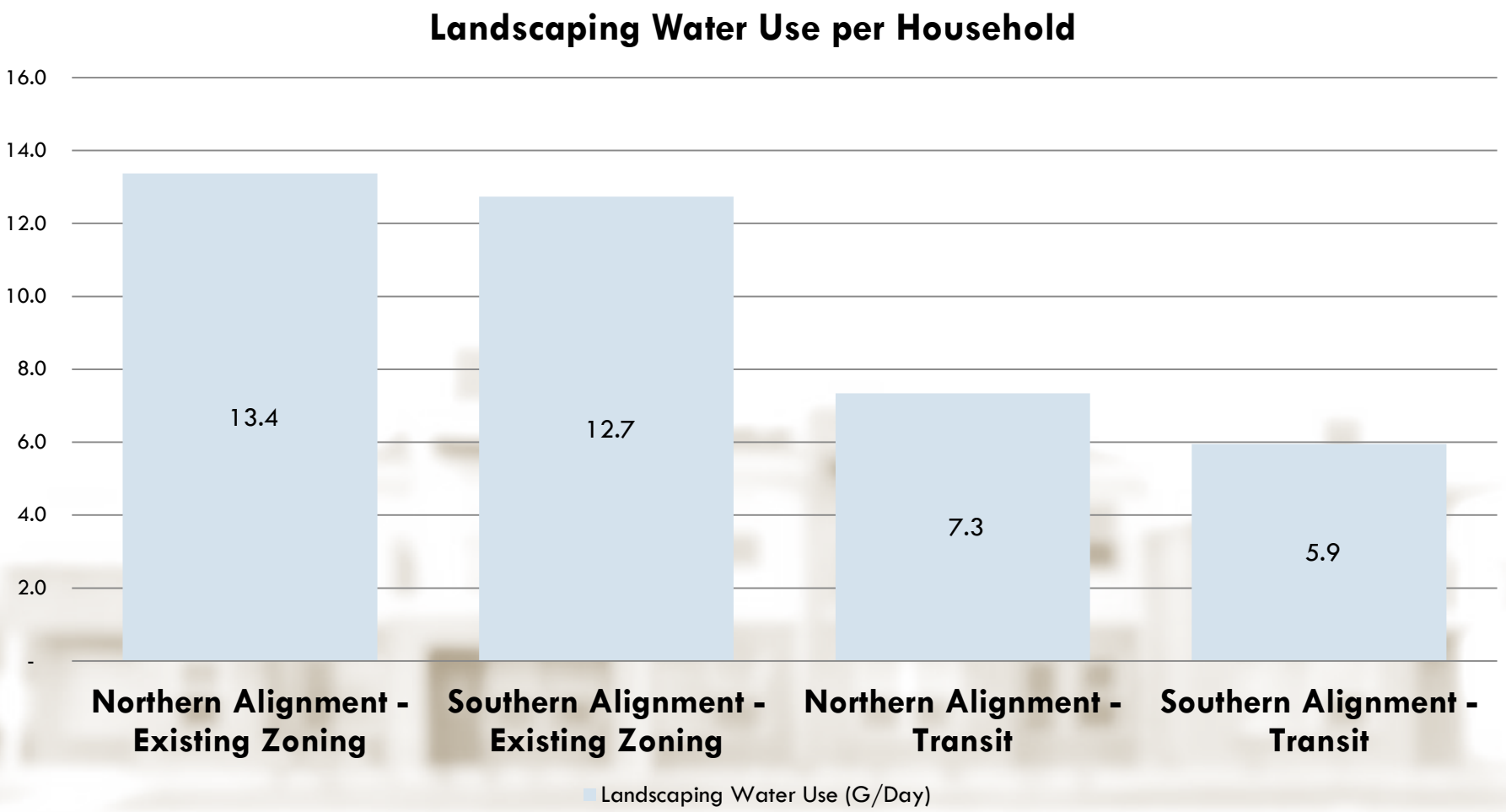


Transit Supportive

New Building Value
Translates to Tax Revenue



Landscaping Water Use

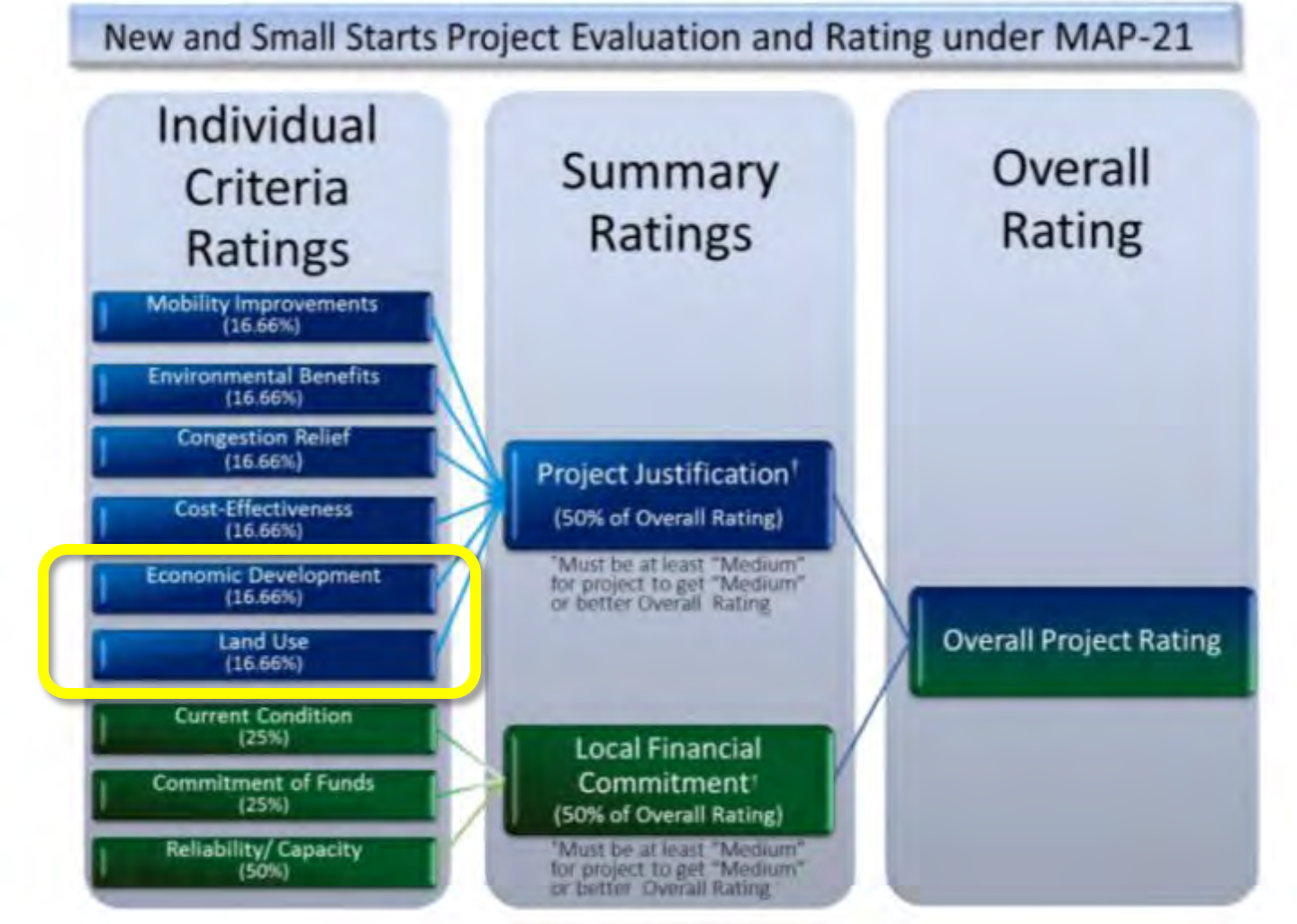


Conclusion

- The regulatory environment has larger impact than the alignment
  - Zoning and development regulations
- Washington and 25th both have many opportunities; 30th and Harrison (25th to 30th) have few.
  - 25th has more walkable streets and higher desirability/rents
- 25th/Northern alignment has best land use and economic development performance
  - Assuming zoning issues are addressed

NEXT STEPS

Federal Transit Funding
Evaluation Criteria



What's Required to Be Competitive?

- Transit supportive corridor policies (regional to local)
- Supportive zoning near transit
- Plans and policies to support affordable housing
- Tools to implement transit supportive plans and policies
- Performance of transit supportive plans and policies

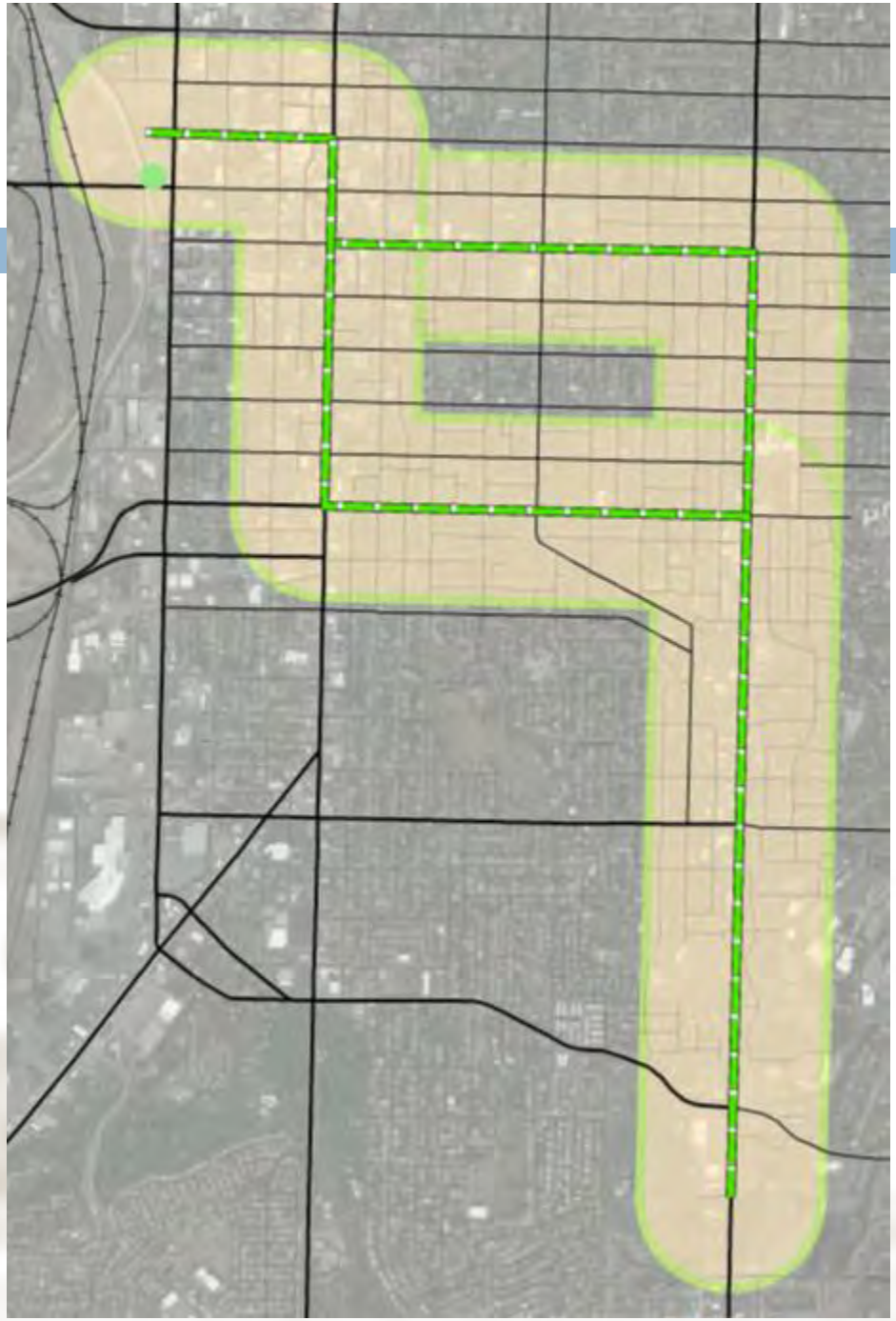
Recommendations

- Short term zoning changes
- Pursue regional funding for updates
- Form-based code template
- Expand TIF districts

- Focus within 2 blocks of preferred alignment

Focus Area

- Quarter mile
- 5-10 minute walk
- Effectively 2 blocks



Priority Zoning Tweaks

- **Parking standards**
  - No more than 1.25 per unit, 2 per 1,000 sq. ft.
    - Market will determine appropriate parking
    - No need for city to dictate
  - *Why: greatly increases cost, reduces density and development feasibility, hurts urban form*

- **Permitted Uses**
  - Focus on building form, not on use
  - *Why: historically, uses were very mixed; a mix of uses supports transit usage and walking*

Priority Zoning Tweaks

- **Minimum Lot Size**
  - Reduce or eliminate minimum lot sizes
  - Remove linkage of units and minimum lot size
  - *Why: increases costs, limits redevelopment potential of smaller parcels*

- **Average Unit Size**
  - Eliminate average unit size
  - *Why: increases costs, minimizes marketability*

Priority Zoning Tweaks

- **Density Limits**
  - Increase or eliminate density limits and FAR within R zones
    - R-2(EC): >20 DU/Acre (townhomes)
      - Currently 7
    - R-3(EC)/R-4(EC)/R-5: >60 DU/Acre (ie- ~4 story apartment)
      - Currently 12-16

- **Lot coverage and landscaping standards**
  - Increase lot coverage allowance around alignment
    - 80-85% is a typical urban standard
  - Reduce rear setback and landscaping
    - Allow for adequate rear area for surface parking, not unused grass
  - Less prescriptive landscaping standards
    - 10-15% is a typical urban standard
    - Allow creativity in vegetation and encourage natives
  - Allow creative rainwater detention for landscaping
  - *Why: increases costs and water usage, reduces developable lot area and potential revenue on the site*

Priority Zoning Tweaks

- **Height**
  - Increase height restrictions to allow efficient wood-frame construction in key areas
  - 55-60 feet in C-1, CP-1, CP-2, CP-3, NC-1, NC-2, R-3, R-4, R-5
- **FAR**
  - Increase or eliminate FAR restrictions
  - At least 2.0 in C, CP, NC & R-3+
  - Why: reduces redevelopment potential

Local Planning Resource Program

- "… provides local jurisdictions with technical assistance to integrate land use and regional transportation plans.
- …implementing the Wasatch Choice for 2040 Vision, including the use of planning tools developed by the Wasatch Choice for 2040 partners.

http://www.wfrc.org/new_wfrc/index.php/wfrc-programs/local-planning-resource-program

Local Planning Resource Program

WASATCH FRONT REGIONAL COUNCIL
Local Planning Resource Program
SALT LAKE COUNTY

Goal

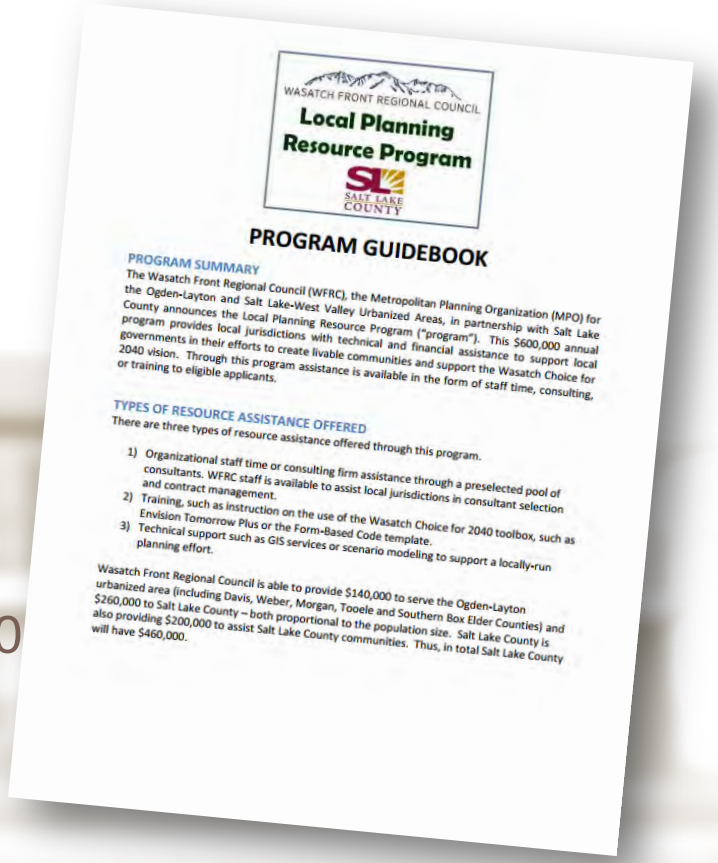
- Support local governments in their efforts to create livable communities

Assistance

- Staff time or consulting firm assistance
- Training (2040 Toolbox, ET+, Form-Based Code Template)
- Technical support (GIS or scenario modeling)

Funds

- $460,000 for Salt Lake County, $140,000 dedicated to Ogden-Layton urbanized area



WASATCH FRONT REGIONAL COUNCIL
Local Planning Resource Program
SALT LAKE COUNTY

PROGRAM GUIDEBOOK

PROGRAM SUMMARY

The Wasatch Front Regional Council (WFRC), the Metropolitan Planning Organization (MPO) for the Ogden-Layton and Salt Lake-West Valley Urbanized Areas, in partnership with Salt Lake County announces the Local Planning Resource Program ("program"). This $600,000 annual program provides local jurisdictions with technical and financial assistance to support local governments in their efforts to create livable communities and support the Wasatch Choice for 2040 vision. Through this program assistance is available in the form of staff time, consulting, or training to eligible applicants.

TYPES OF RESOURCE ASSISTANCE OFFERED

There are three types of resource assistance offered through this program.

1) Organizational staff time or consulting firm assistance through a preselected pool of consultants. WFRC staff is available to assist local jurisdictions in consultant selection and contract management.
2) Training, such as instruction on the use of the Wasatch Choice for 2040 toolbox, such as Envision Tomorrow Plus or the Form-Based Code template.
3) Technical support such as GIS services or scenario modeling to support a locally-run planning effort.

Wasatch Front Regional Council is able to provide $140,000 to serve the Ogden-Layton urbanized area (including Davis, Weber, Morgan, Tooele and Southern Box Elder Counties) and $260,000 to Salt Lake County – both proportional to the population size. Salt Lake County is also providing $200,000 to assist Salt Lake County communities. Thus, in total Salt Lake County will have $460,000.

Local Planning Resource Program

Eligible projects

- Local visions or plans
- Scenario planning using ET+
- Implementation of local plans
- **Revisions to ordinances or land use regulations**
- Public participation related to local plans
- Site assessments for feasibility of TOD projects
- Studies or plans related to local market issues

Not Eligible

- Land acquisition
- Engineering
- Capital investment

Local Planning Resource Program

Requirements

- Eligible project
- Min. local match of 7%
- Letter of Intent (project description/cost)
- Application (if selected)

Program Timeline

- Sept. 2015 - Program announcement
- Oct. 2015 - Letters of intent due
- Jan. 2016 - Applications due
- Mar. 2016 - Notifications of awards

Val Halford, WFRC at 801-363-4250 extension 1108, vhalford@wfrc.org,
or
Julia Collins, WFRC at 801-363-4250 extension 1126 or julia@wfrc.org

Local Planning Resource Program

Recent Awards

- City of South Salt Lake
  - $25,000
  - East Streetcar Area Form Based Code Development and Housing Assessment
- South Ogden City
  - $15,000
  - Creation of a Commercial/Mixed Use Form Based Code for old commercial center

Form-based Code Template

- Wasatch Choices 2040
- Template and process for form-based code implementation
- Can be funded through Local Planning Resource Program grant

http://wasatchchoice2040.com/wasatch-choice-toolbox/tool-form-based-code

Form-Based Code Template

Form-Based Code

- Connects design principles with community planning and zoning
- More responsive and adaptable to mixing uses and creating walkable places than traditional zoning

Template

- Place Types + Districts/Street Types/Open Space Types + Building Types

WASATCH CHOICE FOR 2040 PARTNERS

WASATCH FRONT REGIONAL COUNCIL
DAVIS | MORGAN | SALT LAKE | TOOELE | WEBER

Envision Utah

SALT LAKE COUNTY

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

UTA

Metropolitan Research Center

BEBR
Bureau of Economic and Business Research

MOUNTAINLAND ASSOCIATION OF GOVERNMENTS

UT

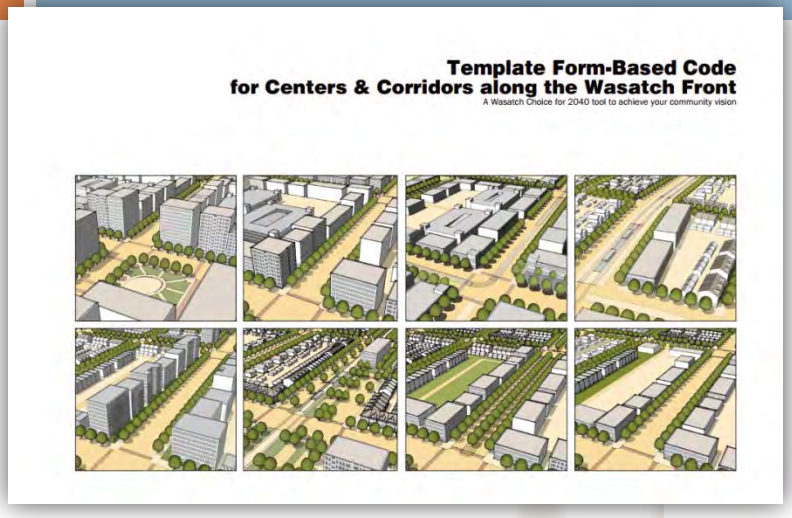
UDOT
udot.utah.gov

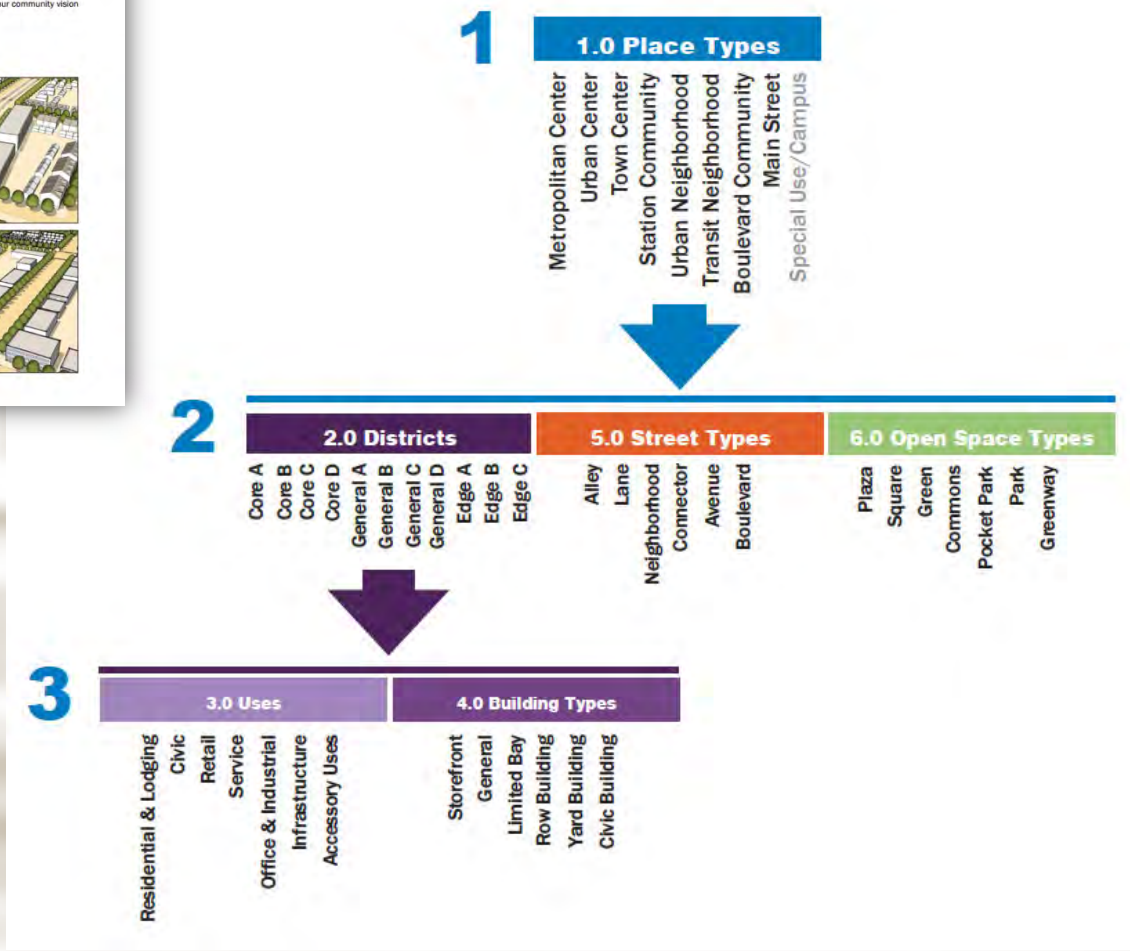
Form-Based Code Template

Benefits

- Focus on the Public Realm
- Predictable results
- Codified requirements
- Place-Specific Regulations
- Build from Community Preference
- Highly illustrated document
- Levels of control
- Economic Benefits

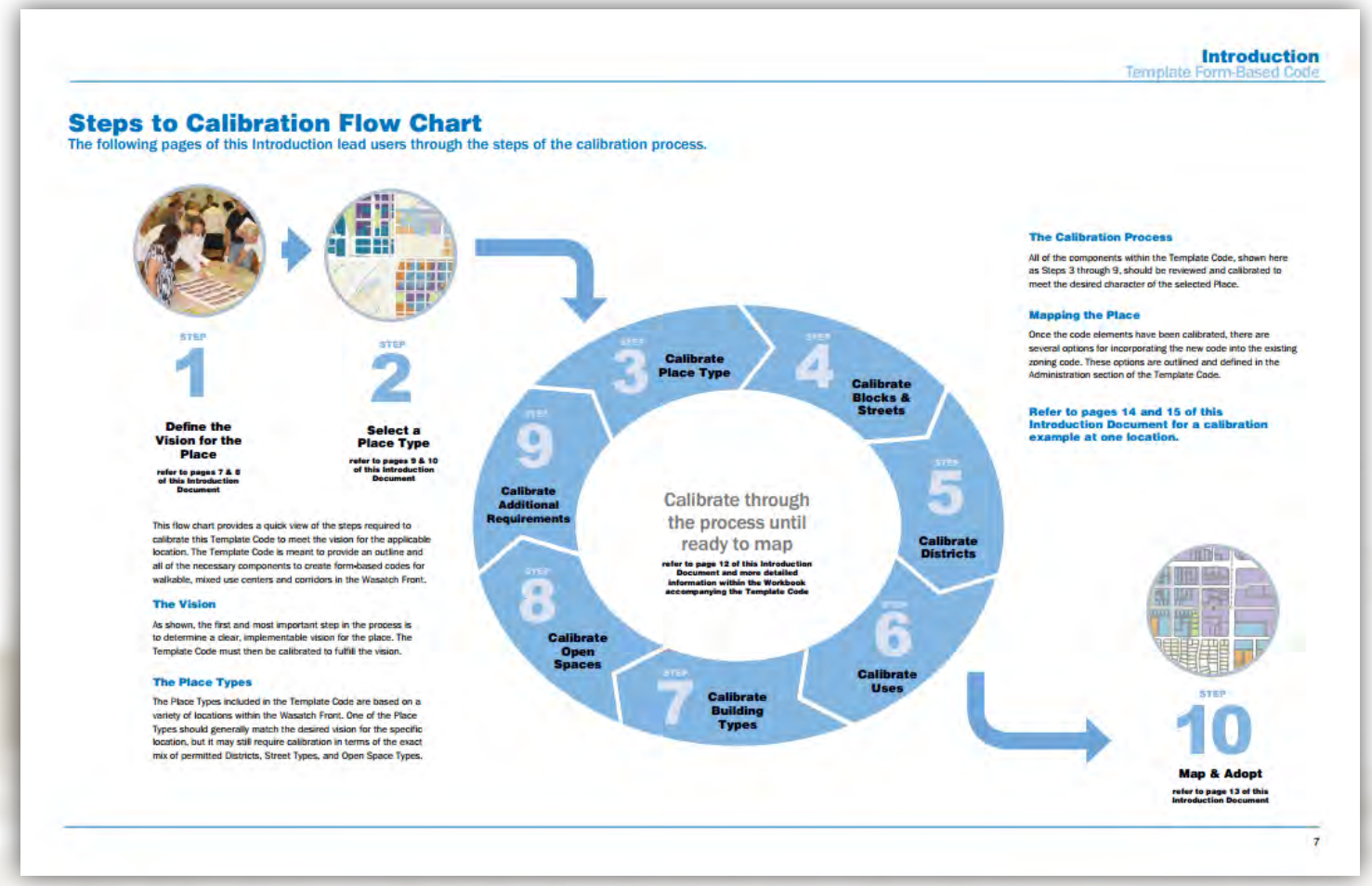
Form-Based Code Template





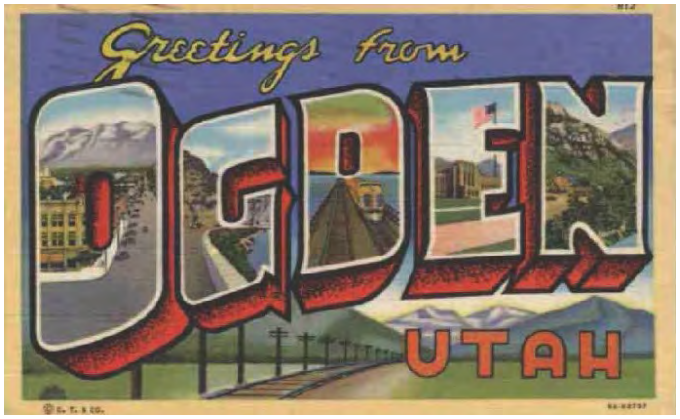
Form-Based Code Template

- 10-step process to calibrate



APPENDIX D

Definition of Alternatives



Definition of Alternatives

Ogden/Weber State University
Transit Project Study

Ogden, Weber County, Utah

January 13, 2015

Contents

Figures

1.0 Introduction

Utah Transit Authority (UTA), in collaboration with several project partners including Ogden City, Weber County, Wasatch Front Regional Council (WFRC), Utah Department of Transportation (UDOT), Weber State University (WSU), and McKay-Dee Hospital, began a 9-month study to evaluate public transportation improvements in Ogden, Utah. These improvements include proposed urban circulator transit alternatives through a 5.3-mile corridor to connect activity centers and neighborhoods in Ogden while tying together the regional transit network to improve mobility, enhance access to education and jobs, reduce growth in automobile trips and parking, increase reliability of transit service, and aid economic development.

2.0 Project Background

In 2004, WFRC's 2004–2030 Long-Range Plan identified the need for improved transit connecting downtown Ogden and WSU. In 2004 and 2005, UTA, WFRC, Ogden City, and WSU conducted the Ogden/Weber State University Corridor Feasibility Study. This study recommended a public transit investment between downtown Ogden and the Ogden FrontRunner commuter-rail station to WSU and McKay-Dee Hospital. Streetcar was identified as the preferred transportation mode, and bus rapid transit (BRT) was identified as an alternative mode.

In 2008, UTA initiated the Ogden/Weber State University Transit Corridor Alternatives Analysis to build on the findings from the 2005 feasibility study, address the community transit needs identified in WFRC's long-range plan, and evaluate options for improved public transportation service in Ogden. This analysis did not investigate alternatives that were screened out from further consideration in the previous study.

The alternatives analysis was overseen by policy and technical committees with representatives from Ogden City, Weber County Commission, Weber Area Council of Governments, WFRC, South Ogden City, UDOT, McKay-Dee Hospital, WSU, and Ogden/Weber Chamber of Commerce.

In 2011, a draft Ogden/Weber State University Transit Corridor Alternatives Analysis was published. The draft alternatives analysis report recommended two potential alternatives for further analysis in subsequent study phases. Both of the recommended alternatives were modern streetcar systems that would connect the Ogden Intermodal Center to WSU and McKay-Dee Hospital using 23rd Street, Washington Boulevard, and either 30th Street or 36th Street to Harrison Boulevard.

In early 2012, Ogden City held a "fact-finding" work session on the project that included presentations by WSU, the Ogden Trolley District group, and the Sierra Club. In May 2013, Ogden's mayor and city council, through a joint resolution, selected two 5-mile routes for further consideration (see Figure 1):

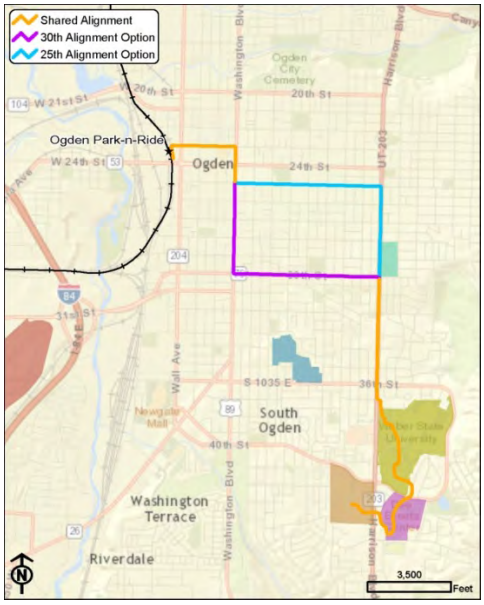


Figure 1. Routes Considered

- **25th Street route:** from Ogden Intermodal Transit Center on 23rd Street to Washington Boulevard, Washington Boulevard to 25th Street, 25th Street to Harrison Boulevard, and Harrison Boulevard to WSU and McKay-Dee Hospital
- **30th Street route:** from Ogden Intermodal Transit Center on 23rd Street to Washington Boulevard, Washington Boulevard to 30th Street, 30th Street to Harrison Boulevard, and Harrison Boulevard to WSU and McKay-Dee Hospital

In addition, Ogden's mayor and city council selected two modes for further consideration: modern streetcar and BRT.

With two routes and two modes under consideration, the following four alternatives were developed:

1. 25th Street Streetcar
2. 25th Street BRT
3. 30th Street Streetcar
4. 30th Street BRT

This report evaluates the four alternatives listed above. The analysis of the alternatives presents the nature and location of the alternatives and evaluates and summarizes their physical and operational characteristics. The report does not evaluate alternatives considered in the previously mentioned earlier studies completed for the project.

The No-Action Alternative is not evaluated in this report since it was analyzed in the 2011 draft report and will be re-evaluated during the environmental documentation phase. The "No-Action" alternative essentially maintains the present condition and includes planned and committed conditions for the future planning-horizon year (2040). This alternative also serves as a baseline for evaluating the other alternatives for the purposes of environmental impact assessment as required by the Council on Environmental Quality (CEQ) regulations that implement the National Environmental Policy Act (NEPA).

3.0 Project Objectives

The study area is a 5-mile corridor that includes downtown Ogden, WSU, and McKay-Dee Hospital and the following major destinations: the Ogden Intermodal Transit Center and FrontRunner commuter-rail station (FrontRunner operates frequent service from Ogden to Provo, an 88-mile route), Lindquist Field (a minor-league baseball stadium with an 8,262-person capacity), the Junction (a 20-acre entertainment, residential, retail, and office mixed-use redevelopment), the Ogden downtown central business district (including city, county, and federal offices), the east-central Trolley District neighborhood, WSU (with 2,500 faculty and staff and 17,000 students, 600 of whom live on campus), the Dee Events Center (a 12,000-seat sports and entertainment venue with a 3,000-space parking lot), and McKay-Dee Hospital Center (at 2,300 employees, the fourth-largest hospital in Utah).

The study area is located in a region of rapid population growth and has strong existing transit use. The Wasatch Front region, Weber County, and Ogden have experienced rapid population and employment growth, and state and local governments expect continued rapid growth in these areas. Currently, 283,000 daily person-trips occur within the study area, and this number is expected to increase to 351,000 (an increase of 24%) by 2030. Three of the most heavily used transit routes in the area (UTA bus routes 455, 603, and 640) have a combined daily ridership of nearly 5,000. WSU plans to add 10,000 new students, staff, and faculty by 2030 and to have 25% of the trips to and from campus occur via transit, up from a current transit mode share of 11%.

Given these activities and growth, the objectives of the project are to:

- Increase mobility, connectivity, and travel choices between downtown Ogden and the WSU/McKay-Dee Hospital area
- Promote economic and community development and create jobs in Ogden
- Support local and regional land-use initiatives
- Increase ridership, attract more local riders, and provide improved access to the overall transit system
- Develop a project that has strong local support
- Develop a project that is competitive for federal funding

4.0 Project-Development Process

The process below is typically followed to advance a transportation-improvement project from idea to implementation:

1. Identify a corridor in need of a transportation improvement.
2. Collect data for the study area and identify deficiencies.
3. Develop a purpose and need statement—the goals and objectives of the project.
4. From the purpose and need statement, formulate evaluation criteria.
5. Identify potential solutions (route and mode alternatives).
6. Evaluate alternatives.
7. Prepare an Alternatives Analysis Report.
8. Decision-makers select the Locally Preferred Alternative (LPA).
9. Develop conceptual engineering plans for the LPA so that the environmental team knows clearly what they are evaluating.
10. Prepare an environmental evaluation and obtain environmental clearance.
11. Identify funding.
12. Prepare construction plans, specifications, and estimates (PS&E).
13. Construct the project.
14. Start up the service and perform testing.
15. Operate the service.

5.0 Purpose of the Alternatives Analysis Process

The ultimate purpose of the first phase of the Ogden/Weber State University Transit Project Study is to select an LPA. The primary steps of the Alternatives Analysis (AA) process are:

1. Confirm the need for an advanced transit system in the Ogden area.
2. Define specific transit alternatives to meet the defined transportation needs, alternatives including mode/technology, guideway alignment, and operations.
3. Evaluate the benefits and costs, environmental impacts, and transportation effectiveness of the transit alternatives.
4. Engage the community in the study process to select an LPA.
5. Identify potential sources of funding and help to position the project for phased implementation.

This report describes the second step specifically. The Alternatives Analysis Update Report will describe the other steps.

6.0 Need for a More-Precise Definition of Alternatives

Evaluation Criteria. Given the project objectives, the evaluation criteria are:

1. Ridership
2. Ridership by zero-car households
3. Reduction in vehicle-miles traveled
4. Capital cost
5. Annual operations and maintenance cost
6. Cost-effectiveness (annualized federal share divided by annual trips)
7. Land use and economic development impact
8. Local support

Alternatives Evaluated. This report evaluates the following four alternatives:

1. 25th Street Streetcar
2. 25th Street BRT
3. 30th Street Streetcar
4. 30th Street BRT

A more-precise definition of these four alternatives is necessary to more thoroughly evaluate the alternatives against the evaluation criteria presented above.

6.1 Possible Modes

6.1.1 Streetcar Mode

Streetcar is a flexible transit mode that consists of a single electric car of varying dimensions that runs on standard-gauge rails that can receive electric power from an overhead wire or can store energy on board in batteries and capacitors. Streetcars can operate mixed-flow (in a traffic lane with traffic) or can run in an exclusive right-of-way at grade, elevated, or in a tunnel. Streetcars typically have a top speed of 40 or 45 miles per hour (mph), can turn on a minimum 66-foot radius, and can climb and descend grades as steep as 9%. Given the limited capacity of the single car (which typically accommodates about 120 people seated and standing), streetcars are typically used on short routes of 3 to 5 miles end to end.

Electric streetcars were first developed in the 1880s and were used to expand most cities and towns, including Ogden. Streetcars were popular through World War II, after which privately owned cars took over as the predominant mode of transport, and most local jurisdictions replaced aging streetcar systems with buses. Streetcars have made a comeback with the recent resurgence and renewed interest and investment to bring back and restore the livability, desirability, and competitiveness of downtowns and urban centers and the commitment toward multimodalism, complete streets, and reduced use of automobiles.

Heritage systems use historic cars or replica cars (new cars built to match the appearance of historic cars). These cars are typically nonarticulated, shorter cars with high floors, a lower top speed, and reduced capacity. Heritage streetcar systems are operating in New Orleans, San Francisco, Philadelphia, Dallas, Little Rock, Tampa, and Kenosha (Wisconsin).

Modern streetcars use articulated low-floor vehicles with a higher top speed and a greater capacity. Since 2001, modern streetcar systems have opened in Portland (Oregon), Tacoma, Seattle, Salt Lake City, and Tucson; are currently being tested in Washington, DC, and Atlanta; are currently under construction in Dallas, Cincinnati, Kansas City (Missouri), Detroit, and Charlotte; are well through project development in Ft. Lauderdale, Milwaukee, Oklahoma City, Tempe, Sacramento, Santa Ana, and Los Angeles; and are being considered in Oakland, Reno, Boise, Denver, Omaha, Minneapolis, Indianapolis, Grand Rapids, Columbus (Ohio), Providence (Rhode Island), and Miami.

Within the project study area, the streetcar line's configuration could vary according to the existing physical constraints. Although a streetcar line generally operates in a mixed-flow traffic lane, it can operate in an exclusive transit lane as well.

6.1.2 Bus Rapid Transit (BRT) Mode

BRT is a flexible transit mode that is intended to provide the quality of rail transit at a lower cost. BRT typically serves local trips and offers higher frequency, faster speeds, and better reliability compared to traditional bus lines.

Improved service and operational efficiency can be attributed to several BRT features. BRT typically operates at higher frequencies and with greater speeds and improved reliability of service, which are facilitated by exclusive transit lanes, traffic signal priority, bypass lanes, and fewer stops to improve speeds and reliability to better compete with a trip by car.

BRT can include preferential treatment of buses at signalized intersections, including the extension of green time or actuation of the green light when the signal detects an approaching bus. BRT also improves the user experience by providing rail-quality stations, modern low-floor vehicles using various propulsion technologies, off-board fare collection, and real-time updates on the arrival of the next bus. Capacity can be increased by using articulated vehicles or operating multiple vehicles in a platoon.

BRT was introduced in 1974 in Curitiba, Brazil, as a way to provide the capacity and speed of a metro system at a significantly lower cost by operating buses in exclusive transit lanes in the center of major arterial roads. In 1992, Curitiba introduced off-board fare collection, enclosed stations, and platform-level boarding. BRT has also been popular in the United States, with systems implemented in Austin, Atlanta, Boston, Cleveland, Eugene (Oregon), Grand Rapids (Michigan), Houston, Kansas City (Missouri), Las Vegas, Los Angeles, Miami, Minneapolis, New York, Orlando, Philadelphia, Phoenix, Pittsburgh, and San Diego.

Within the project study area, the BRT's configuration could vary according to the existing physical constraints. BRT can operate on exclusive transit lanes or it can operate mixed-flow in a traffic lane, and most BRT projects use a combination of the two configurations. To clearly differentiate BRT services from other bus transit services, UTA would use distinctive vehicles and specialized branding to call out the BRT service as unique, innovative, and distinctive.

6.2 Existing Conditions along the 25th Street and 30th Street Routes and Feasible Design Options

Two routes, the 25th Street and 30th Street routes, are being considered. The project team, in consultation with the Technical Advisory Committee (TAC)—which consists of representatives from each of the project partners—conducted a segment-by-segment right-of-way constraint and fatal-flaw analysis along each route to better define the four alternatives (two mode alternatives for each route).

The table below lists the project team and TAC's recommendations for the type of transit lane for each segment.

Segment	Recommended Type of Transit Lanes
23rd Street from Wall Street to Grant Avenue	Mixed-flow transit lanes
23rd Street from Grant Avenue to Kiesel Avenue	Mixed-flow transit lanes
23rd Street from Kiesel Avenue to Washington Boulevard	Mixed-flow transit lanes
Washington Boulevard from 23rd Street to 26th Street	Mixed-flow transit lanes
Washington Boulevard from 26th Street to 30th Street	Mixed-flow transit lanes for streetcar, exclusive transit lanes for BRT
25th Street from Washington Boulevard to Adams Avenue	Mixed-flow transit lanes
25th Street from Adams Avenue to Jefferson Avenue	Mixed-flow transit lanes
25th Street from Jefferson Avenue to Harrison Boulevard	Mixed-flow transit lanes
30th Street from Washington Boulevard to Harrison Boulevard	Mixed-flow transit lanes
Harrison Boulevard from 25th Street to 30th Street [a]	Mixed-flow transit lanes
Harrison Boulevard from 30th Street to 36th Street [a]	Mixed-flow transit lanes for streetcar, exclusive transit lanes for BRT

[a] These two segments are discussed jointly in Section 6.2.10, Harrison Boulevard from 25th Street to 36th Street.

6.2.1 23rd Street from Wall Street to Grant Avenue

Recommendation: Mixed-flow transit lanes

23rd Street from Wall Street to Grant Avenue features one traffic lane in each direction and diagonal parking spaces on both sides of the street (Figures 2 and 3). Streetcar or BRT would be implemented by running transit mixed-flow in the existing traffic lanes and converting the parking to reverse diagonal (Figure 4). Constructing exclusive transit lanes would require either widening the roadway and causing significant right-of-way impacts or removing a large number of on-street parking spaces, so mixed-flow transit lanes are recommended for this segment.

Figure 2. Existing View

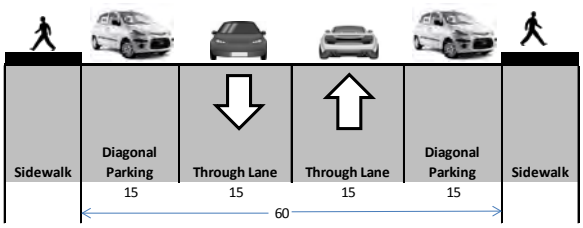


Figure 3. Existing Section

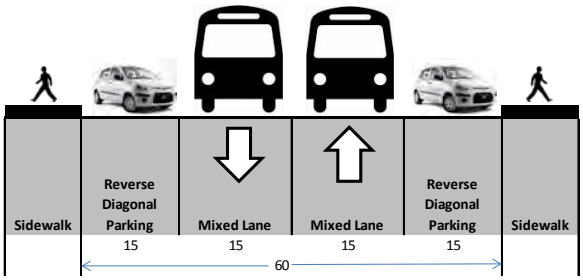


Figure 4. Proposed Section

6.2.2 23rd Street from Grant Avenue to Kiesel Avenue

Recommendation: Mixed-flow transit lanes

23rd Street from Grant Avenue to Kiesel Avenue has one traffic lane in each direction, a continuous center turn lane, and diagonal parking spaces on one side of the street (Figures 5 and 6). Streetcar or BRT would be implemented by running transit mixed-flow in the existing traffic lanes and converting the parking to reverse diagonal (Figure 7). Constructing exclusive transit lanes would require either widening the roadway and causing significant right-of-way impacts or removing a large number of on-street parking spaces, so mixed-flow transit lanes are recommended for this segment.

Figure 5. Existing View

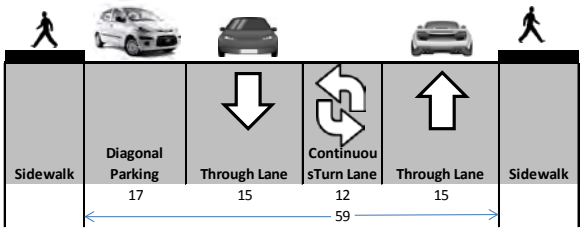


Figure 6. Existing Section

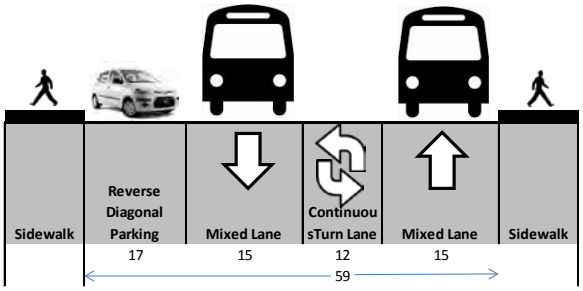


Figure 7. Proposed Section

6.2.3 23rd Street from Kiesel Avenue to Washington Boulevard

Recommendation: Mixed-flow transit lanes

23rd Street from Kiesel Avenue to Washington Boulevard has one traffic lane in each direction, a continuous center turn lane, and diagonal parking spaces on both sides of the street (Figures 8 and 9). Streetcar or BRT would be implemented by running transit mixed-flow in the existing traffic lanes and converting the parking to reverse diagonal (Figure 10). Constructing exclusive transit lanes would require either widening the roadway and causing significant right-of-way impacts or removing a large number of on-street parking spaces, so exclusive transit lanes are not recommended for this segment. Therefore, streetcar or BRT should be implemented by running transit mixed-flow in the existing traffic lanes and converting the parking to reverse diagonal (Figure 10).

Figure 8. Existing View

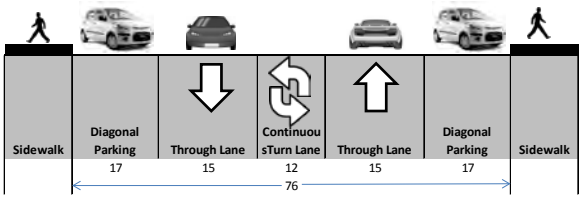


Figure 9. Existing Section

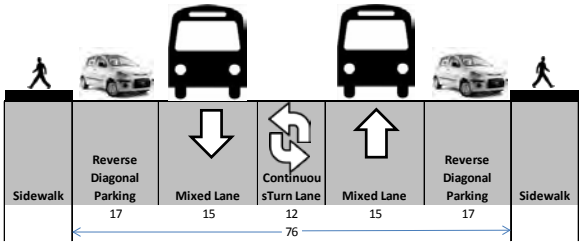


Figure 10. Proposed Section

6.2.4 Washington Boulevard from 23rd Street to 26th Street

Recommendation: Mixed-flow transit lanes

Washington Boulevard from 23rd Street to 26th Street has two traffic lanes in each direction, a median/center turn lane, bike lanes, and parallel parking spaces on both sides of the street (Figures 11 and 12).

Figure 11. Existing View

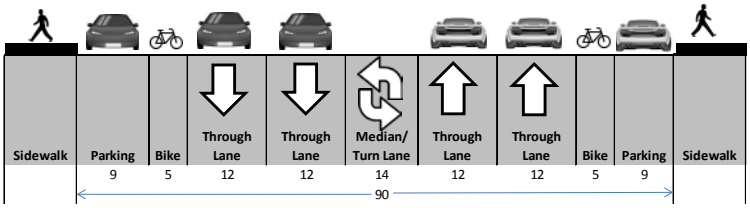


Figure 12. Existing Section

If streetcar or BRT were implemented by running transit mixed-flow in the existing traffic lanes, the traffic lanes would not need to be widened or restriped (Figure 13).

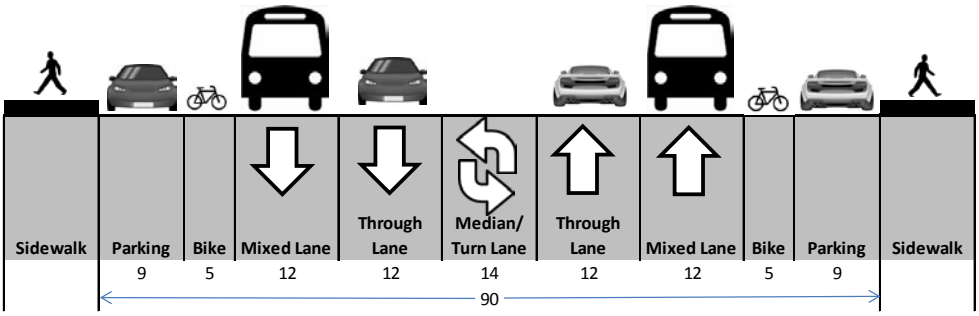


Figure 13. Mixed-Flow Transit Lanes Option

If streetcar or BRT were implemented by providing exclusive transit lanes in the median, the existing median/turn lanes and the bike lanes would have to be eliminated, and the parking lanes would have to be reduced from 9 feet wide to 8.5 feet wide (Figure 14). Bike lanes would need to be moved to a parallel street. Left turns would be prohibited at 23rd, 24th, 25th, and 26th Streets and from intermediate driveways.

The mid-block crosswalks between 23rd/24th, 24th/25th, and 25th/26th Streets would no longer have a pedestrian refuge area in the median and should probably be removed. Currently, pedestrians can cross two lanes of traffic traveling in one direction and then pause at the median. Without the median, pedestrians would have to cross four lanes of traffic in traveling two directions, plus the two-way transitway, all at once.

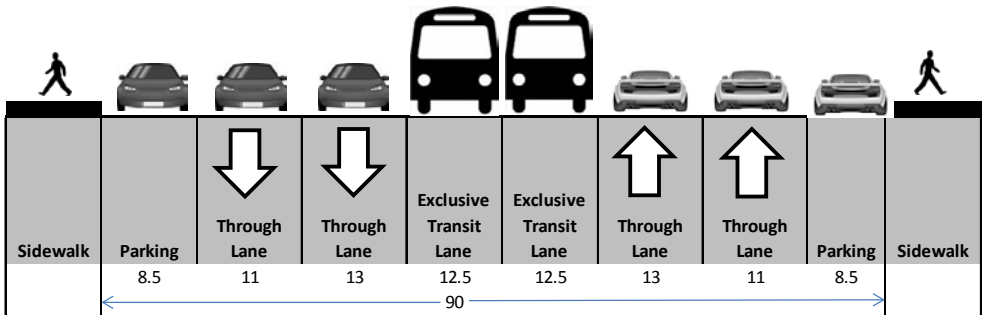


Figure 14. Exclusive Transit Lanes in Median Option

Advantages of Mixed-Flow Transit Lanes	Advantages of Exclusive Transit Lanes
• Maintain turn lanes • Maintain bike lanes • Maintain mid-block crosswalks	• No traffic impediments to transit • Improved transit speed and reliability

Given that existing and anticipated future traffic conditions on Washington Boulevard in this segment do not and would not cause excessive vehicle queues or delays, given the short distance on Washington Boulevard that would be available for transit priority, and given the recent investments that were made to improve the multimodal, complete-streets character of Washington Boulevard that would be eliminated with the exclusive transit lane option, the project team recommends that transit improvements on Washington Boulevard in this segment use mixed-flow transit lanes.

6.2.5 Washington Boulevard from 26th Street to 30th Street

Recommendation: Mixed-flow transit lanes for streetcar, exclusive transit lanes for BRT

Washington Boulevard from 26th Street to 30th Street has three traffic lanes southbound, two traffic lanes northbound, a median/center turn lane, and parallel parking spaces on both sides of the street (Figures 11 and 12).

Figure 15. Existing View

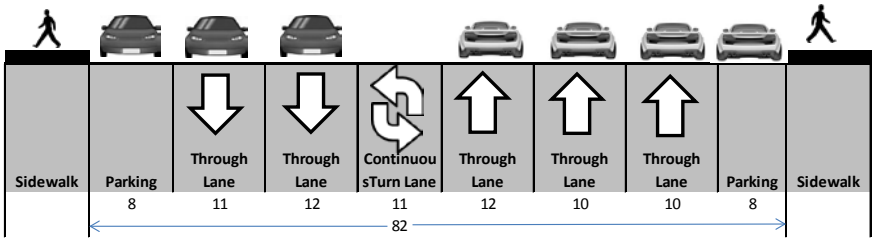


Figure 16. Existing Section

If streetcar or BRT were implemented by running transit mixed-flow in the existing traffic lanes, the traffic lanes would not need to be widened or restriped (Figure 17). The proposed stop at 28th Street would be provided by eliminating a few parking spaces and extending the curb and sidewalk to meet the transit lane.

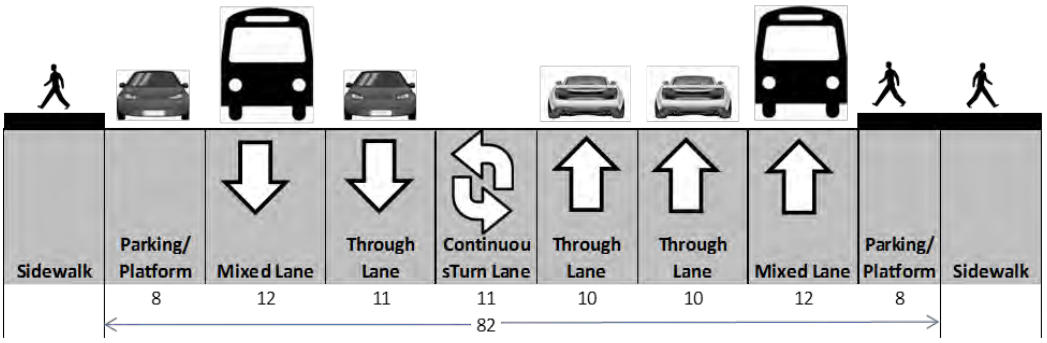


Figure 17. Mixed Flow Transit Lanes Option

If streetcar or BRT were implemented by providing exclusive transit lanes in the median, the existing median/turn lanes would have to be eliminated (Figure 18). Left turns would be prohibited at 26th, 27th, 29th, and 30th Streets and from intermediate driveways. Even with the elimination of the third southbound traffic lane, 7 feet of widening would be required.

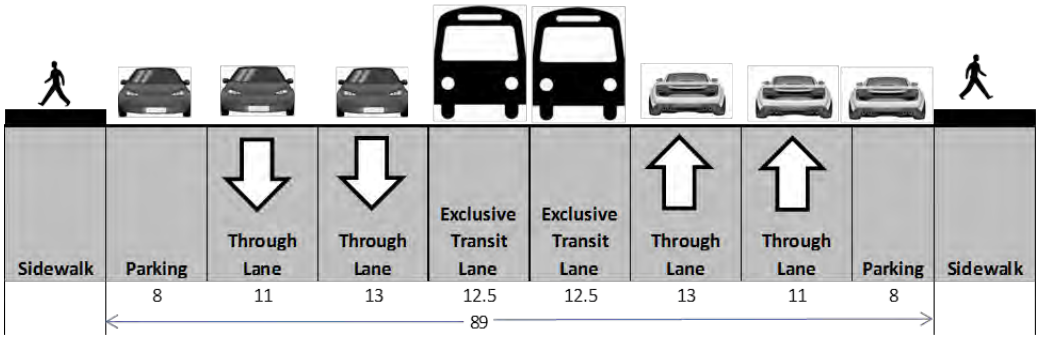


Figure 18. Exclusive Transit Lanes in Median Option at Non-Stop Location

The proposed stop at 28th Street would be provided at the far side of the intersection, and the near side would include a left turn lane (Figure 19). Even with elimination of the third southbound traffic lane for the length of the station and turn lanes, 27 feet of widening would be required.

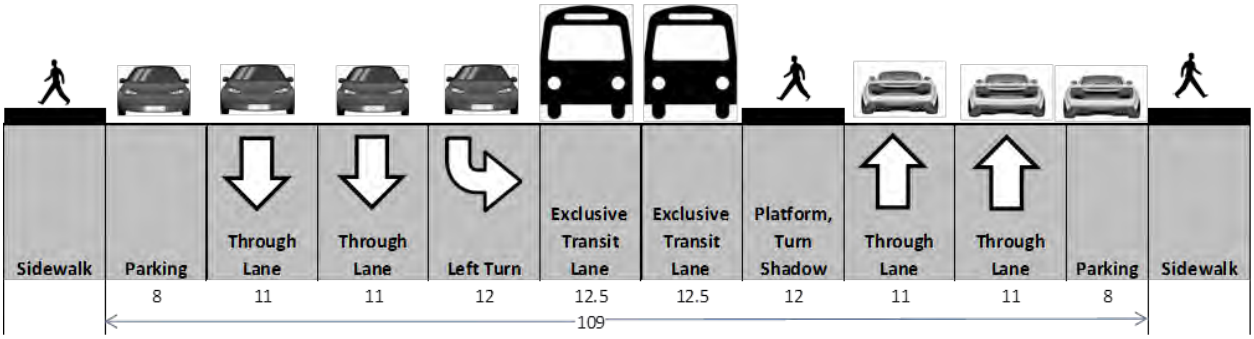


Figure 19. Exclusive Transit Lanes in Median Option at Stop Location

Advantages of Mixed-Flow Transit Lanes	Advantages of Exclusive Transit Lanes
• Maintain turn lanes • Maintain third southbound lane • Avoid 7 to 27 feet of roadway widening and impacts to curb, gutter, sidewalk, driveways, and one property	• No traffic impediments to transit • Improved transit speed and reliability

Given that existing and anticipated future traffic conditions on Washington Boulevard in this segment do not and would not cause excessive vehicle queues or delays, given the short distance on Washington Boulevard that would be available for transit priority, and given the right-of-way impacts and cost required to provide exclusive transit lanes, the project team recommends that transit improvements on Washington Boulevard in this segment use mixed-flow transit lanes for streetcar, since the streetcar infrastructure (rail, overhead wires, and poles) conveys an image of a fixed investment.

While the existing and future conditions noted above apply to BRT as well, the conditions certainly don't preclude exclusive transit lanes, especially considering that this section of Washington Boulevard is ripe for redevelopment. Anecdotal evidence suggests that redevelopment potential is greater with a fixed transit investment. Therefore, the project team and TAC recommend that, in the spirit of having a full slate of alternatives to analyze, this section of Washington Boulevard should have exclusive transit lanes for BRT.

6.2.6 25th Street from Washington Boulevard to Adams Avenue

Recommendation: Mixed-flow transit lanes

25th Street from Washington Boulevard to Adams Avenue has one traffic lane in each direction, a continuous turn lane, and diagonal parking spaces on both sides of the street (Figures 20 and 21). Streetcar or BRT would be implemented by running transit mixed-flow in the existing traffic lanes and converting the parking to reverse diagonal (Figure 22). Constructing exclusive transit lanes would require either widening the roadway and causing significant right-of-way impacts or removing a large number of on-street parking spaces, so mixed-flow transit lanes are recommended for this segment.

Figure 20. Existing View

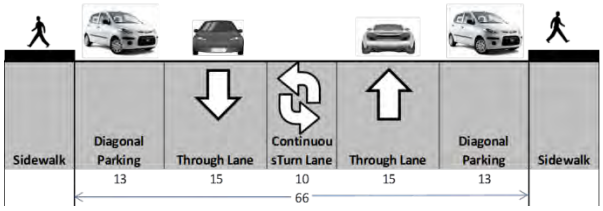


Figure 21. Existing Section

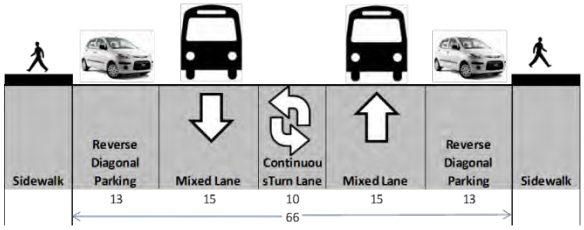


Figure 22. Proposed Section

6.2.7 25th Street from Adams Avenue to Jefferson Avenue

Recommendation: Mixed-flow transit lanes

25th Street from Adams Avenue to Jefferson Avenue has one traffic lane in each direction, diagonal parking spaces on one side of the street, and parallel parking spaces on the other side (Figures 23 and 24). Streetcar or BRT would be implemented by running transit mixed-flow in the existing traffic lanes and converting the diagonal parking to reverse diagonal (Figure 25). Constructing exclusive transit lanes would require either widening the roadway and causing significant right-of-way impacts or removing a large number of on-street parking spaces, so mixed-flow transit lanes are recommended for this segment.

Figure 23. Existing View

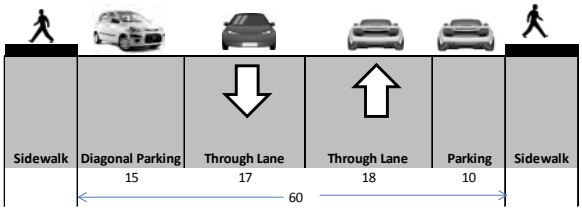


Figure 24. Existing Section

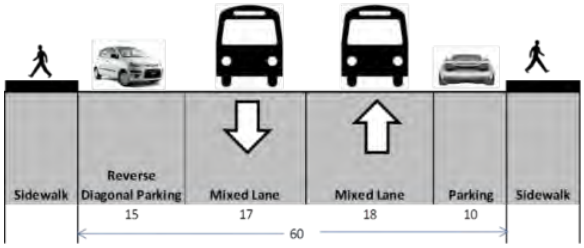


Figure 25. Proposed Section

6.2.8 25th Street from Jefferson Avenue to Harrison Boulevard

Recommendation: Mixed-flow transit lanes

25th Street from Jefferson Avenue to Harrison Boulevard has one traffic lane in each direction and parallel parking spaces on both sides of the street (Figures 26 and 27). Streetcar or BRT would be implemented by running transit mixed-flow in the existing traffic lanes (Figure 28). Constructing exclusive transit lanes would require either widening the roadway and causing significant right-of-way impacts or removing a large number of on-street parking spaces, so mixed-flow transit lanes are recommended for this segment.

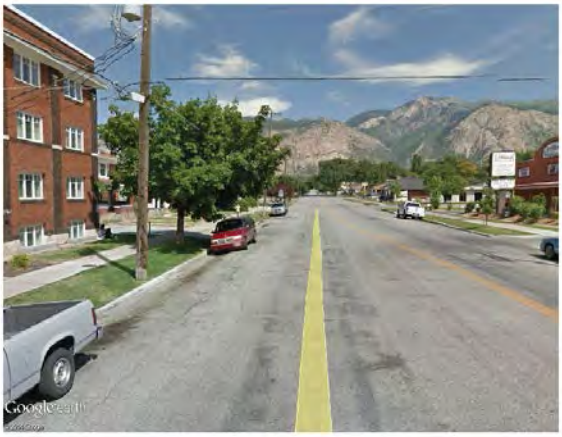


Figure 26. Existing View

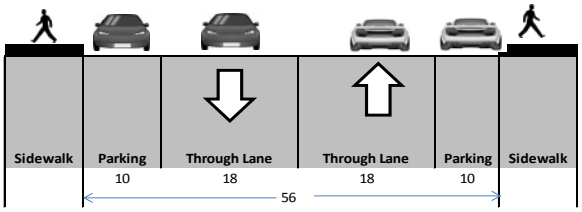


Figure 27. Existing Section

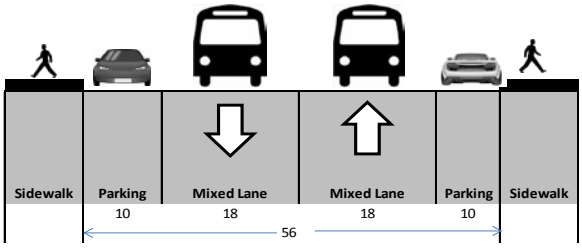


Figure 28. Proposed Section

6.2.9 30th Street from Washington Boulevard to Harrison Boulevard

Recommendation: Mixed-flow transit lanes

30th Street from Washington Boulevard to Harrison Boulevard has one traffic lane in each direction, a continuous turn lane, and parallel parking spaces on both sides of the street (Figures 29 and 30). Streetcar or BRT would be implemented by running transit mixed-flow in the existing traffic lanes (Figure 31). Constructing exclusive transit lanes would require either widening the roadway and causing significant right-of-way impacts or removing a large number of on-street parking spaces, so mixed-flow transit lanes are recommended for this segment.

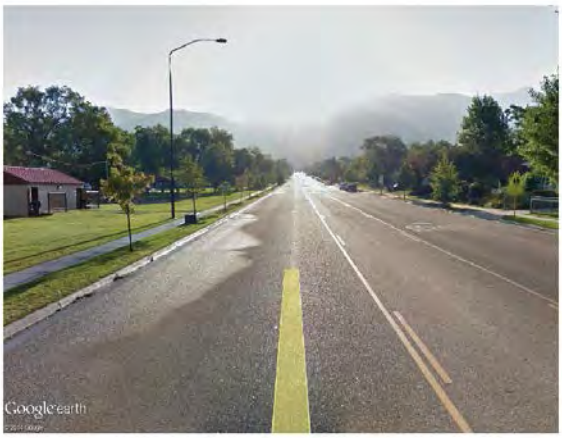


Figure 29. Existing View

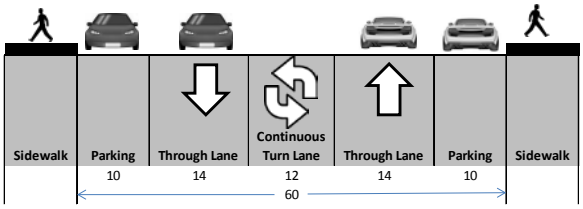


Figure 30. Existing Section

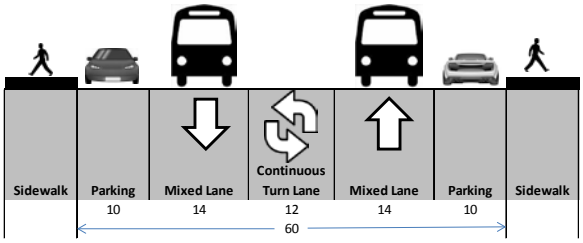


Figure 31. Proposed Section

6.2.10 Harrison Boulevard from 25th Street to 36th Street

Recommendation: Mixed-flow transit lanes from 25th Street to 30th Street for both modes, mixed-flow transit lanes from 30th Street to 36th Street for streetcar, and exclusive transit lanes from 30th Street to 36th Street for BRT

Harrison Boulevard from 25th Street to 36th Street has two traffic lanes in each direction, a median/center turn lane, and parallel parking spaces on both sides of the street (Figures 32 and 33).

Figure 32. Existing View

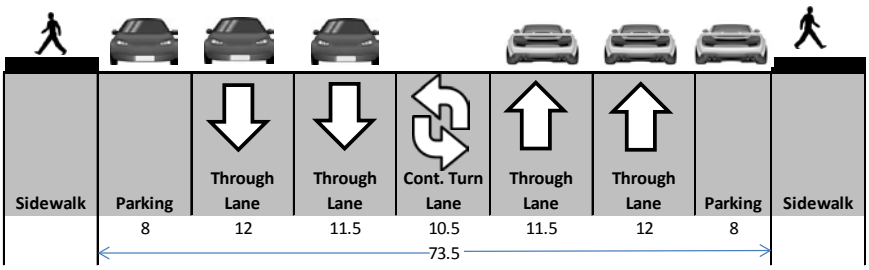


Figure 33. Existing Section

If streetcar or BRT were implemented by running transit mixed-flow in the existing traffic lanes, the traffic lanes would not need to be widened or restriped (Figure 34). Stops proposed at 28th, 32nd, and 36th Streets would be provided by eliminating a few parking spaces and extending the curb and sidewalk to meet the transit lane.

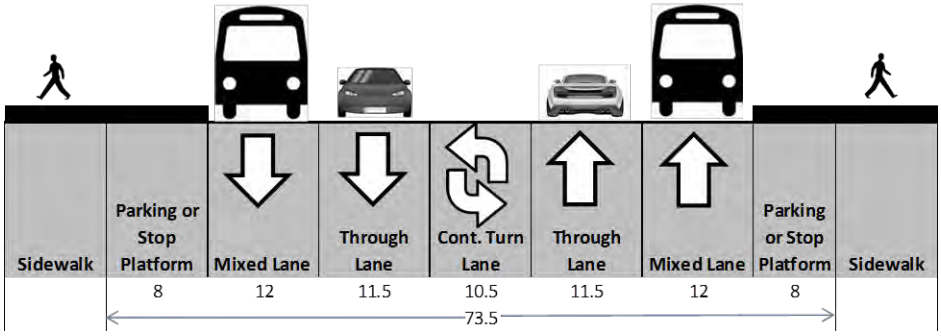


Figure 34. Mixed-Flow Transit Lanes Option

If streetcar or BRT were implemented by providing exclusive transit lanes in the median, the existing continuous turn lane would have to be eliminated (Figure 35). Left turns would be prohibited at 25th, 26th, 27th, 29th, 30th, 33rd, 34th, and 35th Streets and at intermediate driveways. Harrison Boulevard would need to be widened by 17.5 feet.

Section 4(f) of the Department of Transportation Act provides substantive protection for historic resources. Specifically, the regulation states that any federally assisted transportation projects may not "use" land from a historic site, among other environmentally sensitive areas, unless (1) there is "no feasible and prudent alternative" to using the site and (2) the project includes all possible planning to minimize harm to the site. From 25th Street to 30th Street, exclusive transit lanes in the median would not meet this requirement, since mixed-flow transit lanes provide a "feasible and prudent alternative," and therefore exclusive transit lanes

are not recommended. From 30th Street to 36th Street, there are nonhistoric commercial properties on the west side of Harrison Boulevard, so widening would be feasible.

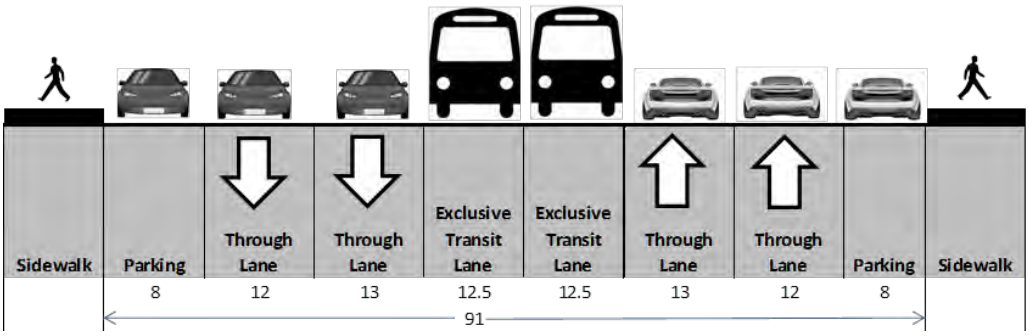


Figure 35. Exclusive Transit Lanes in Median Option at Non-Stop Location

The proposed stops at 28th, 32nd, and 36th Streets would be provided at the far side of the intersection, and the near side would include a left-turn lane (Figure 36). For the length of the station and turn lanes, 35.5 feet of widening would be required.

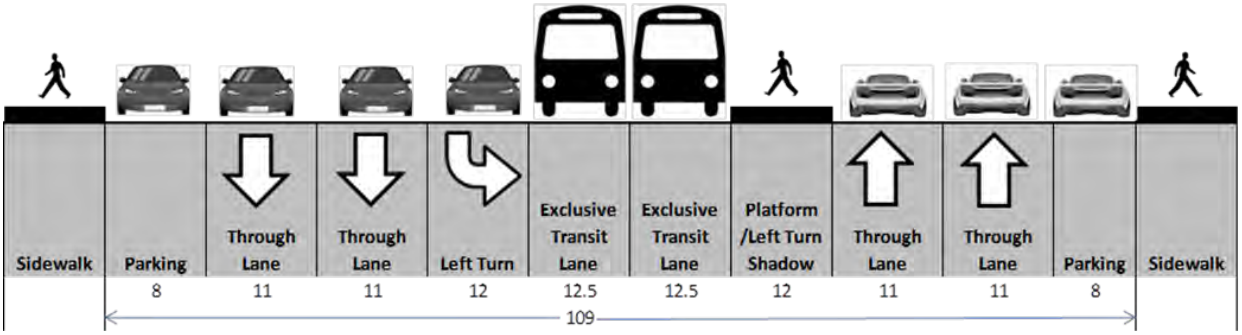


Figure 36. Exclusive Transit Lanes in Median Option at Stop Locations

Advantages of Mixed-Flow Transit Lanes	Advantages of Exclusive Transit Lanes
• Reduce traffic delays by maintaining turn lanes. Eliminating a turn lane would shunt traffic to the next available turn lane. • Avoid 17.5 to 35.5 feet of roadway widening, full takes of four businesses (Pizza Runner, 7-Eleven gas station, Carriage Cleaners, and Family Dollar), and parking impacts to 20 businesses. (Note that exclusive transit lanes could be incorporated south of these businesses to avoid takes.) • Avoid driver confusion and potential traffic accidents. If part of the project is mixed-flow and other parts use exclusive transit lanes, drivers could mistakenly follow transit into the exclusive transit lane at the transition. • Avoid delays for traffic and transit. If part of the project is mixed-flow and other parts use exclusive transit lanes, the transitions would require a separate, additional traffic signal phase, which could add additional delay.	• No traffic impediments. • Improved transit speed and reliability. • More permanence and better branding for BRT. • Anecdotal evidence suggests more-robust economic redevelopment for BRT in exclusive transit lanes due to permanence and branding.

The 2005 and 2008 studies assumed that mixed-flow transit lanes would not be feasible on Harrison Boulevard between 25th Street and 30th Street. UTA and the project team met with UDOT on July 17, 2014, to investigate the validity of this assumption.

UDOT's position is that the transit project cannot degrade traffic operations and must balance all users of the state highway facility. Transit vehicles must operate at the 40-mph speed limit. UDOT asked UTA and the project team to provide a traffic analysis to determine whether transit operating mixed-flow in traffic lanes on Harrison Boulevard between 25th Street and 30th Street would harm traffic operations. UDOT stated that a VISSIM traffic microsimulation would be the best method for the evaluation. UDOT asked the project team to use traffic volumes projected by WFRC for 2040 and requested the opportunity to review the VISSIM model assumptions and results in detail before conclusions regarding the viability of mixed-flow transit lanes on Harrison Boulevard between 25th Street and 30th Street were reached.

The VISSIM traffic microsimulation was conducted for a streetcar vehicle rather than a BRT vehicle because a streetcar vehicle would cause more impacts to the existing travel stream and would represent a "worst-case" scenario. If a streetcar could be shown to operate acceptably, then a BRT vehicle would likely work as well.

The VISSIM analysis showed that traffic would operate within acceptable parameters through 2040 with mixed-flow transit on Harrison Boulevard between 25th Street and 30th Street. For all but one intersection, the addition of a streetcar would not significantly increase average vehicle delay. In some cases, notably at 26th Street, the amount of vehicle delay would decrease. This decrease in delay is not likely due to the streetcar itself but is primarily a result of switching to a longer 80-second cycle for the traffic signal. In other words, at 26th Street, the increased delay caused by the streetcar would be outweighed by the benefits of a longer traffic signal cycle.

The average delays that would be experienced at a new signal at 25th Street would be among the highest along the route. Nevertheless, the level of service (LOS) at the intersection would remain at an acceptable level (LOS D or better) for all locations and scenarios. Operating a mixed-flow streetcar on Harrison Boulevard between 25th Street and 30th Street is not expected to cause unacceptable impacts to overall vehicle flow or transit performance. Most measurable impacts would be caused by a new signal at 25th Street. The new signal introduces additional delay to the transportation system, and travel times along the route would increase by about 20 seconds in each direction.

At 25th Street, the overall intersection delay with the signal would be LOS C for both existing and 2040 conditions. Additionally, the northbound left-turn movement would increase from LOS A to LOS D, largely due to the use of protected left-turn phasing. However, the increase in vehicle queue lengths would be marginal, which suggests that the northbound left-turn phase would be able to adequately clear the vehicle queues each cycle.

UDOT agreed with the traffic evaluation and agreed that mixed-flow transit could be incorporated on Harrison Boulevard. Because of the requirements of the Section 4(f) regulations and the fact that mixed-flow transit lanes are feasible on Harrison Boulevard between 25th Street and 30th Street, mixed-flow transit lanes are recommended for this segment for both modes.

From 30th Street to 36th Street, there are nonhistoric commercial properties on the west side of Harrison Boulevard, so widening would be feasible. Note that, for the streetcar mode, it is not essential or typical for an exclusive transit lane to be provided. Due to the permanence of a streetcar system's fixed guideway features, the improvement in the ride quality, the user's perception of the transit service, and the streetcar system's influence on development and investment resulting from the commitment made would be the same regardless of whether mixed-flow or exclusive transit lanes were implemented.

Given that existing and anticipated future traffic conditions on Harrison Boulevard in this segment do not and would not cause excessive vehicle queues or delays, given the right-of-way impacts and cost that would be required to provide exclusive transit lanes, and given the fact that exclusive transit lanes are not essential or typical for streetcars, mixed-flow transit lanes are recommended between 30th Street and 36th Street for streetcar.

Conversely, for BRT, an exclusive transit lane is the most tangible and noticeable improvement that can be made to the bus system. Changing at least part of a bus route to exclusive transit lanes provides benefits to ridership, land uses, and economic development, and these benefits might be worth the right-of-way impacts and costs for construction. In addition, exclusive transit lanes offer reliability that a bus subject to mixed-flow traffic isn't afforded. Therefore, the project team recommends that exclusive transit lanes be considered on Harrison Boulevard between 30th Street and 36th Street for BRT.

7.0 Alternatives Definition

Based on a segment-by-segment right-of-way constraint and fatal-flaw analysis and TAC recommendations, the project team recommends a combination of mixed-flow and exclusive transit lane configurations for each of the four alternatives (that is, some segments of each alternative have exclusive transit lanes, and other segments have mixed-flow transit lanes).

- With an exclusive transit lane configuration, the two lanes adjacent to the median (one in each direction) would be converted from a general-purpose lane into a streetcar- or BRT-only lane. This would leave two lanes in each direction for vehicles. The streetcar- or BRT-only lane would have raised medians so that it would be used by streetcar or BRT vehicles only. To make the exclusive transit lane fit into the existing roadway, additional right-of-way would be required on parts of Washington and Harrison Boulevards.
- With a mixed-flow transit lane configuration, the streetcar or BRT vehicle would operate in the traffic lanes. In the case of BRT, the vehicle would operate just like buses do currently. When BRT operates in mixed flow, it's no longer true BRT but rather a rapid bus or enhanced bus, though stations and vehicles would be upgraded. For the streetcar system, the track would be embedded in the traffic lanes. For the most part, no additional right-of-way would be required for a mixed-flow configuration.

8.0 Alternatives To Be Evaluated

Figure 37 depicts the four alternatives that will be evaluated and compared in the Update to the Alternatives Analysis. Note that a segment of an alternative with an exclusive transit lane configuration is shown as purple, and a segment of an alternative with a mixed-flow transit lane configuration is shown as orange.

All alternatives include up to 16 new stations. Exact station locations will be analyzed during the environmental documentation phase of the project. The new stations would be equipped with enhanced amenities similar to UTA's light-rail stations. The stations could have larger and more elaborate shelters, wayfinding information, larger waiting areas, seating, trash receptacles, off-board fare collection, farepay card readers, emergency call boxes, and closed-circuit television cameras.

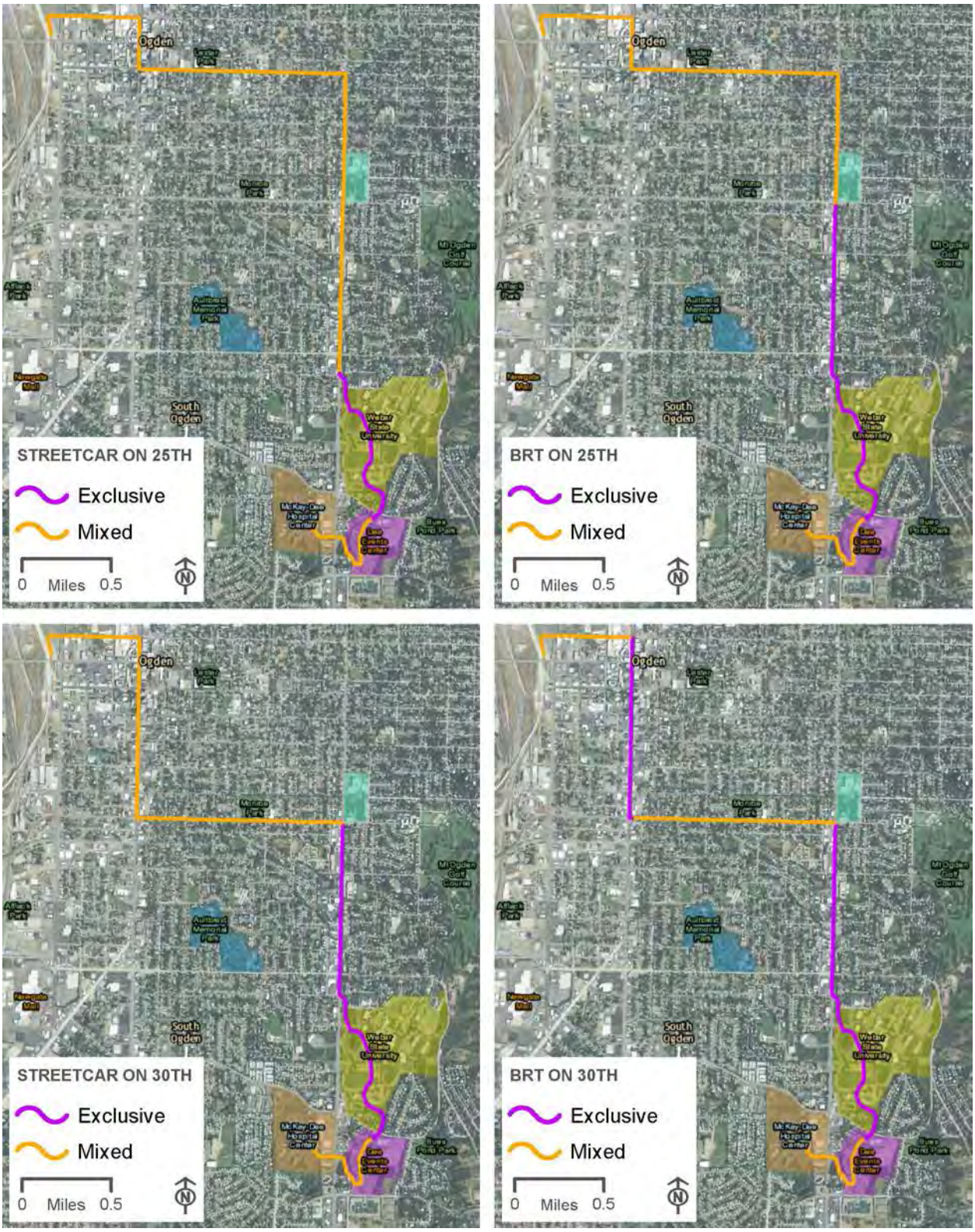


Figure 37. Recommended Alternatives

9.0 Reasons for the Recommended Definition of Alternatives

The project team, in consultation with the TAC, recommends a combination of mixed-flow and exclusive transit lane configurations for each of the four alternatives (that is, some segments of each alternative have exclusive transit lanes, and other segments have mixed-flow transit lanes). The comparison of alternatives in the Update to the Alternatives Analysis will compare the routes against the criteria listed in Section 6.0, Need for a More-Precise Definition of Alternatives, of this report. The project team cites the following reasons for the recommended definition of alternatives:

- Exclusive transit lanes are not feasible on 23rd, 25th, or 30th Streets or from the Dee Events Center to McKay-Dee Hospital, so these segments would be mixed-flow transit lanes.
- Exclusive transit lanes are not feasible on Harrison Boulevard from 25th Street to 30th Street.
- For the both the 25th Street and 30th Street alternatives, it does not make sense to implement exclusive transit lanes on Washington Boulevard from 23rd Street to 25th Street due to recent investments that were made to improve the multimodal, complete-streets character of Washington Boulevard in this area. These features would be eliminated by constructing exclusive transit lanes.
- For the 30th Street alternatives, there is a long enough segment on Washington Boulevard between 26th Street and 30th Street to consider exclusive transit lanes.
- For the 30th Street alternatives, all of Harrison Boulevard could be exclusive transit lanes, and the segments of Harrison Boulevard that would be exclusive transit lanes south of 30th Street could have exclusive transit lanes with the 25th Street alternatives.

Note that, for the streetcar mode, it is not essential or typical for an exclusive transit lane to be provided. Due to the permanence of a streetcar system's fixed guideway features, the improvement in the ride quality, the user's perception of the transit service, and the streetcar system's influence on development and investment resulting from the commitment made would be the same regardless of whether mixed-flow or exclusive transit lanes were implemented.

Conversely, for BRT, an exclusive transit lane is the most tangible and noticeable improvement that can be made to the bus system. Changing at least part of a bus route to exclusive transit lanes provides benefits to ridership, land uses, and economic development. Most BRT projects use some combination of the two configurations—that is, some segments have exclusive transit lanes and other segments have mixed-flow transit lanes.

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APPENDIX E

Capital and Operating and Maintenance Cost Evaluations

Transit Corridor Project

Opinion of Probable Costs

			Option 1 25th Street with Streetcar							Current Year
										2015.00 (YR)
SCC	**SCC Sub**	**Item #**	**Item Discription**	**Unit**	**Unit Cost**	**Quantity**	**Item Cost**	**A. Cont.**	**Item Cont.**	**Subtotal**
10			**GUIDEWAY & TRACK ELEMENTS (route miles)**				**$27,365,450**		**$5,479,090**	**$32,844,540**
	10.01		Guideway: At-grade exclusive right-of-way				$1,555,450		$311,090	$1,866,540
		10.01.01	Bus Lanes - pavement 9" PCCP, 6" UTBC, 12" GB	LF	$635	0.0	$0	20%	$0	$0
		10.01.02	Asphalt tie-in	LF	$56	0.0	$0	20%	$0	$0
		10.01.03	B5 curb	LF	$20	0.0	$0	20%	$0	$0
		10.01.04	Median Concrete Infill	LF	$144	5300.0	$763,200	20%	$152,640	$915,840
		10.01.05	Intersection Concrete Infill	LF	$85	250.0	$21,250	20%	$4,250	$25,500
		10.01.06	Guideway curb	LF	$25	10600.0	$265,000	20%	$53,000	$318,000
		10.01.07	Embankment - Guideway	CY	$20	17900.0	$358,000	20%	$71,600	$429,600
		10.01.08	Excavation - Guideway	CY	$20	7400.0	$148,000	20%	$29,600	$177,600
	10.08		Guideway: Retained cut or fill				$60,000		$18,000	$78,000
		10.08.01	Retaining Wall	SF	$60	1000.0	$60,000	30%	$18,000	$78,000
	10.10		Track: Embedded				$25,155,000		$5,031,000	$30,186,000
		10.10.01	Furnish Rail - Assume 115RE Rail	TF	$90	55900.0	$5,031,000	20%	$1,006,200	$6,037,200
		10.10.02	Embedded Track - Construct Track Slab	TF	$360	55900.0	$20,124,000	20%	$4,024,800	$24,148,800
	10.11		Track: Ballasted				$115,000		$23,000	$138,000
		10.11.01	Furnish Rail - Assume 115RE Rail	TF	$70	1150.0	$80,500	20%	$16,100	$96,600
		10.11.02	Ballasted Track	TF	$30	1150.0	$34,500	20%	$6,900	$41,400
	10.12		Track: Special (switches, turnouts)				$480,000		$96,000	$576,000
		10.12.01	Embedded Turnout - Furnish and Install	EA	$225,000	0.0	$0	20%	$0	$0
		10.12.02	Ballasted Track - Diamond Crossover	EA	$125,000	1.0	$125,000	20%	$25,000	$150,000
		10.12.03	Ballast-to-Embedded Transistion	LS	$25,000	1.0	$25,000	20%	$5,000	$30,000
		10.12.04	End Stop	EA	$7,500	4.0	$30,000	20%	$6,000	$36,000
		10.12.05	Embedded Track - Diamond Crossover	EA	$300,000	1.0	$300,000	20%	$60,000	$360,000
20			**STATIONS, STOPS, TERMINALS, INTERMODAL (number)**				**$3,440,000**		**$688,000**	**$4,128,000**
	20.01		At-grade station, stop, shelter, mall, terminal, platform				$3,440,000		$688,000	$4,128,000
		20.01.01	Streetcar Stop - Side platform	EA	$120,000	22.0	$2,640,000	20%	$528,000	$3,168,000
		20.01.02	Streetcar Stop - Center shared platform	EA	$160,000	5.0	$800,000	20%	$160,000	$960,000
30			**SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS**				$15,825,000		$3,165,000	$18,990,000
	30.02		Light Maintenance Facility				$15,000,000		$3,000,000	$18,000,000
		30.02.01	Streetcar Maintenance Building - New	EA	$15,000,000	1.0	$15,000,000	20%	$3,000,000	$18,000,000
		30.02.02	Bus Maintenance Building - Renovations	EA	$5,000,000	0.0	$0	20%	$0	$0
40			**SITEWORK & SPECIAL CONDITIONS**				**$28,234,656**		**$2,229,900**	**$30,464,556**
	40.02		Site Utilities, Utility Relocation				$3,520,000		$1,056,000	$4,576,000
		40.02.01	23rd Street - Wall Ave to Washington Blvd	LS	$450,000	1.0	$450,000	30%	$135,000	$585,000
		40.02.02	Washington Blvd - 23rd Street to 25th Street	LS	$275,000	1.0	$275,000	30%	$82,500	$357,500
		40.02.03	Washington Blvd - 25th Street to 30th Street (Streetcar - Mixed)	LS	$80,000	0.0	$0	30%	$0	$0
		40.02.04	Washington Blvd - 25th Street to 30th Street (BRT - Exclusinve)	LS	$90,000	0.0	$0	30%	$0	$0
		40.02.05	25th Street - Washington Blvd to Harrison Blvd	LS	$1,668,000	0.0	$0	30%	$0	$0
		40.02.06	Harrison Blvd - 25th Street to 30th Street	LS	$435,000	0.0	$0	30%	$0	$0
		40.02.07	Harrison Blvd - 30th Street to 37th Street (Mixed)	LS	$1,660,000	0.0	$0	30%	$0	$0
		40.02.08	Harrison Blvd - 30th Street to 37th Street (Exclusive)	LS	$877,500	0.0	$0	30%	$0	$0
		40.02.09	30th Street - Washington Blvd to Harrison Blvd	LS	$1,965,000	0.0	$0	30%	$0	$0

		40.02.10	Utility Relocation - (Miscellaneous relocations)	TF	$100	27950.0	$2,795,000	30%	$838,500	$3,633,500
	40.07		Automobile, bus, van accessways including roads, parking lots				$5,869,500		$1,173,900	$7,043,400
		40.07.01	Roadway Improvement Allowance	TF	$75	55900.0	$4,192,500	20%	$838,500	$5,031,000
		40.07.02	Track Drainage Allowance	TF	$20	55900.0	$1,118,000	20%	$223,600	$1,341,600
		40.07.03	Street Lighting Allowance (Adjustments, Relocations, New)	TF	$10	55900.0	$559,000	20%	$111,800	$670,800
		40.07.04	Curb & Gutter - B2	LF	$25	0.0	$0	20%	$0	$0
		40.07.05	Sidewalk	SF	$8	0.0	$0	20%	$0	$0
		40.07.06	HMA Pavement	SF	$25	0.0	$0	20%	$0	$0
		40.07.07	Concrete Driveways	SF	$10	0.0	$0	20%	$0	$0
		40.07.08	Parkstrip	SF	$5	0.0	$0	20%	$0	$0
		40.07.09	Remove Parking Lot Paving	SF	$2	0.0	$0	20%	$0	$0
		40.07.10	Intersection Concrete Infill	LF	$10	0.0	$0	20%	$0	$0
		40.07.11	Remove Concrete Sidewalk	SF	$2	0.0	$0	20%	$0	$0
		40.07.12	Remove HMA Pavement	SF	$2	0.0	$0	20%	$0	$0
		40.07.13	Remove Concrete Driveway	SF	$4	0.0	$0	20%	$0	$0
		40.07.14	Remove Park Strip	SF	$2	0.0	$0	20%	$0	$0
	40.08		Temporary Facilities and other indirect costs during construction				$18,845,156		$0	$18,845,156
		40.08.01	Temporary Maintenance of Traffic	LS	5%	117782222.7	$5,889,111	0%	$0	$5,889,111
		40.08.02	Contractor Indirects (Staff, Office, etc.)	LS	10%	117782222.7	$11,778,222	0%	$0	$11,778,222
		40.08.03	Art in Transit (1% of Construction)	LS	1%	117782222.7	$1,177,822	0%	$0	$1,177,822
50			**SYSTEMS**				**$24,164,500**		**$4,877,900**	**$29,042,400**
	50.01		Train control and signals				$150,000		$75,000	$225,000
		50.01.01	New train control and signals	EA	$75,000	2.0	$150,000	50%	$75,000	$225,000
	50.02		Traffic signals and crossing protection				$2,430,000		$486,000	$2,916,000
		50.02.01	Modify Existing Traffic Signal	EA	$75,000	12.0	$900,000	20%	$180,000	$1,080,000
		50.02.02	New Traffic Signal Allowance	EA	$150,000	7.0	$1,050,000	20%	$210,000	$1,260,000
		50.02.03	Signal Priority Allowance	EA	$20,000	19.0	$380,000	20%	$76,000	$456,000
		50.02.04	New Pedestrian Traffic Signal Allowance	EA	$75,000	0.0	$0	20%	$0	$0
		50.02.05	Crossing Gates at Roundabout	LS	$100,000	1.0	$100,000	20%	$20,000	$120,000
	50.03		Traction power supply: substations				$4,500,000		$900,000	$5,400,000
		50.03.01	Traction Power Substation (Assume 1/Track Mile or 1 per 0.5 Rt. Mile)	EA	$900,000	5.0	$4,500,000	20%	$900,000	$5,400,000
	50.04		Traction power distribution: catenary and third rail				$15,974,000		$3,194,800	$19,168,800
		50.04.01	Overhead Trolley Wire Allowance (Poles, wires, appurtenances)	TF	$280	57050.0	$15,974,000	20%	$3,194,800	$19,168,800
	50.05		Communications				$570,500		$114,100	$684,600
		50.05.01	Communications Allowance	LF	$20	28525.0	$570,500	20%	$114,100	$684,600
	50.06		Fare collection system and equipment				$540,000		$108,000	$648,000
		50.06.01	Fare Collection Allowance	EA	$20,000	27.0	$540,000	20%	$108,000	$648,000
	Construction Subtotal (10-50)						**$99,029,606**		**$16,439,890**	**$115,469,496**
60			**ROW, LAND, EXISTING IMPROVEMENTS**				**$0**		**$0**	**$0**
	60.01		Purchase or lease of real estate				$0		$0	$0
		60.01.01	Right of Way Acquisition	LS	$1	0.0	$0	0%	$0	$0
70			**VEHICLES (number)**				$21,500,000		$445,000	$21,945,000
	70.01		Light Rail				$21,000,000		$420,000	$21,420,000
		70.01.01	Modern Streetcar Vehicle (Assumes wired system)	EA	$4,200,000	5.0	$21,000,000	2%	$420,000	$21,420,000
	70.04		Bus				$0		$0	$0

Transit Corridor Project

Opinion of Probable Costs

		70.04.01	60-foot Articulated Bus	EA	$1,000,000	0.0	$0	5%	$0	$0
	70.07		Spare parts				$500,000		$25,000	$525,000
		70.07.01	Spare Parts for New Streetcars (Per Vehicle)	EA	$100,000	5.0	$500,000	5%	$25,000	$525,000
		70.07.02	Spare Parts for New Buses (Per Vehicle)	EA	$10,000	0.0	$0	5%	$0	$0
80			**PROFESSIONAL SERVICES (applies to Cats. 10-50)**				**$29,213,734**		**$0**	**$29,213,734**
	80.01		Preliminary Engineering				$2,475,740		$0	$2,475,740
		80.01.01	Percentage of Direct Costs SCC (10-50)	LS	2.5%	$99,029,606	$2,475,740	0%	$0	$2,475,740
	80.02		Final Design				$6,932,072		$0	$6,932,072
		80.02.01	Percentage of Direct Costs SCC (10-50)	LS	7.0%	$99,029,606	$6,932,072	0%	$0	$6,932,072
	80.03		Project Management for Design and Construction				$4,951,480		$0	$4,951,480
		80.03.01	Percentage of Direct Costs SCC (10-50)	LS	5.0%	$99,029,606	$4,951,480	0%	$0	$4,951,480
	80.04		Construction Administration & Management				$5,941,776		$0	$5,941,776
		80.04.01	Percentage of Direct Costs SCC (10-50)	LS	6.0%	$99,029,606	$5,941,776	0%	$0	$5,941,776
	80.05		Professional Liability and other Non-Construction Insurance				$2,970,888		$0	$2,970,888
		80.05.01	Percentage of Direct Costs SCC (10-50)	LS	3.0%	$99,029,606	$2,970,888	0%	$0	$2,970,888
	80.06		Legal; Permits; Review Fees by other agencies, cities, etc.				$1,980,592		$0	$1,980,592
		80.06.01	Percentage of Direct Costs SCC (10-50)	LS	2.0%	$99,029,606	$1,980,592	0%	$0	$1,980,592
	80.07		Surveys, Testing, Investigation, Inspection				$1,980,592		$0	$1,980,592
		80.07.01	Percentage of Direct Costs SCC (10-50)	LS	2.0%	$99,029,606	$1,980,592	0%	$0	$1,980,592
	80.08		Start up				$1,980,592		$0	$1,980,592
		80.08.01	Percentage of Direct Costs SCC (10-50)	LS	2.0%	$99,029,606	$1,980,592	0%	$0	$1,980,592
	Subtotal (10-80)						**$149,743,339**		**$16,884,890**	**$166,628,229**
90			**UNALLOCATED CONTINGENCY**	**LS**	**10%**					**$16,662,823**
100			**FINANCE CHARGES**							***Current Year Total***
	Segment Totals (10-100)									**$183,291,052**

Transit Corridor Project

Opinion of Probable Costs

			Option 2 25th Street with BRT							Current Year *2015.00 (YR)*
SCC	**SCC Sub**	**Item #**	**Item Discription**	**Unit**	**Unit Cost**	**Quantity**	**Item Cost**	**A. Cont.**	**Item Cont.**	**Subtotal**
10			**GUIDEWAY & TRACK ELEMENTS (route miles)**				**$1,876,500**		**$375,300**	**$2,251,800**
	10.01		Guideway: At-grade exclusive right-of-way				$1,876,500		$375,300	$2,251,800
		10.01.01	Bus Lanes - pavement 9" PCCP, 6" UTBC, 12" GB	LF	$635	2300.0	$1,460,500	20%	$292,100	$1,752,600
		10.01.02	Asphalt tie-in	LF	$56	0.0	$0	20%	$0	$0
		10.01.03	B5 curb	LF	$20	3300.0	$66,000	20%	$13,200	$79,200
		10.01.04	Median Concrete Infill	LF	$144	0.0	$0	20%	$0	$0
		10.01.05	Intersection Concrete Infill	LF	$85	0.0	$0	20%	$0	$0
		10.01.06	Guideway curb	LF	$25	0.0	$0	20%	$0	$0
		10.01.07	Embankment - Guideway	CY	$20	16000.0	$320,000	20%	$64,000	$384,000
		10.01.08	Excavation - Guideway	CY	$20	1500.0	$30,000	20%	$6,000	$36,000
	10.08		Guideway: Retained cut or fill				$0		$0	$0
		10.08.01	Retaining Wall	SF	$60	0.0	$0	30%	$0	$0
	10.10		Track: Embedded				$0		$0	$0
		10.10.01	Furnish Rail - Assume 115RE Rail	TF	$90	0.0	$0	20%	$0	$0
		10.10.02	Embedded Track - Construct Track Slab	TF	$360	0.0	$0	20%	$0	$0
	10.11		Track: Ballasted				$0		$0	$0
		10.11.01	Furnish Rail - Assume 115RE Rail	TF	$70	0.0	$0	20%	$0	$0
		10.11.02	Ballasted Track	TF	$30	0.0	$0	20%	$0	$0
	10.12		Track: Special (switches, turnouts)				$0		$0	$0
		10.12.01	Embedded Turnout - Furnish and Install	EA	$225,000	0.0	$0	20%	$0	$0
		10.12.02	Ballasted Track - Diamond Crossover	EA	$125,000	0.0	$0	20%	$0	$0
		10.12.03	Ballast-to-Embedded Transistion	LS	$25,000	0.0	$0	20%	$0	$0
		10.12.04	End Stop	EA	$7,500	0.0	$0	20%	$0	$0
		10.12.05	Embedded Track - Diamond Crossover	EA	$300,000	0.0	$0	20%	$0	$0
20			**STATIONS, STOPS, TERMINALS, INTERMODAL (number)**				**$3,240,000**		**$648,000**	**$3,888,000**
	20.01		At-grade station, stop, shelter, mall, terminal, platform				$3,240,000		$648,000	$3,888,000
		20.01.01	Streetcar Stop - Side platform	EA	$120,000	23.0	$2,760,000	20%	$552,000	$3,312,000
		20.01.02	Streetcar Stop - Center shared platform	EA	$160,000	3.0	$480,000	20%	$96,000	$576,000
30			**SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS**				$5,000,000		$1,000,000	$6,000,000
	30.02		Light Maintenance Facility				$5,000,000		$1,000,000	$6,000,000
		30.02.01	Streetcar Maintenance Building - New	EA	$15,000,000	0.0	$0	20%	$0	$0
		30.02.02	Bus Maintenance Building - Renovations	EA	$5,000,000	1.0	$5,000,000	20%	$1,000,000	$6,000,000
40			**SITEWORK & SPECIAL CONDITIONS**				**$4,638,431**		**$427,500**	**$5,065,931**
	40.02		Site Utilities, Utility Relocation				$1,425,000		$427,500	$1,852,500
		40.02.01	23rd Street - Wall Ave to Washington Blvd	LS	$450,000	0.0	$0	30%	$0	$0
		40.02.02	Washington Blvd - 23rd Street to 25th Street	LS	$275,000	0.0	$0	30%	$0	$0
		40.02.03	Washington Blvd - 25th Street to 30th Street (Streetcar - Mixed)	LS	$80,000	0.0	$0	30%	$0	$0
		40.02.04	Washington Blvd - 25th Street to 30th Street (BRT - Exclusinve)	LS	$90,000	0.0	$0	30%	$0	$0
		40.02.05	25th Street - Washington Blvd to Harrison Blvd	LS	$1,668,000	0.0	$0	30%	$0	$0
		40.02.06	Harrison Blvd - 25th Street to 30th Street	LS	$435,000	0.0	$0	30%	$0	$0
		40.02.07	Harrison Blvd - 30th Street to 37th Street (Mixed)	LS	$1,660,000	0.0	$0	30%	$0	$0
		40.02.08	Harrison Blvd - 30th Street to 37th Street (Exclusive)	LS	$877,500	0.0	$0	30%	$0	$0
		40.02.09	30th Street - Washington Blvd to Harrison Blvd	LS	$1,965,000	0.0	$0	30%	$0	$0

		40.02.10	Utility Relocation - (Miscellaneous relocations)	TF	$100	14250.0	$1,425,000	30%	$427,500	$1,852,500
	40.07		Automobile, bus, van accessways including roads, parking lots				$0		$0	$0
		40.07.01	Roadway Improvement Allowance	TF	$75	0.0	$0	20%	$0	$0
		40.07.02	Track Drainage Allowance	TF	$20	0.0	$0	20%	$0	$0
		40.07.03	Street Lighting Allowance (Adjustments, Relocations, New)	TF	$10	0.0	$0	20%	$0	$0
		40.07.04	Curb & Gutter - B2	LF	$25	0.0	$0	20%	$0	$0
		40.07.05	Sidewalk	SF	$8	0.0	$0	20%	$0	$0
		40.07.06	HMA Pavement	SF	$25	0.0	$0	20%	$0	$0
		40.07.07	Concrete Driveways	SF	$10	0.0	$0	20%	$0	$0
		40.07.08	Parkstrip	SF	$5	0.0	$0	20%	$0	$0
		40.07.09	Remove Parking Lot Paving	SF	$2	0.0	$0	20%	$0	$0
		40.07.10	Intersection Concrete Infill	LF	$10	0.0	$0	20%	$0	$0
		40.07.11	Remove Concrete Sidewalk	SF	$2	0.0	$0	20%	$0	$0
		40.07.12	Remove HMA Pavement	SF	$2	0.0	$0	20%	$0	$0
		40.07.13	Remove Concrete Driveway	SF	$4	0.0	$0	20%	$0	$0
		40.07.14	Remove Park Strip	SF	$2	0.0	$0	20%	$0	$0
	40.08		Temporary Facilities and other indirect costs during construction				$3,213,431		$0	$3,213,431
		40.08.01	Temporary Maintenance of Traffic	LS	5%	$20,083,942	$1,004,197	0%	$0	$1,004,197
		40.08.02	Contractor Indirects (Staff, Office, etc.)	LS	10%	$20,083,942	$2,008,394	0%	$0	$2,008,394
		40.08.03	Art in Transit (1% of Construction)	LS	1%	$20,083,942	$200,839	0%	$0	$200,839
50			**SYSTEMS**				**$1,955,000**		**$391,000**	**$2,346,000**
	50.02		Traffic signals and crossing protection				$865,000		$173,000	$1,038,000
		50.02.01	Modify Existing Traffic Signal	EA	$75,000	1.0	$75,000	20%	$15,000	$90,000
		50.02.02	New Traffic Signal Allowance	EA	$150,000	3.0	$450,000	20%	$90,000	$540,000
		50.02.03	Signal Priority Allowance	EA	$20,000	17.0	$340,000	20%	$68,000	$408,000
		50.02.04	New Pedestrian Traffic Signal Allowance	EA	$75,000	0.0	$0	20%	$0	$0
		50.02.05	Crossing Gates at Roundabout	LS	$100,000	0.0	$0	20%	$0	$0
	50.03		Traction power supply: substations				$0		$0	$0
		50.03.01	Traction Power Substation (Assume 1/Track Mile or 1 per 0.5 Rt. Mile)	EA	$900,000	0.0	$0	20%	$0	$0
	50.04		Traction power distribution: catenary and third rail				$0		$0	$0
		50.04.01	Overhead Trolley Wire Allowance (Poles, wires, appurtenances)	TF	$280	0.0	$0	20%	$0	$0
	50.05		Communications				$570,000		$114,000	$684,000
		50.05.01	Communications Allowance	LF	$20	28500.0	$570,000	20%	$114,000	$684,000
	50.06		Fare collection system and equipment				$520,000		$104,000	$624,000
		50.06.01	Fare Collection Allowance	EA	$20,000	26.0	$520,000	20%	$104,000	$624,000
	Construction Subtotal (10-50)						**$16,709,931**		**$2,841,800**	**$19,551,731**
60			**ROW, LAND, EXISTING IMPROVEMENTS**				**$0**		**$0**	**$0**
	60.01		Purchase or lease of real estate				$0		$0	$0
		60.01.01	Right of Way Acquisition	LS	$1	0.0	$0	0%	$0	$0
70			**VEHICLES (number)**				$5,050,000		$252,500	$5,302,500
	70.01		Light Rail				$0		$0	$0
		70.01.01	Modern Streetcar Vehicle (Assumes wired system)	EA	$4,200,000	0.0	$0	2%	$0	$0
	70.04		Bus				$5,000,000		$250,000	$5,250,000
		70.04.01	60-foot Articulated Bus	EA	$1,000,000	5.0	$5,000,000	5%	$250,000	$5,250,000
	70.07		Spare parts				$50,000		$2,500	$52,500

		70.07.01	Spare Parts for New Streetcars (Per Vehicle)	EA	$100,000	0.0	$0	5%	$0	$0
		70.07.02	Spare Parts for New Buses (Per Vehicle)	EA	$10,000	5.0	$50,000	5%	$2,500	$52,500
80			**PROFESSIONAL SERVICES (applies to Cats. 10-50)**				**$4,929,430**		**$0**	**$4,929,430**
	80.01		Preliminary Engineering				$417,748		$0	$417,748
		80.01.01	Percentage of Direct Costs SCC (10-50)	LS	2.5%	$16,709,931	$417,748	0%	$0	$417,748
	80.02		Final Design				$1,169,695		$0	$1,169,695
		80.02.01	Percentage of Direct Costs SCC (10-50)	LS	7.0%	$16,709,931	$1,169,695	0%	$0	$1,169,695
	80.03		Project Management for Design and Construction				$835,497		$0	$835,497
		80.03.01	Percentage of Direct Costs SCC (10-50)	LS	5.0%	$16,709,931	$835,497	0%	$0	$835,497
	80.04		Construction Administration & Management				$1,002,596		$0	$1,002,596
		80.04.01	Percentage of Direct Costs SCC (10-50)	LS	6.0%	$16,709,931	$1,002,596	0%	$0	$1,002,596
	80.05		Professional Liability and other Non-Construction Insurance				$501,298		$0	$501,298
		80.05.01	Percentage of Direct Costs SCC (10-50)	LS	3.0%	$16,709,931	$501,298	0%	$0	$501,298
	80.06		Legal; Permits; Review Fees by other agencies, cities, etc.				$334,199		$0	$334,199
		80.06.01	Percentage of Direct Costs SCC (10-50)	LS	2.0%	$16,709,931	$334,199	0%	$0	$334,199
	80.07		Surveys, Testing, Investigation, Inspection				$334,199		$0	$334,199
		80.07.01	Percentage of Direct Costs SCC (10-50)	LS	2.0%	$16,709,931	$334,199	0%	$0	$334,199
	80.08		Start up				$334,199		$0	$334,199
		80.08.01	Percentage of Direct Costs SCC (10-50)	LS	2.0%	$16,709,931	$334,199	0%	$0	$334,199
	Subtotal (10-80)						**$26,689,360**		**$3,094,300**	**$29,783,660**
90			**UNALLOCATED CONTINGENCY**	**LS**	**10%**					**$2,978,366**
100			**FINANCE CHARGES**							***Current Year Total***
	Segment Totals (10-100)									**$32,762,026**

Transit Corridor Project

Opinion of Probable Costs

			Option 3 25th Street with Streetcar							Current Year *2015.00 (YR)*
SCC	**SCC Sub**	**Item #**	**Item Discription**	**Unit**	**Unit Cost**	**Quantity**	**Item Cost**	**A. Cont.**	**Item Cont.**	**Subtotal**
10			**GUIDEWAY & TRACK ELEMENTS (route miles)**				**$28,317,200**		**$5,669,440**	**$33,986,640**
	10.01		Guideway: At-grade exclusive right-of-way				$2,507,200		$501,440	$3,008,640
		10.01.01	Bus Lanes - pavement 9" PCCP, 6" UTBC, 12" GB	LF	$635	0.0	$0	20%	$0	$0
		10.01.02	Asphalt tie-in	LF	$56	0.0	$0	20%	$0	$0
		10.01.03	B5 curb	LF	$20	0.0	$0	20%	$0	$0
		10.01.04	Median Concrete Infill	LF	$144	10050.0	$1,447,200	20%	$289,440	$1,736,640
		10.01.05	Intersection Concrete Infill	LF	$85	600.0	$51,000	20%	$10,200	$61,200
		10.01.06	Guideway curb	LF	$25	20120.0	$503,000	20%	$100,600	$603,600
		10.01.07	Embankment - Guideway	CY	$20	17900.0	$358,000	20%	$71,600	$429,600
		10.01.08	Excavation - Guideway	CY	$20	7400.0	$148,000	20%	$29,600	$177,600
	10.08		Guideway: Retained cut or fill				$60,000		$18,000	$78,000
		10.08.01	Retaining Wall	SF	$60	1000.0	$60,000	30%	$18,000	$78,000
	10.10		Track: Embedded				$25,155,000		$5,031,000	$30,186,000
		10.10.01	Furnish Rail - Assume 115RE Rail	TF	$90	55900.0	$5,031,000	20%	$1,006,200	$6,037,200
		10.10.02	Embedded Track - Construct Track Slab	TF	$360	55900.0	$20,124,000	20%	$4,024,800	$24,148,800
	10.11		Track: Ballasted				$115,000		$23,000	$138,000
		10.11.01	Furnish Rail - Assume 115RE Rail	TF	$70	1150.0	$80,500	20%	$16,100	$96,600
		10.11.02	Ballasted Track	TF	$30	1150.0	$34,500	20%	$6,900	$41,400
	10.12		Track: Special (switches, turnouts)				$480,000		$96,000	$576,000
		10.12.01	Embedded Turnout - Furnish and Install	EA	$225,000	0.0	$0	20%	$0	$0
		10.12.02	Ballasted Track - Diamond Crossover	EA	$125,000	1.0	$125,000	20%	$25,000	$150,000
		10.12.03	Ballast-to-Embedded Transistion	LS	$25,000	1.0	$25,000	20%	$5,000	$30,000
		10.12.04	End Stop	EA	$7,500	4.0	$30,000	20%	$6,000	$36,000
		10.12.05	Embedded Track - Diamond Crossover	EA	$300,000	1.0	$300,000	20%	$60,000	$360,000
20			**STATIONS, STOPS, TERMINALS, INTERMODAL (number)**				**$3,360,000**		**$672,000**	**$4,032,000**
	20.01		At-grade station, stop, shelter, mall, terminal, platform				$3,360,000		$672,000	$4,032,000
		20.01.01	Streetcar Stop - Side platform	EA	$120,000	20.0	$2,400,000	20%	$480,000	$2,880,000
		20.01.02	Streetcar Stop - Center shared platform	EA	$160,000	6.0	$960,000	20%	$192,000	$1,152,000
30			**SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS**				$15,825,000		$3,165,000	$18,990,000
	30.02		Light Maintenance Facility				$15,000,000		$3,000,000	$18,000,000
		30.02.01	Streetcar Maintenance Building - New	EA	$15,000,000	1.0	$15,000,000	20%	$3,000,000	$18,000,000
		30.02.02	Bus Maintenance Building - Renovations	EA	$5,000,000	0.0	$0	20%	$0	$0
40			**SITEWORK & SPECIAL CONDITIONS**				**$32,840,121**		**$3,011,658**	**$35,851,779**
	40.02		Site Utilities, Utility Relocation				$4,477,500		$1,343,250	$5,820,750
		40.02.01	23rd Street - Wall Ave to Washington Blvd	LS	$450,000	1.0	$450,000	30%	$135,000	$585,000
		40.02.02	Washington Blvd - 23rd Street to 25th Street	LS	$275,000	1.0	$275,000	30%	$82,500	$357,500
		40.02.03	Washington Blvd - 25th Street to 30th Street (Streetcar - Mixed)	LS	$80,000	1.0	$80,000	30%	$24,000	$104,000
		40.02.04	Washington Blvd - 25th Street to 30th Street (BRT - Exclusinve)	LS	$90,000	0.0	$0	30%	$0	$0
		40.02.05	25th Street - Washington Blvd to Harrison Blvd	LS	$1,668,000	0.0	$0	30%	$0	$0
		40.02.06	Harrison Blvd - 25th Street to 30th Street	LS	$435,000	0.0	$0	30%	$0	$0
		40.02.07	Harrison Blvd - 30th Street to 37th Street (Mixed)	LS	$1,660,000	0.0	$0	30%	$0	$0
		40.02.08	Harrison Blvd - 30th Street to 37th Street (Exclusive)	LS	$877,500	1.0	$877,500	30%	$263,250	$1,140,750
		40.02.09	30th Street - Washington Blvd to Harrison Blvd	LS	$1,965,000	0.0	$0	30%	$0	$0

		40.02.10	Utility Relocation - (Miscellaneous relocations)	TF	$100	27950.0	$2,795,000	30%	$838,500	$3,633,500
	40.07		Automobile, bus, van accessways including roads, parking lots				$8,342,038		$1,668,408	$10,010,445
		40.07.01	Roadway Improvement Allowance	TF	$75	45700.0	$3,427,500	20%	$685,500	$4,113,000
		40.07.02	Track Drainage Allowance	TF	$20	55900.0	$1,118,000	20%	$223,600	$1,341,600
		40.07.03	Street Lighting Allowance (Adjustments, Relocations, New)	TF	$10	55900.0	$559,000	20%	$111,800	$670,800
		40.07.04	Curb & Gutter - B2	LF	$25	9880.0	$247,000	20%	$49,400	$296,400
		40.07.05	Sidewalk	SF	$8	37910.0	$303,280	20%	$60,656	$363,936
		40.07.06	HMA Pavement	SF	$25	92075.0	$2,301,875	20%	$460,375	$2,762,250
		40.07.07	Concrete Driveways	SF	$10	3350.0	$33,500	20%	$6,700	$40,200
		40.07.08	Parkstrip	SF	$5	6145.0	$30,725	20%	$6,145	$36,870
		40.07.09	Remove Parking Lot Paving	SF	$2	25675.0	$38,513	20%	$7,703	$46,215
		40.07.10	Intersection Concrete Infill	LF	$10	8140.0	$81,400	20%	$16,280	$97,680
		40.07.11	Remove Concrete Sidewalk	SF	$2	37870.0	$75,740	20%	$15,148	$90,888
		40.07.12	Remove HMA Pavement	SF	$2	20840.0	$31,260	20%	$6,252	$37,512
		40.07.13	Remove Concrete Driveway	SF	$4	8790.0	$30,765	20%	$6,153	$36,918
		40.07.14	Remove Park Strip	SF	$2	42320.0	$63,480	20%	$12,696	$76,176
	40.08		Temporary Facilities and other indirect costs during construction				$20,020,584		$0	$20,020,584
		40.08.01	Temporary Maintenance of Traffic	LS	5%	125128647.1	$6,256,432	0%	$0	$6,256,432
		40.08.02	Contractor Indirects (Staff, Office, etc.)	LS	10%	125128647.1	$12,512,865	0%	$0	$12,512,865
		40.08.03	Art in Transit (1% of Construction)	LS	1%	125128647.1	$1,251,286	0%	$0	$1,251,286
50			**SYSTEMS**				**$24,089,500**		**$4,862,900**	**$28,952,400**
	50.02		Traffic signals and crossing protection				$2,375,000		$475,000	$2,850,000
		50.02.01	Modify Existing Traffic Signal	EA	$75,000	15.0	$1,125,000	20%	$225,000	$1,350,000
		50.02.02	New Traffic Signal Allowance	EA	$150,000	5.0	$750,000	20%	$150,000	$900,000
		50.02.03	Signal Priority Allowance	EA	$20,000	20.0	$400,000	20%	$80,000	$480,000
		50.02.04	New Pedestrian Traffic Signal Allowance	EA	$75,000	0.0	$0	20%	$0	$0
		50.02.05	Crossing Gates at Roundabout	LS	$100,000	1.0	$100,000	20%	$20,000	$120,000
	50.03		Traction power supply: substations				$4,500,000		$900,000	$5,400,000
		50.03.01	Traction Power Substation (Assume 1/Track Mile or 1 per 0.5 Rt. Mile)	EA	$900,000	5.0	$4,500,000	20%	$900,000	$5,400,000
	50.04		Traction power distribution: catenary and third rail				$15,974,000		$3,194,800	$19,168,800
		50.04.01	Overhead Trolley Wire Allowance (Poles, wires, appurtenances)	TF	$280	57050.0	$15,974,000	20%	$3,194,800	$19,168,800
	50.05		Communications				$570,500		$114,100	$684,600
		50.05.01	Communications Allowance	LF	$20	28525.0	$570,500	20%	$114,100	$684,600
	50.06		Fare collection system and equipment				$520,000		$104,000	$624,000
		50.06.01	Fare Collection Allowance	EA	$20,000	26.0	$520,000	20%	$104,000	$624,000
	Construction Subtotal (10-50)						**$104,431,821**		**$17,380,998**	**$121,812,819**
60			**ROW, LAND, EXISTING IMPROVEMENTS**				**$2,664,600**		**$0**	**$2,664,600**
	60.01		Purchase or lease of real estate				$2,664,600		$0	$2,664,600
		60.01.01	Right of Way Acquisition	LS	$1	2664600.0	$2,664,600	0%	$0	$2,664,600
70			**VEHICLES (number)**				$21,500,000		$445,000	$21,945,000
	70.01		Light Rail				$21,000,000		$420,000	$21,420,000
		70.01.01	Modern Streetcar Vehicle (Assumes wired system)	EA	$4,200,000	5.0	$21,000,000	2%	$420,000	$21,420,000
	70.04		Bus				$0		$0	$0
		70.04.01	60-foot Articulated Bus	EA	$1,000,000	0.0	$0	5%	$0	$0
	70.07		Spare parts				$500,000		$25,000	$525,000

		70.07.01	Spare Parts for New Streetcars (Per Vehicle)	EA	$100,000	5.0	$500,000	5%	$25,000	$525,000
		70.07.02	Spare Parts for New Buses (Per Vehicle)	EA	$10,000	0.0	$0	5%	$0	$0
80			**PROFESSIONAL SERVICES (applies to Cats. 10-50)**				**$30,807,387**		**$0**	**$30,807,387**
	80.01		Preliminary Engineering				$2,610,796		$0	$2,610,796
		80.01.01	Percentage of Direct Costs SCC (10-50)	LS	2.5%	$104,431,821	$2,610,796	0%	$0	$2,610,796
	80.02		Final Design				$7,310,227		$0	$7,310,227
		80.02.01	Percentage of Direct Costs SCC (10-50)	LS	7.0%	$104,431,821	$7,310,227	0%	$0	$7,310,227
	80.03		Project Management for Design and Construction				$5,221,591		$0	$5,221,591
		80.03.01	Percentage of Direct Costs SCC (10-50)	LS	5.0%	$104,431,821	$5,221,591	0%	$0	$5,221,591
	80.04		Construction Administration & Management				$6,265,909		$0	$6,265,909
		80.04.01	Percentage of Direct Costs SCC (10-50)	LS	6.0%	$104,431,821	$6,265,909	0%	$0	$6,265,909
	80.05		Professional Liability and other Non-Construction Insurance				$3,132,955		$0	$3,132,955
		80.05.01	Percentage of Direct Costs SCC (10-50)	LS	3.0%	$104,431,821	$3,132,955	0%	$0	$3,132,955
	80.06		Legal; Permits; Review Fees by other agencies, cities, etc.				$2,088,636		$0	$2,088,636
		80.06.01	Percentage of Direct Costs SCC (10-50)	LS	2.0%	$104,431,821	$2,088,636	0%	$0	$2,088,636
	80.07		Surveys, Testing, Investigation, Inspection				$2,088,636		$0	$2,088,636
		80.07.01	Percentage of Direct Costs SCC (10-50)	LS	2.0%	$104,431,821	$2,088,636	0%	$0	$2,088,636
	80.08		Start up				$2,088,636		$0	$2,088,636
		80.08.01	Percentage of Direct Costs SCC (10-50)	LS	2.0%	$104,431,821	$2,088,636	0%	$0	$2,088,636
	Subtotal (10-80)						**$159,403,808**		**$17,825,998**	**$177,229,806**
90			**UNALLOCATED CONTINGENCY**	**LS**	**10%**					**$17,722,981**
100			**FINANCE CHARGES**							***Current Year Total***
	Segment Totals (10-100)									**$194,952,786**

Transit Corridor Project

Opinion of Probable Costs

			Option 4 30th Street with Bus Rapid Transit							Current Year *2015.00 (YR)*
SCC	**SCC Sub**	**Item #**	**Item Discription**	**Unit**	**Unit Cost**	**Quantity**	**Item Cost**	**A. Cont.**	**Item Cont.**	**Subtotal**
10			**GUIDEWAY & TRACK ELEMENTS (route miles)**				**$9,333,225**		**$1,866,645**	**$11,199,870**
	10.01		Guideway: At-grade exclusive right-of-way				$9,333,225		$1,866,645	$11,199,870
		10.01.01	Bus Lanes - pavement 9" PCCP, 6" UTBC, 12" GB	LF	$635	12675.0	$8,048,625	20%	$1,609,725	$9,658,350
		10.01.02	Asphalt tie-in	LF	$56	10375.0	$581,000	20%	$116,200	$697,200
		10.01.03	B5 curb	LF	$20	17680.0	$353,600	20%	$70,720	$424,320
		10.01.04	Median Concrete Infill	LF	$144	0.0	$0	20%	$0	$0
		10.01.05	Intersection Concrete Infill	LF	$85	0.0	$0	20%	$0	$0
		10.01.06	Guideway curb	LF	$25	0.0	$0	20%	$0	$0
		10.01.07	Embankment - Guideway	CY	$20	16000.0	$320,000	20%	$64,000	$384,000
		10.01.08	Excavation - Guideway	CY	$20	1500.0	$30,000	20%	$6,000	$36,000
	10.08		Guideway: Retained cut or fill				$0		$0	$0
		10.08.01	Retaining Wall	SF	$60	0.0	$0	30%	$0	$0
	10.10		Track: Embedded				$0		$0	$0
		10.10.01	Furnish Rail - Assume 115RE Rail	TF	$90	0.0	$0	20%	$0	$0
		10.10.02	Embedded Track - Construct Track Slab	TF	$360	0.0	$0	20%	$0	$0
	10.11		Track: Ballasted				$0		$0	$0
		10.11.01	Furnish Rail - Assume 115RE Rail	TF	$70	0.0	$0	20%	$0	$0
		10.11.02	Ballasted Track	TF	$30	0.0	$0	20%	$0	$0
	10.12		Track: Special (switches, turnouts)				$0		$0	$0
		10.12.01	Embedded Turnout - Furnish and Install	EA	$225,000	0.0	$0	20%	$0	$0
		10.12.02	Ballasted Track - Diamond Crossover	EA	$125,000	0.0	$0	20%	$0	$0
		10.12.03	Ballast-to-Embedded Transistion	LS	$25,000	0.0	$0	20%	$0	$0
		10.12.04	End Stop	EA	$7,500	0.0	$0	20%	$0	$0
		10.12.05	Embedded Track - Diamond Crossover	EA	$300,000	0.0	$0	20%	$0	$0
20			**STATIONS, STOPS, TERMINALS, INTERMODAL (number)**				**$3,160,000**		**$632,000**	**$3,792,000**
	20.01		At-grade station, stop, shelter, mall, terminal, platform				$3,160,000		$632,000	$3,792,000
		20.01.01	Streetcar Stop - Side platform	EA	$120,000	21.0	$2,520,000	20%	$504,000	$3,024,000
		20.01.02	Streetcar Stop - Center shared platform	EA	$160,000	4.0	$640,000	20%	$128,000	$768,000
30			**SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS**				$5,000,000		$1,000,000	$6,000,000
	30.02		Light Maintenance Facility				$5,000,000		$1,000,000	$6,000,000
		30.02.01	Streetcar Maintenance Building - New	EA	$15,000,000	0.0	$0	20%	$0	$0
		30.02.02	Bus Maintenance Building - Renovations	EA	$5,000,000	1.0	$5,000,000	20%	$1,000,000	$6,000,000
40			**SITEWORK & SPECIAL CONDITIONS**				**$13,219,695**		**$1,545,258**	**$14,764,953**
	40.02		Site Utilities, Utility Relocation				$1,711,300		$513,390	$2,224,690
		40.02.01	23rd Street - Wall Ave to Washington Blvd	LS	$450,000	0.0	$0	30%	$0	$0
		40.02.02	Washington Blvd - 23rd Street to 25th Street	LS	$275,000	0.0	$0	30%	$0	$0
		40.02.03	Washington Blvd - 25th Street to 30th Street (Streetcar - Mixed)	LS	$80,000	0.0	$0	30%	$0	$0
		40.02.04	Washington Blvd - 25th Street to 30th Street (BRT - Exclusinve)	LS	$90,000	1.0	$90,000	30%	$27,000	$117,000
		40.02.05	25th Street - Washington Blvd to Harrison Blvd	LS	$1,668,000	0.0	$0	30%	$0	$0
		40.02.06	Harrison Blvd - 25th Street to 30th Street	LS	$435,000	0.0	$0	30%	$0	$0
		40.02.07	Harrison Blvd - 30th Street to 37th Street (Mixed)	LS	$1,660,000	0.0	$0	30%	$0	$0
		40.02.08	Harrison Blvd - 30th Street to 37th Street (Exclusive)	LS	$877,500	0.0	$0	30%	$0	$0
		40.02.09	30th Street - Washington Blvd to Harrison Blvd	LS	$1,965,000	0.0	$0	30%	$0	$0

		40.02.10	Utility Relocation - (Miscellaneous relocations)	TF	$100	16213.0	$1,621,300	30%	$486,390	$2,107,690
	40.07		Automobile, bus, van accessways including roads, parking lots				$5,159,340		$1,031,868	$6,191,208
		40.07.01	Roadway Improvement Allowance	TF	$75	0.0	$0	20%	$0	$0
		40.07.02	Track Drainage Allowance	TF	$20	0.0	$0	20%	$0	$0
		40.07.03	Street Lighting Allowance (Adjustments, Relocations, New)	TF	$10	0.0	$0	20%	$0	$0
		40.07.04	Curb & Gutter - B2	LF	$25	18695.0	$467,375	20%	$93,475	$560,850
		40.07.05	Sidewalk	SF	$8	39475.0	$315,800	20%	$63,160	$378,960
		40.07.06	HMA Pavement	SF	$25	143340.0	$3,583,500	20%	$716,700	$4,300,200
		40.07.07	Concrete Driveways	SF	$10	11145.0	$111,450	20%	$22,290	$133,740
		40.07.08	Parkstrip	SF	$5	26845.0	$134,225	20%	$26,845	$161,070
		40.07.09	Remove Parking Lot Paving	SF	$2	25675.0	$38,513	20%	$7,703	$46,215
		40.07.10	Intersection Concrete Infill	LF	$10	17250.0	$172,500	20%	$34,500	$207,000
		40.07.11	Remove Concrete Sidewalk	SF	$2	69100.0	$138,200	20%	$27,640	$165,840
		40.07.12	Remove HMA Pavement	SF	$2	38015.0	$57,023	20%	$11,405	$68,427
		40.07.13	Remove Concrete Driveway	SF	$4	15800.0	$55,300	20%	$11,060	$66,360
		40.07.14	Remove Park Strip	SF	$2	56970.0	$85,455	20%	$17,091	$102,546
	40.08		Temporary Facilities and other indirect costs during construction				$6,349,055		$0	$6,349,055
		40.08.01	Temporary Maintenance of Traffic	LS	5%	39681593.7	$1,984,080	0%	$0	$1,984,080
		40.08.02	Contractor Indirects (Staff, Office, etc.)	LS	10%	39681593.7	$3,968,159	0%	$0	$3,968,159
		40.08.03	Art in Transit (1% of Construction)	LS	1%	39681593.7	$396,816	0%	$0	$396,816
50			**SYSTEMS**				**$2,668,500**		**$533,700**	**$3,202,200**
	50.02		Traffic signals and crossing protection				$1,600,000		$320,000	$1,920,000
		50.02.01	Modify Existing Traffic Signal	EA	$75,000	8.0	$600,000	20%	$120,000	$720,000
		50.02.02	New Traffic Signal Allowance	EA	$150,000	4.0	$600,000	20%	$120,000	$720,000
		50.02.03	Signal Priority Allowance	EA	$20,000	20.0	$400,000	20%	$80,000	$480,000
		50.02.04	New Pedestrian Traffic Signal Allowance	EA	$75,000	0.0	$0	20%	$0	$0
		50.02.05	Crossing Gates at Roundabout	LS	$100,000	0.0	$0	20%	$0	$0
	50.03		Traction power supply: substations				$0		$0	$0
		50.03.01	Traction Power Substation (Assume 1/Track Mile or 1 per 0.5 Rt. Mile)	EA	$900,000	0.0	$0	20%	$0	$0
	50.04		Traction power distribution: catenary and third rail				$0		$0	$0
		50.04.01	Overhead Trolley Wire Allowance (Poles, wires, appurtenances)	TF	$280	0.0	$0	20%	$0	$0
	50.05		Communications				$568,500		$113,700	$682,200
		50.05.01	Communications Allowance	LF	$20	28425.0	$568,500	20%	$113,700	$682,200
	50.06		Fare collection system and equipment				$500,000		$100,000	$600,000
		50.06.01	Fare Collection Allowance	EA	$20,000	25.0	$500,000	20%	$100,000	$600,000
	Construction Subtotal (10-50)					**0.0**	**$33,381,420**		**$5,577,603**	**$38,959,023**
60			**ROW, LAND, EXISTING IMPROVEMENTS**				**$25,000**		**$0**	**$25,000**
	60.01		Purchase or lease of real estate				$25,000		$0	$25,000
		60.01.01	Right of Way Acquisition	LS	$1	25000	$25,000	0%	$0	$25,000
70			**VEHICLES (number)**				$5,050,000		$252,500	$5,302,500
	70.01		Light Rail				$0		$0	$0
		70.01.01	Modern Streetcar Vehicle (Assumes wired system)	EA	$4,200,000	0.0	$0	2%	$0	$0
	70.04		Bus				$5,000,000		$250,000	$5,250,000
		70.04.01	60-foot Articulated Bus	EA	$1,000,000	5.0	$5,000,000	5%	$250,000	$5,250,000
	70.07		Spare parts				$50,000		$2,500	$52,500

Transit Corridor Project

Opinion of Probable Costs

		70.07.01	Spare Parts for New Streetcars (Per Vehicle)	EA	$100,000	0.0	$0	5%	$0	$0
		70.07.02	Spare Parts for New Buses (Per Vehicle)	EA	$10,000	5.0	$50,000	5%	$2,500	$52,500
80			**PROFESSIONAL SERVICES (applies to Cats. 10-50)**				**$9,847,519**		**$0**	**$9,847,519**
	80.01		Preliminary Engineering				$834,535		$0	$834,535
		80.01.01	Percentage of Direct Costs SCC (10-50)	LS	2.5%	$33,381,420	$834,535	0%	$0	$834,535
	80.02		Final Design				$2,336,699		$0	$2,336,699
		80.02.01	Percentage of Direct Costs SCC (10-50)	LS	7.0%	$33,381,420	$2,336,699	0%	$0	$2,336,699
	80.03		Project Management for Design and Construction				$1,669,071		$0	$1,669,071
		80.03.01	Percentage of Direct Costs SCC (10-50)	LS	5.0%	$33,381,420	$1,669,071	0%	$0	$1,669,071
	80.04		Construction Administration & Management				$2,002,885		$0	$2,002,885
		80.04.01	Percentage of Direct Costs SCC (10-50)	LS	6.0%	$33,381,420	$2,002,885	0%	$0	$2,002,885
	80.05		Professional Liability and other Non-Construction Insurance				$1,001,443		$0	$1,001,443
		80.05.01	Percentage of Direct Costs SCC (10-50)	LS	3.0%	$33,381,420	$1,001,443	0%	$0	$1,001,443
	80.06		Legal; Permits; Review Fees by other agencies, cities, etc.				$667,628		$0	$667,628
		80.06.01	Percentage of Direct Costs SCC (10-50)	LS	2.0%	$33,381,420	$667,628	0%	$0	$667,628
	80.07		Surveys, Testing, Investigation, Inspection				$667,628		$0	$667,628
		80.07.01	Percentage of Direct Costs SCC (10-50)	LS	2.0%	$33,381,420	$667,628	0%	$0	$667,628
	80.08		Start up				$667,628		$0	$667,628
		80.08.01	Percentage of Direct Costs SCC (10-50)	LS	2.0%	$33,381,420	$667,628	0%	$0	$667,628
	Subtotal (10-80)						**$48,303,939**		**$5,830,103**	**$54,134,042**
90			**UNALLOCATED CONTINGENCY**	**LS**	**10%**					**$5,413,404**
100			**FINANCE CHARGES**							***Current Year Total***
	Segment Totals (10-100)									**$59,547,446**

Transit Corridor Project

Opinion of Probable Costs

			Option 5 25th Street with Bus Rapid Transit (Exclusive 30th to 37th)							Current Year *2015.00 (YR)*
SCC	**SCC Sub**	**Item #**	**Item Discription**	**Unit**	**Unit Cost**	**Quantity**	**Item Cost**	**A. Cont.**	**Item Cont.**	**Subtotal**
10			**GUIDEWAY & TRACK ELEMENTS (route miles)**				**$5,502,600**		**$1,100,520**	**$6,603,120**
	10.01		Guideway: At-grade exclusive right-of-way				$5,502,600		$1,100,520	$6,603,120
		10.01.01	Bus Lanes - pavement 9" PCCP, 6" UTBC, 12" GB	LF	$635	7400.0	$4,699,000	20%	$939,800	$5,638,800
		10.01.02	Asphalt tie-in	LF	$56	5100.0	$285,600	20%	$57,120	$342,720
		10.01.03	B5 curb	LF	$20	8400.0	$168,000	20%	$33,600	$201,600
		10.01.04	Median Concrete Infill	LF	$144	0.0	$0	20%	$0	$0
		10.01.05	Intersection Concrete Infill	LF	$85	0.0	$0	20%	$0	$0
		10.01.06	Guideway curb	LF	$25	0.0	$0	20%	$0	$0
		10.01.07	Embankment - Guideway	CY	$20	16000.0	$320,000	20%	$64,000	$384,000
		10.01.08	Excavation - Guideway	CY	$20	1500.0	$30,000	20%	$6,000	$36,000
	10.08		Guideway: Retained cut or fill				$0		$0	$0
		10.08.01	Retaining Wall	SF	$60	0.0	$0	30%	$0	$0
	10.10		Track: Embedded				$0		$0	$0
		10.10.01	Furnish Rail - Assume 115RE Rail	TF	$90	0.0	$0	20%	$0	$0
		10.10.02	Embedded Track - Construct Track Slab	TF	$360	0.0	$0	20%	$0	$0
	10.11		Track: Ballasted				$0		$0	$0
		10.11.01	Furnish Rail - Assume 115RE Rail	TF	$70	0.0	$0	20%	$0	$0
		10.11.02	Ballasted Track	TF	$30	0.0	$0	20%	$0	$0
	10.12		Track: Special (switches, turnouts)				$0		$0	$0
		10.12.01	Embedded Turnout - Furnish and Install	EA	$225,000	0.0	$0	20%	$0	$0
		10.12.02	Ballasted Track - Diamond Crossover	EA	$125,000	0.0	$0	20%	$0	$0
		10.12.03	Ballast-to-Embedded Transistion	LS	$25,000	0.0	$0	20%	$0	$0
		10.12.04	End Stop	EA	$7,500	0.0	$0	20%	$0	$0
		10.12.05	Embedded Track - Diamond Crossover	EA	$300,000	0.0	$0	20%	$0	$0
20			**STATIONS, STOPS, TERMINALS, INTERMODAL (number)**				**$3,160,000**		**$632,000**	**$3,792,000**
	20.01		At-grade station, stop, shelter, mall, terminal, platform				$3,160,000		$632,000	$3,792,000
		20.01.01	Streetcar Stop - Side platform	EA	$120,000	21.0	$2,520,000	20%	$504,000	$3,024,000
		20.01.02	Streetcar Stop - Center shared platform	EA	$160,000	4.0	$640,000	20%	$128,000	$768,000
30			**SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS**				$5,000,000		$1,000,000	$6,000,000
	30.02		Light Maintenance Facility				$5,000,000		$1,000,000	$6,000,000
		30.02.01	Streetcar Maintenance Building - New	EA	$15,000,000	0.0	$0	20%	$0	$0
		30.02.02	Bus Maintenance Building - Renovations	EA	$5,000,000	1.0	$5,000,000	20%	$1,000,000	$6,000,000
40			**SITEWORK & SPECIAL CONDITIONS**				**$9,471,650**		**$1,072,458**	**$10,544,108**
	40.02		Site Utilities, Utility Relocation				$1,416,500		$424,950	$1,841,450
		40.02.01	23rd Street - Wall Ave to Washington Blvd	LS	$450,000	0.0	$0	30%	$0	$0
		40.02.02	Washington Blvd - 23rd Street to 25th Street	LS	$275,000	0.0	$0	30%	$0	$0
		40.02.03	Washington Blvd - 25th Street to 30th Street (Streetcar - Mixed)	LS	$80,000	0.0	$0	30%	$0	$0
		40.02.04	Washington Blvd - 25th Street to 30th Street (BRT - Exclusinve)	LS	$90,000	0.0	$0	30%	$0	$0
		40.02.05	25th Street - Washington Blvd to Harrison Blvd	LS	$1,668,000	0.0	$0	30%	$0	$0
		40.02.06	Harrison Blvd - 25th Street to 30th Street	LS	$435,000	0.0	$0	30%	$0	$0
		40.02.07	Harrison Blvd - 30th Street to 37th Street (Mixed)	LS	$1,660,000	0.0	$0	30%	$0	$0
		40.02.08	Harrison Blvd - 30th Street to 37th Street (Exclusive)	LS	$877,500	0.0	$0	30%	$0	$0
		40.02.09	30th Street - Washington Blvd to Harrison Blvd	LS	$1,965,000	0.0	$0	30%	$0	$0

		40.02.10	Utility Relocation - (Miscellaneous relocations)	TF	$100	14165.0	$1,416,500	30%	$424,950	$1,841,450
	40.07		Automobile, bus, van accessways including roads, parking lots				$3,237,538		$647,508	$3,885,045
		40.07.01	Roadway Improvement Allowance	TF	$75	0.0	$0	20%	$0	$0
		40.07.02	Track Drainage Allowance	TF	$20	0.0	$0	20%	$0	$0
		40.07.03	Street Lighting Allowance (Adjustments, Relocations, New)	TF	$10	0.0	$0	20%	$0	$0
		40.07.04	Curb & Gutter - B2	LF	$25	9880.0	$247,000	20%	$49,400	$296,400
		40.07.05	Sidewalk	SF	$8	37910.0	$303,280	20%	$60,656	$363,936
		40.07.06	HMA Pavement	SF	$25	92075.0	$2,301,875	20%	$460,375	$2,762,250
		40.07.07	Concrete Driveways	SF	$10	3350.0	$33,500	20%	$6,700	$40,200
		40.07.08	Parkstrip	SF	$5	6145.0	$30,725	20%	$6,145	$36,870
		40.07.09	Remove Parking Lot Paving	SF	$2	25675.0	$38,513	20%	$7,703	$46,215
		40.07.10	Intersection Concrete Infill	LF	$10	8140.0	$81,400	20%	$16,280	$97,680
		40.07.11	Remove Concrete Sidewalk	SF	$2	37870.0	$75,740	20%	$15,148	$90,888
		40.07.12	Remove HMA Pavement	SF	$2	20840.0	$31,260	20%	$6,252	$37,512
		40.07.13	Remove Concrete Driveway	SF	$4	8790.0	$30,765	20%	$6,153	$36,918
		40.07.14	Remove Park Strip	SF	$2	42320.0	$63,480	20%	$12,696	$76,176
	40.08		Temporary Facilities and other indirect costs during construction				$4,817,613		$0	$4,817,613
		40.08.01	Temporary Maintenance of Traffic	LS	5%	$30,110,079	$1,505,504	0%	$0	$1,505,504
		40.08.02	Contractor Indirects (Staff, Office, etc.)	LS	10%	$30,110,079	$3,011,008	0%	$0	$3,011,008
		40.08.03	Art in Transit (1% of Construction)	LS	1%	$30,110,079	$301,101	0%	$0	$301,101
50			**SYSTEMS**				**$2,251,600**		**$450,320**	**$2,701,920**
	50.02		Traffic signals and crossing protection				$1,185,000		$237,000	$1,422,000
		50.02.01	Modify Existing Traffic Signal	EA	$75,000	3.0	$225,000	20%	$45,000	$270,000
		50.02.02	New Traffic Signal Allowance	EA	$150,000	4.0	$600,000	20%	$120,000	$720,000
		50.02.03	Signal Priority Allowance	EA	$20,000	18.0	$360,000	20%	$72,000	$432,000
		50.02.04	New Pedestrian Traffic Signal Allowance	EA	$75,000	0.0	$0	20%	$0	$0
		50.02.05	Crossing Gates at Roundabout	LS	$100,000	0.0	$0	20%	$0	$0
	50.03		Traction power supply: substations				$0		$0	$0
		50.03.01	Traction Power Substation (Assume 1/Track Mile or 1 per 0.5 Rt. Mile)	EA	$900,000	0.0	$0	20%	$0	$0
	50.04		Traction power distribution: catenary and third rail				$0		$0	$0
		50.04.01	Overhead Trolley Wire Allowance (Poles, wires, appurtenances)	TF	$280	0.0	$0	20%	$0	$0
	50.05		Communications				$566,600		$113,320	$679,920
		50.05.01	Communications Allowance	LF	$20	28330.0	$566,600	20%	$113,320	$679,920
	50.06		Fare collection system and equipment				$500,000		$100,000	$600,000
		50.06.01	Fare Collection Allowance	EA	$20,000	25.0	$500,000	20%	$100,000	$600,000
	Construction Subtotal (10-50)					**0.0**	**$25,385,850**		**$4,255,298**	**$29,641,148**
60			**ROW, LAND, EXISTING IMPROVEMENTS**				**$0**		**$0**	**$0**
	60.01		Purchase or lease of real estate				$0		$0	$0
		60.01.01	Right of Way Acquisition	LS	$1	0.0	$0	0%	$0	$0
70			**VEHICLES (number)**				$5,050,000		$252,500	$5,302,500
	70.01		Light Rail				$0		$0	$0
		70.01.01	Modern Streetcar Vehicle (Assumes wired system)	EA	$4,200,000	0.0	$0	2%	$0	$0
	70.04		Bus				$5,000,000		$250,000	$5,250,000
		70.04.01	60-foot Articulated Bus	EA	$1,000,000	5.0	$5,000,000	5%	$250,000	$5,250,000
	70.07		Spare parts				$50,000		$2,500	$52,500

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		70.07.01	Spare Parts for New Streetcars (Per Vehicle)	EA	$100,000	0.0	$0	5%	$0	$0
		70.07.02	Spare Parts for New Buses (Per Vehicle)	EA	$10,000	5.0	$50,000	5%	$2,500	$52,500
80			**PROFESSIONAL SERVICES (applies to Cats. 10-50)**				**$7,488,826**		**$0**	**$7,488,826**
	80.01		Preliminary Engineering				$634,646		$0	$634,646
		80.01.01	Percentage of Direct Costs SCC (10-50)	LS	2.5%	$25,385,850	$634,646	0%	$0	$634,646
	80.02		Final Design				$1,777,010		$0	$1,777,010
		80.02.01	Percentage of Direct Costs SCC (10-50)	LS	7.0%	$25,385,850	$1,777,010	0%	$0	$1,777,010
	80.03		Project Management for Design and Construction				$1,269,293		$0	$1,269,293
		80.03.01	Percentage of Direct Costs SCC (10-50)	LS	5.0%	$25,385,850	$1,269,293	0%	$0	$1,269,293
	80.04		Construction Administration & Management				$1,523,151		$0	$1,523,151
		80.04.01	Percentage of Direct Costs SCC (10-50)	LS	6.0%	$25,385,850	$1,523,151	0%	$0	$1,523,151
	80.05		Professional Liability and other Non-Construction Insurance				$761,576		$0	$761,576
		80.05.01	Percentage of Direct Costs SCC (10-50)	LS	3.0%	$25,385,850	$761,576	0%	$0	$761,576
	80.06		Legal; Permits; Review Fees by other agencies, cities, etc.				$507,717		$0	$507,717
		80.06.01	Percentage of Direct Costs SCC (10-50)	LS	2.0%	$25,385,850	$507,717	0%	$0	$507,717
	80.07		Surveys, Testing, Investigation, Inspection				$507,717		$0	$507,717
		80.07.01	Percentage of Direct Costs SCC (10-50)	LS	2.0%	$25,385,850	$507,717	0%	$0	$507,717
	80.08		Start up				$507,717		$0	$507,717
		80.08.01	Percentage of Direct Costs SCC (10-50)	LS	2.0%	$25,385,850	$507,717	0%	$0	$507,717
	Subtotal (10-80)						**$37,924,676**		**$4,507,798**	**$42,432,474**
90			**UNALLOCATED CONTINGENCY**	**LS**	**10%**					**$4,243,247**
100			**FINANCE CHARGES**							***Current Year Total***
	Segment Totals (10-100)									**$46,675,721**

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			Option 5 25th Street with Bus Rapid Transit (Exclusive 30th to 37th & through WSU)							Current Year *2015.00 (YR)*
SCC	**SCC Sub**	**Item #**	**Item Discription**	**Unit**	**Unit Cost**	**Quantity**	**Item Cost**	**A. Cont.**	**Item Cont.**	**Subtotal**
10			**GUIDEWAY & TRACK ELEMENTS (route miles)**				**$7,830,600**		**$1,572,120**	**$9,402,720**
	10.01		Guideway: At-grade exclusive right-of-way				$7,770,600		$1,554,120	$9,324,720
		10.01.01	Bus Lanes - pavement 9" PCCP, 6" UTBC, 12" GB	LF	$635	10600.0	$6,731,000	20%	$1,346,200	$8,077,200
		10.01.02	Asphalt tie-in	LF	$56	5100.0	$285,600	20%	$57,120	$342,720
		10.01.03	B5 curb	LF	$20	12400.0	$248,000	20%	$49,600	$297,600
		10.01.04	Median Concrete Infill	LF	$144	0.0	$0	20%	$0	$0
		10.01.05	Intersection Concrete Infill	LF	$85	0.0	$0	20%	$0	$0
		10.01.06	Guideway curb	LF	$25	0.0	$0	20%	$0	$0
		10.01.07	Embankment - Guideway	CY	$20	17900.0	$358,000	20%	$71,600	$429,600
		10.01.08	Excavation - Guideway	CY	$20	7400.0	$148,000	20%	$29,600	$177,600
	10.08		Guideway: Retained cut or fill				$60,000		$18,000	$78,000
		10.08.01	Retaining Wall	SF	$60	1000.0	$60,000	30%	$18,000	$78,000
	10.10		Track: Embedded				$0		$0	$0
		10.10.01	Furnish Rail - Assume 115RE Rail	TF	$90	0.0	$0	20%	$0	$0
		10.10.02	Embedded Track - Construct Track Slab	TF	$360	0.0	$0	20%	$0	$0
	10.11		Track: Ballasted				$0		$0	$0
		10.11.01	Furnish Rail - Assume 115RE Rail	TF	$70	0.0	$0	20%	$0	$0
		10.11.02	Ballasted Track	TF	$30	0.0	$0	20%	$0	$0
	10.12		Track: Special (switches, turnouts)				$0		$0	$0
		10.12.01	Embedded Turnout - Furnish and Install	EA	$225,000	0.0	$0	20%	$0	$0
		10.12.02	Ballasted Track - Diamond Crossover	EA	$125,000	0.0	$0	20%	$0	$0
		10.12.03	Ballast-to-Embedded Transistion	LS	$25,000	0.0	$0	20%	$0	$0
		10.12.04	End Stop	EA	$7,500	0.0	$0	20%	$0	$0
		10.12.05	Embedded Track - Diamond Crossover	EA	$300,000	0.0	$0	20%	$0	$0
20			**STATIONS, STOPS, TERMINALS, INTERMODAL (number)**				**$3,160,000**		**$632,000**	**$3,792,000**
	20.01		At-grade station, stop, shelter, mall, terminal, platform				$3,160,000		$632,000	$3,792,000
		20.01.01	Streetcar Stop - Side platform	EA	$120,000	21.0	$2,520,000	20%	$504,000	$3,024,000
		20.01.02	Streetcar Stop - Center shared platform	EA	$160,000	4.0	$640,000	20%	$128,000	$768,000
30			**SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS**				$5,000,000		$1,000,000	$6,000,000
	30.02		Light Maintenance Facility				$5,000,000		$1,000,000	$6,000,000
		30.02.01	Streetcar Maintenance Building - New	EA	$15,000,000	0.0	$0	20%	$0	$0
		30.02.02	Bus Maintenance Building - Renovations	EA	$5,000,000	1.0	$5,000,000	20%	$1,000,000	$6,000,000
40			**SITEWORK & SPECIAL CONDITIONS**				**$10,221,463**		**$1,112,208**	**$11,333,670**
	40.02		Site Utilities, Utility Relocation				$1,549,000		$464,700	$2,013,700
		40.02.01	23rd Street - Wall Ave to Washington Blvd	LS	$450,000	0.0	$0	30%	$0	$0
		40.02.02	Washington Blvd - 23rd Street to 25th Street	LS	$275,000	0.0	$0	30%	$0	$0
		40.02.03	Washington Blvd - 25th Street to 30th Street (Streetcar - Mixed)	LS	$80,000	0.0	$0	30%	$0	$0
		40.02.04	Washington Blvd - 25th Street to 30th Street (BRT - Exclusinve)	LS	$90,000	0.0	$0	30%	$0	$0
		40.02.05	25th Street - Washington Blvd to Harrison Blvd	LS	$1,668,000	0.0	$0	30%	$0	$0
		40.02.06	Harrison Blvd - 25th Street to 30th Street	LS	$435,000	0.0	$0	30%	$0	$0
		40.02.07	Harrison Blvd - 30th Street to 37th Street (Mixed)	LS	$1,660,000	0.0	$0	30%	$0	$0
		40.02.08	Harrison Blvd - 30th Street to 37th Street (Exclusive)	LS	$877,500	0.0	$0	30%	$0	$0
		40.02.09	30th Street - Washington Blvd to Harrison Blvd	LS	$1,965,000	0.0	$0	30%	$0	$0

		40.02.10	Utility Relocation - (Miscellaneous relocations)	TF	$100	15490.0	$1,549,000	30%	$464,700	$2,013,700
	40.07		Automobile, bus, van accessways including roads, parking lots				$3,237,538		$647,508	$3,885,045
		40.07.01	Roadway Improvement Allowance	TF	$75	0.0	$0	20%	$0	$0
		40.07.02	Track Drainage Allowance	TF	$20	0.0	$0	20%	$0	$0
		40.07.03	Street Lighting Allowance (Adjustments, Relocations, New)	TF	$10	0.0	$0	20%	$0	$0
		40.07.04	Curb & Gutter - B2	LF	$25	9880.0	$247,000	20%	$49,400	$296,400
		40.07.05	Sidewalk	SF	$8	37910.0	$303,280	20%	$60,656	$363,936
		40.07.06	HMA Pavement	SF	$25	92075.0	$2,301,875	20%	$460,375	$2,762,250
		40.07.07	Concrete Driveways	SF	$10	3350.0	$33,500	20%	$6,700	$40,200
		40.07.08	Parkstrip	SF	$5	6145.0	$30,725	20%	$6,145	$36,870
		40.07.09	Remove Parking Lot Paving	SF	$2	25675.0	$38,513	20%	$7,703	$46,215
		40.07.10	Intersection Concrete Infill	LF	$10	8140.0	$81,400	20%	$16,280	$97,680
		40.07.11	Remove Concrete Sidewalk	SF	$2	37870.0	$75,740	20%	$15,148	$90,888
		40.07.12	Remove HMA Pavement	SF	$2	20840.0	$31,260	20%	$6,252	$37,512
		40.07.13	Remove Concrete Driveway	SF	$4	8790.0	$30,765	20%	$6,153	$36,918
		40.07.14	Remove Park Strip	SF	$2	42320.0	$63,480	20%	$12,696	$76,176
	40.08		Temporary Facilities and other indirect costs during construction				$5,434,925		$0	$5,434,925
		40.08.01	Temporary Maintenance of Traffic	LS	5%	33968281.7	$1,698,414	0%	$0	$1,698,414
		40.08.02	Contractor Indirects (Staff, Office, etc.)	LS	10%	33968281.7	$3,396,828	0%	$0	$3,396,828
		40.08.03	Art in Transit (1% of Construction)	LS	1%	33968281.7	$339,683	0%	$0	$339,683
50			**SYSTEMS**				**$2,390,600**		**$478,120**	**$2,868,720**
	50.02		Traffic signals and crossing protection				$1,335,000		$267,000	$1,602,000
		50.02.01	Modify Existing Traffic Signal	EA	$75,000	3.0	$225,000	20%	$45,000	$270,000
		50.02.02	New Traffic Signal Allowance	EA	$150,000	5.0	$750,000	20%	$150,000	$900,000
		50.02.03	Signal Priority Allowance	EA	$20,000	18.0	$360,000	20%	$72,000	$432,000
		50.02.04	New Pedestrian Traffic Signal Allowance	EA	$75,000	0.0	$0	20%	$0	$0
		50.02.05	Crossing Gates at Roundabout	LS	$100,000	0.0	$0	20%	$0	$0
	50.03		Traction power supply: substations				$0		$0	$0
		50.03.01	Traction Power Substation (Assume 1/Track Mile or 1 per 0.5 Rt. Mile)	EA	$900,000	0.0	$0	20%	$0	$0
	50.04		Traction power distribution: catenary and third rail				$0		$0	$0
		50.04.01	Overhead Trolley Wire Allowance (Poles, wires, appurtenances)	TF	$280	0.0	$0	20%	$0	$0
	50.05		Communications				$555,600		$111,120	$666,720
		50.05.01	Communications Allowance	LF	$20	27780.0	$555,600	20%	$111,120	$666,720
	50.06		Fare collection system and equipment				$500,000		$100,000	$600,000
		50.06.01	Fare Collection Allowance	EA	$20,000	25.0	$500,000	20%	$100,000	$600,000
	Construction Subtotal (10-50)					**0.0**	**$28,602,663**		**$4,794,448**	**$33,397,110**
60			**ROW, LAND, EXISTING IMPROVEMENTS**				**$0**		**$0**	**$0**
	60.01		Purchase or lease of real estate				$0		$0	$0
		60.01.01	Right of Way Acquisition	LS	$1	0.0	$0	0%	$0	$0
70			**VEHICLES (number)**				$5,050,000		$252,500	$5,302,500
	70.01		Light Rail				$0		$0	$0
		70.01.01	Modern Streetcar Vehicle (Assumes wired system)	EA	$4,200,000	0.0	$0	2%	$0	$0
	70.04		Bus				$5,000,000		$250,000	$5,250,000
		70.04.01	60-foot Articulated Bus	EA	$1,000,000	5.0	$5,000,000	5%	$250,000	$5,250,000
	70.07		Spare parts				$50,000		$2,500	$52,500

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		70.07.01	Spare Parts for New Streetcars (Per Vehicle)	EA	$100,000	0.0	$0	5%	$0	$0
		70.07.02	Spare Parts for New Buses (Per Vehicle)	EA	$10,000	5.0	$50,000	5%	$2,500	$52,500
80			**PROFESSIONAL SERVICES (applies to Cats. 10-50)**				**$8,437,785**		**$0**	**$8,437,785**
	80.01		Preliminary Engineering				$715,067		$0	$715,067
		80.01.01	Percentage of Direct Costs SCC (10-50)	LS	2.5%	$28,602,663	$715,067	0%	$0	$715,067
	80.02		Final Design				$2,002,186		$0	$2,002,186
		80.02.01	Percentage of Direct Costs SCC (10-50)	LS	7.0%	$28,602,663	$2,002,186	0%	$0	$2,002,186
	80.03		Project Management for Design and Construction				$1,430,133		$0	$1,430,133
		80.03.01	Percentage of Direct Costs SCC (10-50)	LS	5.0%	$28,602,663	$1,430,133	0%	$0	$1,430,133
	80.04		Construction Administration & Management				$1,716,160		$0	$1,716,160
		80.04.01	Percentage of Direct Costs SCC (10-50)	LS	6.0%	$28,602,663	$1,716,160	0%	$0	$1,716,160
	80.05		Professional Liability and other Non-Construction Insurance				$858,080		$0	$858,080
		80.05.01	Percentage of Direct Costs SCC (10-50)	LS	3.0%	$28,602,663	$858,080	0%	$0	$858,080
	80.06		Legal; Permits; Review Fees by other agencies, cities, etc.				$572,053		$0	$572,053
		80.06.01	Percentage of Direct Costs SCC (10-50)	LS	2.0%	$28,602,663	$572,053	0%	$0	$572,053
	80.07		Surveys, Testing, Investigation, Inspection				$572,053		$0	$572,053
		80.07.01	Percentage of Direct Costs SCC (10-50)	LS	2.0%	$28,602,663	$572,053	0%	$0	$572,053
	80.08		Start up				$572,053		$0	$572,053
		80.08.01	Percentage of Direct Costs SCC (10-50)	LS	2.0%	$28,602,663	$572,053	0%	$0	$572,053
	Subtotal (10-80)						**$42,090,448**		**$5,046,948**	**$47,137,396**
90			**UNALLOCATED CONTINGENCY**	**LS**	**10%**					**$4,713,740**
100			**FINANCE CHARGES**							***Current Year Total***
	Segment Totals (10-100)									**$51,851,135**

	Name		Distance from Previous (Feet)	Distance (Miles)	Comm. Dist. (Feet)	Comm Dist (Miles)	Assumed Speed	Running Time	Dwell Time	Total Time	Dist (repeat)	Commulative Time Train #1	Commulative Time Train #2	Commulative Time Train #3	Commulative Time Train #4	Commulative Time Train #1
1	Frontrunner--23rd and Wall	0									0.00	0.00	15.00	30.00	45.00	60.00
2	23rd and Lincoln	1132	1132	0.21	1132	0.21	15	0.86	0.33	1.19	1132.00	1.19	16.19	31.19	46.19	61.19
3	23rd and Washington	2549	1417	0.27	2549	0.48	15	1.07	0.33	1.40	2549.00	2.59	17.59	32.59	47.59	62.59
4	25th and Washington	4152	1603	0.30	4152	0.79	**20**	0.91	0.33	1.24	4152.00	3.83	18.83	33.83	48.83	63.83
5	25th and Jefferson	5664	1512	0.29	5664	1.07	15	1.15	0.33	1.48	5664.00	5.31	20.31	35.31	50.31	65.31
6	25th and Monroe	7200	1536	0.29	7200	1.36	15	1.16	0.33	1.49	7200.00	6.80	21.80	36.80	51.80	66.80
7	25th and Jackson	8627	1427	0.27	8627	1.63	15	1.08	0.33	1.41	8627.00	8.21	23.21	38.21	53.21	68.21
8	25th and Harrison	10114	1487	0.28	10114	1.92	15	1.13	0.33	1.46	10114.00	9.67	24.67	39.67	54.67	69.67
9	Harrison and 28th	12487	2373	0.45	12487	2.36	**20**	1.35	0.33	1.68	12487.00	11.35	26.35	41.35	56.35	71.35
10	Harrison and 30th	13885	1398	0.26	13885	2.63	**20**	0.79	0.33	1.12	13885.00	12.47	27.47	42.47	57.47	72.47
11	Harrsion and 32nd	15466	1581	0.30	15466	2.93	**20**	0.90	0.33	1.23	15466.00	13.70	28.70	43.70	58.70	73.70
12	Harrison and 36th	18546	3080	0.58	18546	3.51	**20**	1.75	0.33	2.08	18546.00	15.78	30.78	45.78	60.78	75.78
13	Browning Center	21124	2578	0.49	21124	4.00	15	1.95	0.33	2.28	21124.00	18.06	33.06	48.06	63.06	78.06
14	41st Street	22432	1308	0.25	22432	4.25	15	0.99	0.33	1.32	22432.00	19.38	34.38	49.38	64.38	79.38
15	Dee Events Center	24949	2517	0.48	24949	4.73	15	1.91	0.33	2.24	24949.00	21.62	36.62	51.62	66.62	81.62
16	McKay Dee Hospital	27925	2976	0.56	27925	5.29	15	2.25	0	2.25	27925.00	**23.87**	38.87	53.87	68.87	83.87
									5	5.00		28.87	43.87	58.87	73.87	88.87
	Dee Events Center		2976	0.56	30901	5.85	15	2.25	0.33	2.58		31.46	46.46	61.46	76.46	91.46
	41st Street		2517	0.48	27466	5.20	15	1.91	0.33	2.24		33.70	48.70	63.70	78.70	93.70
	Browning Center		1308	0.25	28774	5.45	15	0.99	0.33	1.32		35.02	50.02	65.02	80.02	95.02
	Harrison and 36th		2578	0.49	31352	5.94	15	1.95	0.33	2.28		37.30	52.30	67.30	82.30	97.30
	Harrison and 32nd		3080	0.58	34432	6.52	**20**	1.75	0.33	2.08		39.38	54.38	69.38	84.38	99.38
	Harrison and 30th		1581	0.30	36013	6.82	**20**	0.90	0.33	1.23		40.61	55.61	70.61	85.61	100.61
	Harrison and 28th		1398	0.26	37411	7.09	**20**	0.79	0.33	1.12		41.73	56.73	71.73	86.73	101.73
	25th and Harrison		2373	0.45	39784	7.53	**20**	1.35	0.33	1.68		43.41	58.41	73.41	88.41	103.41
	25th and Jackson		1487	0.28	41271	7.82	15	1.13	0.33	1.46		44.87	59.87	74.87	89.87	104.87
	25th and Monroe		1427	0.27	42698	8.09	15	1.08	0.33	1.41		46.28	61.28	76.28	91.28	106.28
	25th and Jefferson		1536	0.29	44234	8.38	15	1.16	0.33	1.49		47.77	62.77	77.77	92.77	107.77
	25th and Washington		1512	0.29	45746	8.66	15	1.15	0.33	1.48		49.25	64.25	79.25	94.25	109.25
	23rd and Washington		1603	0.30	47349	8.97	**20**	0.91	0.33	1.24		50.49	65.49	80.49	95.49	110.49
	23rd and Lincoln		1417	0.27	48766	9.24	15	1.07	0.33	1.40		51.89	66.89	81.89	96.89	111.89
	Frontrunner--23rd and Wall		1132	0.21	49898	9.45	15	0.86	0.33	1.19		53.08	68.08	83.08	98.08	113.08

layover at OTC 6.92
run time 23.87
assumed high speed 20
assumed low speed 15

Scenario 1--consistent headway throughtout day

		Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Hours		19	19	19	19	19	18	12
Vehicles		4	4	4	4	4	3	3
Vehicle-Hours		76	76	76	76	76	54	36
Vehicle-Miles		805.6	805.6	805.6	805.6	805.6	572.4	381.6
Vehicle-Hours per Week		470		Vehicle-Miles per Week		4,982		
Vehicle-Hours per Year		24,440		Vehicle-Miles per Year		259,064		

		Streetcar	BRT	
Operating Cost per Vehicle Hour		$ 185	$ 130	See next tab for how this was calculated
Operating Cost per Year		$ 4,521,400	$3,177,200	

First Proposed Schedule

	AM	Mid-Day	PM
Headway	30min	15min	30min
Number of Vehicles	2	4	2
Monday-Friday	4:30am-7am	7am-7pm	7pm-1am
Saturday	8am-1am		
Sunday/Holidays	8am-11pm		

Revised Schedule--U

Monday-Friday
Saturday
Sunday/Holidays

Frontrunner Schedule			S-Line		Blue
Monday-Friday			6:00-9:32	20-min	4:58-12:01
Arrivals	4:22-6:22	Hourly			
	6:22-9:52	30-minute			
	9:52-15:52	Hourly			
	15:52-19:52	30-minute			
	19:52-22:52	Hourly			
	0:35				
Departures	5:07-10:07	30-minute			
	10:09-15:07	Hourly			
	15:07-18:07	30-minute			
	18:07-19:07	Hourly			
	19:07-21:07	30-minute			
	22:37				
	23:07				
Saturday			6:00-9:32	20-min	5:53-12:18
Arrivals	7:52-0:52	Hourly			
Departures	8:07-1:07	Hourly			
Sunday	No Service		9:00-7:32	20-min	9:33-8:33

Schedule--S-Line

Monday-Friday
Saturday
Sunday/Holidays

niform Headways

Span	Hrs	Headway	Number of Cars
5am-12am	19	15min	4
6am-12am	18	20min	3
9am-9pm	12	20min	3

Revised Schedule--

Monday-Friday
Monday-Friday
Monday-Friday
Saturday
Sunday/Holidays

	Red		Green		Pick
15-min	4:49-11:58	15-min	5:03-11:59	15-min	5am-12am
20-min	5:23-12:03	20-min	5:53-12:02	20-min	6am-12am
20-min	9:23-8:43	20-min	8:53-8:42	20-min	9am-9pm

Span	Hrs	Headway	Number of Cars
6am-9pm	15	20min	2
6am-9pm	15	20min	2
6am-9pm	15	20min	2

-Reduced Headways M-F morning and evening

Span	Hrs	Headway	Number of Cars
5am-8am	3	30min	2
8am-6pm	10	15min	4
6pm-12am	6	30min	2
6am-12am	18	30min	2
9am-9pm	12	30min	2

15-min
20-min
20-min

APPENDIX F

WFRC Preliminary Transit Ridership Forecasting Memorandum

WASATCH FRONT REGIONAL COUNCIL

MEMORANDUM

To: Ogden-Weber State Transit Study Team
From: Jon Larsen, PE and Suzie Swim
Date: November 16, 2015
Subject: Preliminary Transit Ridership Forecasting

The purpose of this memorandum is to provide a summary of the ridership forecasts to date for the Ogden-Weber State Transit Study. The primary audience of this memorandum is the technical project team. As the project progresses and additional analyses are performed, we will periodically update this memo accordingly.

Alignment Alternatives

In the fall of 2014, WFRC looked at two alignments for the project: one that runs down 25th Street with no exclusive lanes and one that runs down 30th Street with some exclusive lanes. The regional Travel Demand Model (TDM), Version 7 was used for producing forecasts for the project. Table 1 shows a comparison of the assumptions that went into these alternatives, as well as the ridership forecasts.

Table 1
Draft Comparison of Alignments and Modes

Characteristic	*25th Street Alignment*		*30th Street Alignment*	
Mode	*Streetcar*	*BRT*	*Streetcar*	*BRT*
2016 Daily Boardings	4,500	2,500	4,400	3,000
2020 Daily Boardings	5,600	3,100	5,500	3,400
2040 Daily Boardings	7,400	4,300	7,400	4,800
Headway	15 min all day	15 min all day	15 min all day	15 min all day
Length in model	5.3 miles	5.3 miles	5.3 miles	5.3 miles
Number of Stations	16	16	16	16

Table 1 assumes 15 minute headways. We also did some sensitivity testing on the impact of 10 and 5 minute headways. These resulted in forecasted increases of 15% and 31% respectively over the 15 minute headways.

Figure 1 shows station-level boardings for BRT along the 25th Street alignment. Figure 2 shows station-level boardings for streetcar along the 25th Street alignment. Figure 3 shows station-level boardings for BRT along the 30th Street alignment. Figure 4 shows station-level boardings for streetcar along the 30th Street alignment. All figures also include the percentage of zero-car households by census tract.

Transit Dependent Ridership

Transit dependent riders are defined as riders from 0 vehicle households. This is an important metric for several reasons. This is a measure of how well the project serves those who need it most. For this reason, when applying for FTA New Starts or Small Starts funding, transit dependent riders are counted double in the ridership calculations.

Table 2 shows the transit dependent ridership for the two alignments. These were forecasted using a combination of the travel model and the on-board survey.

Table 2 Draft Comparison of Transit Dependent Ridership by Alignment				
Characteristic - Mode	*25th Street Alignment - Streetcar*		*30th Street Alignment - Streetcar*	
	Streetcar	*BRT*	*Streetcar*	*BRT*
Home Based College*	16%	16%	16%	16%
Home Based Other	35%	36%	36%	33%
Home Based Work	18%	23%	19%	20%
Non Home Based*	24%	24%	24%	24%
Total	20%	22%	20%	20%

**These percentages were generated based on the 2011 On-Board Survey*

STOPS

STOPS (Simplified Trips-On-Project Software) is a forecasting tool developed by FTA which is intended to simplify the forecasting process and streamline the review process when applying for federal funds. WFRC has run some preliminary forecasts for this project using STOPS. One of the weaknesses of STOPS is that it doesn't explicitly account for home-based-college trips. Because Weber State University is intended to be a major anchor and ridership generator for this project, it appears that STOPS may be under estimating the ridership for this project.

Under a 2012 base year scenario, the TDM projects approximately 3,600 boardings per day on the project, assuming a streetcar on 25th Street. STOPS projects less than half that amount. WFRC will continue to test and refine the STOPS model, but for now, we will use the WFRC Travel Demand Model for official project forecasts.

Locally Preferred Alternative

In July of 2015, Ogden City passed a resolution adopting a locally preferred alternative (LPA) for both alignment and mode. The LPA that was selected was to run BRT on the 25th Street alignment, with exclusive lanes on the southern portion of Harrison Boulevard and through the WSU campus. In fall of 2015, WFRC used Version 8.0 of the travel demand model to forecast two opening day or 'existing system + project' scenarios. The first would run BRT at a frequency of 15 minutes and the second at a frequency of 10 minutes. Table 3 shows a comparison of these assumptions, as well as the ridership forecasts.

Table 3 Opening Day LPA Comparison of Frequency		
Characteristic	*Locally Preferred Alternative – BRT on 25th Street*	
2014 Daily Boardings	2,600	3,100
Headway	15 min all day	10 min all day
Length in model	5.3 miles	5.3 miles
Number of Stations	16	16

Weber State Shuttle Replacement

Additionally, Weber State provides a campus shuttle for their students which carries them from a parking lot on the periphery of campus to the main campus. Today this shuttle averages a daily ridership of ~3,200. The Ogden-Weber State transit line would replace this shuttle service resulting in up to an additional 3,200 riders per day on the project.

Figure 1 - Draft 25th St BRT Daily Boardings

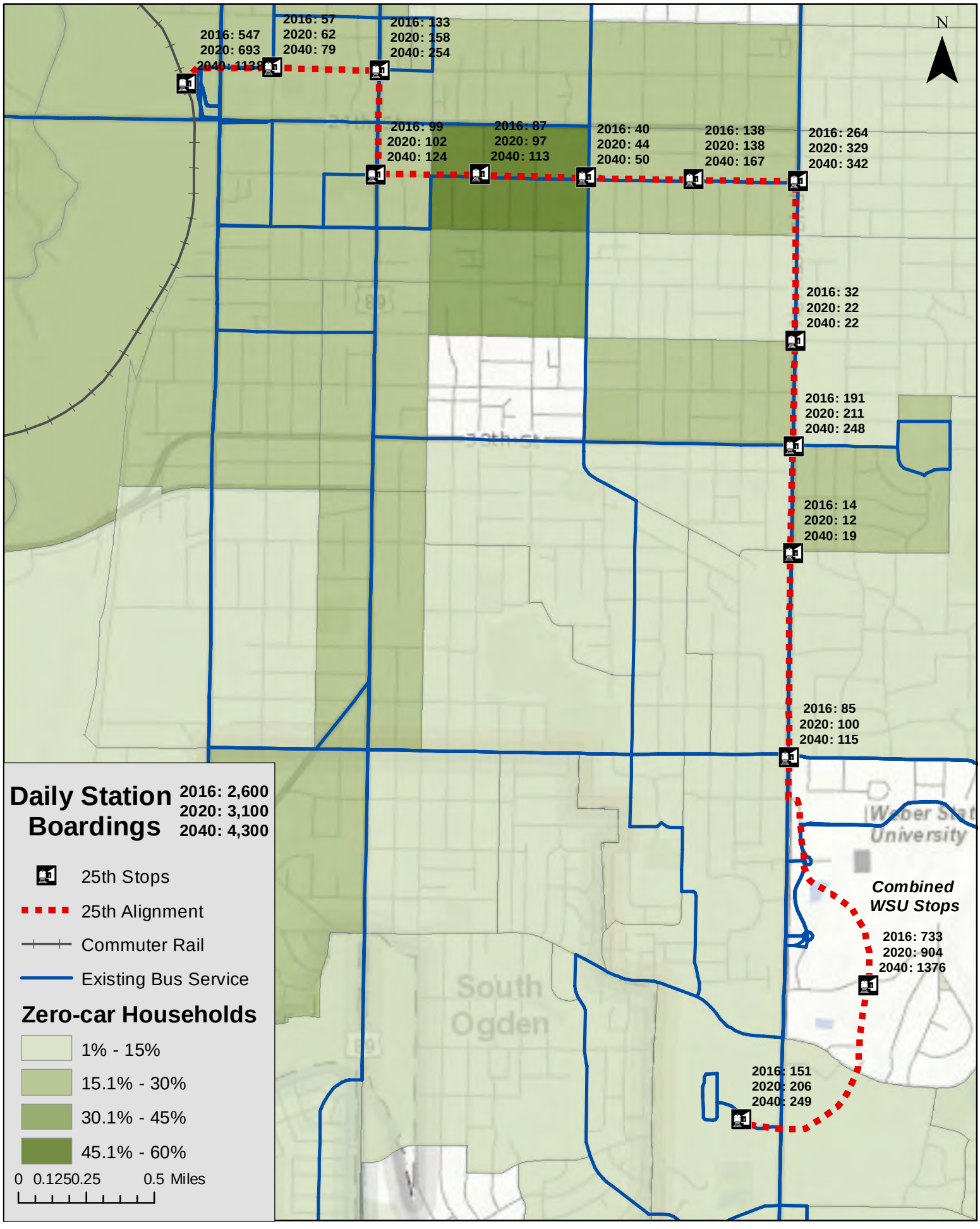


Figure 2 - Draft 25th St Rail Daily Boardings

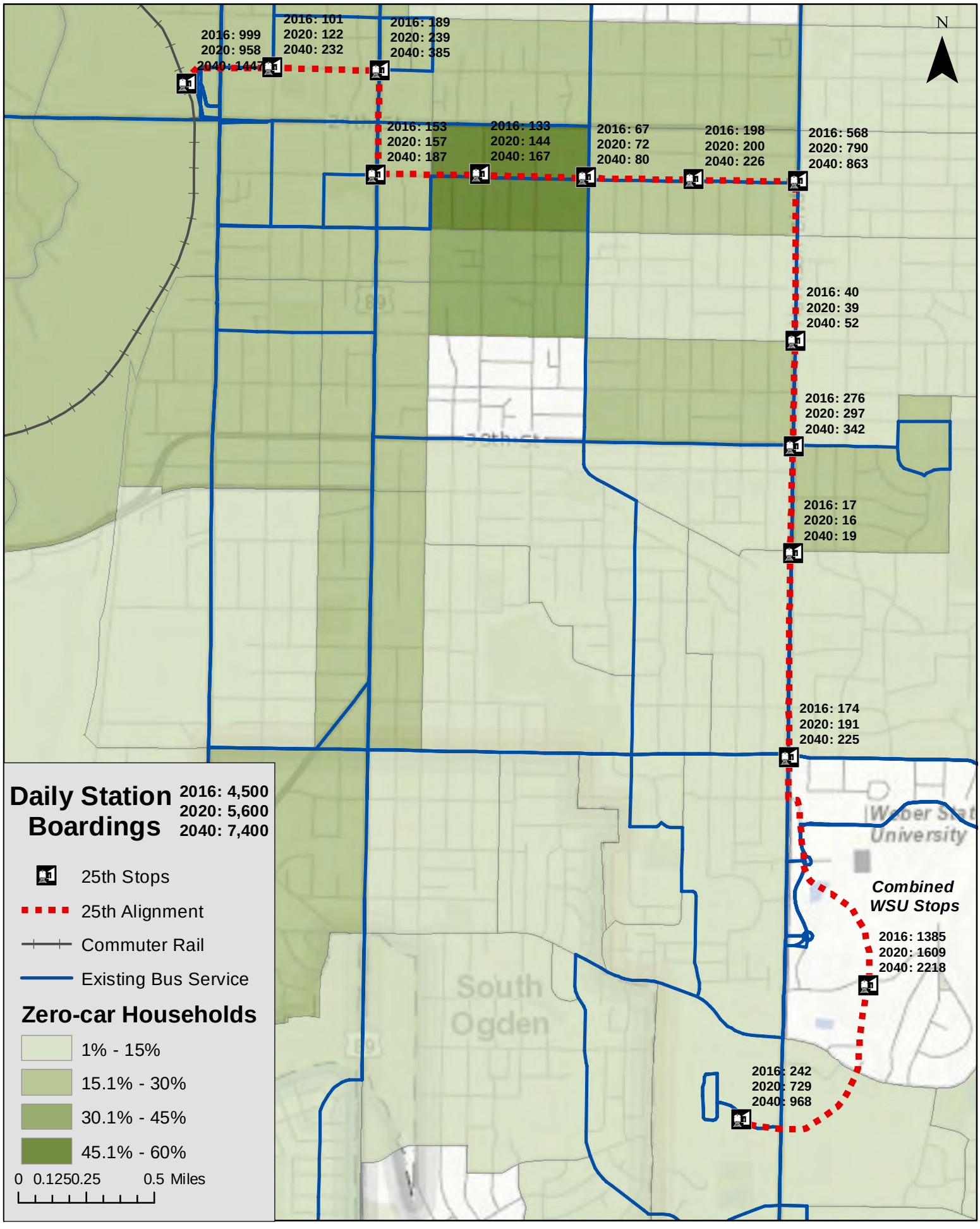


Figure 3 - Draft 30th St BRT Daily Boardings

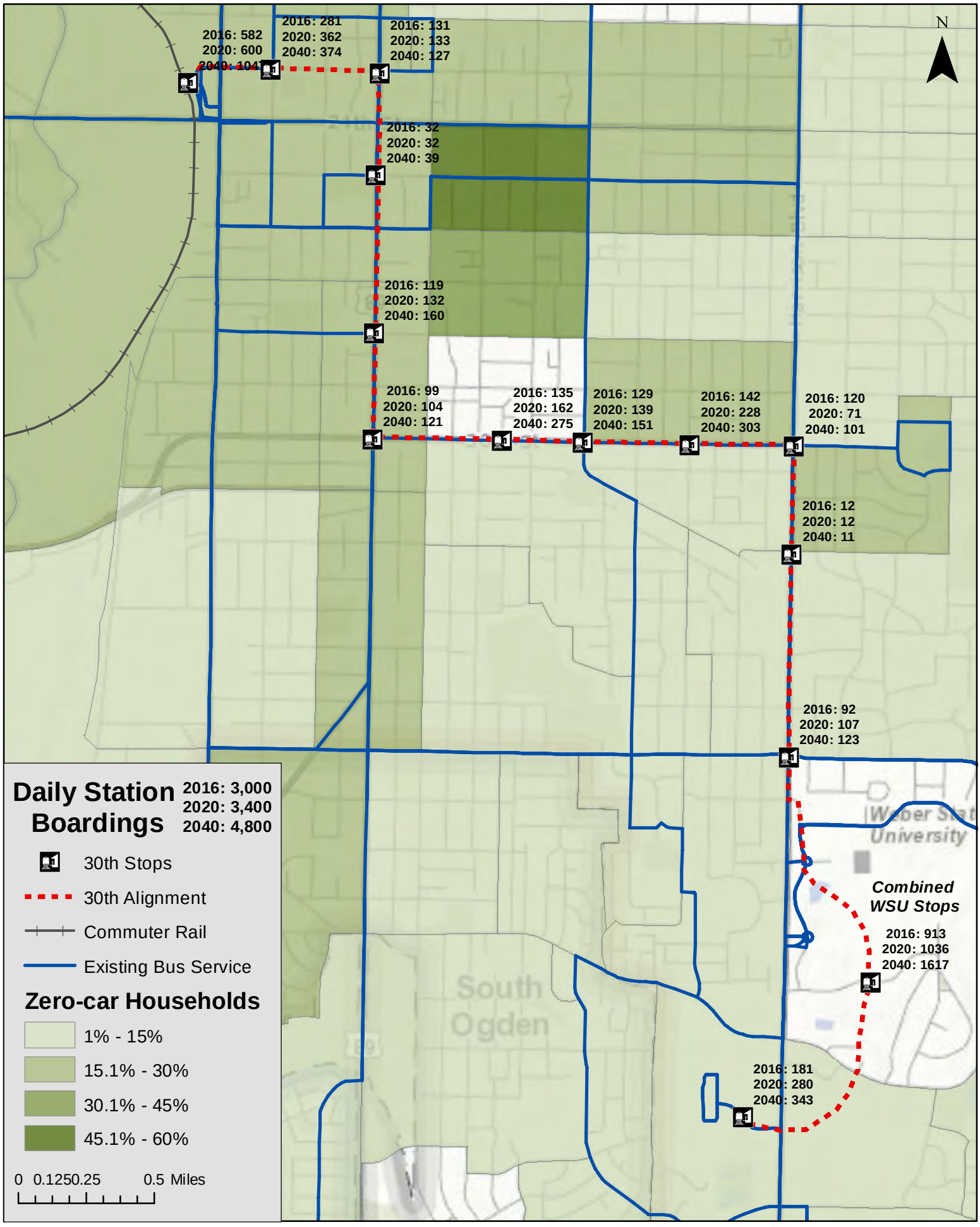
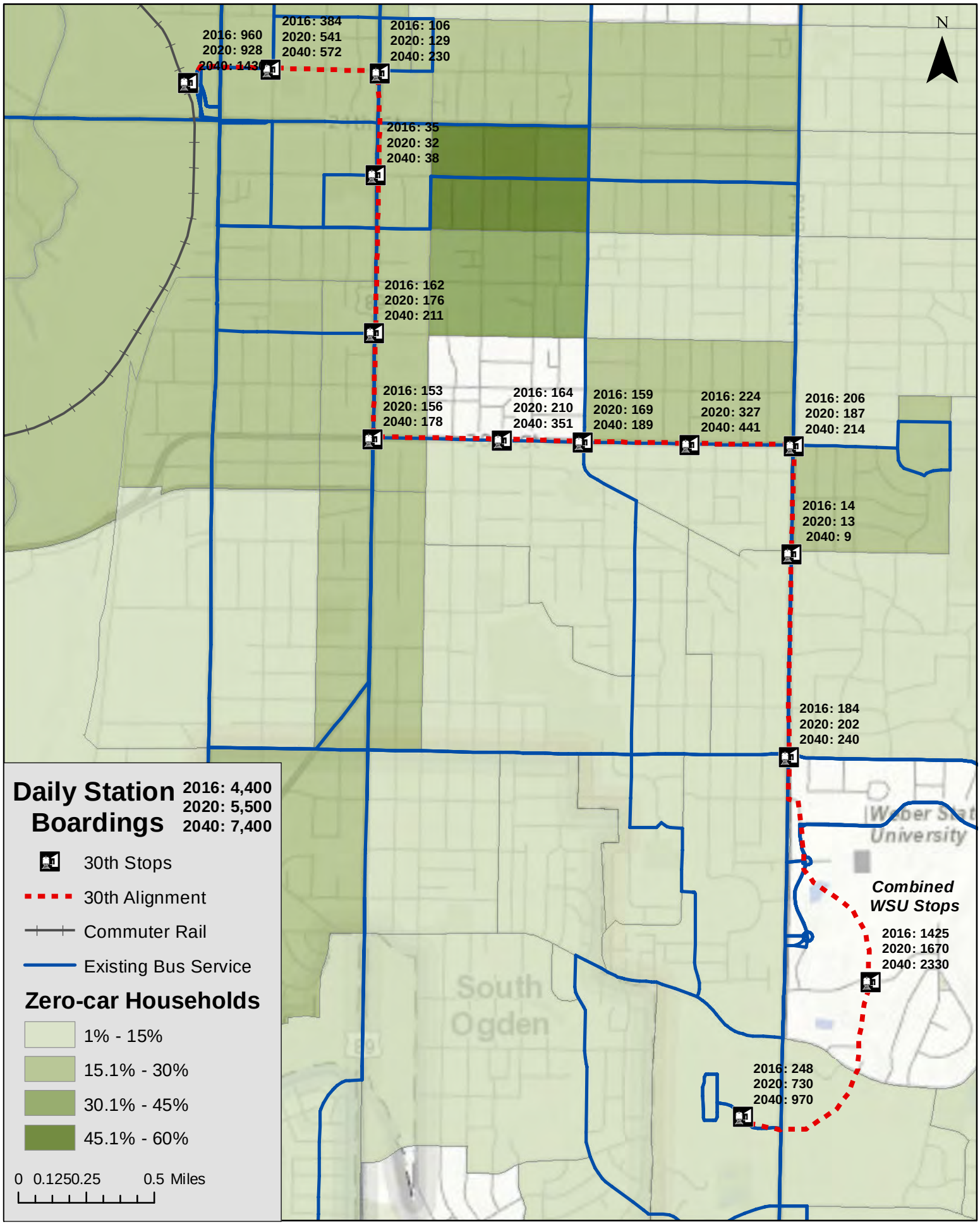


Figure 4 - Draft 30th St Rail Daily Boardings



APPENDIX G

Traffic Technical Report to Determine Feasibility of 25th Street Alignment

InterPlan
Transportation Planning
7719 South Main Street
Midvale, Utah 84047

MEMORANDUM

To: Jim McNulty, UTA

From: HDR Engineering and InterPlan Co.

Date: December 2, 2014

Subject: **Ogden/Weber State Transit Corridor Preliminary Simulation Analysis - *Revised***

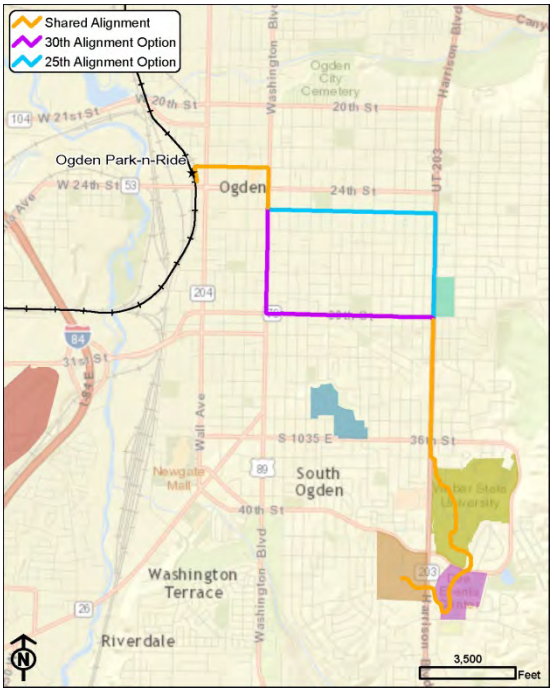
Background

Previous studies have identified a need for a transit project in Ogden but have been unable to identify a preferred route for transit improvements from the Ogden Intermodal Transit Center, through downtown and the surrounding community, to Weber State University and McKay-Dee Hospital. Consensus was not reached because the community favored an alignment on 25th Street to Harrison Boulevard, but the assumed design for the transit guideway on Harrison Boulevard resulted in potential impacts to 103 historic homes between 25th and 30th Streets. Section 4f (Title 49 Unites States Code (U.S.C.) Section 303 and Title 23 U.S.C. Section 138) does not allow the use of land from historical sites unless there is no feasible and prudent alternative. In May 2013, the Ogden City Council selected two routes for further consideration (see Figure 1):

- From Ogden Intermodal Hub to Weber State University and McKay-Dee Hospital using 23rd Street, Washington Boulevard to 30th Street, 30th Street to Harrison Boulevard, and Harrison Boulevard to Weber State University (the "30th" Street Alternative).
- From Ogden Intermodal Hub to Weber State University and McKay-Dee Hospital using 23rd Street, Washington Boulevard, 25th Street, to Harrison Boulevard, and Harrison Boulevard to Weber State University (the "25th Street Alternative")

The purpose of this memo is to introduce the process, purpose and preliminary results of the VISSIM modeling conducted as part of an overall analysis of the feasibility of a design option on 25th Street to Harrison Boulevard that does not impact the historic homes on Harrison between 25th and 30th Streets. Without a feasible design option on Harrison between 25th and 30th Streets, the 25th Street alternative would again be dropped from consideration, and the project could remain in the same position as it was after the previous study.

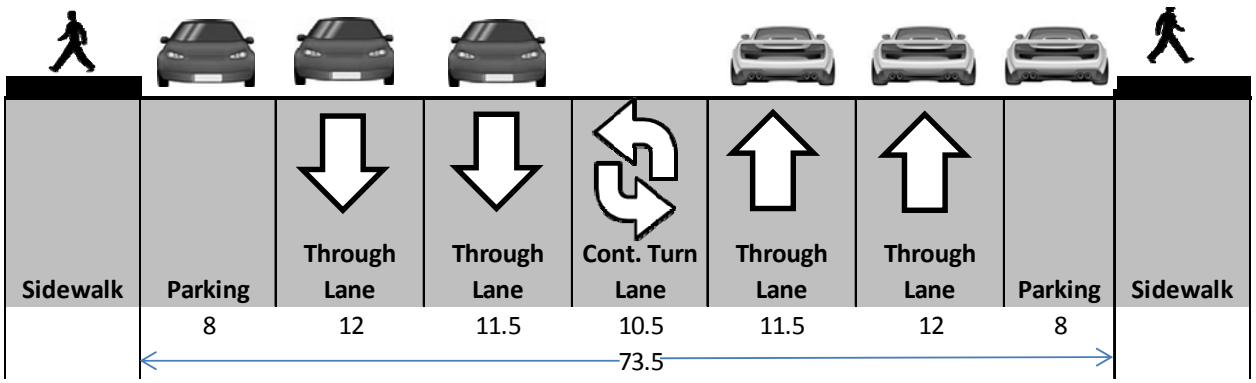
Figure 1 – Potential Transit Alternatives



Design Options

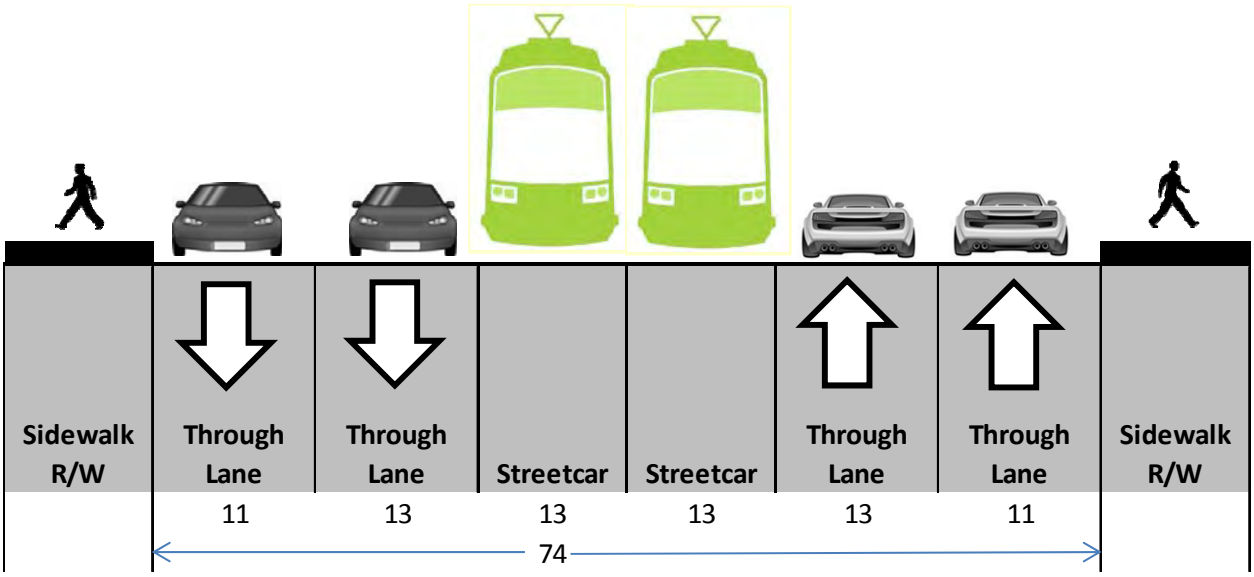
Harrison Boulevard has two lanes of traffic in each direction, parking on both sides of the street, and a continuous turn lane down the middle. The curb-to-curb width is approximately 73.5 feet (see Figure 2). On-street parking is important for the existing homes, and will be important for future redevelopment. On-street parking separates traffic from pedestrians and homes and has a traffic calming effect, consistent with community goals.

Figure 2 -- Existing



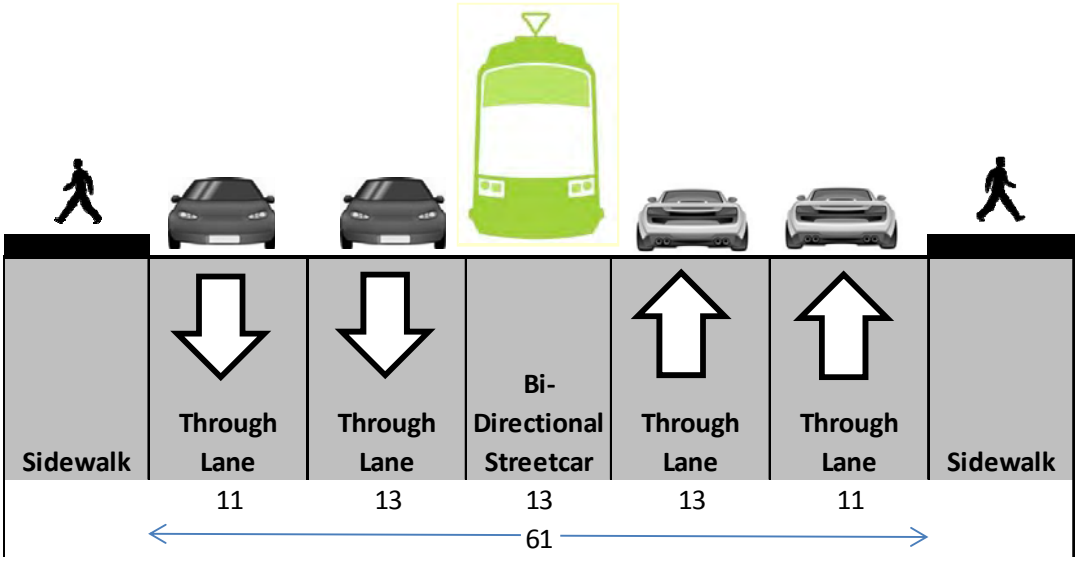
The previous study assumed that the transit improvement would be placed in an exclusive median on Harrison Boulevard, even though all of the west-east portions of the proposed routes were assumed to operate in mixed flow. If the transit guideway were made wide enough for transit to travel in both directions, it would come within 6 inches of fitting if parking were removed (see Figure 3). However, there would not be any room for transit stops or a left turn lane, and therefore it would not work.

Figure 3 -- Exclusive Double Guideway without Parking, Stops, or Turn Lanes



If the transit guideway were narrowed and controlled so that only one transit vehicle could pass through per direction at a time (limiting maximum frequency to 10 minutes), the transit guideway would fit if parking were removed, but there would not be sufficient width for transit stops and a left turn lane (see Figure 4), and therefore it would not work.

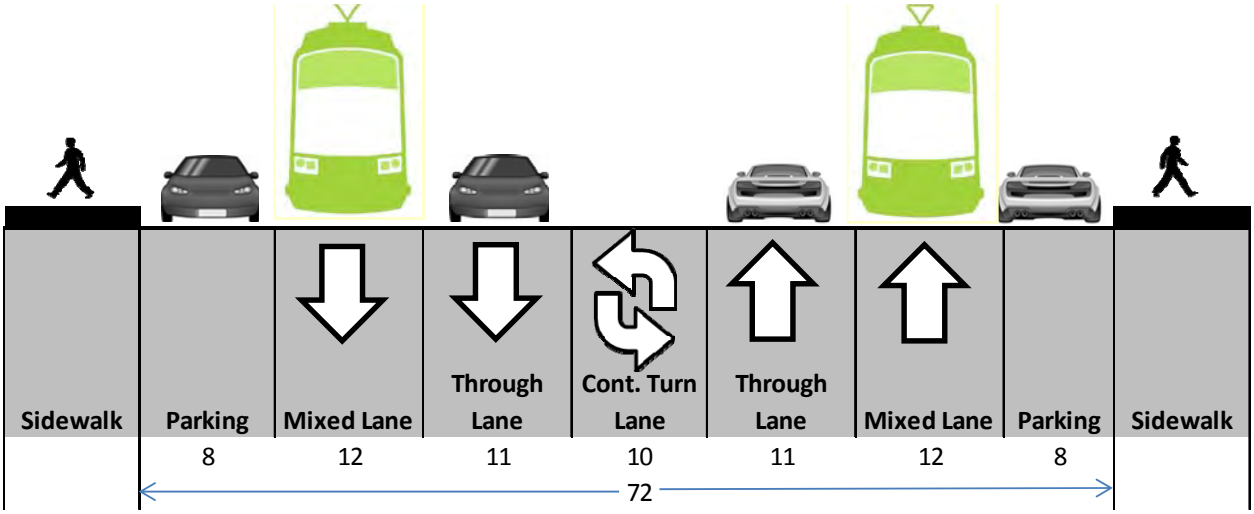
Figure 4 -- Exclusive Single Guideway without Parking, Stops, or Turn Lanes



The only design option that avoids impacts to historic houses, maintains on-street parking, allows stops to be placed (by eliminating two or three on-street parking spaces per stop), and maintains left turn lanes is to have the transit service share the outside lane of traffic (i.e. mixed-flow operation in the right lane) (see Figure 5). Therefore, the Project Team decided to model the mixed-flow operation using VISSIM to determine whether or not there would be impacts to traffic. Modern streetcars are operating in mixed-flow in Portland, Seattle, Tacoma

and Tucson, and are planned for mixed-flow in Washington DC, Dallas, Kansas City, Los Angeles, Sacramento, Ft Lauderdale, and Tempe.

Figure 5 -- Mixed Flow in the Right Lanes



VISSIM Analysis

Before advancing a mixed flow option for the 25th Street Alternative, the project team initiated a brief traffic simulation analysis to determine if mixed flow operation would cause unacceptable impacts to traffic flow or transit performance specifically on Harrison Boulevard between 24th and 30th Streets. It is important to note that the VISSIM analysis was only conducted for this segment of the 25th Street Alternative because it's the critical segment of the alternative from an engineering and operations standpoint. Prior to beginning the traffic simulation modeling process, UTA met with UDOT personnel to discuss the modeling effort and vet the mixed flow option. After initial VISSIM analysis, UTA submitted the modeling files to UDOT for comment and review. UDOT provided technical comments which were then incorporated into the modeling procedures. This results summarized in this memo reflect the inclusion of UDOT comments.

Modeling Assumptions

In order to test the impacts of a mixed-flow running alternative on Harrison Boulevard, several assumptions were made regarding the operational characteristics of the transit route. It is important to note that in this stage of the study the assumptions are not design decisions. The assumptions allow the project team to develop a preliminary set of inputs that meet the degree of specificity inherent in detailed traffic simulation analysis. These assumptions are open to adjustment and modification should the mixed-flow alternative advance in the study process.

Model Structure

The project team based this analysis on the VISSIM road network structure from the 2009 modeling efforts.

Transit Vehicle Type and Guideway

The transit line was modeled with a streetcar vehicle running in the outer travel lanes in mixed-

flow traffic on Harrison Boulevard. The streetcar was assumed to operate at the current posted speed limit of 40 mph. A streetcar vehicle was analyzed rather than a Bus Rapid Transit (BRT) vehicle because it would incur more impacts to the existing travel stream and represents a "worst-case" scenario. If a streetcar can be shown to operate acceptably, then a BRT vehicle would likely work as well.

Stations

Stations were located on Harrison Boulevard at 28th Street and 30th Street and on 25th Street west of Harrison Boulevard. The Harrison Boulevard stations were assumed to be located on the far side of the intersection for respective directions of travel. Station platforms would be constructed to extend from the curb to the outer travel lane so that the streetcar vehicle would stop in the outer travel lane to load/unload passengers. Station dwell times were assumed at 20 seconds.

Schedule

The streetcar was modeled to operate with 10 minute headways in each direction during peak times.

Left Turn Transition from Harrison Boulevard to 25th Street

A new signal would be constructed at 25th Street with a protected northbound left-turn phase to allow the streetcar to make a direct left-turn from Harrison Boulevard to 25th Street. The primary purpose of installing the signal is to allow the streetcar to make a left-turn without having to find gaps in the opposing traffic stream. Absent the streetcar, a signal would not likely otherwise be warranted at this location given the low side-street volumes and the presence of nearby signals at 24th Street and 26th Street. Additionally, if a signal at 25th Street were to be installed, UDOT personnel expressed their preference that either the 24th Street or 26th Street signal be removed. For this analysis, both the 24th Street signal and the 26th Street signal are included in the model. The 26th Street signal could be utilized to help the streetcar transition from the outer travel lane to the center turn lane, as discussed below. The 24th Street signal remained in the model so that a future analysis of the corridor with and without the 24th Street signal could be tested, if desired.

It was assumed that the transition from the outer travel lane on Harrison to the center turn lane would begin at the 26th Street intersection. At the 26th Street intersection, the streetcar would move into a queue-jumper lane in the right shoulder and wait at the signal for an exclusive queue-jumper phase. During this phase, all other traffic movements would halt while the streetcar proceeds north through the intersection. Just beyond the intersection, the streetcar tracks would transition the streetcar diagonally across both northbound travel lanes into the center turn lane. In order to protect the streetcar from conflicts with other left-turning vehicles, it was assumed that the center turn lane would be separated from the southbound lanes via raised median for much of the length between 26th Street and 25th Street. It is important to note that if alternative options for the left-turn transition are identified during the design process, they may be incorporated into final design pending thorough microsimulation analysis and evaluation with stakeholders.

Signal Timing

Existing signal timing parameters from UDOT were assumed for base conditions. For models with streetcar operation, corridor signal cycle lengths were increased from 60 seconds to 80 seconds to accommodate the added phases at the 25th Street and 26th street signals. The ensuing effects to corridor signal coordination would likely need to be considered at a future step in the process. Other than the northbound queue-jumper phase at 26th Street, transit signal priority measures have not been used in the modeling effort thus far. The short cycle lengths at Harrison Boulevard intersections and the minimum pedestrian crossing intervals limit the potential benefits transit signal priority could afford streetcar travel times.

Traffic Volumes

Peak hour intersection volumes acquired for the 2009 modeling efforts served as the basis for current analysis. Traffic counts performed in 2014 indicate 2009 volumes were slightly higher than 2014 volumes. Historic daily roadway volumes on Harrison Boulevard from UDOT confirm this trend. Pedestrian counts from 2014 were added to the VISSIM model. Future (2040) intersection volumes were developed using the WFRC Regional Travel Demand Model. The model shows a 20 percent growth in traffic volumes by 2040 which equates to a less than 1 percent annual growth rate.

Preliminary Results

Traffic simulation analysis with VISSIM quantifies the potential impacts to overall traffic flow in the Harrison Boulevard corridor between 24th Street and 30th Street. Table 1 illustrates the intersection Level of Service (LOS) results for each signalized intersection during the PM peak hour. The addition of a streetcar does not result in a significant increase in average vehicle delay at any of the intersections. In some cases under 2040 conditions, a slight decrease in delay is experienced. This decrease in delay is not likely due to the streetcar itself, but is primarily a result of switching to the longer 80 second cycle length. In other words, the increases in delay brought on by the streetcar are outweighed by the benefits of a longer cycle length. Such benefits could be realized with or without an accompanying streetcar.

Table 2 summarizes corridor travel times on Harrison Boulevard during the PM peak hour. With the streetcar in place, corridor travel times increase by approximately 20 seconds in each direction. These increases are primarily due to the addition of a signal at 25th Street.

The individual impacts of the streetcar operation on traffic flow are noticeable at the new 25th Street intersection, where the northbound left turn movement onto 25th Street experiences an increase in average vehicle delay of about 20 seconds during the PM peak hour. The maximum PM peak hour queues for the northbound left turn also increase by about 75-100 feet. Assuming an average storage length of 25 ft per vehicle, this equates to 3-4 additional queued vehicles. These trends are attributed to the assumption of a protected-only left-turn phase to facilitate streetcar movements onto 25th Street.

Table 1 – Intersection PM Peak Hour LOS Results

	LOS							
	Existing				2040			
	No Build		With Streetcar		No Build		With Streetcar	
Intersection	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh	LOS	Delay (sec/veh)	LOS
24th & Harrison	7	A	11	B	13	B	12	B
25th & Harrison	N/A	N/A	10	B	N/A	N/A	13	B
26th & Harrison	8	A	8	A	7	A	10	A
28th & Harrison	5	A	12	B	5	A	14	B
30th & Harrison	15	B	15	B	23	C	19	B

Table 2 – Harrison Boulevard PM Peak Hour Travel Time Results (25th St to 30th St)

	Travel Times (seconds)			
	Existing		2040	
Harrison Blvd	No Build	With Streetcar	No Build	With Streetcar
Northbound 30th to 24th	106	130	118	138
Southbound 24th to 30th	106	126	106	134

Table 3 – 25th Street Northbound Left Turn Movement PM Peak Hour LOS Results

	LOS							
	Existing				2040			
	No Build		With Streetcar		No Build		With Streetcar	
Movement	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
25th & Harrison NBL	4	A	26	C	4	A	32	C

Table 4 – 25th Street Northbound Left Turn Movement PM Peak Hour Queuing Results

	Maximum Queue (ft)			
	Existing		2040	
Movement	No Build	With Streetcar	No Build	With Streetcar
25th & Harrison NBL	50	125	50	150

Summary

Operation of a mixed-flow streetcar on Harrison Boulevard between 24th Street and 30th Street is not expected to result in unacceptable impacts to overall vehicle flow or transit performance. Most measurable impacts are related to the installation of a new signal at 25th Street. The new signal introduces additional delay to the system and corridor travel times increase by about 20 seconds in each direction. At 25th Street, overall intersection delay with the signal is LOS B for both existing and 2040 conditions. Additionally, the northbound left-turn movement increases from LOS A to LOS C, largely due to the utilization of protected left-turn phasing. However, the increase in queue lengths are marginal, suggesting the northbound left-turn phase will be able to adequately clear queues each cycle.

Alternative	Segment	Length	Avg Speed	Travel Time	Signal	Delay	Excl*	Transit Stops	Dwell Time*
Streetcar on 25th	23rd Street	0.45	25	0:01:05				2	00:40
					Wall Ave	00:10			
					Lincoln Av (2-Way Stop)	00:05			
					Grant Ave	00:10			
					Kiesel Ave (4-Way Stop)	00:10			
					Washington Ave	00:10			
	Washington - 23rd to 25th	0.3	21	0:00:51				1	00:20
					24th St	00:20			
					25th St	00:10			
	25th Street	1.15	21	0:03:17				3	01:00
					Adams Ave	00:20			
					Monroe Blvd	00:15			
					Harrison Blvd (Proposed)	00:10			
	Harrison Blvd - 25th to 37th	1.7	27	0:03:47				5	01:40
					26th St	00:10			
					28th St	00:10			
					30th St	00:15			
					32nd St	00:10			
					36th St	00:25			
	Weber State - McKay Dee Hospital	1.7	20	0:05:06				5	01:40
					46th St & Harrison Blvd	00:20			
				0:14:06		03:30			0:05:20

Assumptions

*Signals on exclusive sections received 0:05 reduction in delay for TSP

*Dwell Time assumed as 0:20 per station

Total Travel Time **0:22:56**

BRT on 25th	23rd Street	0.45	25	0:01:05				2	00:40
					Wall Ave	00:10			
					Lincoln Av (2-Way Stop)	00:05			
					Grant Ave	00:10			
					Kiesel Ave (4-Way Stop)	00:10			
					Washington Ave	00:10			
	Washington - 23rd to 25th	0.3	21	0:00:51				1	00:20
					24th St	00:20			
					25th St	00:10			
	25th Street	1.15	21	0:03:17				3	01:00
					Adams Ave	00:20			
					Monroe Blvd	00:15			
					Harrison Blvd (Proposed)	00:10			
	Harrison Blvd - 25th to 37th	1.7	27	0:03:47				5	01:40
					26th St	00:10			
					28th St	00:10			
					30th St	00:15			
					32nd St	00:10			
					36th St	00:25			
	Weber State - McKay Dee Hospital	1.7	20	0:05:06				5	01:40
					3850 S Roundabout	00:10			
					3950 S Roundabout	00:10			
					46th St & Harrison Blvd	00:20			
				0:14:06		03:50			05:20

Total Travel Time **0:23:16**

Streetcar on 30th	23rd Street	0.45	25	0:01:05				2	00:40
					Wall Ave	00:10			
					Lincoln Av (2-Way Stop)	00:05			
					Grant Ave	00:10			
					Kiesel Ave (4-Way Stop)	00:10			
					Washington Ave	00:10			
	Washington - 23rd to 30th	1.0	21	0:02:51				5	01:40
					24th St	00:20			
					25th St	00:10			
					26th St	00:10			
					27th St	00:10			
					28th St	00:10			
					29th St	00:10			
					30th St	00:15			
	30th Street	1.15	28	0:02:28				2	00:40
					Monroe Blvd	00:25			
					Harrison Blvd	00:15			
	Harison Blvd - 30th to 37th	1.4	27	0:03:07				2	00:40
					32nd St	00:05	Excl		
					36th St	00:15	Excl		
	Weber State - McKay Dee Hospital	1.7	20	0:05:06				5	01:40
					46th St & Harrison Blvd	00:20			
				0:14:37		03:30			05:20

Total Travel Time **0:23:27**

BRT on 30th	23rd Street	0.45	25	0:01:05				2	00:40
					Wall Ave	00:10			
					Lincoln Av (2-Way Stop)	00:05			
					Grant Ave	00:10			
					Kiesel Ave (4-Way Stop)	00:10			
					Washington Ave	00:10			
	Washington - 23rd to 30th	1.0	21	0:02:51				5	01:40
					24th St	00:10	Excl		
					25th St	00:05	Excl		
					26th St	00:05	Excl		
					27th St	00:05	Excl		
					28th St	00:05	Excl		
					29th St	00:05	Excl		
					30th St	00:10	Excl		
	30th Street	1.15	28	0:02:28				2	00:40
					Monroe Blvd	00:25			
					Harrison Blvd	00:15			
	Harison Blvd - 30th to 37th	1.4	27	0:03:07				2	00:40
					32nd St	00:05	Excl		
					36th St	00:15	Excl		
	Weber State - McKay Dee Hospital	1.7	20	0:05:06				5	01:40
					3850 S Roundabout	00:10			
					3950 S Roundabout	00:10			
					46th St & Harrison Blvd	00:20			
				0:14:37		03:10			05:20

Total Travel Time **0:23:07**

APPENDIX H

Financing/Funding Evaluation

Ogden / Weber State University Transit Project Study

Preliminary Financial Review
June 9, 2015

01 Recent UTA Financial Strategies

02 Preliminary Financial Review

03 Conclusions & Next Steps

01 Recent UTA Financial Strategies

UTA Fixed Guideway Projects Financial Strategies

	Provo-Orem BRT (2016)	Sugarhouse Streetcar (2013)	FrontLines 2015 Program			
			Draper LRT (2014)	Airport LRT (2014)	Mid-Jordan LRT (2014)	West Valley LRT (2014)
CAPITAL COST	$150.0	$37.3	$146.2	$250.0	$509.8	$199.0
Revenues						
Federal Programs						
New Starts			$87.7		$407.8	
Small Starts	$75.0					
USDOT TIGER Funds		$26.0				
State Participation						
UDOT - Joint Construction & R.O.W.	$7.0					
UTA Funds						
2006 Referendum Bond Proceeds			$58.5		$68.5	
General Revenues				$150.0		$194.0
Local Partnerships						
Utah County - 3rd 1/4 cent sales tax	$3.0					
Utah County - 3rd 1/4 cent revenue bond	$65.0					
Property Donations		$0.1 (Salt Lake City)		$100.0 (Salt Lake City)	$33.5 (Mid-Jordan)	$5.0 (West Lake City)
Salt Lake City		$2.5				
South Salt Lake		$2.5				
Other		$6.0				

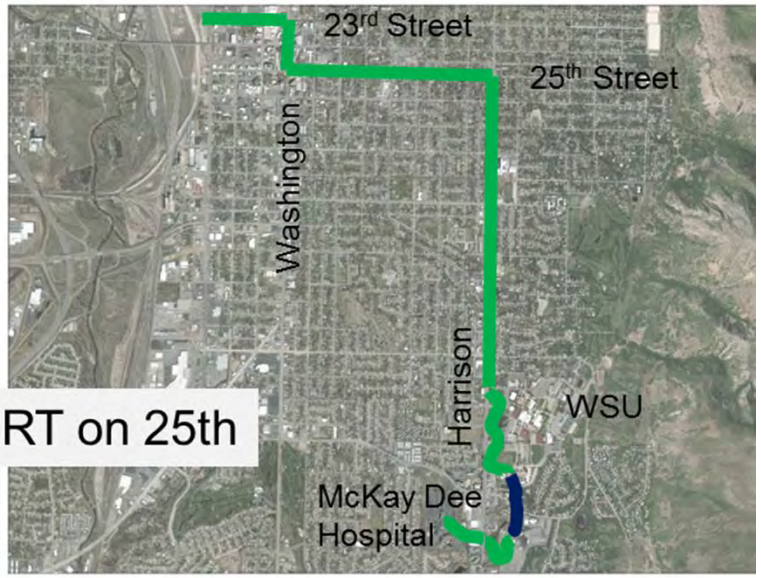
UTA Fixed Guideway Projects Financial Strategies

	Provo-Orem BRT (2016)	Sugarhouse Streetcar (2013)	FrontLines 2015 Program			
			Draper LRT (2014)	Airport LRT (2014)	Mid-Jordan LRT (2014)	West Valley LRT (2014)
SHARE OF TOTAL REVENUES						
Federal	50%	70%	60%		80%	
State	5%					
UTA			40%	60%	13%	97%
Local	45%	30%		**40%**	7%	**3%**

UTA Fixed Guideway Project: O&M Costs and Revenues ($ in millions)

	Provo-Orem BRT (2016)	Sugarhouse Streetcar (2013)	FrontLines 2015 Program			
			Draper LRT (2014)	Airport LRT (2014)	Mid-Jordan LRT (2014)	West Valley LRT (2014)
Annual O&M Costs	$4.3 *	$1.6	$0.7	$1.2	$2.0	$1.0
Revenue Sources						
UTA General Operating Funds		$0.4	$0.7	$1.2	$2.0	$1.0
Salt Lake City & South Salt Lake		$1.2				
Utah County	$2.5					
Reduction in O&M (route elimination)	$1.8					

- Annual Provo-Orem BRT O&M costs are planned. All other costs are actuals.



02 Preliminary Financial Review

How Are Projects Funded Across the Country?

Streetcar

- 16 Projects

Source	Projects Receiving Funding From:	Min Share	Max Share
Federal	14	10%	70%
State	4	2%	25%
Regional / Local	14	2%	100%
Private / Assessment Districts	11	2%	78%

BRT

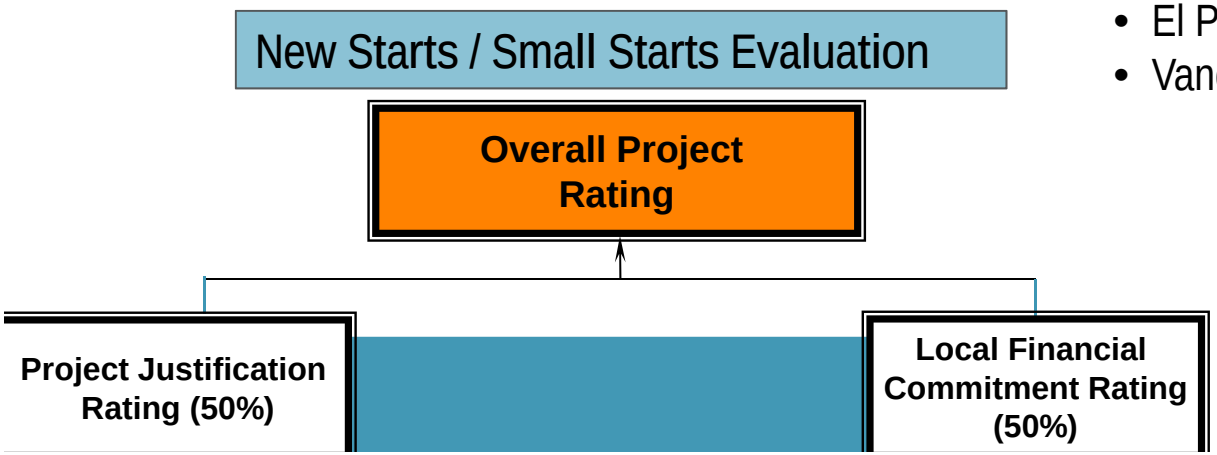
- 11 Projects (<$150 M)

Source	Projects Receiving Funding From:	Min Share	Max Share
Federal	11	45%	80%
State	6	4%	22%
Regional / Local	8	1%	35%
Private / Assessment Districts	-	-	-

Federal Programs: New Starts / Small Starts

- Streetcar
  - Up to 50% of total costs
    - Portland Eastside Loop: $75 M (50% of total costs)
    - Ft. Lauderdale: $59 M (37%)
    - Tempe: $56 M (43%)
    - Los Angeles: $75 M (50%)
    - Sacramento: $75 M (45%)

- BRT (<$150 M)
  - Up to 80% of total costs
  - Existing or Budgeted Construction Grant Agreements
    - Provo-Orem: $75 M (50% of total costs)
    - Fresno: $39 M (80%)
    - Jacksonville: $19 M (80%)
    - Jacksonville: $26.8 M (80%)
    - Grand Rapids: $19.0 M (50%)
    - Reno: $7 M (12%)
    - Columbus: $38 M (80%)
    - Eugene: $75 M (79%)
    - El Paso: $20 M (57%)
    - El Paso: $27 M (59%)
    - Vancouver: $38 M (73%)



Other Federal Programs

(New Starts/Small Starts + Other Federal Programs)

- Streetcar

Other Federal Programs	Number of Projects	Funding Levels (in millions)
TIGER / Competitive Grants	10	$2 - $63
Flexible Highway Funds (CMAQ /STP / TAP)	8	$4 - $32

- BRT (<$150 M)

Other Federal Programs	Number of Projects	Funding Levels (in millions)
TIGER / Competitive Grants	1	$16
Flexible Highway Funds (CMAQ /STP / TAP)	6	$1 - $17

Non-Federal Funding

Streetcar

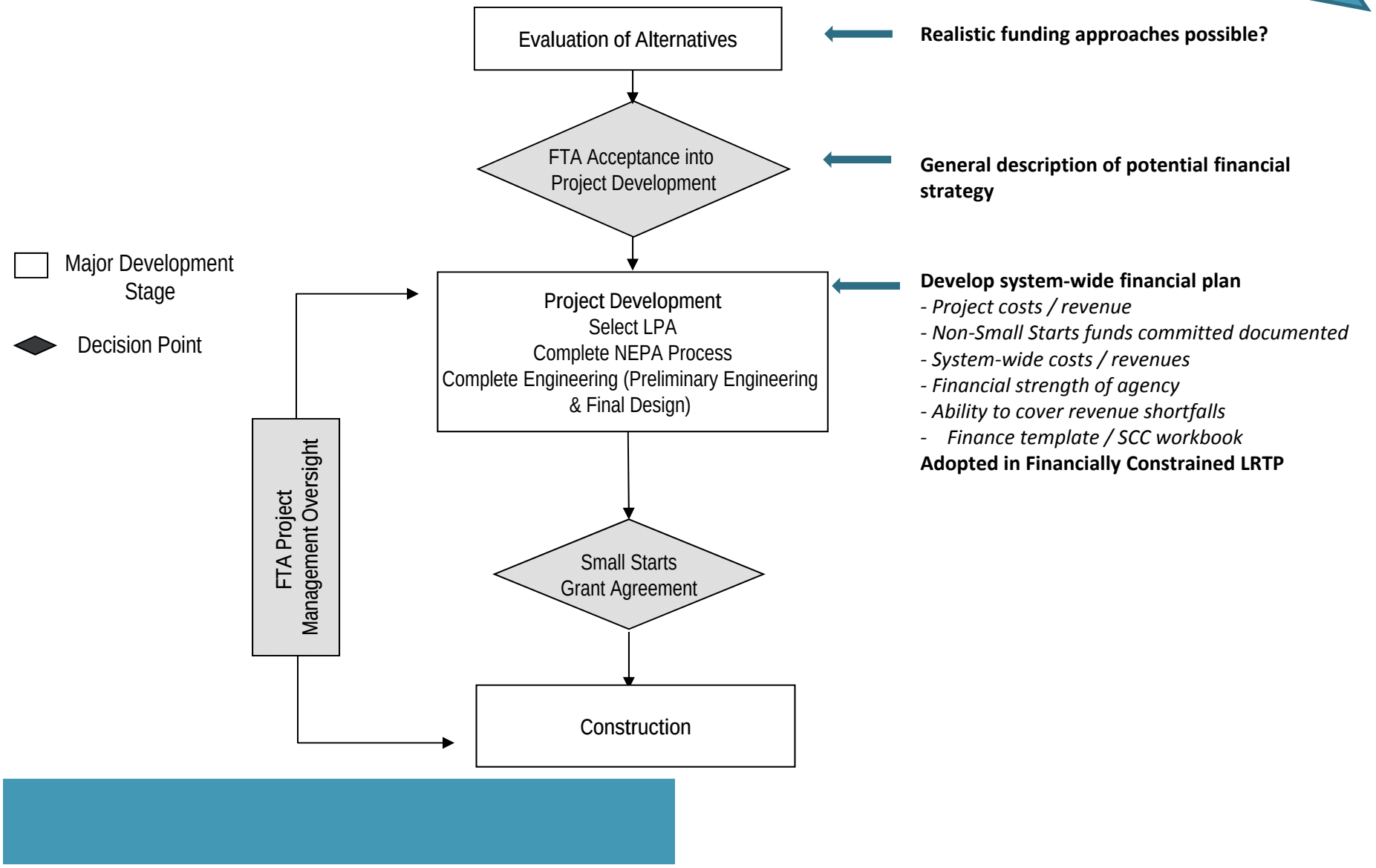
- **State**: 4 Projects (2% to 24%)
- **Local**: 14 Projects (5% to 100%)
  - Local Sales Tax
  - General Fund / General Transportation Fund
  - Parking Revenue
  - Bond Proceeds
  - Tax Increment Finance District (existing)
  - Sale of Property / Land Donation
  - Savings From Other Capital Projects
  - Tram Transfer
  - Water Utility Contribution
- Private Participation: 11 Projects (1% to 80%)
  - Assessment Districts
  - Private Donations
  - New Market Tax Credits

BRT

- **State**: 10 Projects (4% to 22%)
- **Local**: 9 Projects (1% to 35%)
  - Local Sales Tax
  - General Fund
  - Bond Proceeds
  - Sale of Property / Land Donation

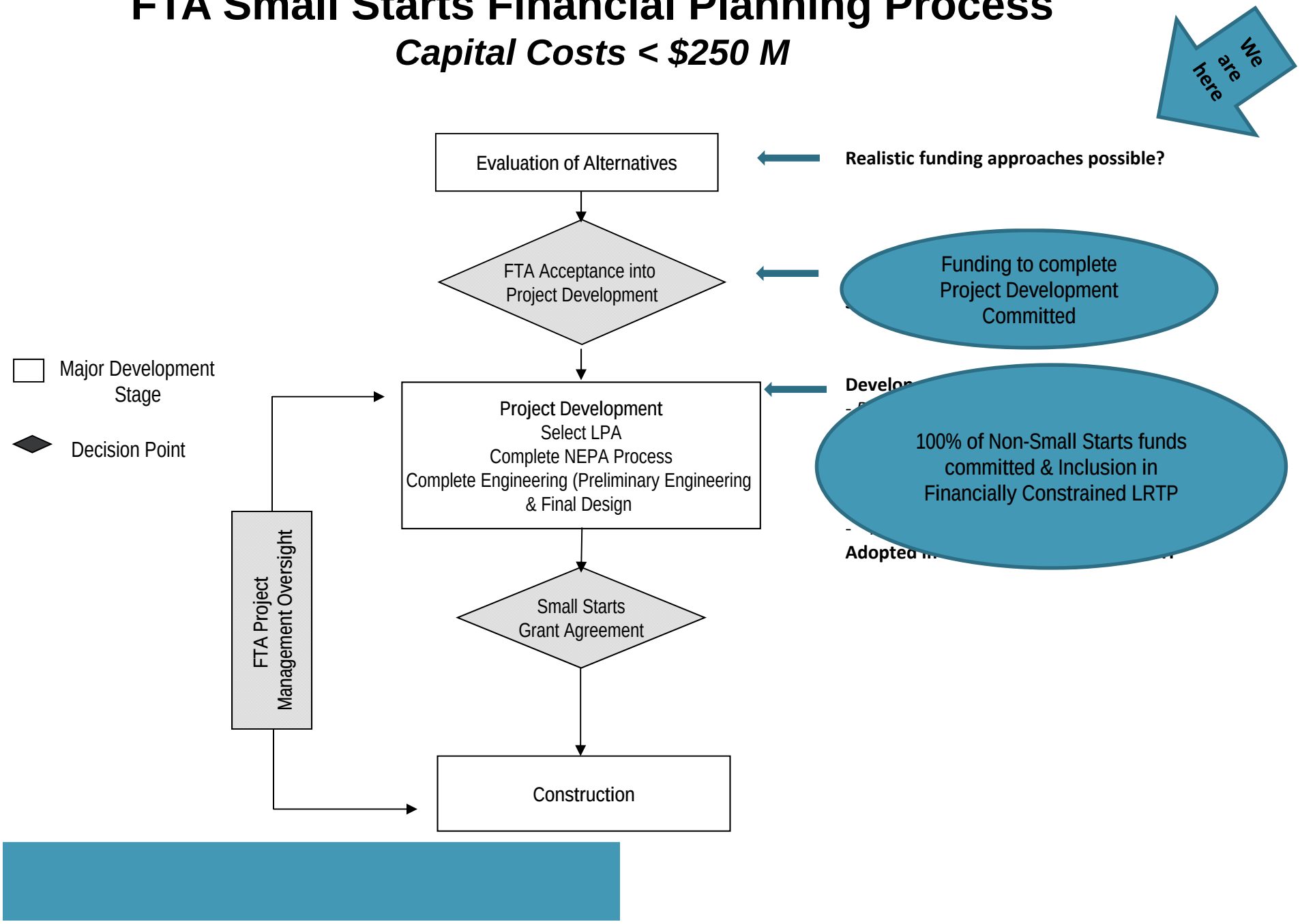
FTA Small Starts Financial Planning Process

Capital Costs < $250 M



FTA Small Starts Financial Planning Process

Capital Costs < $250 M



Conceptual Financial Strategies ($ in millions)

Assumptions	25th Street Streetcar		30th Street BRT		25th Street BRT (Original)		25th Street BRT (Hybrid)	
	Current Year $	YOE $	Current Year $	YOE $	Current Year $	YOE $	Current Year $	YOE $
Capital Costs	$183.3	$220.0	$59.5	$71.4	$32.8	$39.4	$46.7	$56.1
Construction Schedule	2019 - 2021		2019 - 2021		2019 - 2021		2019 - 2021	
Annual O&M Costs	$3.4	$4.0	$2.4	$2.8	$2.4	$2.8	$2.4	$2.8
Annual Fare Revenue	$1.4		$0.9		$0.8		$0.8	
FTA Small Starts Revenue Received	2019-2022		2019-2022		2019-2022		2019-2022	
UTA TDP Financing	30 year term; 6.125% interest							

For Evaluation of Alternatives Purposes Only – Detailed financial plan would be developed for LPA

Conceptual Financial Strategies: 25th Street Streetcar

	25th Street Streetcar	
Capital Cost (YOE $, in millions)	$220.0	
Potential Funding Scenarios	1-Minimal Federal (50% Total)	2-Moderate Federal & State
FTA New Starts (50%)	$110.0	$110.0
Potential Other Federal Funds	$0.0	$5.0 - $10.0
Potential State Assistance	$0.0	$5.0 - $10.0
Total Federal & State Funds	*$110.0*	*$120.0 - $130.0*
Capital Funding Shortfall	$110.0	$100.0 - $90.0
Annual O&M Cost (YOE $, in millions)	$4.0	
Fare Revenue	$1.4	$1.4
Elimination of Route 603	$0.9	$0.9
Operating Funding Shortfall	$1.7	$1.7
Additional Annual Revenue Required		
Annual Debt Service Payment	$10.0	$9.2 - $8.4
Equivalent Weber County Sales Tax Rate (*debt service & operating subsidy*)	0.23%	0.22% - 0.21%

Note: Potential land donation from Weber State University could be used as local match. This potential donation is not reflected In the conceptual financial strategy analysis

For Evaluation of Alternatives Purposes Only – Detailed financial plan would be developed for LPA

Conceptual Financial Strategies: 30th Street BRT

	30th Street BRT	
Capital Cost (YOE $, in millions)	$71.4	
Potential Funding Scenarios	1-Minimal Federal (50% Total)	2-Moderate Federal & State
FTA New Starts	$35.7	$35.7
Potential Other Federal Funds	$0.0	$5.0 - $10.0
Potential State Assistance	$0.0	$5.0 - $10.0
Total Federal & State Funds	*$35.7*	*$45.7 - $55.7*
Capital Funding Shortfall	$35.7	$25.7 – 15.7
Annual O&M Cost (YOE $, in millions)	$2.8	
Fare Revenue	$0.9	$0.9
Operating Funding Shortfall	$1.9	$1.9
Additional Annual Revenue Required		
Annual Debt Service Payment	$3.3	$2.5 - $1.7
Equivalent Weber County Sales Tax Rate (*debt service & operating subsidy*)	0.10%	0.09% – 0.07%

Note: Potential land donation from Weber State University could be used as local match. This potential donation is not reflected In the conceptual financial strategy analysis

For Evaluation of Alternatives Purposes Only – Detailed financial plan would be developed for LPA

Conceptual Financial Strategies: 25th Street BRT (Original)

	25th Street BRT (Original)	
Capital Cost (YOE $, in millions)	$39.4	
Potential Funding Scenarios	1-Minimal Federal (50% Total)	2-Moderate Federal & State
FTA New Starts	$19.7	$19.7
Potential Other Federal Funds	$0.0	$5.0 - $10.0
Potential State Assistance	$0.0	$5.0 - $10.0
Total Federal & State Funds	$19.7	$29.7 - $39.4
Capital Funding Shortfall	$19.7	$9.7 - $0.0
Annual O&M Cost (YOE $, in millions)	$2.8	
Fare Revenue	$0.8	$0.8
Elimination of Route 603	$0.9	$0.9
Operating Funding Shortfall	$1.1	$1.1
Additional Annual Revenue Required		
Annual Debt Service Payment	$1.9	$1.2 - $0.0
Equivalent Weber County Sales Tax Rate (*debt service & operating subsidy*)	0.06%	0.05% - 0.04%

Note: Potential land donation from Weber State University could be used as local match. This potential donation is not reflected In the conceptual financial strategy analysis.

For Evaluation of Alternatives Purposes Only – Detailed financial plan would be developed for LPA

Conceptual Financial Strategies: 25th Street BRT (Hybrid)

	25th Street BRT (Hybrid)	
Capital Cost (YOE $, in millions)	$56.1	
Potential Funding Scenarios	1-Minimal Federal (50% Total)	2-Moderate Federal & State
FTA New Starts	$28.1	$28.1
Potential Other Federal Funds	$0.0	$5.0 - $10.0
Potential State Assistance	$0.0	$5.0 - $10.0
Total Federal & State Funds	$28.1	$38.1 - $28.1
Capital Funding Shortfall	$28.1	$18.0 - $8.0
Annual O&M Cost (YOE $, in millions)	$2.8	
Fare Revenue	$0.8	$0.8
Elimination of Route 603	$0.9	$0.9
Operating Funding Shortfall	$1.1	$1.1
Additional Annual Revenue Required		
Annual Debt Service Payment	$2.6	$1.9 - $1.1
Equivalent Weber County Sales Tax Rate (*debt service & operating subsidy*)	0.07%	0.06% - 0.05%

Note: Potential land donation from Weber State University could be used as local match. This potential donation is not reflected In the conceptual financial strategy analysis.

For Evaluation of Alternatives Purposes Only – Detailed financial plan would be developed for LPA

03

Conclusions & Next Steps

Conclusions & Next Steps

- Financial strategies evolve through the project implementation process
  - Sources change
  - Project definition and costs change

- At this stage, are the funding short falls shown previously fatal flaws or does the preliminary analysis indicate potential realistic strategies are possible?

- If the decision is made to move forward:
  - Develop detailed financial plan for Locally Preferred Alternative (LPA)
    - Define total and annual Small Starts funding levels
    - Identify and target potential other Federal and State funds
    - Determine local financing mechanism
  - Funding commitments are required:
    - In the letter requesting entry into Project Development to cover expenses related to Project Development Activities ONLY
    - During Project Develop/prior to requesting the Small Starts Construction Grant Agreement 100% of non-Small Starts funds must be committed