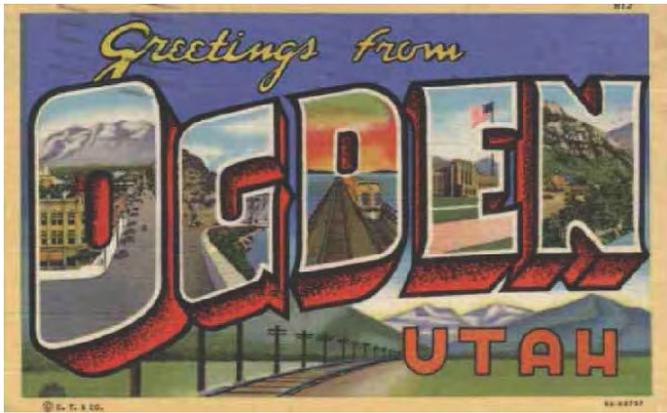


APPENDIX A

Alternatives Analysis Update Report



Alternatives Analysis Update Report

**Ogden/Weber State University
Transit Project Study**

Ogden, Weber County, Utah

December 1, 2015



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Appendix G. Traffic Technical Report to Determine Feasibility of 25th Street Alignment

Appendix H. Financing/Funding Evaluation

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Executive Summary

Ogden/Weber State University Transit Project Study December 2015



Executive summary

This document describes the process by which a Locally Preferred Alternative (LPA) was selected for the Ogden/Weber State University Transit Project Study.

The study was led by the Utah Transit Authority (UTA) in cooperation with several partners including Ogden City, Weber County, the Wasatch Front Regional Council, the Utah Department of Transportation, Weber State University, and McKay-Dee Hospital.

The study was initiated to identify a transit alternative that best meets the transportation needs of the local community in terms of technical feasibility, costs, and benefits.

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, 380,000 daily person-trips occur within the study area, and this number is expected to increase to 515,000 by 2040.

Public outreach

The study team conducted extensive coordination with study area residents, businesses, special-interest groups, and agencies to ensure that their concerns and issues were heard and addressed.

The goal of the public and agency involvement process was to have an informed local community and government leadership to help make decisions regarding the selection and implementation of an LPA. The process was open to ensure that interested parties could be involved in planning. Stakeholders had an opportunity to direct, review, and comment during the entire course of the study.

Overall, people felt that not only would transit improvements increase connectivity and mobility, but investing in premium transit service would also help economically revitalize Ogden and raise Ogden's profile as a city along the Wasatch Front. Wherever the location and whatever the mode, the majority of people expressed support for a transit project in Ogden.



Purpose and Need

What is the problem?

- The study partners want to upgrade transit service and enhance the experience for already high existing bus ridership.
- A large number of transit-dependent customers live in the study area.
- Growth forecasted for Weber State University will overwhelm roadway and parking capacity unless there are alternatives to auto travel.
- Traffic congestion is growing, and roadway level of service and air quality are declining.
- Local and regional land-use plans and economic and redevelopment initiatives are not adequately supported by UTA's existing fixed-route bus system.

What is the purpose of the transit solution?

- Strengthen east-west connection between the Ogden Intermodal Transit Center, Ogden's central business district, Weber State University, McKay-Dee Hospital, and the communities in between to improve regional and local mobility, connectivity, and travel choices.
- Better serve transit-dependent populations through improved and accessible transit service.

- Enhance access to Weber State University while reducing the growth in automobile trips and parking demand at the university.
- Increase transit ridership by providing a viable and competitive transit alternative to private automobiles and existing bus service. The project would attract new riders by offering improved transit service and facilities, transit travel times competitive with auto travel, and a rail-like experience proved to attract riders from automobiles.
- Reduce transportation-related energy use, air pollution emissions, and greenhouse gas emissions.
- To meet the secondary objective of supporting local and regional planning initiatives and land-use strategies that aim to strengthen communities, foster economic development and fulfill goals for long-range economic and employment growth.



How is this study different from previous studies?

The Ogden/Weber State University Transit Study builds on previous planning efforts and most notably builds on a 2011 draft alternatives analysis (AA), which analyzed a range of transit modes but ultimately found streetcar and BRT to be the most viable. The 2011 draft AA also screened a range of alignments, but the study partners never achieved a consensus on supporting any one mode or alignment.

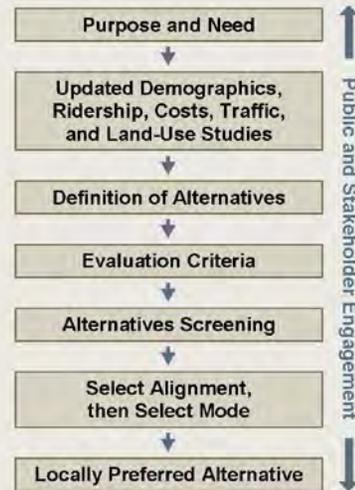
The Ogden/Weber State University Transit Study analyzed streetcar and BRT on two specific alignments—25th Street and 30th Street—that were selected by Ogden’s Mayor and City Council through a joint resolution in 2013.

UTA, in cooperation with the study partners, developed the following four alternatives for the current study:

- 25th Street Streetcar
- 25th Street BRT
- 30th Street Streetcar
- 30th Street BRT

Given all the previous work that had been conducted in support of transit improvements in Ogden, UTA and the study partners decided to update the 2011 draft AA to analyze the four new alternatives.

Study process



Four alternatives developed for the Ogden/Weber State University Transit Project Study

Locally Preferred Alternative

The LPA includes a 5.3-mile bus rapid transit (BRT) line between the Ogden Intermodal Transit Center and the FrontRunner commuter-rail station, Ogden’s central business district, Weber State University, and McKay-Dee Hospital.

The selection of the LPA follows an 18-month study to develop and evaluate transit alternatives in downtown Ogden. The work conducted for the current study builds on previous planning efforts in the region and involved extensive collaboration between government jurisdictions and stakeholders in multiple communities.



Study area and LPA for the Ogden/Weber State University Transit Project Study

How did we get to the Locally Preferred Alternative?

After reviewing the technical results and listening to feedback from the public, the project’s Technical Advisory Committee and Policy Advisory Committee unanimously selected BRT on 25th Street as the LPA and recommended this alternative to the Ogden City Council for adoption. The City Council adopted the LPA by resolution in July 2015.

What are the next steps?

The Wasatch Front Regional Council is in the process of amending the region’s transportation plan (RTP), which guides the development of the region’s transportation system. The Ogden/Weber State University Transit Study LPA will be incorporated into the RTP during this amendment process.

UTA and the study partners will continue with the next phase of the Ogden/Weber State University Transit Study by completing environmental documentation, advanced conceptual engineering, and a financial plan and identifying funding for the project.

For more information: www.rideuta.com/mc/?page=Projects-OgdenWSUTransitStudy

1.0 Project Overview

In 2011, the Utah Transit Authority (UTA) published the Ogden/Weber State University Transit Corridor Draft Alternatives Analysis (2011 draft AA) as part of evaluating options for improved public transportation service in the city of Ogden in Weber County, Utah.

In July 2015, UTA, in cooperation with several study partners including Ogden City, Weber County, the Wasatch Front Regional Council (WFRC), the Utah Department of Transportation (UDOT), Weber State University, and McKay-Dee Hospital, updated the 2011 draft AA as part of the current Ogden/Weber State University Transit Project Study. This study is evaluating the benefits, costs, and impacts of implementing premium transit service in Ogden. The 2011 draft AA was updated in 2015 to identify a transit alternative that would best meet the transportation needs of the local community in terms of technical feasibility, costs, and benefits.

This AA update report describes the process by which the 2011 draft AA was updated and a Locally Preferred Alternative (LPA)—bus rapid transit (BRT) on 25th Street in Ogden—was selected for the current study. The 2011 draft AA was updated after extensive analysis and considerable public involvement from agency and business leaders and residents in the community.

1.1 Purpose of This Report

The AA update work conducted for the current study builds on previous planning efforts in the region and has involved extensive collaboration between government jurisdictions and stakeholders in multiple communities. For over 10 years, representatives of agencies and districts responsible for plans and policies in the study area have been considering significant transit improvements to serve anticipated growth in the study area—growth in population, households, employment, and the number of automobile trips as well as growth at Weber State University (campus size, number of students and staff, and number of automobile trips to campus). These efforts led to the Ogden/Weber State University Transit Corridor Alternatives Analysis process and the subsequent 2011 draft AA. (For a definition of the study area, see Section 2.0, Study Area and Corridor.)

Many land-use and transportation plans have been adopted for Ogden and Weber County over the past 10 years, and a key feature of these plans has been higher-capacity and enhanced transit service from the Ogden Intermodal Transit Center and FrontRunner commuter-rail station connecting through downtown Ogden to Weber State University and McKay-Dee Hospital. However, the plans have included many different transit alignments and operating features.

Consequently, this AA update report builds on previous planning efforts and most notably builds on the 2011 draft AA, which analyzed a range of transit modes but ultimately found streetcar and BRT to be the most viable. The 2011 draft AA also screened a range of alignments (primarily between 24th Street and 36th Street), but the study partners and the community never achieved a consensus around supporting any one mode or alignment.

This AA update report analyzes streetcar and BRT on two specific alignments—25th Street and 30th Street—that were selected by the City of Ogden in 2012 (see Section 1.4, Project History). The purpose of this AA update report is not to start from scratch but rather to carefully review, incorporate, and update the 2011 draft AA in order to create a current and uniform basis for selecting an LPA.

The data-update component of this AA update was aimed at reviewing and updating data regarding travel, traffic, population, and employment. Since the 2011 draft AA was published, new population and employment forecasts have become available from the U.S. Census Bureau (2010 Census) and the Governor’s Office of Planning and Budget. In addition, traffic modeling performed for the 2011 draft AA used a horizon year of 2030, while the traffic modeling for this AA update uses a horizon year of 2040.

The study team for the current study conducted additional technical analysis for travel and traffic specifically on Harrison Boulevard between 25th Street and 30th Street, since that section of Harrison Boulevard has the narrowest right-of-way and has affected the selection of a preferred alignment in previous analyses. The study team also conducted additional analysis and modeling for current and future land use and zoning and undertook extensive partner and public outreach in support of the AA update process.

This AA update allowed the study’s policy and technical advisory committees to reassess the goals for the study area (see Section 2.0, Study Area and Corridor) and the options to increase access to transit along the study corridor. This AA update report is a step toward incorporating the LPA into WFRC’s long-range vision and seeking funding to implement additional transit service in the study area.

Ultimately, the goal of updating the 2011 draft AA is to position the Ogden/Weber State University Transit Project Study for its next steps, which include potentially receiving funding through the Federal Transit Administration’s (FTA) Small Starts program and identifying a path toward implementation.

1.2 Public and Agency Involvement as Part of the Alternatives Analysis Update Process

Public and agency involvement was an important part of the AA update process. The study team developed and implemented a comprehensive public involvement plan and program, which is described in detail in Section 3.0, Public Outreach. Advisory committees were also created as a major element in the process.

- The Technical Advisory Committee consists of individuals representing the study partners and consists of representatives from local agencies including UTA, UDOT, and WFRC; representatives from Ogden City and Weber County; and representatives from Weber State University and McKay-Dee Hospital.
- The Policy Advisory Committee consists of representatives from agencies, city, and county governments, and elected officials.

These committees served as advisory groups that reviewed technical information produced during the study and provided valuable comments and suggestions throughout the study. The committees continue to provide a valuable critique of the study methods and findings.

1.3 Contents of This Report

This AA update report presents the transit alignment and technology alternatives that were selected through a public participation process, which was used to screen initial alternatives. This report also presents a comparative analysis to refine previous assumptions developed for the alternatives.

An AA is a locally managed study process that uses local information related to regional travel patterns, problems, and needs. This information is typically generated as part of the metropolitan transportation planning process. For Ogden, this information has been gathered during past systems planning efforts by WFRC, which is Weber County's metropolitan planning organization, and UTA.

The outcome of the AA process is an LPA that meets the purpose of the project, provides a good balance in meeting project goals, and presents a competitive project for New Starts/Small Starts funding with regard to ridership, cost-effectiveness, transit supportiveness of existing and future land use, and local financial commitment (among other factors in the New Starts/Small Starts rating framework). The LPA will be advanced to more-detailed technical analysis and compared to the No-Action Alternative as part of the environmental clearance process during the preparation of an environmental document for the project.

The following supporting documentation is provided as appendices to this report:

- A. Ogden/Weber State University Transit Corridor Alternatives Analysis Draft Final Report (UTA, May 2011)
- B. Ogden/Weber State University Transit Project Study Master Public Involvement Report
- C. Ogden Transit Project Land-Use Evaluation
- D. Definition of Alternatives
- E. Capital and Operating and Maintenance Cost Evaluations
- F. WFRC Preliminary Transit Ridership Forecasting Memorandum
- G. Traffic Technical Report to Determine Feasibility of 25th Street Alignment
- H. Financing/Funding Evaluation

1.4 Project History

Transit improvements in Ogden have been evaluated and identified in numerous planning studies for the region. The study area is one of the region's highest-priority transit corridors for implementing future fixed-guideway transit improvements.

Ogden/Weber State University Corridor Feasibility Study. In 2004, WFRC's 2004–2030 Long-Range Plan identified the need for improved transit connecting downtown Ogden and Weber State University. In 2004 and 2005, UTA, WFRC, Ogden City, and Weber State University conducted the Ogden/Weber State University Corridor Feasibility Study. This was the first step in determining the best transit mode (BRT, streetcar, light-rail transit, etc.), estimated ridership, possible routes and stops, and projected costs to build, operate, and maintain a transit system in the region.

This feasibility study recommended a public transit investment between downtown Ogden and the Ogden FrontRunner commuter-rail station to Weber State University and McKay-Dee Hospital. Streetcar was identified as the preferred transit mode, and BRT was identified as an alternative mode.

Ogden/Weber State University Transit Corridor Alternatives Analysis. In 2008, UTA initiated the Ogden/Weber State University Transit Corridor Alternatives Analysis to build on the findings from the 2004–2005 feasibility study, address community transit needs in WFRC’s Long-Range Plan, and further evaluate options for improved public transportation service in Ogden.

Although a range of routes and modes is typically studied in an AA, this AA did not investigate alternatives that were screened out from further consideration in the previous study. An AA is the first step toward determining a project’s eligibility for federal funding, and typically an LPA is selected at the conclusion of the analysis.

The AA process was overseen by policy and technical advisory committees with representatives from Ogden City, the Weber County Commission, the Weber Area Council of Governments, WFRC, South Ogden City, the Utah Department of Transportation (UDOT), McKay-Dee Hospital, Weber State University, and the Ogden/Weber Chamber of Commerce.

In 2011, the Ogden City Council voted unanimously that the preferred alternative for transit improvements in Ogden should be a streetcar line running from 23rd Street to Washington Boulevard, Washington Boulevard to 25th Street, 25th Street to Harrison Boulevard, and Harrison Boulevard to Weber State University and McKay-Dee Hospital. The Council maintained that this route would foster development and would best serve residents.

Also in 2011, as part of the Ogden/Weber State University Transit Corridor Alternatives Analysis process, UTA published a draft AA report (2011 draft AA) that identified and evaluated rapid-transit alternatives that would improve mobility options and education and job access, provide better connectivity to major destinations, and increase economic development opportunities in Ogden. The AA process included a multi-tiered screening process that evaluated modal and alignment alternative options, resulting in the recommendation of two potential alternatives for further analysis in subsequent AA phases.

UTA recommended two alternatives in the 2011 draft AA. Each alternative was a modern streetcar system that would connect the Ogden Intermodal Transit Center to Weber State University and McKay-Dee Hospital using 23rd Street, Washington Boulevard, and either 30th Street or 36th Street to Harrison Boulevard (see Appendix A, Ogden/Weber State University Transit Corridor Alternative Analysis Draft Final Report). However, these alternatives were not supported by the City Council or the public in general, and the City Council asked UTA to temporarily put the AA process on hold.

In early 2012, Ogden City held a “fact-finding” work session on the AA process that included presentations by Weber State University, the Ogden Trolley District group, and the Sierra Club. In May 2013, Ogden’s Mayor and City Council, through a joint resolution, selected two 5.3-mile routes for further consideration (see Figure 1):

- **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 Weber State University 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 Weber State University 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, UTA, in coordination with the study partners, developed the following four alternatives (see Figure 2 and Section 6.0, Alternatives Development):

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

Given all the previous work that had been conducted in support of transit improvements in Ogden, UTA and the study partners decided to update the 2011 draft AA to analyze the four new alternatives.

Ogden/Weber State University Transit Project Study. In 2014, UTA, in collaboration with several partners including Ogden City, Weber County, WFRC, UDOT, Weber State University, and McKay-Dee Hospital, began the current Ogden/Weber State University Transit Project Study to evaluate public transportation improvements in Ogden. 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, improve access to education and jobs, reduce growth in automobile trips and parking at Weber State University, enhance and further invest in existing transit service, and aid economic development in the city.

Although a modern streetcar system on either 30th Street or 36th Street was identified as the long-term transit vision in the 2011 draft AA, not all of the draft AA partners agreed with the preferred route, and many of the local residents were not happy with the route either. The current study allowed the study partners to reassess their goals for the study area and the long- and short-term options to increase access to transit along the study corridor. This updated AA does not investigate alternatives that were screened out from further consideration in the previous studies and includes only the four alternatives listed above.

The Ogden City Council adopted the LPA through a resolution on July 28, 2015. As the next step in the process, the study team will now begin environmental documentation, advanced conceptual engineering, and development of finance plans.

Figure 1. Routes Considered

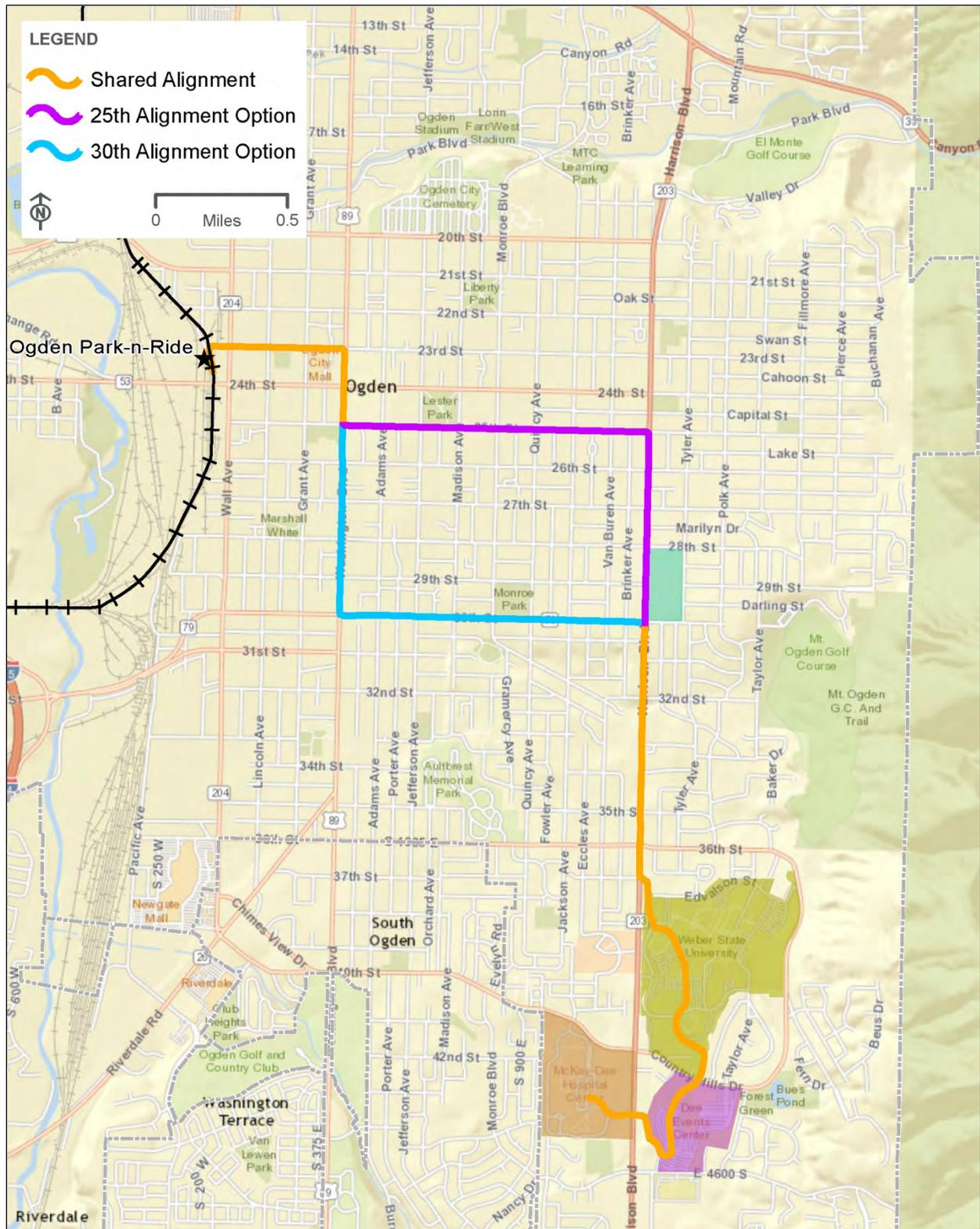
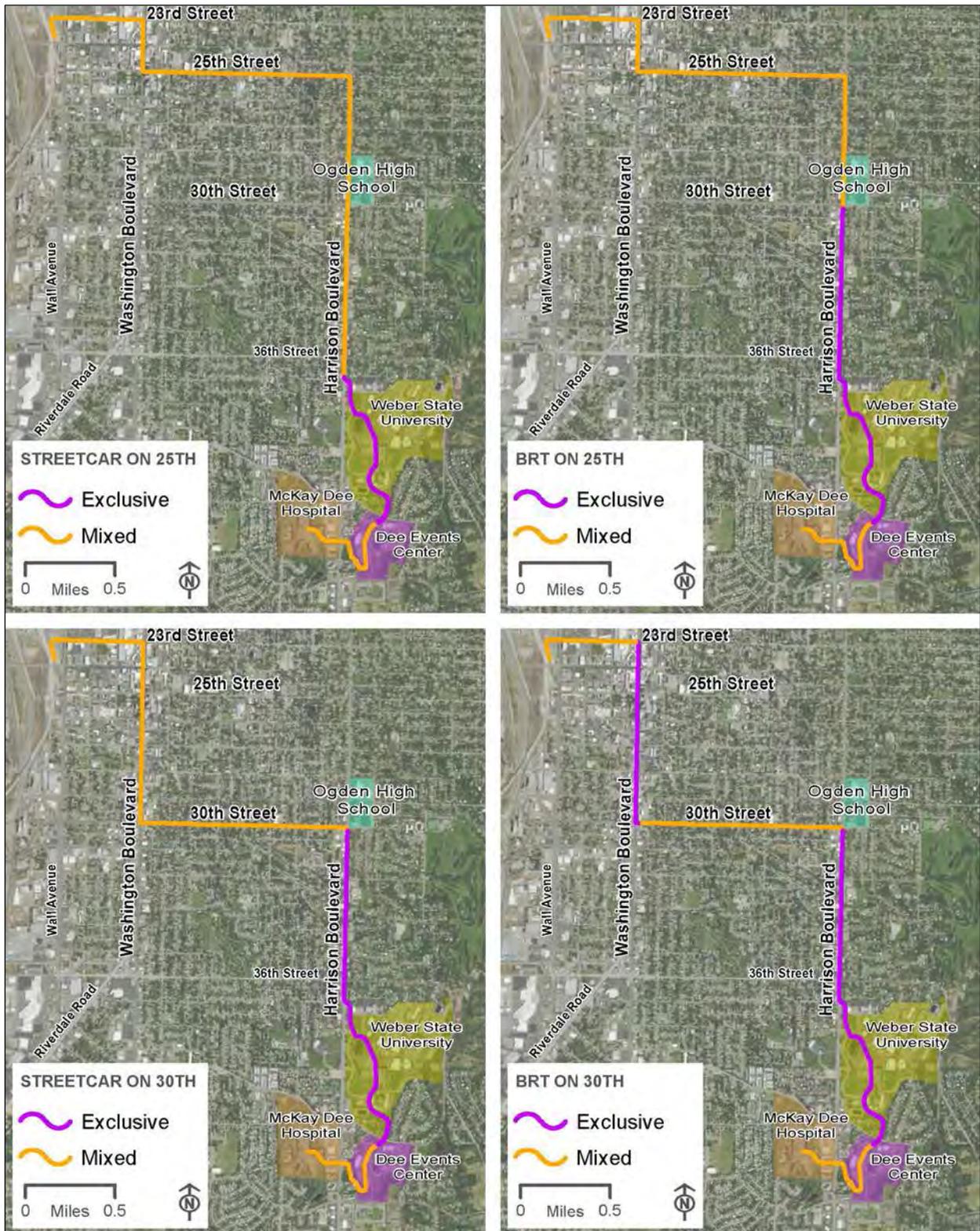


Figure 2. Alternatives Considered



1.5 Project Objectives

The study area is a 5.3-mile corridor that includes downtown Ogden, Weber State University, 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, Weber State University (with 2,500 faculty and staff and 25,000 students [up from 17,000 in 2007], 750 of whom lived on campus as of September 2011), 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, 380,000 daily person-trips occur within the study area, and this number is expected to increase to 515,000 (an increase of about 36%) by 2040 (Larsen 2015). Existing transit use in Ogden is focused primarily at four major areas: the Ogden Intermodal Transit Center, downtown Ogden (25th Street and Washington Boulevard), Weber State University, and McKay-Dee Hospital. These four stops produce over half the total transit ridership in the study area.

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. The primary local route, 603, provides 15-minute service between the Ogden Intermodal Transit Center, Weber State University, and McKay-Dee Hospital (via 25th Street) and is one of the highest-producing local routes in the entire UTA system in terms of riders per hour, producing nearly 50 riders per hour, 3.2 riders per mile, and an average of 2,300 weekday riders when classes are in session at the university.

According to its 2004 Master Plan (the most recent Master Plan), Weber State University plans to add 10,000 new students, staff, and faculty between 2007 and 2030. This equals about 6,500 between 2015 and 2030, since about 50% of this growth has already occurred (new estimates for the current study's horizon year of 2040 are not available). The University also plans to have 25% of the trips to and from campus occur via transit, up from a transit mode share of 11% in 2004 (Weber State University 2004).

Weber State University's Wildcat Express Shuttle loops between the Dee Events Center and the bus stop near the Stewart Library in the center of the university campus. The shuttles pick up riders from the south side of the Dee Events Center parking lot and drop off riders next to the library near the center of campus. These are the only two stops. The shuttle buses run fall and winter semesters from 6:30 AM to 8:30 PM. They run every 15 minutes from 6:30 AM to 7:00 AM and every 4 to 5 minutes from 7:00 AM to 2:00 PM. After 2:00 PM, they run every 15 minutes.

The shuttle bus system offers students a free ride from the Dee Events Center parking lot to campus. The shuttles are provided by the university to help alleviate congested parking on

campus. According to university officials, about 3,200 riders per day (15,000 riders per week) ride the shuttle buses (McNulty 2015).

Given these activities and projected growth, the objectives of the project (transit improvements in Ogden) are to:

- Increase mobility, connectivity, and travel choices between downtown Ogden and the Weber State University/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 by introducing premium transit service in the study area
- Develop a project that has strong local support
- Develop a project that has no significant traffic impacts or significant impacts to the natural or built environments
- Develop a project that is competitive for federal funding

2.0 Study Area and Corridor

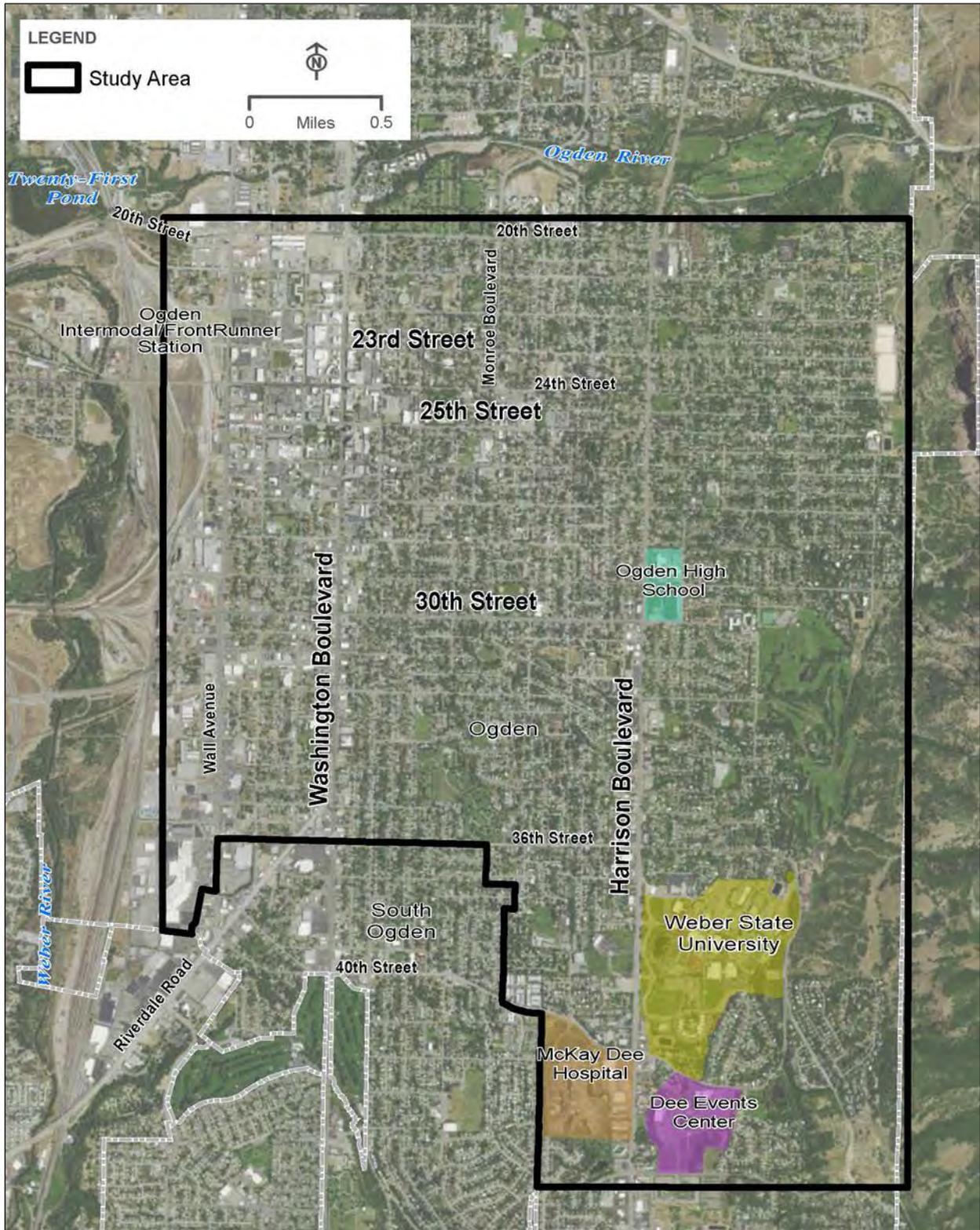
The study area encompasses a 5.3-mile corridor between downtown Ogden, Weber State University, and McKay-Dee Hospital. The study area is located within the city of Ogden in Weber County, Utah. The study area encompasses a portion of downtown central Ogden bounded by the Union Pacific Railroad (UPRR) line to the west, 20th Street (State Route [S.R.] 104) to the north, the city limits at the base of the Wasatch Mountains to the east, and about 4600 South to the south, the southwestern part of which follows the Ogden/South Ogden municipal boundary (see Figure 3).

This study area includes the following major destinations and Ogden neighborhood districts that could be served by higher-capacity transit service:

- Ogden Intermodal Transit Center and the FrontRunner commuter-rail station
- Downtown Ogden central business district
- Six neighborhood districts: East Central, Taylor, Jefferson, T.O. Smith, Mt. Ogden, and Southeast Ogden
- Weber State University
- Dee Events Center
- McKay-Dee Hospital Center

Ogden is one of the oldest communities in Utah and has a number of historic districts and neighborhoods. Much of central Ogden is served by a traditional grid street system, and a number of the major arterials are state highways managed by UDOT which serve regional travel through Ogden. These major arterials are Washington Boulevard (S.R. 89), Harrison Boulevard (S.R. 203), and 30th Street (S.R. 79). The UPRR line and the FrontRunner commuter-rail line are on the western edge of the city, and Interstate 15 (I-15) is just west of the city.

Figure 3. Study Area



3.0 Public Outreach

This section describes the public coordination efforts for the Ogden/Weber State University Transit Project Study, which began in June 2014 with a public open house sponsored by UTA and Ogden City to kick off the AA update process. Public and agency involvement is critical to the success of any project that could affect the community. The planning for the AA update has involved extensive coordination and consultation with the affected community and agencies. The affected community includes not only residents of the study area but also individuals, businesses, groups, and others interested in the study area.

The public outreach process was structured and implemented to ensure that all relevant factors were considered, including the affected community's concerns and issues related to the project's purpose and need, alignment and engineering solutions, social impacts, environmental impacts, economic effects, financing, and other items of concern to the community.

The goal of the public and agency involvement program and process was to have an informed local community and government leadership to help make decisions regarding the selection and implementation of an LPA. The public and agency involvement process is open to ensure that interested parties have an opportunity to be involved in planning. Stakeholders had an opportunity to direct, review, and comment during the entire course of the AA update process.

3.1 Public Involvement Activities

Several methods for engagement were used to provide multiple avenues for receiving public guidance. Specific activities included meetings with key stakeholder groups, public open-house meetings, targeted engagement of the Latino community, door-to-door conversations with business owners and representatives, focus groups, a telephone survey, community and City Council presentations, and online questionnaires via "Open UTA" and other web and online engagement.

A project website and Facebook account were actively maintained by UTA staff to disseminate news, information, and project materials to the wider public. The following sections summarize the public involvement work done for the AA update. More information is provided in Appendix B, Ogden/Weber State University Transit Project Study Master Public Involvement Report.

3.1.1 Technical Advisory and Policy Advisory Committees

A collaborative, multi-jurisdictional approach was used for the Ogden/Weber State University Transit Project Study, which allowed the study team to draw from the collective knowledge and expertise of staff members and elected officials representing the study partners. Meetings of these groups coincided with key decision points including developing study goals and objectives, developing evaluation criteria, initial corridor and technology screening, reviewing detailed alternatives, and selecting an LPA to be forwarded to the Ogden City Council for adoption.

The Technical Advisory Committee (TAC) consisted of staff representatives from all of the study partners: UTA, Ogden City, Weber County, WFRC, UDOT, Weber State University, and McKay-Dee Hospital. The TAC gave technical input to the study team, helped resolve technical issues in the committee members' respective fields, and provided its LPA selection to the Policy Advisory Committee (PAC) to further inform the LPA selection that was eventually advanced to the Ogden City Council for adoption.

3.1.2 Focus Groups

Focus groups were convened to assess the transportation needs within the target market and to gauge public perceptions of specific transportation modes. The target market for this study included a broad range of individuals within the study area (Ogden) and within UTA's service area in northern Utah (Davis and Weber Counties).

To accomplish the study objectives, participants were guided through a discussion that encompassed the topics and themes that included consumer habits and transit perceptions, the impact of public transit on local communities, and transit mode and alignment preferences. Participants recognized the economic importance of transit, believed that public transit allows access for individuals from outside a community, preferred the 25th Street route, and preferred modern streetcar because it is popular, stable, and cost-efficient in the long run. The focus group findings, which are summarized in Appendix B, Ogden/Weber State University Transit Project Study Master Public Involvement Report, were shared with the advisory and policy committees for the study to help inform the decision-making process.

3.1.3 Telephone Survey

A telephone survey of residents in Davis County and Salt Lake City was conducted to capture additional input on travel behaviors and preferences for the study area. Survey objectives included the desire to understand and confirm regional travel patterns, modes used, and purpose for travel; to discover whether respondents use public transportation to get to work or school and, if so, identify the modes of transit respondents typically use; discover the likelihood of respondents increasing their ridership of public transit if public transit were improved; determine the perceived impact of public transit on economic growth within Ogden; and gather demographic information such as gender, age, education, annual household income, marital status, household size, and city of residence. The survey findings, which are summarized in Appendix B, Ogden/Weber State University Transit Project Study Master Public Involvement Report, were shared with the advisory and policy committees for the study to help inform the decision-making process.

3.1.4 Community and Business Outreach

UTA conducted a comprehensive grass-roots community and business outreach program. Public participation was important to developing sound recommendations and selecting a transit alternative that will be supported by the community. UTA's commitment at the beginning of this AA update process was to proactively involve the public so decisions could be made that reflect the goals of those who live, work, and travel in the study area.

Throughout this AA update process, the study team has kept the public informed, incorporated their feedback, and helped identify issues and develop solutions to improve transportation in the study area. The community outreach has reached out to the public and given them an opportunity to provide input into and collaborate on the processes of defining the project purpose and identifying the LPA. UTA relies on public comments made to help identify issues as well as to gauge public sentiment about the proposed transit improvements. A total of about 576 comments were received during the 18-month study period. Comments regarding alignment alternatives were most prevalent, followed by statements of mode preference and the desire for transit improvements.

UTA also contacted every business along the corridor(s) to create project ownership. Outreach strategies included visiting with and educating individual business and property owners on project options and processes while recording their input on opinions and concerns. In addition, UTA visited all businesses door to door to make sure that no one was left out. UTA and the outreach team contacted all area chambers of commerce as well as other civic organizations to provide presentations of the project including the potential impacts from construction. Study partners were included, or were given the opportunity to be included, in every outreach effort.

3.1.5 Web and Online Engagement

A variety of web and online engagement tools were used during the course of the AA update process. The project website (www.rideuta.com/mc/?page=Projects-OgdenWSUTransitStudy) presented project background and current study information, answered frequently asked questions, informed the public about key decisions, and invited the public to meetings.

The public was also invited to learn about and comment on the project via Open UTA. Open UTA is UTA's online forum that allows people to research and comment on UTA projects and read what others are saying. Two individual topics pertained to the Ogden/Weber State University Transit Project Study, and both topics received many visitors and many individual comments. In addition, the study partners promoted the project on Facebook and Twitter.

3.1.6 Latino/Latina Community Outreach

Ogden has a history of rich cultural diversity. Ogden residents who are Hispanic or Latino/Latina are nearly 30% of Ogden's population. UTA and the City of Ogden proactively coordinated with Latinos United Promoting Education and Civic Engagement (LUPEC) in an effort to engage the Latino/Latina community in matters pertaining to the Ogden/Weber State University Transit Project Study.

A public open house was held specifically for Spanish-speaking residents. Outreach materials were provided in both English and Spanish, and Spanish speakers were available for translation at the meeting. Surveys were taken by Spanish-speaking students from Weber State University in order to better determine the needs and preferences for transit in the Latino/Latina community. An English/Spanish informative video was also created for the event. The meeting was well attended with over 100 participants.

3.1.7 Overall Public Outreach Conclusions

Through the course of the public outreach process, about 576 individual public comments were received. Not everyone expressed a mode or alignment preference, but the vast majority of respondents supported transit improvements in general. More commenters supported the 25th Street route and slightly more commenters supported the streetcar mode, but public support didn't substantially favor one alignment or mode over another. Wherever the location and whatever the mode, the majority of people expressed support for a transit project in Ogden.

Overall, people felt that not only would transit improvements increase connectivity and mobility, but investing in premium transit service would also help economically revitalize Ogden and raise Ogden's profile as a city along the Wasatch Front. For more information, see Appendix B, Ogden/Weber State University Transit Project Study Master Public Involvement Report. Public outreach will continue through the next phases of this study.

4.0 Purpose of and Need for the Project

Several studies and analyses dating back to 2004 have led to this AA update. Each study or analysis has stated the need to provide an efficient, safe, economical, and balanced transportation system (with auto, transit, and non-motorized modes of travel) that would minimize the impact to the environment and would complement Ogden's development patterns.

This Ogden/Weber State University Transit Project Study considers urban circulator transit alternatives to connect activity centers and neighborhoods in central Ogden while tying together the regional transit network to improve mobility, improve access to education and jobs, reduce growth in automobile trips and parking at Weber State University, enhance and further invest in existing transit service, and aid economic development in the city. The study strives to address the challenges of improving on existing bus service in one of UTA's most successful markets (downtown Ogden and Weber State University).

By enhancing the transit opportunities that connect employment and educational hubs, residential areas, shopping areas, civic resources, historic districts, cultural landmarks, and entertainment venues in central Ogden, the project (transit improvements in Ogden) would increase mobility and accessibility for the people who live, work, and visit the study area. The project would provide better linkages to the regional transit network and connect with the UTA FrontRunner commuter rail line. The project would promote transit use, biking, and walking within the study area while reducing the need to travel by automobile and decreasing greenhouse gas emissions. Finally, the project would provide improved transit service to low- to moderate-income populations in downtown Ogden and throughout the study area.

In concert with local efforts, the project would play a pivotal role in improving bicycle and pedestrian connections in the study area. The ongoing Ogden Bicycle Master Plan project is coordinating with UTA's First/Last Mile Strategies Study and the Utah Collaborative Active Transportation Study (UCATS) to identify bicycle-related improvements at the Ogden Transit Center that could potentially increase transit ridership.

4.1 Purpose of the Project

The purpose of the proposed project is to:

- Strengthen east-west connection between the Ogden Intermodal Transit Center, the central business district, Weber State University, McKay-Dee Hospital, and the communities in between to improve regional and local mobility, connectivity, and travel choices.
- Better serve transit-dependent populations through improved and accessible transit service.
- Enhance access to Weber State University while reducing the growth in automobile trips and parking demand at the university.
- Increase transit ridership by providing a viable and competitive transit alternative to private automobiles and existing bus service. The project would attract new riders by offering improved transit service and facilities, transit travel times competitive with auto travel, and a rail-like experience proved to attract riders from automobiles.
- Reduce transportation-related energy use, air pollution emissions, and greenhouse gas emissions.

The proposed project would also meet the secondary objective of supporting local and regional planning initiatives and land-use strategies that aim to strengthen communities, foster economic development, and fulfill goals for long-range economic and employment growth.

4.2 Need for the Project

The need for the proposed project is a result of the following conditions:

- **The study partners want to upgrade transit service and enhance the experience for already high existing bus ridership.** The study area has a number of key 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, Ogden High School (with an annual enrollment of about 1,000 students in grades 10–12), Weber State University (with about 2,500 faculty and staff and 25,000 students [up from 17,000 in 2007], 750 of whom live on campus as of September 2011), 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).

Upgrading transit service in Ogden would allow existing bus riders to travel faster and more comfortably with more-frequent service, level and prepaid boarding, faster boarding and alighting, and increased on-time reliability due to exclusive bus travel

lanes and the aforementioned faster boarding. Three of the most heavily used transit routes in Ogden (UTA bus routes 455, 603, and 640) serve many of the same markets within the study area and have a combined daily ridership of nearly 5,000. Ridership on these routes has been growing, with a notable increase since FrontRunner service began and ridership between Weber State University and downtown Ogden increased.

In addition, about 15,000 riders per week ride the Wildcat Express Shuttle between the Dee Events Center and Stewart Library on the Weber State University campus. Strong existing transit ridership on campus in the study area overall, and the projections for significantly increased travel demand, require capacity to be increased substantially in the study corridor. The capacity needed will exceed UTA's capability to satisfy the demand with conventional bus service. A higher-capacity mode is needed to achieve operating efficiencies and meet passengers' requirements for a shorter travel time.

- **A large number of transit-dependent customers live in the study area.** The project would provide enhanced service to current riders, including low-income and transit-dependent populations, by offering higher-frequency, faster and more consistent service along with upgraded vehicle and station amenities.

Inadequate access to jobs is one of the most frequently cited obstacles to financial independence for disadvantaged populations. Transportation is the second-largest expense for families with limited financial resources. WFRC's 2040 Regional Transportation Plan for the Wasatch Front (Salt Lake, Davis, and Weber Counties) states that 37 census tracts in the Salt Lake and Ogden-Layton Urbanized area were identified as having disproportionately high densities of disadvantage persons, and these tracts are in three general locations, one of which is Ogden. Nine of these tracts are in Ogden, and all are within the study area.

About one in four households within a half-mile walking distance of the study area do not have access to an automobile and rely solely on public transportation to meet their transportation needs. Providing an accessible and affordable downtown-focused transit service with level-boarding access would better serve low-income, minority, elderly, youth, and other transit-dependent customers in the study area. The existing transit service does not have level boarding and can be challenging for people using mobility devices and strollers.

- **Growth forecasted for Weber State University will overwhelm roadway and parking capacity unless there are alternatives to auto travel.** Weber State University is anticipating significant growth in its campus population. According to its 2004 Master Plan (the most recent Master Plan), Weber State University plans to add 10,000 new students, staff, and faculty between 2007 and 2030. This equals about 6,500 between 2015 and 2030, since about 50% of this growth has already occurred (new estimates for the current study's horizon year of 2040 are not available). The University also plans to have 25% of the trips to and from campus occur via transit, up from a transit mode share of 11% in 2004 (Weber State University 2004).

Currently, 380,000 daily person-trips occur in the study area, and WFRC expects this number to increase to 515,000 (an increase of about 36%) by 2040 (Larsen 2015). Based on an extrapolation of this mode share target and the future campus population, over 4,000 daily boardings are estimated for the Weber State University campus alone by 2030. In addition, Weber State University runs a campus shuttle between the Dee Events Center parking lot and the campus's Stewart Library that carries about 3,200 riders per day, or 15,000 riders per week (McNulty 2015).

Weber State University has very limited dormitory space, and only limited on-campus dormitory expansion is planned. Thus, the university will continue to serve a very large number of students that commute to campus daily. Many of these students could be served by more efficient, high-capacity/high-frequency transit service that connects the university with other regional transit services, including FrontRunner at the Ogden Intermodal Transit Center. Connecting parking needs with demand by transit would result in better utilization of the available on-campus parking; would reduce the need for additional parking lots at the university; would reduce the overall carbon footprint of the campus, thereby keeping the university in line with its larger sustainability initiatives; and would allow the university to develop at a higher density.

- **Traffic congestion is growing, and roadway level of service and air quality are declining.** Population and employment growth in the study area and throughout the Wasatch Front region will cause increased travel demand in the coming decades. Ogden is an established community that functions as a regional destination, but the city also experiences a high level of regional through trips. Without high-quality modal choices to reduce reliance on automobiles, these communities are likely to face reduced mobility and degradation in the quality of life for their residents. In addition, the Cities' goals for continued vitality and economic growth could be compromised. People traveling to regional destinations in Ogden would also have longer travel times and few options outside of automobile use.

Many arterial roads in the study area are beginning to experience peak-period congestion, and increasing capacity will be difficult and disruptive to established neighborhoods. Automobile emissions are a major contributor to the region's air quality concerns, and many short trips in the study area could be well served by improved transit. Both regional and local plans envision higher-capacity transit as part of a comprehensive solution to serve future travel needs and incrementally improve regional air quality by providing a real alternative to automobile trips. Further, cleaner transit vehicle technologies and fuels lower the concentration of ambient air pollution citywide.

- **Local and regional land-use plans and economic and redevelopment initiatives are not adequately supported by UTA's existing fixed-route bus system.** The study area encompasses a wide range of established neighborhoods and community facilities as well as locations with substantial development and redevelopment opportunities. Future high-density, transit-oriented development in the study area could provide a rich mix of housing, jobs, shopping, and recreational choices.

Revitalization of downtown Ogden, the East Central neighborhood, and the Weber State University/McKay-Dee Hospital area are key focus areas of the city's general plan and sub-area planning. Improved transit service and increased ridership between downtown Ogden and Weber State University could reduce the environmental impacts of high rates of automobile use, relieve existing and projected traffic congestion, reduce the demand for parking, and encourage the use of alternative modes of travel. Improved transit service would also enable expanding Weber State University's Ogden campus by reducing the need for additional parking as the campus continues to grow. Increased transit ridership to McKay-Dee Hospital could also enable the future growth of its medical campus. Additional benefits realized throughout the community would include increased retail sales taxes and increased property values and tax revenue.

5.0 Regional and Local Demographics

The study area is located in a region of rapid population growth and has strong existing transit use. State and local government officials expect continued rapid growth in these areas. Currently, 380,000 daily person-trips occur in the study area, and WFRC expects this number to increase to 515,000 (an increase of about 36%) by 2040 (Larsen 2015). Three of the most heavily used transit routes in the study area (UTA bus routes 455, 603, and 640) have a combined daily ridership of nearly 5,000. In addition, the Weber State University shuttle bus that loops between the Dee Events Center parking lot and the campus's Stewart Library carries about 3,200 riders per day, or about 15,000 riders per week (McNulty 2015).

The Wasatch Front, which consists of Davis, Salt Lake, Utah, and Weber Counties, is located along the Wasatch Mountains. It is situated near transportation arteries I-15 and Interstate 80 (I-80), the Salt Lake City International Airport, and the state's major colleges and universities. During the last decade, Utah's fastest-growing cities reflected trends similar to the growth of the state's counties, with both showing significant population growth along the Wasatch Front. Nine of the 10 fastest-growing cities with populations over 9,000 are located in Salt Lake, Utah, Davis, or Weber Counties (OLRGC 2012).

Weber County is the smallest of the four counties along the Wasatch Front; the county had a population of 231,236 in 2010 and 240,693 in 2015 (Weber EDP, no date). The Weber County region has experienced rapid growth in population and employment over the past two decades and is anticipated to continue this growth trend with a growth rate between 2010 and 2015 over 4%. By 2020 the county's population is forecasted to be 258,423, and by 2040 the county's population is forecasted to be 349,009, an increase of about 51% over the 2010 population (GOMB 2014). Employment in Weber County was 117,786 in 2010; this is anticipated to increase to 139,623 by 2020 and to 179,443 by 2040, an increase of about 52% over the 2010 employment (GOMB 2007).

Ogden is the most-populated city in Weber County and is the fifth largest in the Salt Lake City and Ogden-Layton urbanized areas. Ogden is expected to grow from its current population of about 83,000 to just over 90,000 in 2020 and to about 102,000 by 2040 (GOMB 2007).

Ogden is the center for business and government in Weber County and for much of northern Utah. Employment continues to grow, with Ogden being ranked #10 in the nation for jobs created in 2008. Ogden is the largest employment area in Weber County and the third largest in the region. In 2008, Ogden was estimated to have about 70,000 jobs or 65% of all jobs in Weber County. By 2030, job growth is expected to reach 90,000 and to continue to represent the majority of the county's job market. According to American Community Survey data, between 2009 and 2013, an average of about 36,000 Ogden residents age 16 and older were employed, 25,000 (73%) of whom worked in Weber County. The average commute time to work for those who work in Weber County is about 19 minutes (TownCharts.com, no date).

Nearly half of the total citywide population and employment in Ogden is located in the study area, although the study area accounts for only a quarter of the city's total land area. A few of the top employers in Ogden are McKay-Dee Hospital, Weber State University, the Internal Revenue Service, and the Ogden City School District. In addition, since Ogden hosted several skiing and curling events during the 2002 Winter Olympic Games, some of the most high-profile brands in the outdoor sporting goods industry have made Ogden their headquarters. Such relocations and expansions include Salomon, Suunto, Atomic, Descente, Nidecker Snowboards, Goode Technologies, Rossignol, Scott, and Quality Bicycle. *The Wall Street Journal* recently named Ogden "the center of outdoor sports gear in the U.S." (OgdenBusiness.com, no date).

In addition to the population growth anticipated for Ogden, Weber State University is anticipating significant growth for its campus population. Weber State University currently serves 25,000 students (up from 17,000 in 2007) with on-campus housing for about 750 students. According to its 2004 Master Plan (the most recent Master Plan), Weber State University plans to add 10,000 new students, staff, and faculty between 2007 and 2030. This equals about 6,500 between 2015 and 2030, since about 50% of this growth has already occurred (new estimates for the current study's horizon year of 2040 are not available). The University also plans to have 25% of the trips to and from campus occur via transit, up from a transit mode share of 11% in 2004 (Weber State University 2004).

Based on an extrapolation of this mode share target and the future campus population, over 4,000 daily boardings are estimated for the Weber State University campus alone by 2030. Due to the large portion of students who commute to campus and the University's desire to decrease parking needs and increase transit use to campus, more-robust local and regional transit options to this location will become a key aspect of accommodating this future growth and demand.

The two study area routes are generally separated by a quarter-mile buffer. Residential population for the 25th Street route in 2010 was 13,870, and employment along that corridor was 20,642. Population within a quarter mile of the 30th Street route was 13,405, and employment along that corridor was 21,217 (U.S. Census Bureau 2010).

According to the 2010 U.S. Census (U.S. Census Bureau 2010), Utah's racial makeup is 86.1% White, 2.0% Asian, 1.2% American Indian or Alaska Native, 1.1% Black or African American, and 0.9% Native Hawaiian or Other Pacific Islander. Two other Census categories, Some Other Race (6.0%) and Two or More Races (2.7%), account for the balance of racial categories. In addition, 358,340 people, or 13% of Utah's population, claimed

Hispanic ethnicity. This is a marked increase from previous census counts. In 1990, nearly 5% of Utah residents claimed Hispanic ethnicity, and by 2000 this number had increased to 9%. Of Utah's 29 counties, Weber County has the third-largest number of Hispanic residents (38,711) and the second-largest percentage of Hispanic residents (16.7%) (OLRGC 2012).

6.0 Alternatives Development

As described in Section 1.4, Project History, the study area is one of the region's highest-priority transit corridors for implementing future fixed-guideway transit improvements, and transit improvements have been evaluated and identified in numerous planning studies for the region. In May 2013, Ogden's Mayor and City Council, through a joint resolution, selected two 5.3-mile routes for further consideration (see Figure 1 on page 8):

- **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 Weber State University 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 Weber State University 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, UTA, in coordination with the study partners, further developed the following four alternatives (see Figure 2 on page 9):

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

6.1 Traffic Studies

The authors of both the Ogden/Weber State University Corridor Feasibility Study in 2005 and the Ogden/Weber State University Transit Corridor Alternatives Analysis in 2008 assumed that mixed-flow transit lanes would not be feasible on Harrison Boulevard between 25th Street and 30th Street. For this reason, the 25th Street alignment was not recommended in these studies as a potential alignment, even though it had the most public and political support.

For this AA update, the study team considered the traffic operational characteristics of both potential transit routes in order to ensure that both alignments would meet the project goal of having no significant traffic impacts and would therefore be feasible routes to carry forward into alternatives screening. Therefore, the study team conducted traffic modeling and analysis as part of this AA update to verify that the 25th Street alignment could indeed be considered a feasible alignment, as discussed in more detail below.

As a first step in determining the feasibility of the 25th Street alignment, the study team used DataQuick software with Google Earth Pro to verify the number and locations of properties on Harrison Boulevard between 25th Street and 32nd Street that are eligible for the National Register of Historic Places. Based on this analysis, the study team determined that 103 small residential properties along Harrison Boulevard between 25th and 32nd Streets were built between 1907 and 1952, therefore making these homes potentially eligible for the National Register.

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.

On Harrison Boulevard between 25th Street and 30th Street, exclusive transit lanes in the median would not meet this requirement, since the road would need to be widened and this widening would consequently impact historic homes on both sides of Harrison Boulevard. Further, the 2005 and 2008 studies assumed that mixed-flow transit lanes would not be feasible on Harrison Boulevard between 25th Street and 30th Street, and therefore the 25th Street alignment was never recommended as a potential alignment. Determined to satisfy public sentiment, in 2011 Ogden’s Mayor and City Council passed a resolution to support making transit improvements on 25th Street. The Council maintained that the 25th Street route would foster development and best serve residents.

Study team representatives met with UDOT on July 17, 2014, to investigate the validity of the assumption that mixed-flow transit lanes would not be feasible on Harrison Boulevard between 25th Street and 30th Street. UDOT’s position was that the transit improvements cannot degrade traffic operations and must balance all users of Harrison Boulevard (which is a state highway). Transit vehicles must operate at the 40-miles-per-hour speed limit.

UDOT asked the study team to provide a traffic analysis to determine whether transit operating in mixed-flow 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 study team to use traffic volumes projected by WFRC for 2040. In addition, UDOT requested the opportunity to review the VISSIM model assumptions and results in detail before making conclusions regarding the viability of mixed-flow transit lanes on Harrison Boulevard between 25th Street and 30th Street.

The VISSIM traffic micro-simulation 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 operate acceptably as well. The traffic evaluation is provided in Appendix G, Traffic Technical Report to Determine Feasibility of 25th Street Alignment.

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. For more information, see Appendix G, Traffic Technical Report to Determine Feasibility of 25th Street Alignment.

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. The study team does not expect that operating a mixed-flow streetcar on Harrison Boulevard between 25th Street and 30th Street would 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 operation of the northbound left-turn movement would decrease 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 minor, which suggests that the northbound left-turn phase could 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 by the study team for this segment for both modes, and the 25th Street alignment became a feasible alternative (see Appendix D, Definition of Alternatives).

6.2 Alternatives Definition

Once the study team determined that the 25th Street alignment was feasible for either mode, they further developed the two routes (25th Street and 30th Street) and two modes (streetcar and BRT) into four alternatives to determine the best operational configuration for each alternative. Based on a segment-by-segment right-of-way constraint and fatal-flaw analysis (see Appendix D, Definition of Alternatives) and the recommendations of the TAC, the study team evaluated and compared the four alternatives using a variety of configuration options that included various combinations of mixed-flow and exclusive-transit travel lanes (see Figure 2 on page 9).

Two primary configuration options were considered: (1) the transit vehicle operating mixed in with automobile traffic and (2) the transit vehicle operating in the median in an exclusive transit travel lane, where the transit lane is located in the middle of the right-of-way as an exclusive guideway with center station platforms. Note that, in Figure 6, 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.

7.0 Land Use and Development Potential

The study team conducted a transit project land-use evaluation to study potential planning strategies to increase the competitiveness of the study area for federal transit funding and to determine whether one alternative had more potential from a land-use and development perspective. 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 make up one-third of the project justification evaluations assessed by federal agencies for projects funded by the Small Starts and New Starts programs. This is because the federal government wants to have confidence that tax dollars will leverage substantive private investment through new development and redevelopment, increasing the rate of community revitalization. Thus, evaluating current policies and making targeted changes where needed is critical to accessing federal transit funding.

7.1 Land-Use Diversity

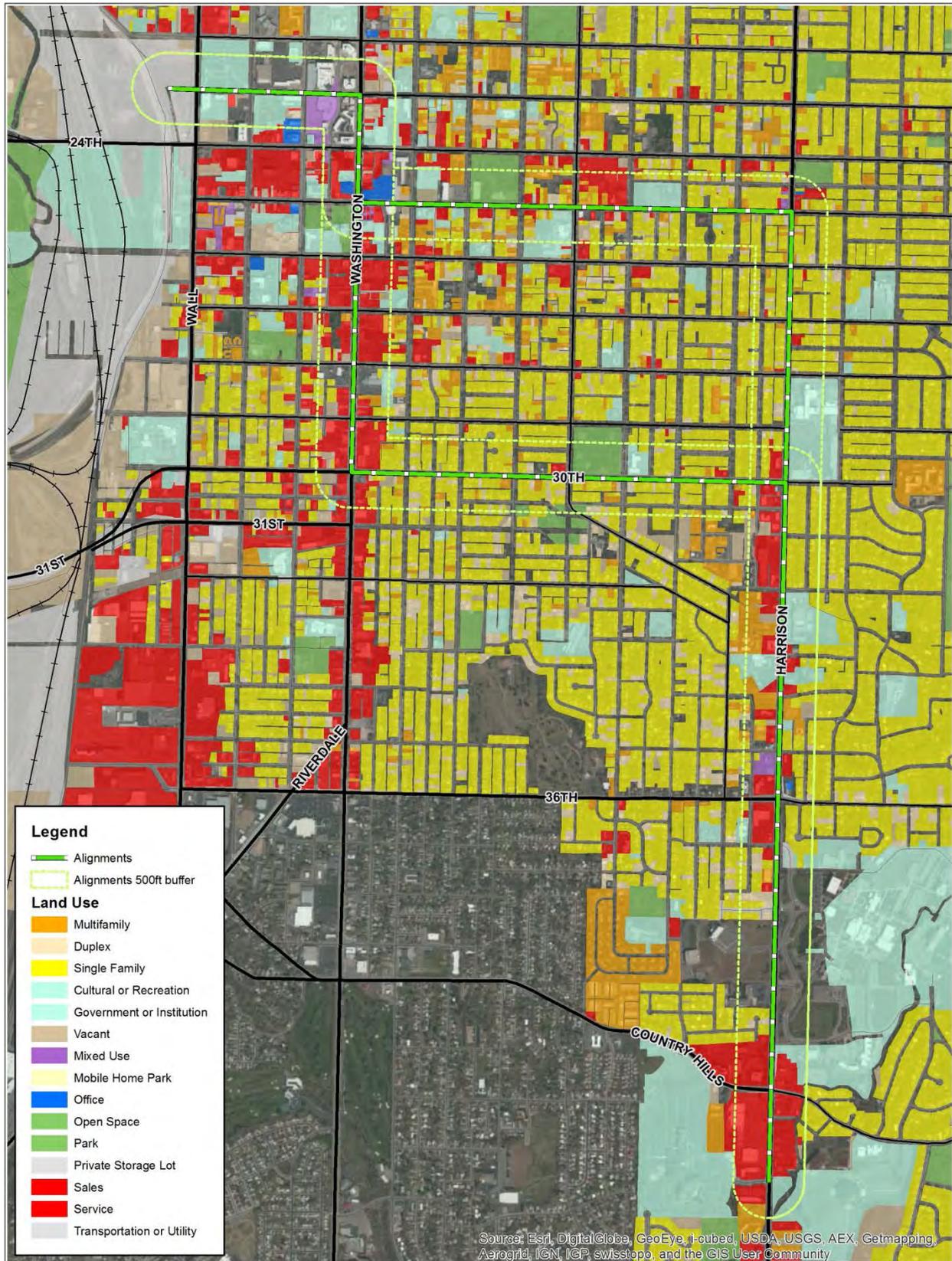
Ogden has many strengths that contribute to a mutually beneficial relationship between transit, land use, and economic development. By building on those strengths while simultaneously addressing select areas of weakness, the study area could increase its competitiveness for federal transit funding. Walking and transit use 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 Street has the highest level of land-use diversity outside of downtown, with a wide range of residential densities, housing types, and land uses. The land-use pattern becomes markedly less mixed along other segments of the recommended routes, where either single-family (30th Street and Harrison Boulevard north of 30th Street) or commercial (Washington Boulevard and Harrison Boulevard south of 30th Street) land uses predominate.

7.2 Residential Diversity

In central Ogden, relatively high housing density is found around 25th Street and Harrison Boulevard south of 30th Street. This area contains legacy apartments and larger single-family residences that have been converted to multi-unit housing. Student apartments surrounding Harrison Boulevard south of 30th Street also contribute to local transit-supportive housing density. Existing land use in the study area is shown in Figure 4.

Figure 4. Existing Land Use in the Study Area



7.3 Regional Employment Accessibility and Transit Access

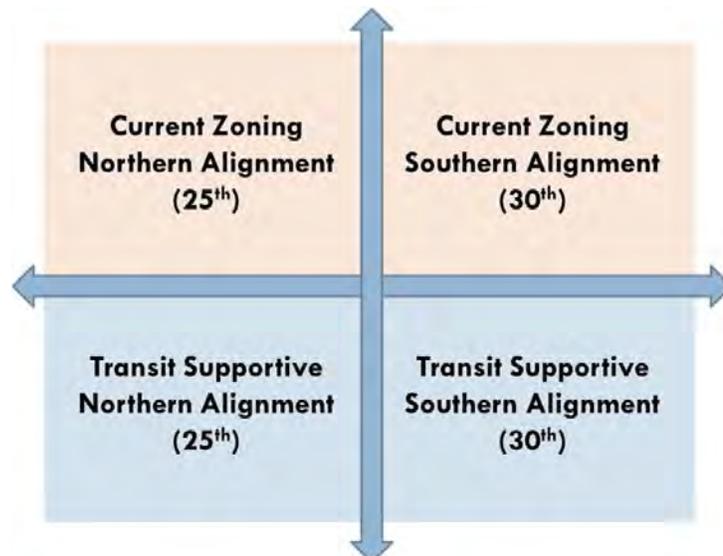
When nearby transit options connect residents with a large share of the region’s jobs, those residents are far more likely to use transit. In the transportation research literature, this is known as *employment accessibility*. Central Ogden has the highest level of regional employment access via transit of any Utah 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 recommended routes would extend this regional accessibility beyond central Ogden and could tie in the East Central area, Weber State University, and McKay-Dee Hospital. By expanding the network of high-quality transit service outside the core of downtown Ogden, many more residents and employees would be able to choose to use transit—and the research indicates that many people will likely make that choice.

7.4 Scenario Evaluation of Alignment Routes and Zoning Policy

The study team used the Envision Tomorrow Plus (ET+) scenario-planning software program to model “alignment influence zones”—that is, the economic-development impact of the transit alignments (routes) as well as possible changes to development regulations, such as zoning. Four scenarios were modeled in detail with direction from the TAC. The scenarios helped the study team and stakeholders understand how each alignment and policy change would affect 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 each alignment.

The illustration below shows a matrix of the four scenarios. Two scenarios were modeled for each alignment option: one with only buildings that could be built under current zoning, and one with buildings that could be built if the zoning were modified to allow a building density to support the transit investment.



7.5 Land Use Conclusions

The modeling results show that the northern alignment along 25th Street would have a competitive advantage compared to the southern alignment along 30th Street, at least in the short to medium terms (5 to 10 years). However, when looking at the alignments with transit-supportive zoning in place compared to current zoning, it became apparent to the study team that changes in zoning regulations would have a far greater effect on economic development than would the specific alignment route chosen. Both the Washington Boulevard and 25th Street segments of each alignment have many opportunities for economic development, while 30th Street and Harrison Boulevard between 25th Street and 30th Street have relatively few opportunities.

In the ET+ modeling, the somewhat higher economic development potential of the 25th Street/Northern transit alignment reflects the low-traffic-volume, walkable street network and higher level of desirability today (measured in achievable rents). The 25th Street alignment would better leverage current and ongoing economic redevelopment in the study corridor and further encourage the pedestrian-oriented development characteristics that are already established.

Potential development sites in the study area are shown in Figure 5. In addition, Ogden City's 2012–2017 Economic Project Plan Map is shown in Figure 6. For more information, see Appendix C, Ogden Transit Project Land-Use Evaluation.

The plans and policies that were evaluated as part of this land use and economic development study and that are recommended in this AA update report 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 the high performance of transit-supportive plans and policies in the New Starts/Small Starts application for federal funding.

Figure 5. Potential Development Sites in the Study Area

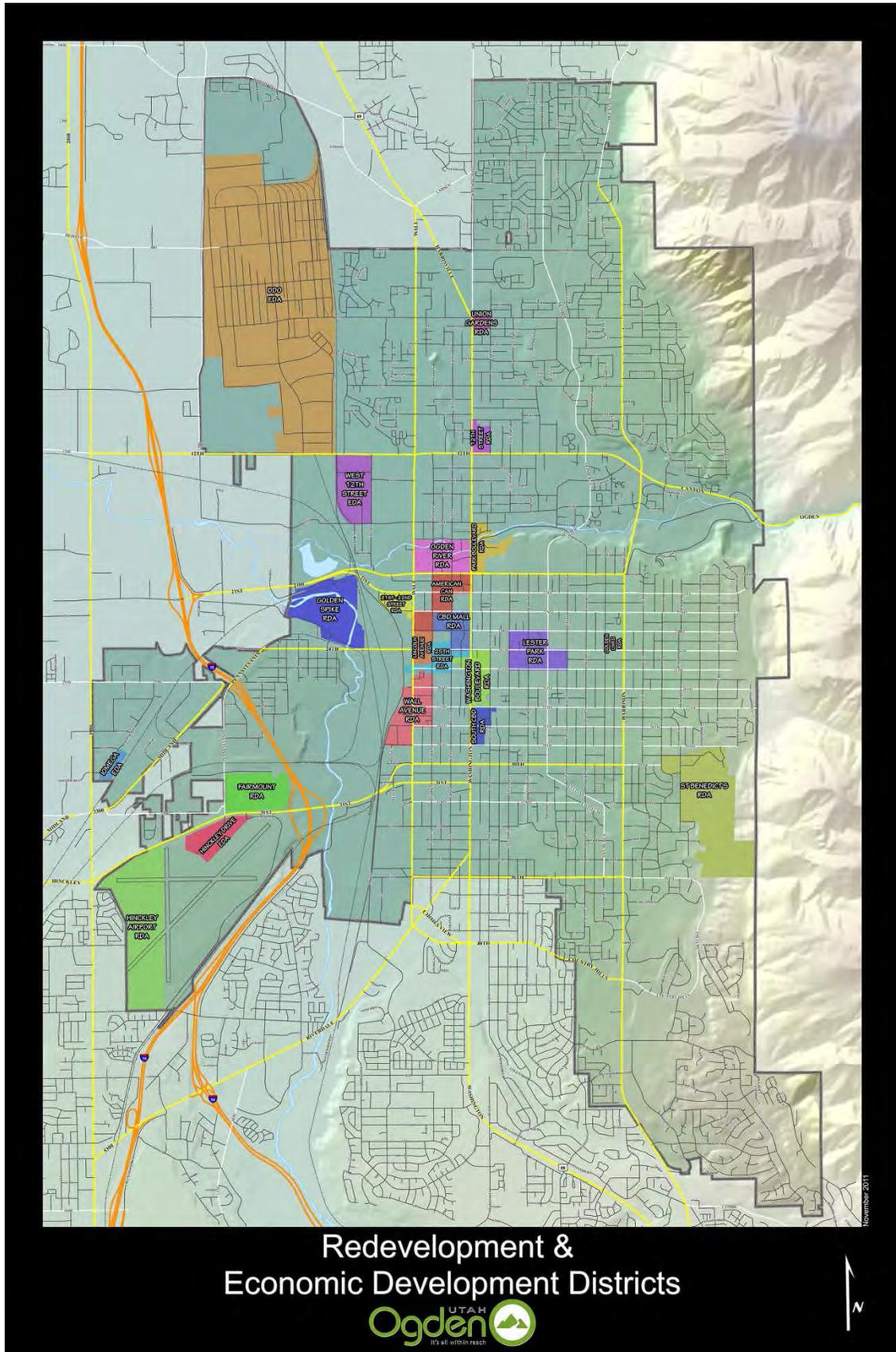
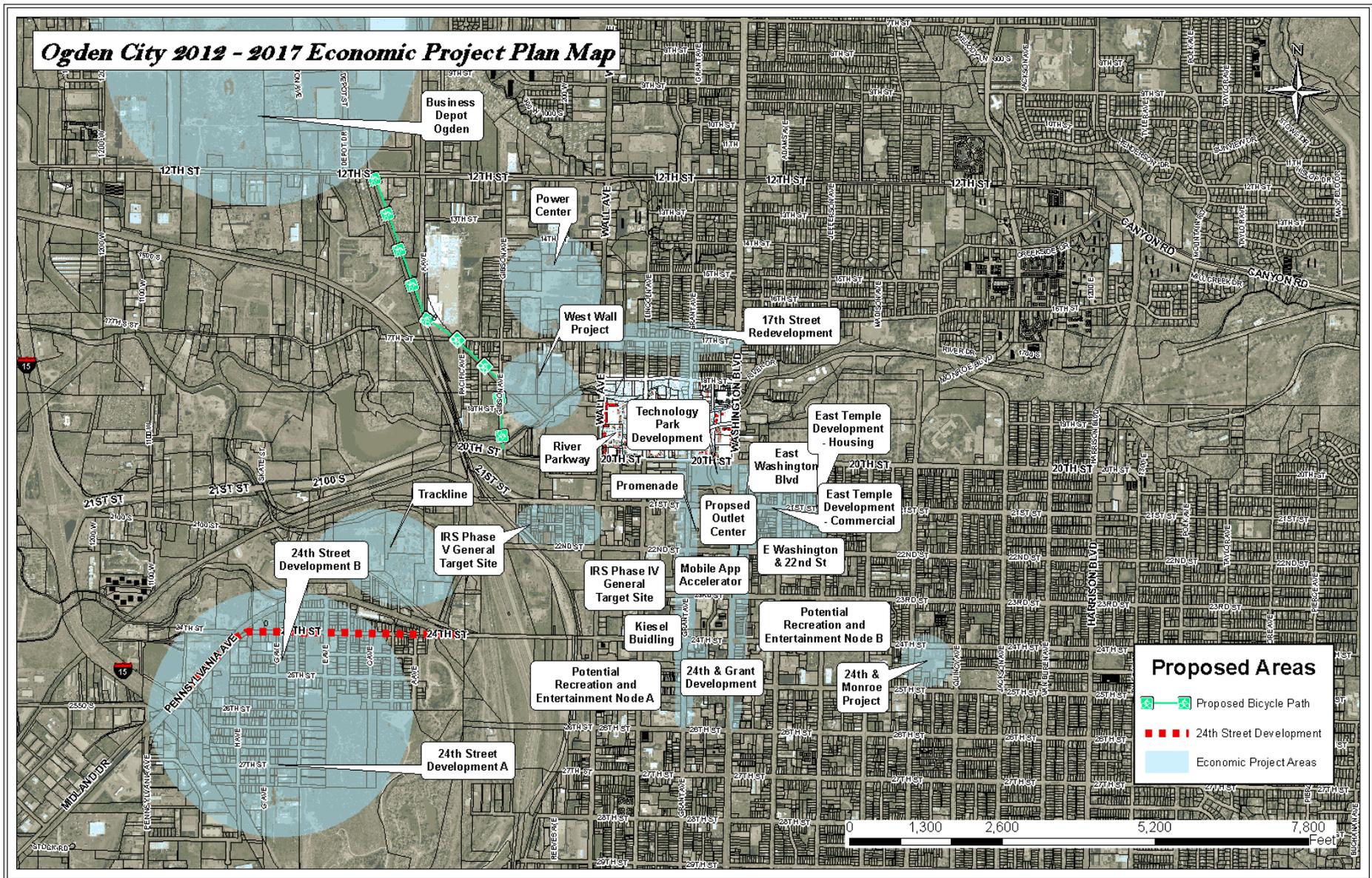


Figure 6. Ogden City 2012–2017 Economic Project Plan Map



8.0 Development of Alternatives-Evaluation Criteria and Measures

The evaluation criteria that the study team used to help the TAC and PAC select the LPA were based on the goal and objectives developed for the current Ogden/Weber State University Transit Project Study, which has focused on seven key issues identified in the 2011 draft AA. These goals were developed to reflect the problems and needs in the study area and to guide the development and selection of an alternative to be implemented. The study team incorporated into the objectives measures that address federal New Starts/Small Starts evaluation criteria. The goals and associated objectives along with their evaluation criteria and measures are described in Table 1.

Table 1. Goals, Objectives, and Evaluation Criteria

Project Goals and Objectives	Criterion	Measures
Increase ridership, attract more local riders, and provide improved access to the overall transit system Increase mobility, connectivity, and travel choices between downtown Ogden and the Weber State University/ McKay-Dee Hospital area	Ridership (2040)	<ul style="list-style-type: none"> • 2040 total daily boardings and annual project riders • Daily boardings per route-mile
	Ridership by zero-car households	<ul style="list-style-type: none"> • Measures service to persons with no cars within one-half mile of the study corridor
	Reduction in vehicle-miles traveled	<ul style="list-style-type: none"> • Measures change in automobile-miles traveled that would result from drivers opting to ride new transit
Develop a project that is competitive for federal funding	Capital cost	<ul style="list-style-type: none"> • Measures planning-level capital cost estimate (in 2014 dollars) per track-mile and identifies major cost items that deviate from a standard cost per mile
	Annual operations and maintenance (O&M) cost	<ul style="list-style-type: none"> • Measures planning-level annual operations and maintenance cost (in 2014 dollars)
	Cost-effectiveness (annualized federal share/annual trips)	<ul style="list-style-type: none"> • Annual ridership, vehicle revenue hours, and capital costs • Cost per new corridor transit rider • Cost per hour of user benefits
Support local and regional land-use initiatives Promote economic and community development and create jobs in Ogden	Land use and economic development impact	<ul style="list-style-type: none"> • Measures potential of the alternative to generate significant economic development • Measures how well the alternative serves major trip generators within one-half mile of the study corridor • Measures transit-supportive 2040 planned land-use types within one-half mile of the study corridor • Measures zoning potential/capacity of redevelopable or unbuilt land
Develop a project that has strong local support	Local support	<ul style="list-style-type: none"> • Measures level of community support/opposition for the alternative

8.1 Alternatives Evaluation

The four proposed alternatives for the Ogden/Weber State University Transit Project Study were evaluated based on various factors including transportation impacts, environmental impacts, potential for smart growth, cost-effectiveness, financial feasibility, and community and political support. Screening criteria were developed directly from the project goals, which flowed from the purpose of the project.

These evaluation factors are reflected in the goals and objectives developed for this AA update. The proposed alternatives were evaluated to determine potential ridership and traffic impacts in the corridor. Environmental impacts, primarily in regard to Section 106 of the National Historic Preservation Act and Section 4(f) of the Department of Transportation Act of 1966, were also addressed. Additional environmental impacts were considered qualitatively; more-detailed technical analysis of the environmental impacts of the selected build alternative will be deferred to the environmental documentation phase of this study, and the selected build alternative will be compared to the No-Action Alternative. The No-Action Alternative was not subject to elimination using the evaluation criteria; it was not studied in this phase since it will be evaluated in the environmental documentation phase.

FTA's New Starts/Small Starts criteria were also considered when evaluating the alternatives. As stated in FTA's New Starts program guidelines, FTA considers specific criteria in its deliberations to advance fixed-guideway transit projects through the project development process and to enter into a long-term financial commitment to implement the proposed transit investments. The New Starts program categorizes these criteria into two broad areas: project justification and local financial commitment. The project justification criteria, which are used to rank alternatives, are:

- Mobility improvements
- Cost-effectiveness
- Economic development
- Land use
- Other factors (environmental benefits and congestion relief)

A comparison of how well each alternative meets the study goals and objectives (described in Section 1.5, Project Objectives) and New Starts/Small Starts criteria is presented in Table 1.

In coordination with the TAC, the study team developed eight evaluation criteria that reflect the project goals and objectives, reflect the Small Starts rating criteria for federal funding eligibility, and allowed the study team to compare and contrast the alternatives with criteria that could set the alternatives apart in an effort to guide the selection of an LPA. Some measures of comparison are subjective and qualitative, while others are quantitative. The eight evaluation criteria are:

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

8.2 Measurement Approaches

8.2.1 Capital Cost Approach

Capital cost estimates were prepared for vehicles, infrastructure, and right-of-way for both of the candidate routes and modes. The engineering and design assumptions were developed in enough detail to support planning-level capital cost estimates, right-of-way requirements, utility impacts, operating procedures, and facility design. Cost estimates were developed using industry standard unit cost measurements. Original opinions of probable cost were developed where there were gaps, and details of these estimates are provided in Appendix E, Capital and Operating and Maintenance Cost Evaluations, which includes tables summarizing the capital cost estimates of the four alternatives evaluated in this AA update.

Costs are inclusive of construction, vehicles, right-of-way and utilities, maintenance facility, and professional services, plus contingency. Estimates were developed in 2014 dollars and escalated (3.5%) to the anticipated year of expenditure. The cost basis was from other built streetcar and bus systems both nationally and locally. Planning-level capital cost estimates were developed using quantities and technology definitions in accordance with the FTA standardized cost categories and are shown in Table 2.

Table 2. Planning-Level Capital Cost of Alternatives

Cost	25th Street Streetcar	25th Street BRT	30th Street Streetcar	30th Street BRT
Capital cost (year of expenditure in millions)	\$220.0	\$39.4 – \$56.1*	\$233.8	\$71.4

* A range of costs and shortfalls is given for 25th Street BRT to account for additional right-of-way and construction costs depending on the exact location where exclusive travel lanes are implemented on Harrison Boulevard.

8.2.2 Operating and Maintenance Cost Approach

Conceptual operating scenarios were developed for how the alternatives will operate on each of the candidate corridors by mode. Where possible, cost information was gathered from recent and relevant studies and operating facilities, such as the S-Line Streetcar, the most recently completed streetcar line in UTA’s system. Operating and maintenance (O&M) costs were calculated using a scenario with 15-minute headways between 8 AM and 6 PM Monday through Friday, 30-minute headways from 5 AM to 8 AM and from 6 PM to 12 AM Monday through Friday, and 30-minute headways on weekends.

Note that the aim of estimating O&M costs at this stage of planning is to compare alternatives. Because the actual implementation of an alternative is still likely years away, the cost estimates, as well as the schedules they are based on, should be viewed as conceptual only and were developed only to the extent needed to compare the alternatives. It is unlikely that any of the schedules would be implemented as is. Original opinions of probable cost were developed where there were gaps, and details of these estimates are provided in Appendix E, Capital and Operating and Maintenance Cost Evaluations, which includes a table summarizing the O&M cost estimates of the two modes evaluated in this AA update as well as the proposed schedule used for operating assumptions. Estimates were developed in

2014 dollars and escalated (3.5%) to the anticipated year of expenditure. The cost basis was from other built streetcar and bus systems both nationally and locally. In general, the annual O&M cost for streetcar on either alternative would be about \$1.5 million more than for BRT on either alternative, although the O&M cost of UTA bus route 603 that currently operates on 25th Street could be recouped and used for a 25th Street alternative.

8.2.3 Land Use and Economic Development

As described in Section 7.0, Land Use and Development Potential, the study team evaluated “alignment influence zones” based on their proximity to the corridor, evaluated existing conditions and growth trends to create future projections, evaluated development potential under existing zoning and used the ET+ scenario-planning software program to evaluate development potential under transit-supportive zoning, and considered vacant and underdeveloped sites, infill, and reuse of larger vacant buildings. The study team also estimated the time required to reach build-out scenarios, compared the maximum likely economic development impact of each alternative, and crosschecked the analysis with the local land developers and Ogden City planners.

The ET+ modeling results show that the northern alignment along 25th Street would have a competitive advantage compared to the southern alignment along 30th Street, at least in the short to medium terms (5 to 10 years). In the ET+ modeling, the somewhat higher economic development potential of the 25th Street/Northern transit alignment reflects the low-traffic-volume, walkable street network and higher level of desirability today (measured in achievable rents). The analysis is summarized in Section 7.0, Land Use and Development Potential, and the Ogden Transit Project Land-Use Evaluation is included in Appendix C.

8.2.4 Project Ridership, Transit-Dependent Ridership, and Travel Time Analysis

Using the station locations and conceptual operating plans, WFRC developed ridership forecasts for each candidate corridor and operating mode as well as for zero-car households (station locations are discussed in more detail in Section 8.0, Development of Alternatives-Evaluation Criteria and Measures). These ridership estimates were also used to determine transit system user benefits and cost-effectiveness measures.

In order to examine the existing transportation system and accurately predict the effects of future population, household, and employment growth, a travel demand model is necessary. A travel demand model is a computer-based mathematical model that simulates existing road conditions, vehicle demand on roads, and use of public transit. Travel demand models are an integral part of analyzing ridership and travel times. By using a model that accurately replicates existing travel conditions, future conditions and the effects of alternatives can be evaluated.

Ridership. WFRC performed travel demand modeling for the project using its regional travel demand model. The regional travel demand model was used to develop forecasts for an initial set of transit service scenarios, and a manual method of ridership calculation was used to develop forecasts for the four alternatives evaluated in this AA update. These forecasts include all services and routes.

WFRC looked at the two alignments and two modes and used version 7 of its travel demand model to produce forecasts for the current study. Table 3 lists the assumptions and ridership forecasts that were used for the alternatives.

Table 3. Comparison of Alignments and Modes

Characteristic	25th Street		30th Street	
	Streetcar	BRT	Streetcar	BRT
2016 daily boardings ^{1,2}	4,500	2,500	4,400	3,000
2020 daily boardings ^{1,2}	5,600	3,100	5,500	3,400
2040 daily boardings ^{1,2}	7,400	4,300	7,400	4,800
Headway ²	15 minutes all day			
Alignment length	5.3 miles	5.3 miles	5.3 miles	5.3 miles
Number of stations	16	16	16	16

¹ WFRC's regional travel demand model (TDM) version 7 was used to produce these forecasts.

² The modeling assumed 15-minute headways. WFRC also conducted sensitivity testing on the impact of 10-minute headways that increased the daily boardings forecasts by 15% over the 15-minute headway.

See Appendix F for WFRC's Preliminary Transit Ridership Forecasting Memorandum, which includes the station-level boardings for all alternatives.

Transit-Dependent Ridership. Transit-dependent riders are defined as riders from zero-vehicle households. This is an important metric since it measures how well the project serves those who need it most. For this reason, when a project sponsor applies for FTA New Starts or Small Starts funding, transit-dependent riders are counted double in the ridership calculations.

Table 4 shows the transit-dependent ridership for the two alignments (routes). The transit-dependent ridership was forecasted using a combination of the travel model and UTA's 2011 on-board survey, which provides system-wide demographic and spatial information and is used to construct rider profiles and trip flows and to understand changes in trip attractors and generators in a region. Table 5 shows the transit-dependent ridership for the alternatives.

Table 4. Alternatives Evaluation Results

	Streetcar on 25th	BRT on 25th	Streetcar on 30th	BRT on 30th
Miles	5.3	5.3	5.3	5.3
Number of Stations	16	16	16	16
Number of Vehicles (4 for 15 min headway plus one spare)	5	5	5	5
Travel Time				
Travel Time from Ogden Transit Center to WSU (from InterPlan, minutes:seconds)	18:00	18:15	18:30	18:00
Travel Time from Ogden Transit Center to McKay Dee Hospital (from InterPlan, minutes:seconds)	23:00	23:15	23:30	23:00
Capital Cost				
Capital Cost (2015)	\$183.3 M	\$32.8 M	\$195.0 M	\$59.5 M
Non-Federal Share of Capital Cost (2015)	\$91.6 M	\$16.4 M	\$97.5 M	\$29.8 M
Capital Cost (Year of Expenditure, assuming 3.5% construction cost increase per year, 2020 opening)	\$220.0 M	\$39.4 M	\$233.8 M	\$71.4 M
Capital Cost per Mile (2015)	\$34.6 M	\$6.2 M	\$36.8 M	\$11.2 M
Annualized Capital Cost	\$3.95 M	\$.67 M	\$4.16 M	\$1.15 M
Operations and Maintenance				
Vehicle Hours per Year 15 min weekday, 30 min early, late, and weekends	18,200	18,200	18,200	18,200
Vehicle Hours per Year 15 min weekday, 20 min weekend	24,440	24,440	24,440	24,440
Vehicle Miles per Year 15 min weekday, 30 min early, late, and weekends	192,920	192,920	192,920	192,920
Vehicle Miles per Year 15 min weekday, 20 min weekend	259,064	259,064	259,064	259,064
Annual O&M Cost (2015) 15 min weekday, 30 min early, late, and weekends	\$3.37 M	\$2.37 M	\$3.37 M	\$2.37 M
Annual O&M Cost (2015) 15 min weekday, 20 min weekend	\$4.52 M	\$3.18 M	\$4.52 M	\$3.18 M
Mobility				
Boardings (from WFRC, 2016)	4,500	2,500	4,400	3,000
Boardings by Transit Dependents (from WFRC, 2016)	900	550	880	600
Annual Boardings (2016, using annualization factor of 295)	1.33 M	.74 M	1.30 M	.89 M
Annual Boardings plus 2x Transit Dependents (2016)	1.59 M	.90 M	1.56 M	1.06 M
Boardings (from WFRC, 2040)	7,400	4,300	7,400	4,800
Boardings by Transit Dependents (from WFRC, 2040)	1,480	946	1,480	960
Annual Boardings (2040, using annualization factor of 295)	2.18 M	1.27 M	2.18 M	1.42 M
Annual Boardings plus 2x Transit Dependents (2040)	2.62 M	1.55 M	2.62 M	1.70 M
Annual Boardings (2016-2040, using annualization factor of 295)	1.76 M	1.00 M	1.74 M	1.15 M
Annual Boardings plus 2x Transit Dependents (2016-2040)	2.11 M	1.22 M	2.09 M	1.38 M
Mobility Improvement Rating (2.5M break-point) (2016-2040)	Low	Low	Low	Low

(continued on next page)

Table 4. Alternatives Evaluation Results (continued)

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	
Cost Effectiveness	Cost Effectiveness (Annualized Costs/Annual Boardings) (less than 4 is High) (2016-2040) ^{April 6, 2015}	\$4.83	\$3.84	\$4.99	\$3.76
	Cost Effectiveness Rating (2016-2040)	Medium-High	High	Medium-High	High
	Cost Effectiveness, Reduced Headways (2016-2040)	\$4.17	\$3.03	\$4.32	\$3.06
	Cost Effectiveness Rating Reduced Headways (2016-2040)	Medium-High	High	Medium-High	High
T.M.	Reduction in Vehicle Miles Traveled Per Day (from WFRC)	5,551	1,385	5,501	1,249
	Environmental Benefit Rating	Medium	Medium	Medium	Medium
Land Use	Population within 1/4 mile (2010 Census, using Census Blocks)	13,870	13,870	13,405	13,405
	Employment within 1/4 mile (2010 Census)	20,642	20,642	21,217	21,217
	Anticipated Land Use Rating	Medium-Low	Medium-Low	Medium-Low	Medium-Low
Economic Development	New Population within 1/4 mile (2040 Envision Tomorrow Plus (ET+))	15,819	15,819	14,572	14,572
	Total Population within 1/4 mile (2040 Envision Tomorrow Plus (ET+))	29,689	29,689	27,977	27,977
	New Building Value assuming Existing Zoning (2040 ET+)	\$570 M	\$142 M	\$502 M	\$251 M
	New Building Value assuming Transit Supportive Zoning (2040 ET+)	\$1.27 B	\$317 M	\$1.14 B	\$570 M
	Anticipated Economic Development Rating (assuming recommended zoning changes)	High	High	High	High
Overall Rating	Anticipated Overall Rating (2016-2040) (full headway)	Medium	Medium-High	Medium	Medium High
	Anticipated Overall Rating (2016-2040) (reduced headway)	Medium	Medium-High	Medium	Medium High
	Strong Local Support	Highest	High	High	Medium

>15	Low
10-14.99	Med-Low
6-9.99	Medium
4-5.99	Med-High
<4	High

Table 5. Comparison of Transit-Dependent Ridership by Alignment

Characteristic	25th Street		30th Street	
	Streetcar	BRT	Streetcar	BRT
Home-based college ¹	16%	16%	16%	16%
Home-based other	35%	36%	36%	33%
Home-based work	18%	23%	19%	20%
Non-home-based ¹	24%	24%	24%	24%
Total	20%	22%	20%	20%

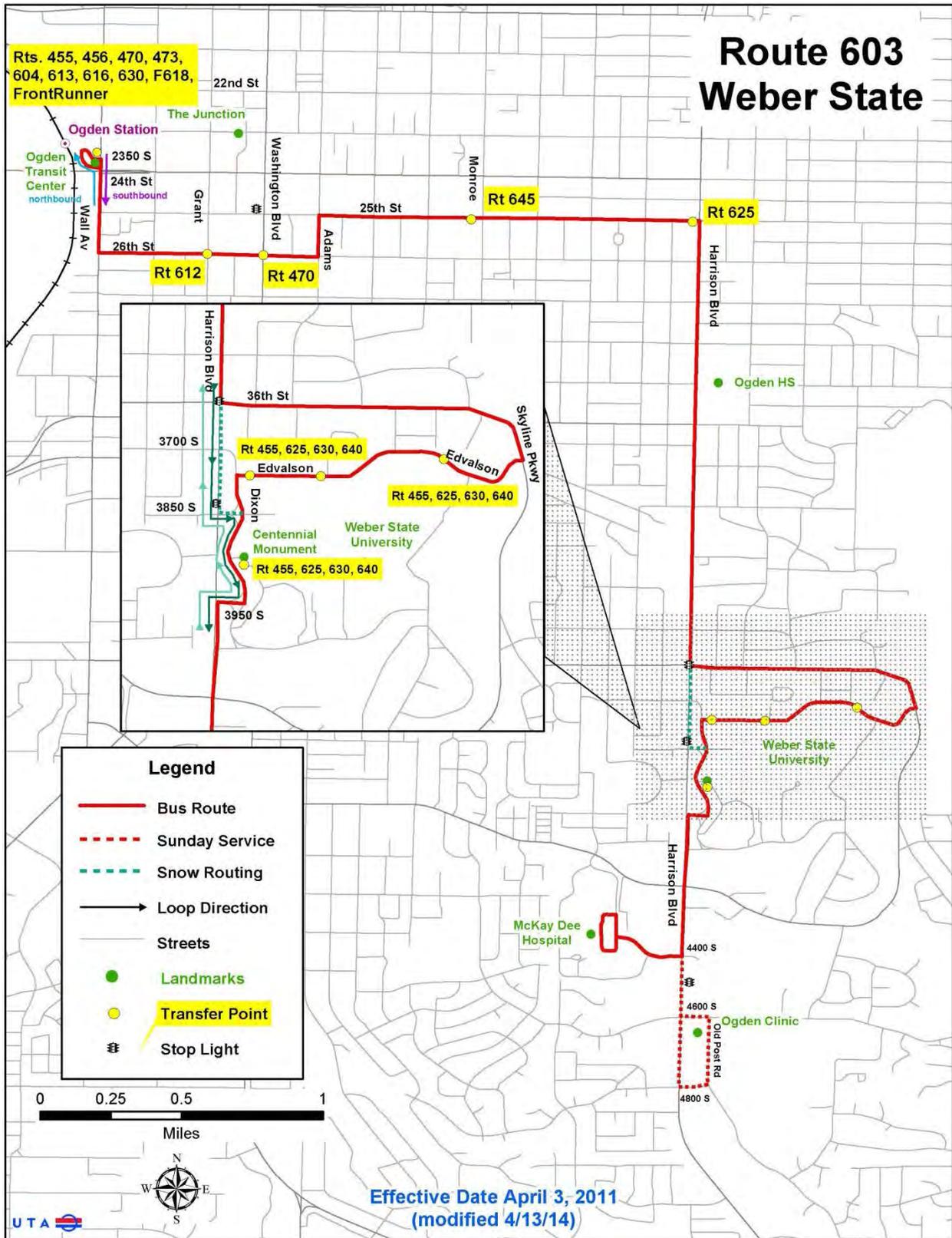
¹ These percentages were generated based on UTA's 2011 on-board survey.

STOPS. STOPS (Simplified Trips-on-Project Software) is a forecasting tool developed by FTA that simplifies the forecasting process and streamlines the review process when an agency applies for federal funds. WFRC has run some preliminary forecasts for this project using STOPS. However, STOPS 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 (transit improvements in Ogden), it appears that STOPS might be underestimating the ridership for this project. Under a 2012 base year scenario, the travel demand model projects about 3,600 boardings per day for this project, assuming a streetcar line on 25th Street. STOPS projects less than half that amount. WFRC will continue to test and refine the STOPS model, but, for now, WFRC will continue to use its travel demand model for official project forecasts.

Travel Time. WFRC and the study team also looked at travel time. With any transit project, UTA aims to improve service reliability, reduce travel time, and improve customer experiences and service efficiency. The TAC was concerned that a new project would not have any substantial travel-time savings over the existing bus services that currently serve the study area. The existing 603 bus route serves a route similar to that of the proposed 25th Street route, as shown in Figure 7.

The travel time for route 603 varies between about 24 and 28 minutes depending on the time of day. It's important to note that route 603 goes up 36th Street as far east as Skyline Drive on the Weber State University campus, which is farther east than any of the proposed alternatives. However, the proposed alternatives bring students to the heart of campus and then continue through the campus reaching the Dee Events Center, a major attraction that is also located near student housing and parking. In comparison, route 603 is designed to bring students to only two locations on campus. Further, the proposed alternatives cross Harrison Boulevard and wind around the McKay-Dee Hospital parking lot.

Figure 7. UTA Bus Route 603



Given the nuances in the alternative routes compared to route 603, the travel times are very competitive and average about 18 minutes to the center of the Weber State University campus and about 23 minutes to McKay-Dee Hospital. The mode makes very little difference in the travel time (the BRT alternatives were about 15 seconds slower than streetcar), and, in either case, both introduce the potential for premium service on an already popular standard bus route.

Signal optimization and transit signal priority are two techniques that can be used on fixed-guideway projects to potentially save additional travel time on congested routes where the transit vehicle might have to rely on an exclusive phase to move through an intersection. Such optimization efforts would be applicable to a center-running streetcar on Washington Boulevard (for example), as opposed to a mixed-flow BRT on 25th Street and Harrison Boulevard.

As the study team began to focus on mixed-flow options on Harrison Boulevard in an effort to define the alternatives, the team discovered that signal adjustments, whether through optimization or transit signal priority, would have a much smaller effect on transit performance than previously anticipated. This small effect is due to the relatively low levels of congestion on 25th Street and Harrison Boulevard. In addition, there are only five traffic signals on the segment of Harrison Boulevard in the study area, and these signals already operate with very short cycle lengths. Therefore, there is little opportunity for optimization adjustments, since little to no green-light time can be taken from the side streets and applied to the mainline due to the time requirements for pedestrian crossing. Additionally, the short cycle lengths mean that a transit vehicle arriving on a red light will not have to wait long until receiving a green light.

8.2.5 Reduction in Vehicle-Miles Traveled

Vehicle-miles traveled (VMT) are calculated per capita on an average daily basis and/or on an annual basis. WFRC used its travel demand model to estimate the VMT by residents living within a given geographic boundary and then determined the reduction in VMT that each alternative would provide over a no-build (no-project) scenario. According to WFRC, the reduction in VMT per day was about 5,500 for streetcar on either alignment (which equates to about a 0.28% reduction) and about 1,300 for BRT on either alignment (which equates to about a 0.06%–0.07% reduction). Because BRT tends to have lower ridership than streetcar, the reduction in VMT would be lower.

However, VMT reduction is also a function of development patterns, and, based on the study partners' land-use and development plans, further reduction in VMT could be realized regardless of mode. FTA evaluates and rates environmental benefits based on a change in VMT due to implementing a proposed project. Preliminarily, all alternatives rate in the medium range for environmental benefits. The VMT reduction will be further analyzed during the environmental documentation phase of this study.

8.2.6 Local Support

The study team has reached out to and engaged the public through a mix of extensive grassroots outreach, statistically significant surveys, and innovative social media techniques. From these efforts, the study team had determined the local support for each alignment and mode. Based public comments, the preferred route is 25th Street, and the preferred mode is streetcar, though there is support for 30th Street and BRT. The general consensus is that a transit project in Ogden is important, regardless of the mode and route. This analysis is summarized in Section 3.0, Public Outreach.

8.2.7 Cost-Effectiveness

The cost-effectiveness measure for New Starts projects is the annual capital and O&M cost per trip on the project. For Small Starts projects, the cost-effectiveness measure is the annualized capital federal share of the project per trip on the project. The number of trips on the project is not an incremental measure but simply the total estimated trips on the project. The study team used ridership estimates to determine the cost per new corridor transit rider and cost per hour of user benefits based on the latest FTA direction. The various cost-effectiveness calculation results are shown in Table 4 on page 36. All the alternatives preliminarily rate medium-high (streetcar) to high (BRT) for cost-effectiveness.

8.3 Comparison of Alternatives

All of the alternatives were evaluated based on both qualitative and quantitative measures that allowed the study team, TAC, and PAC to compare the alternatives and determine the most appropriate alternative to be advanced to environmental screening in the next phase of this study.

As shown in Table 4 on page 36, in almost every category, the four alternatives ranked similarly. When considering future ridership, impacts to the local community and region, costs, land use and development, and public support, each alternative has both advantages and disadvantages, though no one alternative is clearly superior.

8.3.1 Preference for an Alignment

The Ogden/Weber State University Transit Project Study has evaluated eight specific criteria, including ridership data, land use and economic development potential, costs, and travel times. In addition to the goals of increasing mobility, connectivity, travel choices, and transit ridership in the study corridor, the evaluation focused on supporting equity in the corridor, saving costs, strengthening economic development and creating jobs, and building on the vibrancy and diversity of the study corridor while not significantly affecting traffic or the natural or built environments.

The results of the evaluation of the 25th Street and 30th Street alignments (routes) were very similar for most of the evaluation criteria.

- Both alignments begin and end at traffic generators and would serve several traffic generators in between, including the Ogden Intermodal Transit Center, The Junction, Harrison Boulevard, Ogden High School, Mount Ogden Junior High School, Weber State University, the Dee Events Center, and McKay-Dee Hospital.
- Both alignments would increase overall transit ridership in the study corridor and would reduce overall travel time. Projected ridership data for both alignments was very strong regardless of transit mode: an average of about 2,500 (BRT) to 4,500 (streetcar) riders would use the 25th Street alignment each day in 2016, and these numbers would rise to 3,100 (BRT) to 5,600 (streetcar) in 2040.
- Currently, the travel time from the Ogden Intermodal Transit Center to Weber State University on UTA's route 603 bus ranges from about 24 to 28 minutes. BRT on 25th Street could make the trip to Weber State University in 18.15 minutes, while a streetcar could make the trip in 18 minutes. Travel time using 30th Street was basically the same with roughly a 15-second difference.
- Neither of the alignments is likely to significantly affect the natural environment, since both would be located mostly in the public right-of way, in an urbanized area, and, in the case of the portion of the alignment through Weber State University, on land set aside for a planned transitway. The study team determined that a mixed-flow transit alternative would be feasible on 25th Street without affecting either Section 106- or Section 4(f)-eligible resources and without affecting traffic (see Section 6.1, Traffic Studies).
- Both alignments would contribute to increased circulation and mode choice, and both alignments enjoy public support from a variety of stakeholders.

Ultimately, the TAC and PAC's decision to select one alignment over the other was based on nuances in land use and economic development potential, redevelopment timing, and federal funding potential. The fact that public and partners support the 25th Street alignment tipped the scale in that alignment's favor. Although both alignments would promote economic and community development and create jobs in Ogden, it was clear to the TAC and PAC that the 25th Street alignment would benefit the 25th Street corridor, which continues east from the heart of Ogden's historic district and is full of redevelopment potential, including at the Lester Park redevelopment area (RDA). It's important to note that Ogden also has two RDAs on Washington Boulevard, and a future transportation project on Washington Boulevard is included in WFRC's Long-Range Transportation Plan.

As described in Section 7.0, Land Use and Development Potential, 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). Currently, these criteria make up one-third of the project justification evaluations assessed by federal agencies for projects funded by Small Starts and New Starts. This is because the federal government wants to be confident that tax dollars will leverage substantive private investment through new development and redevelopment,

thereby increasing the rate of community revitalization. Thus, evaluating current policies and making targeted changes where needed is critical to accessing federal transit funding.

To that end, after analyzing the alignments' land use and economic development potential, the study team concluded that 25th Street has a competitive advantage compared to 30th Street, at least in the short to medium terms. 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 East Central area is significantly stronger than the market surrounding Washington Boulevard south of 25th Street. The level of desirability (measured in terms of rents and sales prices) in the East Central area can support infill and redevelopment, whereas the level of desirability along and around Washington Boulevard between 25th Street and 30th Street cannot. In the short to medium terms and without significant investment in streetscape improvements along Washington Boulevard, a transit investment of this scale is likely to leverage larger private investments surrounding the northern alignment option along 25th Street.

Moreover, central Ogden has a strong street grid and connectivity, particularly in the East Central neighborhood centered on 25th Street. In addition, 25th Street benefits from the legacy of the streetcar-oriented design of the neighborhood. The traffic speeds and volumes on Washington Boulevard make the pedestrian experience less desirable for transit-oriented investment compared to 25th Street. In the ET+ modeling conducted for the land use and economic development analysis, the somewhat higher performance of the 25th Street alignment reflects the low traffic volume, walkable street network, and higher level of desirability today (measured in achievable rents).

In addition to the land use and economic development considerations, the TAC and PAC considered the success of the existing route 603 bus that runs on 25th Street and realized that a successful traditional bus service could be improved by replacing it with premium transit service. Not only could the travel time to Weber State University be improved, thereby enabling the University to reduce its parking needs and increase on-campus development density, but the route 603 rider experience could be improved by replacing the traditional bus service with a higher-quality system. In addition, the operations and maintenance costs of the existing route 603 bus service could be applied to the new system, since redundant service could be eliminated. However, if the TAC and PAC were to select the 30th Street alignment, the route 603 bus would likely not be eliminated.

In July 2015, the TAC and PAC unanimously selected the 25th Street alignment as the preferred alignment. The route selection along with a mode selection was advanced to the Ogden City Council and Mayor, who adopted the LPA selection by resolution.

Therefore, in this AA update, the study partners select the 25th Street alignment as the preferred alignment because it has the most agency and public support; because a transit investment on this alignment could enhance—and likely replace—the existing route 603 bus service, thereby saving O&M costs and providing a superior service to existing bus riders; and because the TAC, PAC, Ogden City Council, and Ogden Mayor believe that it would be the best alignment to support the City's land-use and economic-development plans in the short term.

8.3.2 Preference for a Mode

As described in Section 1.4, Project History, transit improvements in Ogden have been evaluated and identified in numerous planning studies for the region. However, as with support for a specific alignment, support has varied for the transit vehicle mode. Ogden has a long history with rail transit. Historically, streetcars ran on 25th Street and in the East Central neighborhoods. Although the current study found wide public support for either mode, there appears to be slightly more support for streetcar among those who commented on the project. In particular, residents in the Ogden Trolley District have vocally supported streetcar on 25th Street.

There are many similarities between BRT and streetcar, including unique branding that is distinct from local bus service, higher capacities than traditional bus service, and increased ridership and development potential over traditional buses. In addition, BRT and streetcar on 25th Street were comparable in their travel time from the Ogden Intermodal Transit Center to Weber State University (18:15 minutes and 18:00 minutes, respectively), and, even though BRT would have fewer riders than streetcar (2,500 versus 4,500 in 2016 and 4,300 versus 7,400 in 2040), the ridership still justifies an enhanced transit investment.

Additionally, both streetcar and BRT rate well in the cost-effectiveness category for federal Small Starts funding, with BRT rating high and streetcar rating medium-high (see Table 4 on page 36). Both modes could be implemented without significantly affecting traffic (see Section 6.1, Traffic Studies, and Appendix G, Traffic Technical Report to Determine Feasibility of 25th Street Alignment) or the natural or built environments. Although streetcar would run on electricity, BRT could run on electricity, natural gas, or hybrid (gas/electric) technology, thereby contributing to reduced energy use and cleaner air with either mode.

As a result of the public and agency engagement conducted for the current study, the study team discovered that, overall, people just want a transit improvement. Residents in the Ogden Trolley District regularly participated in the public process in support of streetcar, as described in Section 3.0, Public Outreach. Nonetheless, the study team consistently heard, even among those who favored streetcar, that having an efficient, safe, and affordable transit system is more important than having a transit system that uses a particular mode. This is especially true given that the study corridor is in an area of the city that has a much higher rate of households without access to an automobile and with high existing bus ridership.

However, over the course of the alternatives evaluation, the study team discovered several differences between the two modes, with the main difference being that streetcar would have much higher capital and O&M costs than BRT.

Because the ridership and land-use and economic development potential stemming from either mode was promising, because travel times were similar, because public and agency support for both modes existed, and because capital and O&M costs would be higher for streetcar, the TAC and PAC wanted to review a financial strategies analysis before selecting a preferred mode. A financial strategies analysis would help the committees understand the capital and operating shortfalls associated with each mode and alignment (see the following section).

8.3.3 Financial Strategies Analysis

The Capital Investment Program, which includes New Starts and Small Starts, is FTA's primary grant program for supporting locally planned, implemented, and operated transit "guideway" capital investments including light rail or streetcar and bus rapid transit. In July 2012, Congress enacted a new authorization titled the Moving Ahead for Progress in the 21st Century Act (MAP-21) that changed several aspects of the program.

The study team reviewed how similar projects across the country are funded and how UTA's existing fixed-guideway services (light-rail transit, commuter rail, streetcar, and BRT) have been funded (capital and operating costs). The study team understands that the federal funding arena is significantly different under MAP-21 than under past legislation and that state and local funding opportunities have also changed, so the criteria by which UTA has funded projects in the past no longer apply. Nonetheless, the study team believed that, by framing past project financial strategies in their context, the TAC would be able to put conceptual financial strategies for funding the project in perspective.

At this stage of project development, the study partners do not need to have a defined funding strategy. This is the initial step in the financial planning process, and it is important to identify potential realistic sources and strategies to help the TAC understand the funding realities and shortfalls in an effort to guide the selection of an LPA.

The study team compared 16 streetcar projects and 11 BRT projects from across the country and found that the majority of projects received anywhere from 10% to 80% of their capital costs from federal sources (New Starts/Small Starts plus other federal programs such as Transportation Investment Generating Economic Recovery [TIGER] grants) The remainder of the costs were covered by state, regional, or local sources such as local sales tax, general funds, and bond proceeds.

The study team found that the major sources of revenue for capital and O&M costs on past UTA projects were New Starts funding (capital costs for the Draper Light-Rail Transit Extension and the Mid-Jordan Light-Rail Transit Project), farebox revenues, and sales and use tax. Minor sources of O&M revenues include federal preventive maintenance grants, interest, advertising, rents, and leases. Another source of funding that has been used in the past and that could be applied to the estimated total project cost of this project is an in-kind contribution of the right-of-way appreciation value. The right-of-way through Weber State University would likely be donated by the University and this could count as an in-kind contribution on the Small Starts application. This right-of-way was not reflected in the project's conceptual financial strategy analysis or put toward the funding shortfalls.

After the study team collected and analyzed various federal, state, regional, and local funding sources (capital sources) and farebox and other operating revenue (O&M sources), it developed a series of conceptual financial strategies and presented these strategies to the TAC. The TAC agreed that, based on the screening against Small Starts criteria, either mode rated well and was likely to be competitive for some percentage of Small Starts funding. However, the TAC also agreed that, based on the financial study of other projects around the country, the share given to BRT (45% to 80%) was more promising than the share given to streetcar (10% to 70%). The TAC decided that the resulting capital funding shortfall (per the conceptual financial strategy analysis) that would likely be realized with this project for BRT

(\$8 million to \$28 million, depending on the federal share obtained) could more easily be funded with state or local funding sources compared to the forecasted capital shortfall for streetcar (\$90 million to \$110 million). Similarly, the TAC agreed that the operating shortfall for BRT of \$1.1 million was more realistic to fund locally than the \$1.7-million dollar operating shortfall for streetcar. The TAC agreed that funding BRT was more realistic than funding streetcar.

The study team presented the financial strategies to the TAC as well as the Ogden Mayor and City Council. All groups agreed that it was important to get a transit improvement project completed, and therefore the mode with the most realistic funding potential should be selected. Subsequently, the TAC recommended BRT to the PAC, and the PAC unanimously agreed that BRT is the most achievable mode choice at this time.

Therefore, in this AA update, the study partners select BRT as the preferred mode because it has the most agency support; because BRT on 25th Street could enhance—and likely replace—the existing route 603 bus service, thereby saving O&M costs and providing a superior service to existing bus riders; and because the TAC, PAC, Ogden City Council, and Ogden Mayor believe that it would be the most financially achievable mode to support the City’s land-use and economic-development plans in the short term while also providing superior amenities compared to standard bus service.

Table 6 summarizes the capital and operating funding shortfalls for each alternative as well as the annual debt service payment and equivalent Weber County sales tax rate for the debt service and operating subsidy to give a frame of reference for what repayment would take. Note that the conceptual financing strategies were developed for the purpose of evaluating the alternatives only and that UTA will develop a detailed financial plan for the LPA in subsequent project phases. For the full funding analysis presentation made by the study team to the TAC and Ogden’s Mayor and City Council, see Appendix H, Financing/Funding Evaluation.

9.0 Selection of the Locally Preferred Alternative

Based on updated technical information, land-use and economic growth projections, funding and financing analysis, and the goals and objectives evaluation from the first phase of this study, the TAC and PAC have concluded that **BRT on 25th Street** is the alternative that is best aligned with the study partners’ approved objectives and is most fiscally possible from the study partners’ perspectives (see Figure 8) and is therefore the LPA. As described in Sections 8.3.1, Preference for an Alignment, and Section 8.3.2, Preference for a Mode, the TAC selected 25th Street as the preferred route first and then selected BRT as the best mode for the alignment at this time.

Table 6. Conceptual Funding Strategy Capital and Operating Shortfalls

Dollar values in millions

Cost or Shortfall	25th Street Streetcar		25th Street BRT		30th Street BRT	
	Minimum Federal Funding	Moderate Federal and State Funding	Minimum Federal Funding	Minimum Federal Funding	Minimum Federal Funding	Moderate Federal and State Funding
Capital cost (YOES)	\$220.0		\$39.4–\$56.1*		\$71.4	
Capital funding shortfall	\$110.0	\$100.0–\$90.0	\$19.7–\$28.1	\$8.0–\$18.0	\$35.7	\$25.7–\$15.7
Annual O&M cost (YOES)	\$4.0		\$2.8		\$2.8	
Operating funding shortfall	\$1.7	\$1.7	\$1.1	\$1.1	\$1.9	\$1.9
Annual debt service payment	\$10.0	\$9.2–\$8.4	\$1.9–\$2.6	\$0.0–\$1.9	\$3.3	\$2.5–\$1.7
Equivalent Weber County sales tax rate	0.23%	0.22%–0.21%	0.06%–0.07%	0.04%–0.06%	0.10%	0.09%–0.07%

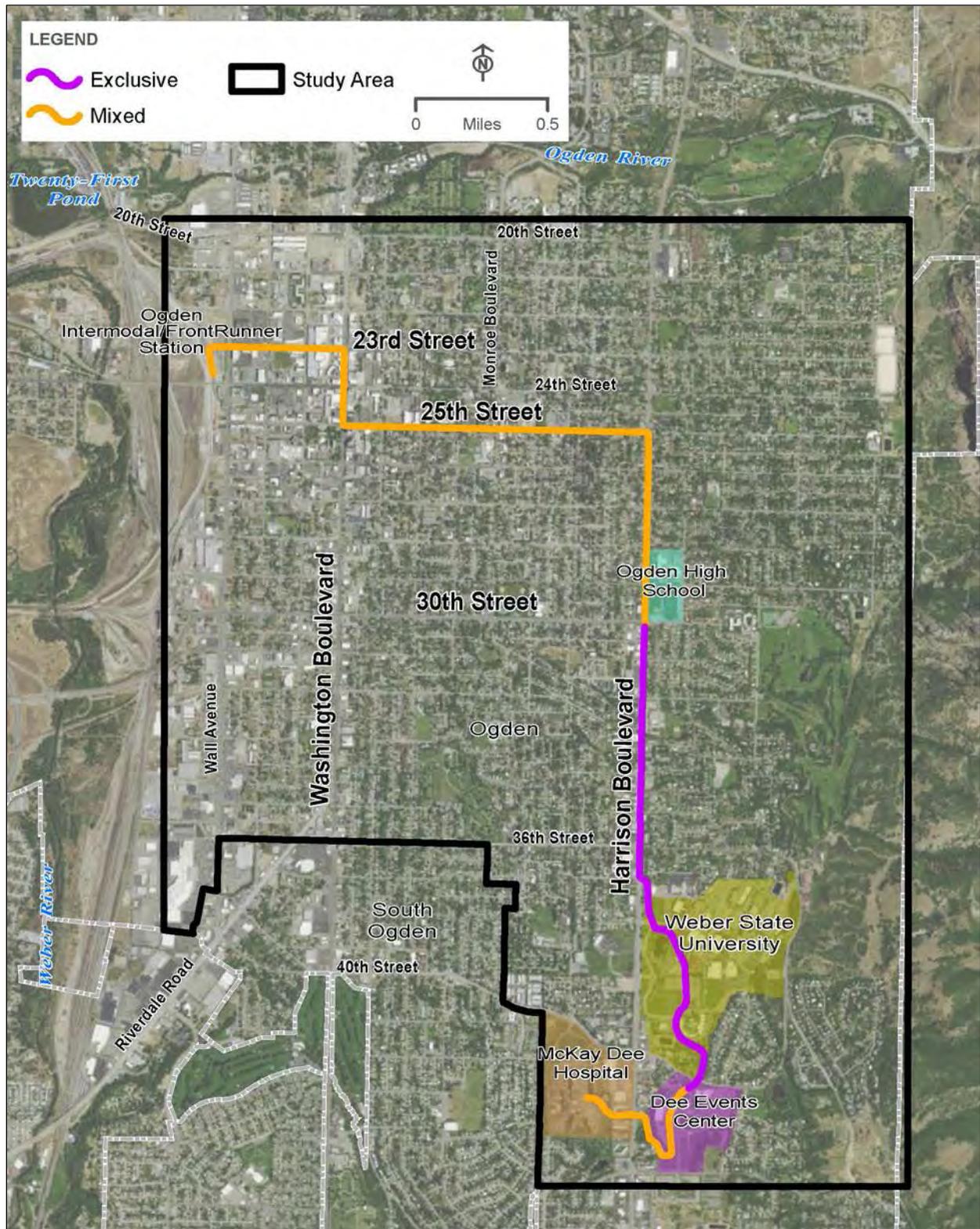
YOES = year-of-expenditure dollars

A funding strategy was conducted for 30th Street BRT as a comparison, even though the study partners had assumed that 25th Street would be the preferred alignment.

Land donation from Weber State University is not reflected in the conceptual financial strategy analysis, but could be used as a local match.

* A range of costs and shortfalls is given for 25th Street BRT to account for additional right-of-way and construction costs depending on the exact location where exclusive travel lanes are implemented on Harrison Boulevard.

Figure 8. Locally Preferred Alternative



The LPA would be about 5.3 miles long (10.6 miles round trip), with a western terminus at the Ogden Intermodal Transit Center. From there, the BRT would head east on 23rd Street to Washington Boulevard, south on Washington Boulevard to 25th Street, east on 25th Street to Harrison Boulevard, and south on Harrison Boulevard through the Weber State University campus and then over to McKay-Dee Hospital. The BRT would loop back on the same route. The BRT would consist of articulated buses, which would provide enhanced passenger capacity compared to typical UTA buses. BRT buses are proposed to operate about every 10 to 15 minutes along the existing corridor right-of-way and in a center-running, exclusive bus-only travel lane on Harrison Boulevard (south of 30th Street) and through the university campus.

The goal will be to provide a rapid, high-quality, brand-distinguished bus service that provides the same level of service as rail transit (in terms of frequency, capacity, quality and reliability), except with greater flexibility and lower capital and operating investment costs.

9.1 Selection Process

The LPA decision was made in consultation with representatives on the TAC and PAC and was presented to the public in a variety of forums and media. The LPA selection follows over 10 years of study to develop and evaluate transit improvements in central Ogden. The study included extensive public engagement, stakeholder involvement, and one-on-one meetings. Many of the TAC representatives acknowledge that there was good information in support of either alignment or mode but believe that the 25th Street route better fits with the City's current land use and economic redevelopment initiatives and existing real estate and development market. The TAC representatives also believe that BRT would be more affordable and fundable in the near term while still attracting riders and enhancing the existing route 603 bus.

During the summer of 2015, the study team undertook a comparative evaluation of four alternatives as part of the update to the 2011 draft AA. Based on the technical analysis, funding strategy analysis, study results, and public meeting record, along with feedback provided by the TAC and the community throughout the identification and evaluation of the study alternatives, the study team evaluated the alternatives, and the TAC and PAC selected a preferred alternative for more-detailed technical analysis in the environmental documentation phase of this study.

In July 2015, UTA held a community meeting to give the public an opportunity to review the findings of the AA update and the recommended LPA and to ask the study team questions regarding the alternatives. On July 28, 2015, the Ogden City Council voted to adopt BRT on 25th Street as the LPA. Several of the Ogden City Council members acknowledged that the concept of a streetcar line was very appealing, but that Ogden City simply did not have the funding to make up the difference in cost between BRT and a streetcar system. The City Council members acknowledged that it was a matter of moving forward with a project and taking steps to ensure that the project would have the most positive impact on the community as possible versus doing nothing, and the fact that an alternative on 25th Street was ultimately selected celebrates the history and vibrancy of the community.

UTA presented the LPA selection and process to UTA's Planning and Development Committee on October 8, 2015. WFRC amended its Regional Transportation Plan to show

the LPA in October 2015. The formal public comment period for amending the Regional Transportation Plan will take place from November 9, 2015, to December 11, 2015. WFRC's Regional Growth Committee and WFRC will review all comments and make a final recommendation in January 2016. The UTA board will adopt the LPA in January 2016 after WFRC's recommendation.

9.2 Further Definition of the LPA To Be Determined during the Environmental Phase

In order for the environmental documentation for a proposed project to be prepared, the project must be defined to a level of detail that allows the project sponsor to analyze the project's expected positive and negative effects. For the Ogden/Weber State University Transit Project Study, the study team and the TAC identified many of the conceptual details of the project during the AA update process. Some other LPA-specific details will be defined during the environmental and final design processes. These details include developing more-specific environmental and engineering information, including detailed environmental mitigation plans if required; geometric alignment design; station location and design; access and operating strategies; drainage; right-of-way requirements; maintenance of traffic during construction; phasing of construction if required; and a detailed financial plan, including funding commitments.

During the environmental documentation phase of this study, the TAC expects the study team to further consider the best location on Harrison Boulevard at which to begin the exclusive travel lanes. The TAC asked that issues such as right-of-way acquisition and potential relocations, as well as traffic and safety issues, be considered. The TAC will help guide the location of exclusive travel lanes on Harrison Boulevard during the next phase of this study.

The preliminary analysis that has been conducted in support of the LPA is described below.

9.2.1 Operational Configuration

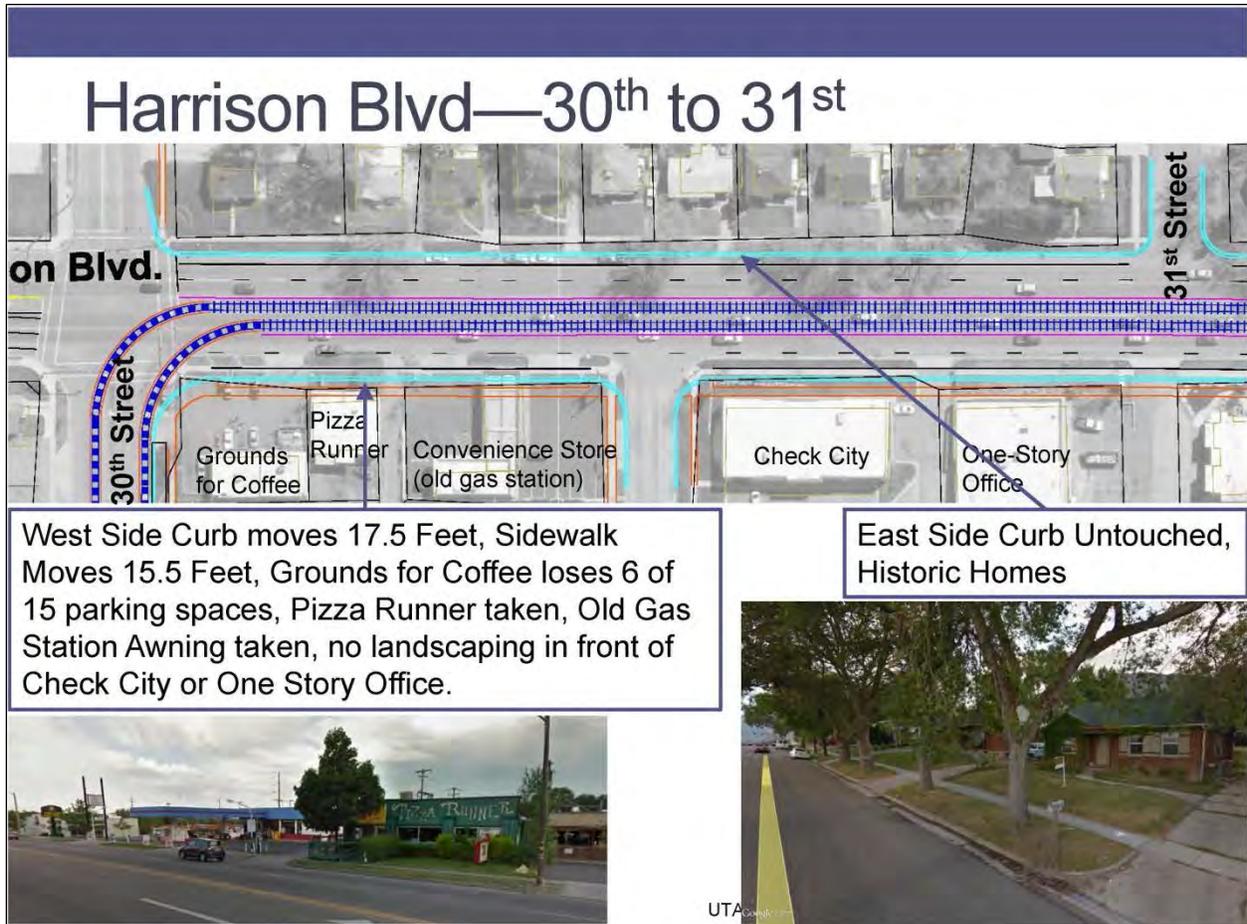
The exact locations for the exclusive bus travel lanes need to be determined. During the AA update process, the study team found the following issues.

Harrison Boulevard between 25th and 30th Streets. Based on the high-level Section 106 and Section 4(f) impacts analyses conducted during this AA update (see Section 6.1, Traffic Studies), the study team determined that the BRT alignment on Harrison Boulevard between 25th and 30th Streets must remain mixed flow.

Harrison Boulevard between 30th and 31st Streets. The right-of-way width on Harrison Boulevard is wider beginning at 30th Street, so it would be possible to widen the road to accommodate exclusive bus travel lanes without affecting Section 106- and Section 4(f)-eligible properties if Harrison Boulevard is widened to the west side to avoid the historic homes on the east side. Between 30th and 31st Streets, there could be some impacts to non-eligible properties, primarily commercial businesses, on the west side of Harrison Boulevard. The west-side curb would need to move about 17.5 feet closer to businesses, and the sidewalk would need to move about 15.5 feet closer to businesses. Grounds for Coffee could lose about six of its 15 parking spaces. In addition, the sidewalk move could encroach on the Pizza

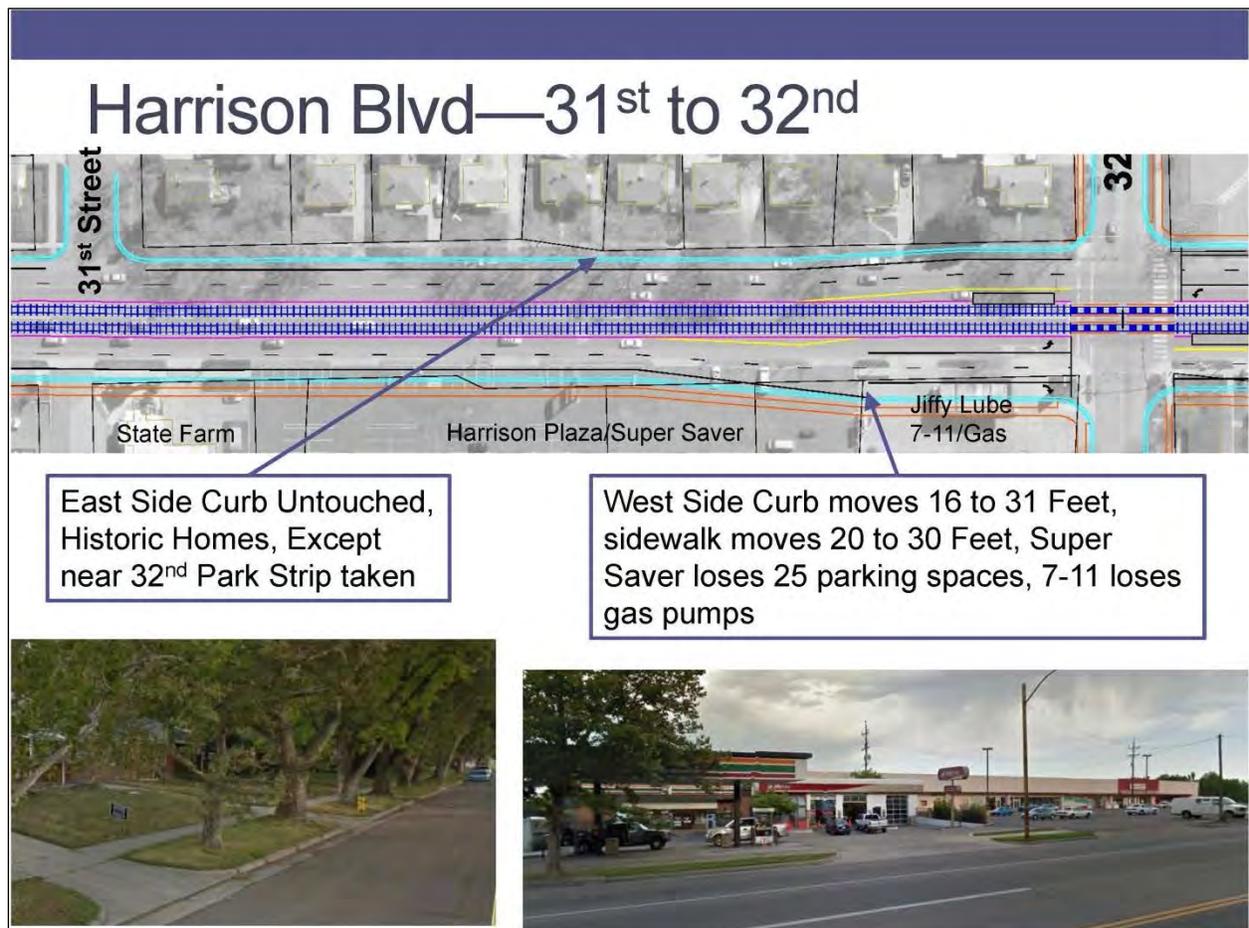
Runner building, which could require relocating the business. An old gas station awning at the USA Mini-Mart store might need to be removed, but the gas pumps are already removed (the old gas fill-up area is used for parking), so removing the awning shouldn't affect the operation of the store. In addition, the landscaping in front of Check City and another commercial/office space on the west side of Harrison Boulevard would be removed, but the historic homes and mature trees on the east side of Harrison Boulevard would remain, as shown in Figure 9.

Figure 9. Harrison Boulevard – 30th to 31st Streets



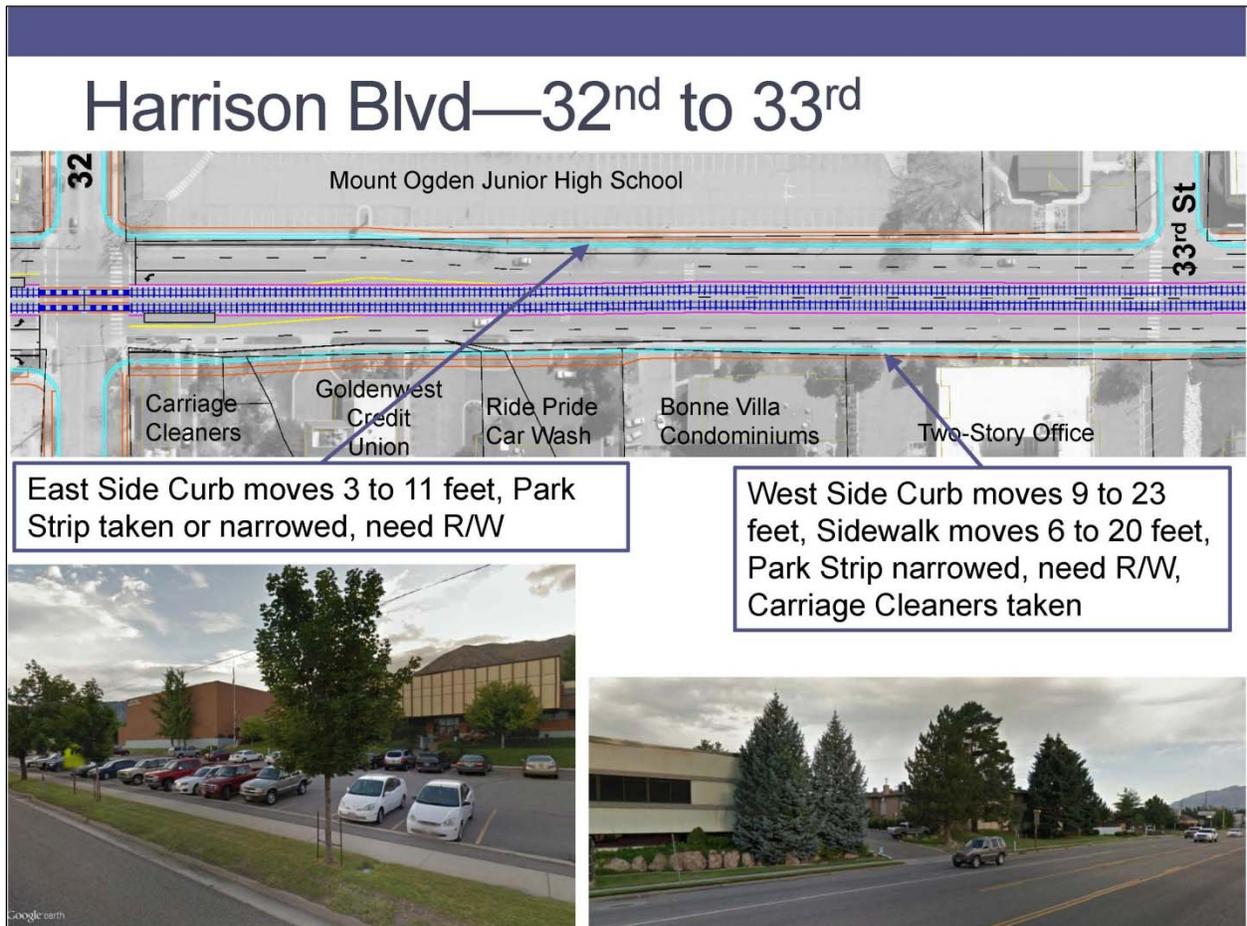
Harrison Boulevard 31st to 32nd Streets. On Harrison Boulevard between 31st and 32nd Streets, widening would continue on the west side to accommodate the exclusive bus travel lanes in the center of the road. The west-side curb would move about 16 to 31 feet to the west, and the sidewalk would move about 20 to 30 feet to the west. The Super Saver store could lose about 25 parking spaces, and the 7-Eleven could lose its gas pumps, possibly requiring total relocation of either business or both businesses. The historic homes and mature trees on the east side of Harrison Boulevard would remain untouched except near 32nd Street, where part of the park strip would be removed in order to accommodate a BRT station, as shown in Figure 10.

Figure 10. Harrison Boulevard – 31st to 32nd Streets



Harrison Boulevard 32nd to 33rd Streets. Between 32nd and 33rd Streets, right-of-way would be taken from both sides of the street. Most of the impacts would occur to the park strip, but, on the west side of Harrison Boulevard just south of the 32nd Street intersection, Carriage Cleaners could be directly impacted and could need to be relocated to accommodate the BRT station as shown in Figure 11.

Figure 11. Harrison Boulevard – 32nd to 33rd Streets



On Harrison Boulevard south of 33rd Street, minor right-of-way strip takes would be required, but no direct impacts to structures are expected, and there would no business relocations.

9.2.2 Alignment through the Weber State University Campus

Weber State University officials have been very clear about their vision for the transit alignment through their campus. They have requested that the alignment be made up almost entirely of exclusive bus travel lanes throughout the campus. For about a 1,000-foot segment near the duck pond and student union center, the officials have requested a single-track busway to avoid impacts to the iconic tiered pond and buildings in the heart of the campus. University officials have agreed to donate the land through their campus that will

accommodate the busway, a donation that will help to defray project costs and can be counted as an in-kind contribution on the Small Starts federal funding application.

During the environmental phase of the project, the study team will work closely with university officials to more closely define the alignment through the campus while adhering to all applicable state and federal regulations.

9.2.3 Utilities

In general, BRT could have minor impacts to utilities. The portion of the BRT alignment that would operate in mixed flow would be built almost completely within the existing street right-of-way. The rights-of-way also include a variety of public and private utilities. Utilities in the area of the LPA could include both underground and aerial utilities. Underground utilities typically include water, sanitary sewer facilities, storm sewer facilities, and natural gas lines. Electrical facilities are sometimes located underground. Aerial utilities typically include communication facilities that are attached to electric distribution poles or are on their own special-purpose structures, such as high-tension power lines or wireless communication towers.

By necessity, the BRT project would be designed to allow utilities to cross under or over the proposed alignment, and it would generally allow ongoing utility maintenance or improvements to occur without affecting the transit operations. Depending on the utilities and a variety of circumstances, the portion of the BRT alignment operating as exclusive bus travel lanes could require relocating or upgrading specific utilities under the area where the road would be reconstructed for the exclusive bus travel lanes. During the project development process, all utilities would be identified, and the engineering and design staff would work with the utility providers to resolve possible conflicts with existing or planned utilities for proposed BRT alignment.

9.2.4 Refined Ridership for LPA

Since the LPA was selected, WFRC has refined and started using version 8.0 of its travel demand model. To help better define the LPA, WFRC used the newest version of the travel demand model to forecast two opening-day scenarios. The first would run BRT at a frequency of 15 minutes, and the second at a frequency of 10 minutes. Table 7 compares these assumptions as well as the ridership forecasts.

Table 7. Opening Day LPA Comparison of Frequency

Characteristic	Locally Preferred Alternative – BRT on 25th Street	
	15 min all day	10 min all day
2014 daily boardings	2,600	3,100
Headway	15 min all day	10 min all day
Length of alignment	5.3 miles	5.3 miles
Number of stations	16	16

It's important to note that the forecasts in Table 3 on page 35 were derived from version 7 of WFRC's travel demand model. When those forecasts were developed, the closest year that WFRC had to an "opening-day" run was a 2016 Regional Transportation Plan phase year. When the LPA was adopted, WFRC shifted its focus toward the FTA funding process, which will require forecasts from "existing + project" conditions. With version 8.0 of the travel demand model available, the best base year WFRC has is 2014, hence the 2014 run.

Additionally, the project would replace Weber State University's Wildcat Express Shuttle service, resulting in up to an additional 3,200 riders per day on the BRT line and accruing the resulting environmental benefits.

9.2.5 Stations

The LPA includes up to 16 new brand-identified station locations that were determined during the 2011 draft AA process. Because the frequency of stops needs to be balanced with travel time, the stop locations and stop spacing were vetted during this AA process with the study partners and the public. The study team agreed that all 16 stops would not likely be constructed for opening day, and some might be designated as future stop locations. Exact station locations will be further analyzed during the environmental documentation phase of this study and would be based on land-use decisions, additional ridership information, and a determination of the locations of exclusive travel lanes on Harrison Boulevard. Most stops could be about 0.25 mile apart, though several stops on Harrison Boulevard would be farther apart due to the spacing of major destinations. Because the number of stations and the distance between them affects both the number of riders a system will attract and the travel time of transit vehicles on the route, these factors will be more closely considered during the environmental documentation phase of this project. Possible station locations are shown in Table 8.

The new stations could 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. Pedestrian and bicycle access could be enhanced through provisions that could include contiguous sidewalk and bicycle lanes where appropriate, and removal or mitigation of barriers that prohibit pedestrian and bicycle traffic from accessing surrounding station areas.

Table 8. Possible Station Locations

Station Number	Station Location	Distance from Previous Stop in Miles
1	Ogden Intermodal Transit Center and FrontRunner Station	Not applicable
2	23rd Street and Lincoln Avenue	0.21
3	23rd Street and Washington Boulevard	0.27
4	25th Street and Washington Boulevard	0.30
5	25th Street and Jefferson Avenue	0.29
6	25th Street and Monroe Street	0.29
7	25th Street and Jackson Avenue	0.27
8	25th Street and Harrison Boulevard	0.28
9	Harrison Boulevard and 28th Street	0.45
10	Harrison Boulevard and 30th Street	0.26
11	Harrison Boulevard and 32nd Street	0.30
12	Harrison Boulevard and 36th Street	0.58
13	Dixon Drive and 3850 South	0.29
14	41st Street	0.40
15	Dee Events Center	0.46
16	McKay-Dee Hospital	0.50

Additional stops could be included on the Weber State University campus, including at the Browning Center.

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