Draper City
Transit Alternatives Study
Final Report

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Prepared for:
Draper City and the
Utah Transit Authority

Prepared by:
Parsons Brinckerhoff Quade & Douglas, Inc.

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CHAPTER 1 – INTRODUCTION AND BACKGROUND

1.1 Introduction

Draper City, in cooperation with the Utah Transit Authority (UTA), is considering extending a higher-level public transit service through Draper City to the south end of Salt Lake County. The purpose of this Transit Alternatives Study is to evaluate and document the potential transit alignment and mode alternatives that address this potential extension and recommend an alternative and implementation strategy to continue the development of a locally preferred alternative.

The Draper Transit Alternatives Study (DTAS) identifies a recommended Locally Preferred Alternative (LPA), which was selected from a set of potential alternatives under consideration. If adopted, the LPA will then be carried forth into further analysis in subsequent stage(s) of project development. The process of selecting the LPA included a technical evaluation of transportation performance characteristics, an assessment of environmental considerations and an engineering assessment of capital investment considerations. The findings generated from these activities are combined and will result in the development of project costs. The selection of the LPA also included consideration of community input regarding its desires and concerns..

This report consists of seven chapters. This chapter describes the study area, reviews study goals and objectives, and provides an overview of the UTA planning process.

1.2 Description of the Study Area and Corridor

The study area is located approximately 18 miles south of Salt Lake City in the southeastern part of Salt Lake County and includes portions of Sandy City, as well as Draper City. Specifically, the DTAS study area and corridor is approximately 8.6 square miles beginning at the 10000 South TRAX station in Sandy City on the north and ending at the 14600 South Interchange with Interstate -15 (I-15) in Draper City on the south. The I-15 corridor is the western border of the study area and the existing UTA-owned rail right-of-way provides the eastern boundary. Figure 1-1 on the following page illustrates the study area. The transit alternatives evaluated and presented in this document are located within these defined limits of this study area.

1.3 Study Goals and Objectives

Table 1-1 presented on pages 1-3 and 1-4 identifies the Draper Transit Alternatives Study goals and objectives developed for the study in cooperation with Draper City, Utah Transit Authority (UTA), and Wasatch Front Regional Council (WFRC) staff.

The five goals identified in Table 1-1 are related to the following categories: mobility, growth patterns, cost-effectiveness, the environment (natural and man-made), and land use consistent with Draper City's vision for the future. Each goal has an associated list of objectives provide guidance for attaining each goal, represent successive levels of achievement in movement toward a goal, and reflect the expected results achieved by a stated point in time (the planning horizon for the project). The goals and objectives were used as the basis of evaluating the final alternatives; the results of this evaluation are presented in Tables 6-6 and 7-1 in subsequent chapters.

FIGURE 1-1: Study Area

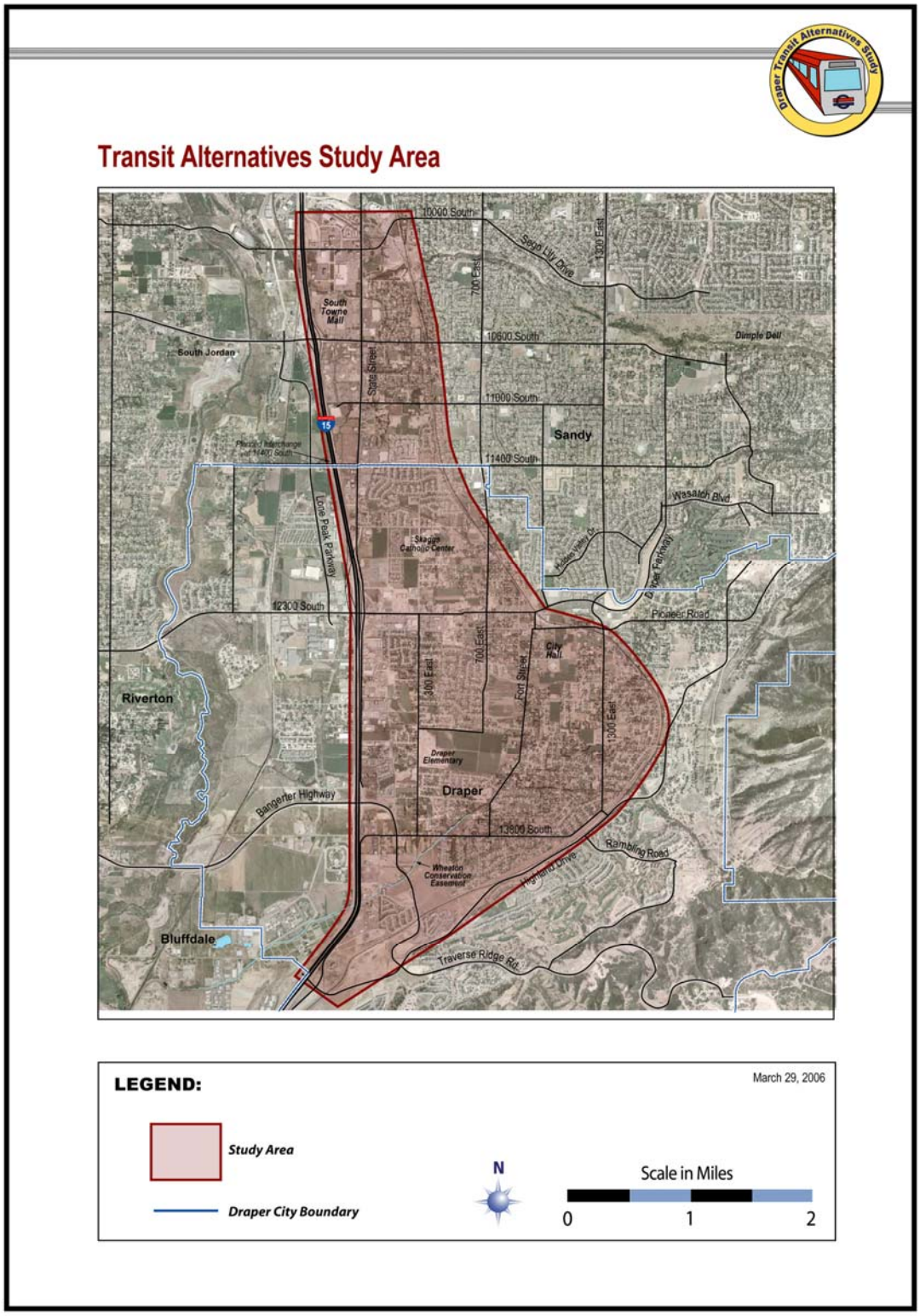


TABLE 1-1: GOALS AND OBJECTIVES

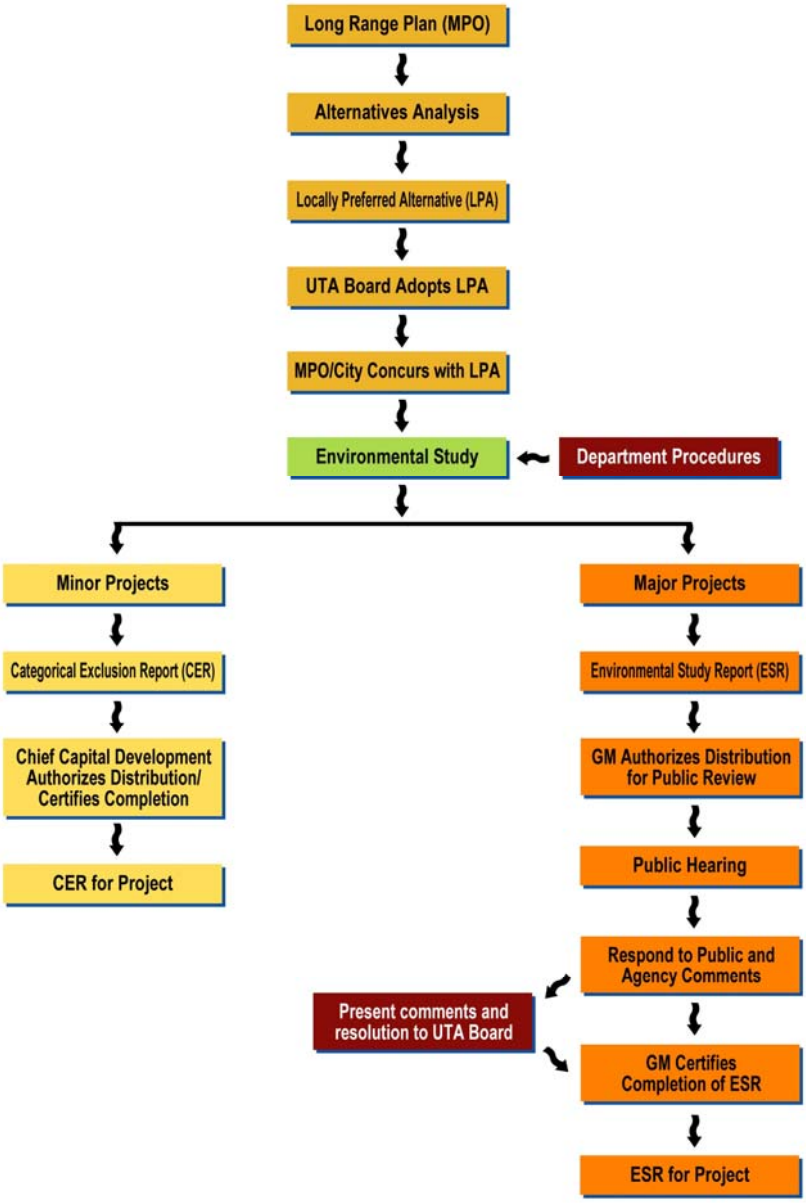
Category	Goal	Objective
Mobility and Access	**Improve Corridor Mobility and Access to Activity Centers**	Develop a coordinated transportation system that is safe, efficient, and provides a balanced set of travel alternatives within the Draper TAS study area.
		Enhance mobility for commuters, shoppers and other travelers by reducing transit travel times in the corridor and establishing connections between new transit service in the corridor and regional transit services.
		Increase total daily transit trips in the study area and increase the percentage of all weekday travel by transit (mode split).
		Reduce vehicle trips and reduce vehicle hours of delay.
		Enhance transit safety, comfort, convenience, and reliability.
Development and Study Area Growth	**Encourage Patterns of Smart Growth and Economic Development**	Ensure compatibility between land use policies and transportation policies in order to minimize the demand for and amount of travel using automobiles in the Draper TAS study area, while promoting economic development.
		Promote compact, multi-use development within ½-mile of transit stations and optimize land uses along the transit way. Transit systems in the study area will provide direct access to major activity and employment centers wherever possible.
		Utilize tools (e.g., regulatory and financial incentives) designed to support locally adopted land use policies in the study area (based on an evaluation of future housing units, population, and employment).
Cost Effectiveness	**Find a Cost-Effective Transportation Solution**	Develop a cost-effective transportation system that makes the most efficient use of financial resources identified for the study area.
		Develop cost-effective solutions for transit service that will maximize operating efficiency while minimizing capital and operating costs. This will be achieved by proposing a transportation system which seeks to maximize the travel time benefits as well.

Environmental	**Avoid, Minimize and Mitigate Adverse Impacts to the Natural and Built Environments**	Avoid, minimize, and mitigate potential community and environmental impacts of proposed transportation improvements in the Draper TAS study area.
		Minimize impacts on natural and built environment including the following categories: historic resources, displacement of homes and businesses, and necessary partial property takings. Avoid disproportionate impacts on low income and minority population groups, minimize disruption to traffic operations and diminishment of safety standards, avoid conflicts with utilities, and minimize short-term construction impacts.
		Maximize benefits to the community by developing a transit system that will be a sustainable asset to residents of the community and enhance and/or sustain quality of life over time.
Land Use and City Vision	**Ensure Consistency with Locally Adopted Growth, Land Use and Development Plans**	Make sure the study effort is consistent with past and current planning efforts.
		Build on past and current planning efforts: • Draper City General Plan Master Transportation Plan (April 2003)Final Report Salt Lake County Transit Corridors Analysis (December 2000) • Sandy City General Plan (February 1998) • Wasatch Front Regional Council 2030 Urban Area Long Range Transportation Plan Update (December 2003) • Wasatch Front Growth Principles and Objectives for Transportation Planning.
		Obtain and consider community input through public outreach and involvement of the community in the study process.

1.4 UTA Planning Process

There are typically two types of funding utilized along the Wasatch Front for constructing major transit investments. These funding sources are "federal" and "local." Depending upon the project, one or both of these sources are used. For the purposes of the DTAS, it is assumed that non-Federal funds alone would be used to construct the Locally Preferred Alternative (LPA). Chapter 4 on funding discusses this assumption and results in more detail. Depending upon the type of funding envisioned to construct a major transit investment, different planning and approval processes are followed. Figure 1-2 illustrates the "UTA Non-Federal Project Environmental Process".

Figure 1-2: The UTA Non-Federal Project Environmental Process



CHAPTER 2 – NEED AND PURPOSE

2.1 Introduction

Chapter 2 describes the need and purpose of the project which is based, in part, on the existing and projected population and employment for the study area. The projection horizon year is 2030 and projections are based on county wide totals produced by the State of Utah, Governor's Office of Planning and Budget. The existing transportation system and the financially constrained Long Range Transportation Plan are also discussed in this chapter. The adopted travel demand model for the Wasatch Front uses the most currently published projections and produces data that illustrates future travel characteristics for the area, projected traffic volumes, congestion levels, and transit usage. Figure 2-1 on page 2-6 illustrates that congestion levels are anticipated to increase region wide as well as within the study area as the population along the Wasatch Front continues to grow. This chapter concludes with a discussion of the need for and purpose of the Draper Transit Alternatives Study in order to accommodate this growth and relieve increasing congestion levels.

2.1.1 Existing and Forecasted Population and Employment

The study area is located in a rapidly growing part of Salt Lake County. Future growth projections indicate that population and employment will continue to increase through 2030, the planning horizon for this study. The Utah Governor's Office of Planning and Budget reported the following observations in the Quality Growth Efficiency Tools (QGET) 2003 Baseline study about the Greater Wasatch Area:

- The annual rate of population increase is approximately twice the national average.
- Natural increase is projected to account for 80% of the new growth.
- The Greater Wasatch Area will average approximately 42,300 new residents a year between now and 2030. These new residents will require government services and infrastructure. This growth will also increase the levels of congestion and place tremendous pressures on open space, farmlands, and air quality.
- Utah's economy is projected to continue to grow more rapidly than that of the nation and its industrial structure is assumed to continue to diversify.

Table 2-1 on the next page presents the forecasted population growth for Sandy City and Draper City. As shown, Draper City is projected to increase in population by 59% over 2005 levels. Sandy City is projected to increase in population by 22 percent. By comparison, Salt Lake County is projected to increase in population between 2005 and 2030 by 48 percent.

TABLE 2-1: SANDY CITY AND DRAPER CITY POPULATION PROJECTIONS

Jurisdiction	Population						
	2002	2005	2010	2020	2030	Growth 2005 to 2030	% Growth 2005 to 2030
Sandy City	93,399	99,967	108,000	119,292	122,357	22,390	22%
Draper City	28,555	32,185	40,719	47,208	51,309	19,124	59%

Source: Wasatch Front Region Small Area Socioeconomic Projections: 2002-2030 Technical Report #42, October 2003.

Table 2-2 presents the forecasted employment growth for Sandy City and Draper City. Employment in Sandy City is projected to increase between 2005 and 2030 by 31% and by 52% in Draper City. By comparison, Salt Lake County is projected to increase in population between 2005 and 2030 by 44 percent.

TABLE 2-2: SANDY CITY AND DRAPER CITY EMPLOYMENT PROJECTIONS

Jurisdiction	Employment						
	2002	2005	2010	2020	2030	Growth 2005 to 2030	% Growth 2005 to 2030
Sandy City	29,761	32,162	36,907	39,115	42,247	10,085	31%
Draper City	11,549	13,416	15,842	18,270	20,449	7,033	52%

Source: Wasatch Front Region Small Area Socioeconomic Projections: 2002-2030 Technical Report #42, October 2003.

2.1.2 Existing Demographics

Table 2-3 on the next page presents a summary of the population characteristics based on 2000 US Census data for Draper and Sandy and compared to Salt Lake County. As shown in the table, Draper and Sandy have similar age and race/ethnic profiles, while the county has a slightly older and more diverse population in comparison.

In general, conclusions reached based on the Year 2000 Census data indicate that Draper City residents are less diverse, more middle-aged with larger household size, and have higher incomes than Salt Lake County residents as a whole. Sandy City also demonstrates these same characteristics when compared to Salt Lake County, but to a lesser degree than Draper City.

2.1.3 Existing and Future Land Use

Land uses within the study area are defined in the Draper City and Sandy City Zoning and Land Use maps. Historically, these communities were characterized as “rural” communities, with large areas of agricultural and undeveloped lands. Beginning in the 1980’s, the land uses changed significantly with residential areas developing on former farm land and orchards. With residential growth came the need for streets and other infrastructure. Retail and commercial employment areas developed along the major roadways throughout the study area. Some agricultural lands remain but the parcels are small in size and are slated for more residential development. As these patterns evolve, the area becomes more and more of an extension of the Salt Lake City Metropolitan region. Draper City runs along the

east bench foothills of the Wasatch Front. Much of the remaining open space on the steep hillside portions of the study area are generally too unstable for any kind of construction.

TABLE 2-3: STUDY AREA DEMOGRAPHICS (2000 US CENSUS)

Subject	Draper City	Sandy City	Salt Lake County
Total Population	**25,220**	**88,418**	**898,387**
Age			
Under 20 years	34.7%	38.2%	34.9%
20 to 64 years	61.6%	56.6%	57.0%
65 years and over	3.7%	5.2%	8.1%
Race			
White	93.0%	95.0%	88.6%
Black/African American	1.8%	0.7%	1.4%
American Indian & Alaska Native	1.3%	0.6%	1.3%
Asian	1.9%	2.8%	3.2%
Native Hawaiian & Other Pacific Islander	0.7%	0.6%	1.6%
Other	3.5%	2.1%	6.6%
Hispanic or Latino Origin			
Hispanic or Latino (of any race)	5.8%	4.4%	11.9%
Not Hispanic or Latino	94.2%	95.6%	88.1%
Average Household Size (People/HH)	3.4	3.4	3.0
Median Household Income (1999 $)	$72,341	$66,458	$48,373

Source: US Census 2000

Table 2-4 illustrates the allocation of land uses in Draper City. The residential development pattern for the last 25 years in both Sandy City and Draper City is idominated by uses consisting of mostly lower density single family developments with clusters of high density residential. These clusters include apartments and town-homes located in areas throughout the City and within Planned Unit Developments (PUDs).

TABLE 2-4:
DRAPER CITY LAND USE DISTRIBUTIONS

Land Use Category	% of Total City
Residential	68%
Open Space	10%
Commercial	8%
Cultural/Institutional	3%
Employment/Manufacturing	5%
Office	1%
Other – Streets & Easements, Etc.	5%

Source: Draper City General Plan, 2003

Within the study area in Draper, between 12300 South and Highland Drive, land uses are mostly low density residential. Large lot estates and expensive housing are characteristic of the developments along 1300 East and areas further east to the mountain. South of Highland Drive in the study area there is a combination of medium density single family housing and multi-family housing (12 units/acre). Most of the commercial areas are located and developed along major arterials and/or near interchanges with I-15.

In Sandy, large commercial areas are located along I-15, State Street, and 11400 South corridors. Commercial uses along these corridors include the Utah Auto Mall, South Towne Business Park, and Sandy's Civic Center. In Draper City, commercial land uses are located along major arterials such as 12300 South, State Street, 700 East, and along the I-15 corridor. The largest commercial east/west corridor in Draper is along the 12300 South..

Future land uses are generally consistent with existing zoning; however, a number of "Growth Areas" have been identified in both Sandy City and Draper City where more intensive, mixed-use and transit supportive land uses are planned.

As an example, the area adjacent to the Sandy TRAX station at 10000 South is planned as mixed use development with transit supportive land uses. Other mixed-use areas in Sandy City are located near 10200 South, 10600 South, and 1300 East. These areas are zoned for higher density residential mixed with office and commercial space.

Growth Areas identified for Draper City are also future locations of concentrated higher density mixed used developments. Draper City has planned a Town Center that encompasses the Intermountain Farmers Association property and City Hall at approximately 12400 South and 1100 East. This Town Center area is master planned for neighborhood commercial and retail development that will emphasize walk-ability and easy access to transit potentially located on the UTA rail right-of-way. This area is of significant economic interest to the city and local community. The City envisions transit playing an important role in the development of the Town Center area. Other "Growth Areas" are located near 11400 South, 12300 South, and at 14600 South. These are locations of concentrated higher density mixed-use developments.

South Mountain and Traverse Ridge developments are large PUD's located further south in the study area. A mixture of multi-family residential, low-density residential, and commercial space is clustered in locations throughout the developments. A large commercial area is located adjacent to the UTA rail right-of-way. The South Pointe master plan area is also located at the south end of the project. This area has multi-family and single family developments.

Commercial land uses proposals continued in Draper City for the area adjacent to I-15 and east of State Street. Draper City and Sorenson Development recently broke ground on a $150 million, 600,000 square foot Class "A" office campus located at 14600 South and Highland Drive. Approximately 3,000 employees are expected to be working on the campus at build out. There will also be some retail component to the campus in order to supplement the large employment base. In addition, commercial land uses would be maintained along 12300 South. The most significant change between existing and future land uses is the creation of designated "Growth Areas" along the corridor.

2.2 Transportation Facilities and Services in the Corridor

Existing transportation facilities and services in Draper City include the I-15 freeway, arterial streets, public transit provided by UTA, and non-motorized (bicycle, pedestrian and equestrian) facilities.

I-15 is the primary highway facility located near the project corridor. It is a major north-south freeway located parallel to the Wasatch Front that extends from the coast of California to the Canadian border. I-15 is a major freight route that has important economic implications for the Western United States and has been designated part of the CANAMEX Freight Corridor which facilitates the shipments of freight between Mexico and Canada.

The Wasatch Front Regional Council's (WFRC) long range transportation plan indicates that by the year 2020 the I-15 Corridor is projected to operate somewhere between 70 to 100 percent over capacity during peak hours. WFRC also projects that the major north-south arterials (State Street, 700 East and 1300 East) and the major east-west arterials (14600 South, 12300 South, 11800 South, 11400 South, and 10600 South) will alsol be heavily congested. One of the most congested locations in the study area is 12300 South. Figure 2-1 on page 2-6 shows estimated traffic volumes and congestion levels for 2001 and 2030. Transportation network improvements proposed by WFRC will relieve congestion in localized areas but overall congestion will not change substantially without adding significant new roadway and transit facilities. Major new roadway facilities in the Draper area are a challenge to develop because of existing development and environmental constraints.

UTA currently operates one transit route in Draper. Route 346 Fast Bus – Draper Central runs from Highland Drive and 200 East to Downtown Salt Lake City. The route follows Highland Drive, 1300 East, 1000 East, and 700 East to 9000 South; then enters and remains on I-15 to downtown. There are two (2) AM peak hour trips and two (2) PM Peak hour trips.

Light Rail Service is currently provided between downtown Salt Lake City and the 10000 South TRAX station in Sandy City.

Key regional trails in Draper City include the Bonneville Shoreline Trail, the Porter Rockwell Trail, and the Jordan River Parkway. In addition, the Corner Canyon trail system is an extensive network of multi-use trails in the Draper foothills (Draper City Transportation Master Plan, 2003).

2.3 Travel Demand

The projected increase in population and development in the study area is anticipated to worsen traffic congestion on I-15 and roadways in Draper and Sandy by 2030. Figure 2-1 shows average daily traffic volumes and PM peak levels of congestion for 2001 compared to 2030. As shown in the figure, daily traffic volumes on I-15 are anticipated to more than double along a majority of segments of the freeway within the study area. Daily traffic volumes would also increase dramatically on major east-west roadways connecting to I-15.

Congestion levels are anticipated to worsen on roadways throughout the study area contributing to increased traffic delays and travel times. Severe congestion (in which traffic volumes would be at or greater than available capacity) is expected to occur during PM peak periods on I-15, State Street, 300 East, 700 East, 1300 East, Highland Drive, 9800 South, 10600 South, 11000 South, Pioneer Road, Bangerter Highway, and 13800 South.

Figure 2-2 on page 2-7 illustrates the projected Year 2030 trip-making patterns for the region. Sub-area 1 on the figure is the Draper/Sandy/South Salt Lake County area. As illustrated in Figure 2-2, approximately 65% of daily trips are forecasted to occur to and/or from north and central Salt Lake County. An additional 27% of daily trips are anticipated to be internal to sub-area 1 and 4% or less are forecasted to come to and/or from the south.

FIGURE 2-1: DRAPER AREA TRAFFIC VOLUMES AND CONGESTION LEVELS: YEAR 2001 AND YEAR 2030

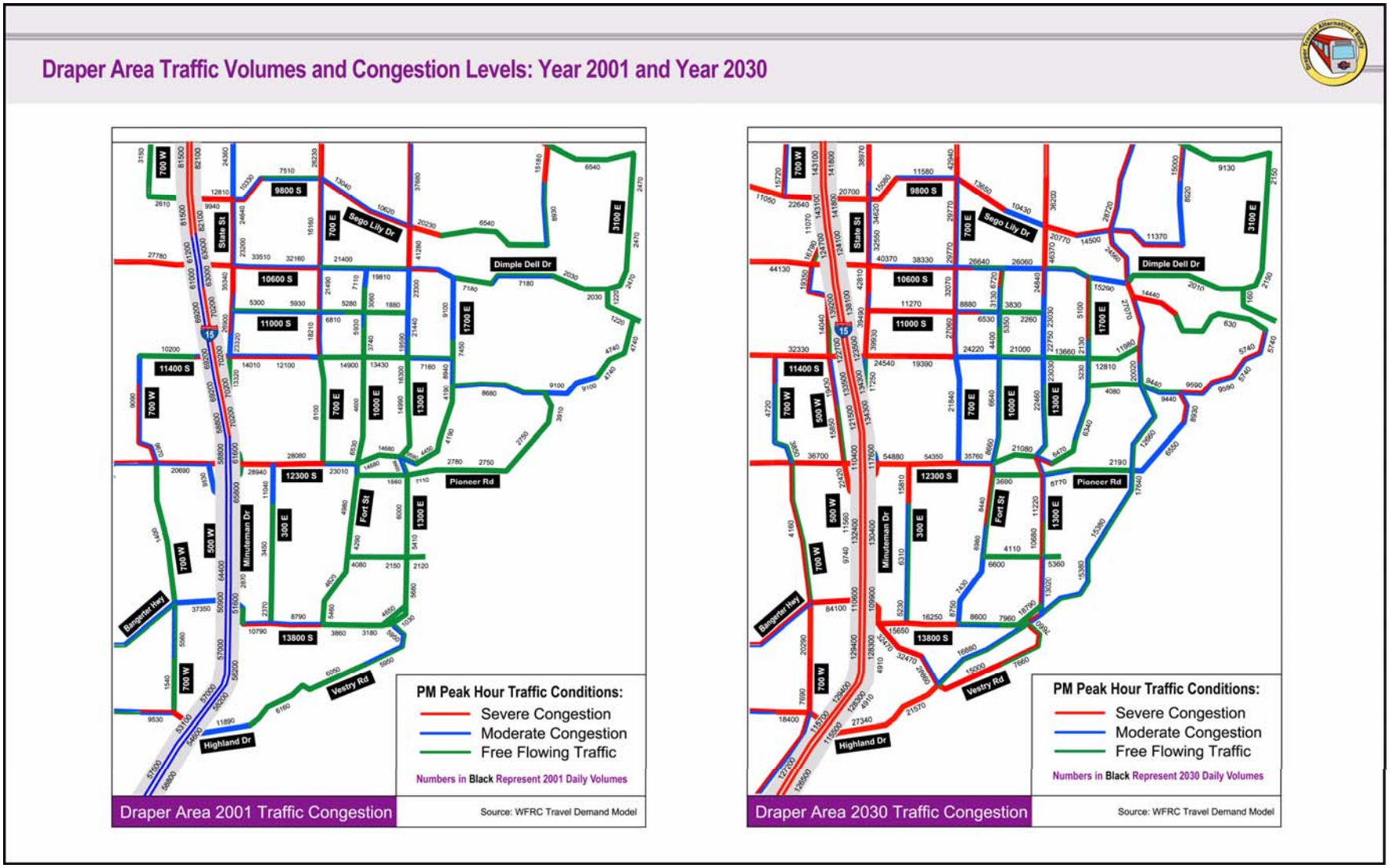
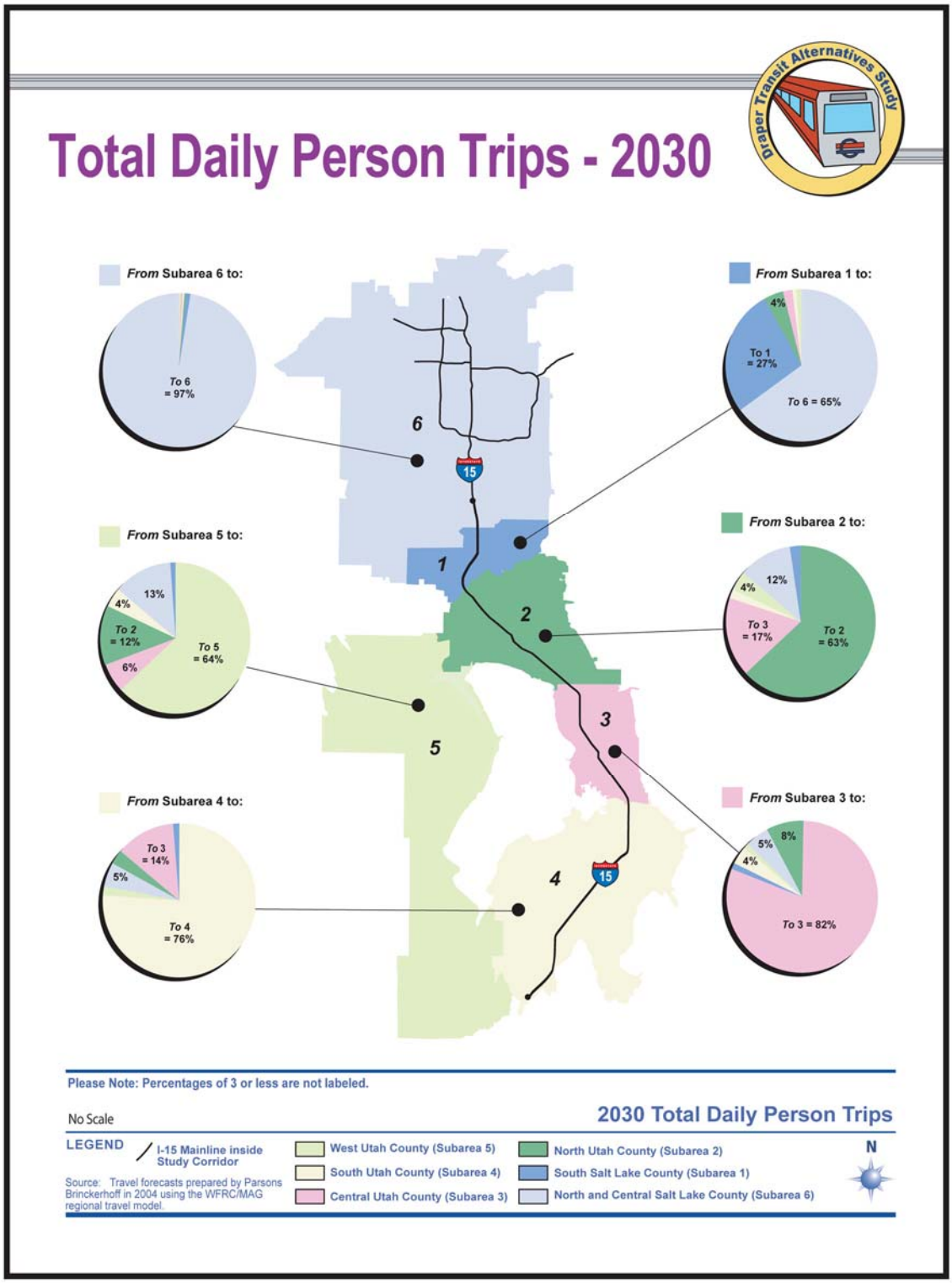


FIGURE 2-2: REGIONAL TRIP DISTRIBUTION - 2030



2.4 Need and Purpose for Transportation Improvements

Extending public transit through Draper City is needed in order to maintain transportation mobility and meet the long-term travel needs of the region as discussed in WFRC's 2030 Long Range Transit Plan (LRTP). Unacceptable levels of congestion and traveler delays on the existing roadway network are projected due to increasing population and employment in Draper and Salt Lake County's southern end and increasing freight travel on Interstate 15 As illustrated in Figure 2-2, the study area is a net "producer" of trips, which simply means that there is more population than employment within the study area. This finding is consistent with development patterns along the Wasatch Front. The need for transportation improvements results from this combination of growth and continued focus on travel to/from the north in the region.

WFRC recommends a multimodal approach to resolving transportation issues n response to these projections and addresses solutions in the LRTP. The LRTP includes consideration and implementation of Light Rail Transit (LRT) extensions to improve north-south mobility along the Wasatch Front.

The WFRC has recommended that Light Rail Transit (LRT) be built to connect Draper City, capture increasing ridership, improve mobility, and address transit needs for the southern Salt Lake County region. This approach would support the objective of maintaining mobility using a multi-modal approach. At the time the 2030 Long Range Transit Plan was adopted by WFRC, the proposed long-term land uses in the Draper City area projected relatively low ridership on the transit line. Subsequently, Draper City has been proactive in focusing on development of transit-supportive plans and projects with the intention of integrating land use decisions with future, higher-capacity transit improvements. Transit will help shape the creation of a Draper City downtown district. It will also integrate the higher density areas of Draper such as South Mountain and the newly approved South Pointe project to develop a genuine sense of place. Moreover, Draper City anticipates that congestion and air quality will improve as the city changes from an auto oriented community to a walkable community developed around good access to a robust public transit system.

The purpose of the proposed project is to address mobility needs within the study area through 2030, principally focusing on accommodating the travel movements to and from the north.

CHAPTER 3 – THE STUDY ALTERNATIVES

This chapter provides an overview of the alternatives that have been studied in the Draper Transit Alternatives Study (DTAS). This includes all five final alternatives that were studied, as well as how these alternatives were developed. The chapter concludes with a tabulation of the key engineering and operational issues that have been identified with each alternative.

3.1 Introduction

The DTAS study initially studied seven possible transit alignment concepts and ultimately evaluated five alternatives in detail and identified a single alternative as the preferred alternative. These five final alternatives were derived from a two-step process consisting of initially screening all of the alignment concepts and transit technologies. Based on the results of this initial screening process, the candidate alignments and technologies were then combined into five conceptual alternatives. The five conceptual alternatives were then defined in greater detail for the purposes of determining their benefits and impacts in a final screening process. Chapter 6 describes the anticipated impacts of the alternatives and Chapter 7 presents the results of the final screening and identifies the Locally Preferred Alternative (LPA) to be advanced to the next phase of project development.

The initial screening of concepts and definition of alternatives consisted of several steps. The initial set of transit alignment and vehicle technology concepts were identified based on discussions with Draper City, Utah Transit Authority (UTA) and Wasatch Front Regional Council (WFRC) staff, plus a review of the Draper City Master Transportation Plan (2003); the Sandy City General Plan Transportation Element (1998); the I-15 Corridor AA/DEIS/FEIS, Utah and Salt Lake County (ongoing); and the Wasatch Front Regional Council 2030 Long Range Plan (2003).

Study goals and objectives were identified and used to guide the development of a set of screening criteria (including engineering, environmental and cost considerations and public input). An initial set of seven alignment concepts and four modes of travel were then defined. Following this, seven different criteria ranging from community input to fatal flaws to integration with the existing TRAX system were used to screen the conceptual alignments and technologies.

The alignments and technologies that remained after this initial screening were then combined to produce a set of five (5) study alternatives (mode and alignment) that were carried forward for more detailed analysis and evaluation.

3.2 Screening of the Long List of Alternatives

The screening of initial potential alternatives (long list) consisted of defining the concepts in general terms, applying several key indicators (as presented in Table 3-1), and then screening the alignments and technologies based on certain criteria (as presented in Table 3-2). The end result of this screening process was combining the alignments and technologies into a set of discreet final alternatives for more-detailed study.

Seven possible transit alignment concepts were initially identified in the study area in collaboration with UTA, Draper City and WFRC staff. The potential alignments focused on the use of:

- State Street/ Minuteman/I-15 right-of-way exclusively;
- State Street and 300 East;

- 300 East exclusively;
- 700 East/300 East;
- Fort Street;
- 1300 East; and the
- Existing UTA railroad right-of-way (former Union Pacific Provo Industrial Lead Railroad right-of-way)

While each of these corridors is technically feasible in their ability to accommodate a major new transit investment, each corridor also has its own set of issues and potential impacts associated with such an improvement.

In addition to a number of alignment concepts, a variety of transit mode technologies were identified that could potentially utilize all or some of the seven alignments previously described. The potential technologies that could be applied in the Draper corridor area included:

- Enhanced bus transit;
- Bus rapid transit;
- Streetcar transit; and
- Light rail transit.

While these four transit technologies are candidates, they are not all applicable to all of the potential alignments. In essence, each technology serves a niche market well and serves other transit markets less efficiently. Determining the appropriate technology is a function of the travel market(s) being served and their requirements, operating speeds and carrying capacity of the technology.

Table 3-1 presents a Preliminary Alignment Screening Matrix of the various candidate corridors and technologies. The alignments are defined in terms of length and potential number of stations and the market potential of each corridor identifying residents and/or employees within a 1/4-mile “walkshed” of the potential corridors. Table 3-1 also illustrates the potential ridership and travel times for each technology and corridor. This information was developed using existing socio-economic and census data, the WFRC travel model and transportation industry standards.

TABLE 3-1: PRELIMINARY ALIGNMENT SCREENING MATRIX

Alignments/ Characteristics	Alignment 1: State Street	Alignment 2: 300 East	Alignment 3: State Street/ 300 East	Alignment 4: 700 East/ 300 East	Alignment 5: Fort Street	Alignment 6: 1300 East	Alignment 7: UTA Railroad Right-of-Way
Length of Route (miles)	6.6	7.2	7.4	7.2	7.6	7.6	8.6
Potential Number of Stations (1)	6	6	6	6	6	6	6
Demographics (2)							
Residents Living within 1/4-mile, 2001	6,800	11,300	7,100	11,700	11,800	12,400	12,600
Residents Living within 1/4-mile, 2030	9,900	14,400	9,700	14,700	15,400	17,500	17,800
Percent Change	46%	27%	37%	26%	31%	41%	41%
Employees Working within 1/4 mile, 2001	7,100	2,800	7,000	2,500	2,100	2,100	2,000
Employees Working within 1/4 mile, 2030	13,400	7,000	13,000	5,400	4,500	4,600	4,400
Percent Change	89%	150%	86%	116%	114%	119%	120%
Residents Living within 1/2-mile, 2001	14,900	21,600	16,900	24,000	24,700	25,000	25,400
Residents Living within 1/2-mile, 2030	21,400	28,300	24,100	30,500	32,400	34,900	35,800
Percent Change	44%	31%	43%	27%	31%	40%	41%
Employees Working within 1/2 mile, 2001	14,500	7,400	14,300	6,700	6,500	5,800	5,400
Employees Working within 1/2 mile, 2030	27,400	15,500	27,500	13,100	12,400	11,200	10,600
Percent Change	89%	109%	92%	96%	91%	93%	96%
Potential Ridership and Travel Times (3)							
LRT: Average Weekday Boardings (4)	5,100	Similar to Alignment #1	Similar to Alignment #1	Similar to Alignment #1	Similar to Alignment #7	Similar to Alignment #7	6,000
LRT: Travel Time from 10000 South to 14600 South (5)	13 min.	13 min.	13 min.	13 min.	13 min.	13 min.	13 min.
BRT: Average Weekday Boardings (4)	2,100	Similar to Alignment #1	Similar to Alignment #1	Similar to Alignment #1	Similar to Alignment #7	Similar to Alignment #7	3,000
BRT: Travel Time from 10000 South to 14600 South (5)	13 min.	13 min.	13 min.	13 min.	13 min.	13 min.	13 min.
Modern Streetcar: Average Weekday Boardings	Ridership capacity is greater than that of a BRT vehicle, but less than that of an LRT vehicle						
Modern Streetcar: Travel Time from 10000 South to 14600 South	Travel time would be longer than for LRT and BRT, given lower maximum speed						
Project Costs (2006$)							
LRT Construction (6)	Costs will range between $165 million and $350 million						
BRT Construction (7)	Costs will range between $66 million and $172 million						
Modern Streetcar Construction	Costs will be similar to LRT, but vehicle costs are less than for LRT vehicles						

(1) Stations would be generally located in the vicinity of 11400 South, 11800 South, 12300 South, 1300 East at Highland Drive, South Mountain at Highland Drive and 14600 South.

(2) Demographic data are based on Traffic Analysis Zones (TAZs) provided by Wasatch Front Regional Council, 2006.

(3) Preliminary ridership and travel times for screening purposes. Final ridership and travel times would be based on operating plans developed for the study alternatives.

(4) Weekday boardings include all trips so that one round trip is equal to two boardings.

(5) Travel speeds for LRT and BRT assumed to be the same: 29 mph and 37 mph respectively for the State Street and UTA Railroad Right-of-Way alignments, assuming semi-exclusive or exclusive right-c

(6) LRT construction costs to range between $25 million and $40 million/mi. based on design and engineering, needed right-of-way, vehicles, construction and environmental mitigation.

(7) BRT construction costs to range between $10 million and $20 million/mi. based on design and engineering, needed right-of-way, vehicles, construction and environmental mitigation.

Once each alignment and technology was conceptually defined for the DTAS corridor, the screening process undertook a more-detailed assessment of each corridor and technology including a "windshield" survey of environmental conditions and potential engineering issues, an assessment of potential operational issues, preparation of preliminary travel demand forecasts and obtaining community input. These factors were then balanced with cost and funding availability, community desires as expressed in adopted city transportation and land use planning documents, and other screening considerations to determine the optimum corridors and technologies for serving the study area. Seven screening criteria were identified by the project team in concert with local decision-makers. These criteria are generally consistent with the goals and objectives developed for the study, but are more generalized for the purposes of screening. Table 3-2 (following page) illustrates the results of this screening effort. Following this table is a more-detailed discussion of the screening criteria and assessments (Table 3-3). And Table 3-4 identifies the significant issues with the street/rail corridor alignment concepts.

TABLE 3-2: SCREENING OF INITITAL CONCEPTS

Screening Criteria	Concept Corridor Alignments							Concept Modes			
	#1 -- State Street	#2 -- State Street/300 East	#3 -- 300 East	#4 -- 700 East	#5 – Fort Street	#6 – 1300 East	#7 – UTA Railroad Right-of-Way	Enhanced Bus	Bus Rapid Transit	Light Rail Transit	Modern / Vintage Streetcar
Community Input	High	Low	Low	Low	Low	Low	High	Med	Med	High	Low
Meet Ridership Goals	Med	Med	Med	Med	Med	Med	Med	Med	High	High	Low
Compete with Auto Travel Times	Med	Med	Med	Med	Med	Med	Med	Med	High	High	Low
Serve Existing and Future Development(s)	High	Low	Low	Low	Low	Low	High	Med	High	High	Med
Potential to Fund	Med	Med	Med	Med	Med	Med	High	High	Med	Med	Med
Potential Fatal Flaws	Med	Low	Low	Low	Low	Low	Med	Med	Med	Med	Med
Integration with TRAX	High	Med	Med	Med	Med	Med	High	Med	Med	High	Low
Overall "Score" & Assessment to Meet the Goals of the Study	This concept has identified benefits.	These concepts all scored a "Low" and the screening process suggested they should be dropped from further study.					This concept scored the best overall.	This mode scored 3rd best overall.	This mode scored 2nd best overall.	This mode scored best overall	This mode scored poorest overall.
											
Performance Rating Scale:  **Poor (Low)---------- Good (High)**											

Source: Parsons Brinckerhoff, 2006

TABLE 3-3: ASSESSMENT DETAILS APPLIED TO CANDIDATE CORRIDORS AND TECHNOLOGIES

Screening Criteria	Assessment Details Applied to Candidate Corridors and Technologies
Community Input	An important element of the screening process was the consideration of comments received during an initial public open house held on March 29, 2006. Sponsored by Draper City, UTA and the Utah Department of Transportation, approximately 75 people attended the public meeting. Although the public identified many issues to be considered during this phase of study, the key issues can be summarized below in the following general subject areas.
Alignment	While not unanimously endorsed as the preferred alignment, many of the attendees expressed support for use of the UTA ROW (former Union Pacific Provo Industrial Lead Railroad right-of-way). There was also some support for evaluating the State Street alignment. Other alignments were not supported due to the significant impacts on local neighborhoods (e.g., right-of-way, traffic, noise and visual impacts). Use of alignments that would deviate from Draper City's General Plan that identifies the UTA right-of-way (former Union Pacific Provo Industrial Lead Railroad right-of-way) was not supported.
Technology	Greatest support for deployment of light rail technology; much less support for other modes.
Community Feeling	Concerns expressed about preserving "Old Draper"; support was for the UTA ROW or State Street.
Community Impacts	Concerns expressed about potential disruption to the recreational use of the Porter-Rockwell Trail, as well as about noise, visual impacts, and safety impacts associated with the combined transit/bicycle/pedestrian/ equestrian use of the trail.
Meet Ridership Goals	Table 3-1 shows the estimated residents and employees within ¼-mile "walksheds" of potential corridors. The UTA ROW has the greatest number of residents, yet the lowest number of employees under the existing and future horizons. As a result, the UTA ROW shows the greatest ridership with State Street showing the second highest potential.
Compete with Auto Travel Times	The corridor travel time for either LRT or BRT is approximately 13 minutes from 14000 South to 10000 South at the TRAX station in Sandy. This travel time is expected to be competitive assuming a reserved right-of-way/travelway concept is used. The travel time for the Modern Streetcar and Vintage Streetcar concepts will be significantly longer than for both BRT and LRT and the automobile, given their lower maximum operating speed.
Serve Existing and Future Development(s)	The UTA ROW and State Street corridors have the greatest potential for integrating future development with a major transit investment. The other corridors have predominately established or new single family residential developments, with large lot single family and/or open space land uses as well. Assuming existing zoning, the potential is low for future development in these other corridors.
Potential to Fund	The potential to fund a major transit investment generally increases as the overall cost of the system decreases. LRT is anticipated to be the most expensive, followed by Modern Streetcar, Bus Rapid Transit (BRT) and then expanded bus is the least expensive.

Screening Criteria	Assessment Details Applied to Candidate Corridors and Technologies
Potentially Significant Issues	Overall, all the alignments, with the exception of the UTA ROW, have severe right-of-way constraints. Of these, State Street has fewer right-of-way conflicts; however, significant impacts exist from approximately Bangerter Highway to the 14600 South station location. State Street will also require overhead structures for BRT or LRT to avoid interrupting traffic operations with use of the 12300 South/Bangerter and 14600 South interchanges.
Integrate with TRAX	With the exception of the UTA ROW conceptual alignment, integration with the TRAX system was not deemed to be more or less significant of an issue for any of the concepts at this phase of analysis. The UTA ROW alignment has controlled street crossings and terminal connections to other facilities. Thus, it is relatively more cost effective and functionally easier to integrate this corridor with the TRAX system.

TABLE 3-4: IDENTIFIED SIGNIFICANT ISSUES WITH STREET ALIGNMENT CONCEPTS

Alignment Concept	Significant Issues
State Street Alignment	➢ The major crossing at 12300 South close to the existing Single Point Urban Interchange (SPUI) will require an extensive structure to avoid interrupting traffic operations; a structure may also be visually intrusive. ➢ The alignment is close to I-15 in the 12500 South area, and will require the purchase or right-of-way and relocation of existing businesses. ➢ A major crossing at Bangerter Highway close to the I-15 interchange will also require a new structure. The existing hi-density residential development in the NE quadrant will be impacted significantly. ➢ Right-of-way along this alignment south of Bangerter Highway becomes an issue as Minuteman Drive is only a two lane frontage road. ➢ Grade changes between Bangerter Highway and 14800 South are problematic for a light rail alternative.
300 East Alignment	➢ The costs and impacts associated with the need to purchase right-of-way along this alignment likely make this alignment infeasible. ➢ The existing grade extending north of the railroad corridor at 300 East is about 6% to 7% for the first 2,000 feet. Approaching the railroad directly from the north is not feasible without special grade exceptions. Swinging the alignment further to the east around 13800 South and then back to the west as you approach the railroad corridor makes the grades feasible. However, this option is only possible if land in the area remains vacant. ➢ The alignment conflicts with the Wheaton Conservation Easement at the southern end of the corridor.

Alignment Concept	Significant Issues
State Street/300 East Alignment	➢ The existing grade extending north of the railroad corridor at 300 East is about 6% to 7% for the first 2,000 feet. Approaching the railroad directly from the north is not feasible without special grade exceptions. ➢ The alignment conflicts with the Wheaton Conservation Easement at the southern end of the corridor.
700 East/300 East Alignment	➢ Same set of issues as listed for 300 East Alignment
Fort Street/300 East Alignment	➢ Same set of issues as listed for 300 East Alignment.
1300 East Alignment	➢ The costs and impacts associated with the need to purchase right-of-way along this alignment likely make this alignment infeasible. ➢ The grades in this area are under 6% when approaching from the north. If a retaining wall and structure are necessary, they will extend 600 feet from the rail corridor and block street access and residential access to 1300 East. It may be possible to avoid a structure along this alignment by allowing an at-grade crossing at Waynes World Drive. And having the LRT continue close to Waynes World Drive on the south side while running toward the railroad corridor and eventually joining the railroad corridor.
UTA Railroad Right-of-Way (former Union Pacific Provo Industrial Right-of-Way) Alignment	➢ Right-of-way extends from 100 south to 146 south (and beyond) with both at-grade crossings (controlled and uncontrolled) and grade separated crossings. ➢ Existing uses in the corridor include a multi-purpose recreational trail. ➢ Adjacent land uses vary from open space to low-density housing to higher-density mixed-use developments. Visual concerns are the only identified environmental issue; no significant engineering issues have been identified.

3.3 Combining Corridors and Modes into Discreet Alternatives

The screening process and the community input received resulted in the identification of two corridors and two modes of transit as having the greatest potential to serve and be accepted by the community. These corridors and modes were combined into a set of four (4) discrete "build" alternatives for more detailed study. In addition to the four "build" alternatives, a No-Build Alternative, which serves as a basis for comparison (if no project is built in the DTAS corridor) was also evaluated.

Two corridor concept alignments scored well and were carried forward. These are the State Street and the UTA Railroad Right-of-Way alignments. For these corridors and based on the screening results, the modes of bus rapid transit (BRT) and light rail transit (LRT) were carried forward for further study.

The following section describes the final five alternatives that were studied further in the next phase of study.

3.4 Description of Alternatives Evaluated

Based on the screening process and results, five final alternatives were carried forward for more detailed study. These alternatives are described in the following pages. Figure 3-1, Draper City Transit Alternatives Advanced for Further Study, illustrates the corridor alternatives and approximate station locations that were studied in more detail.

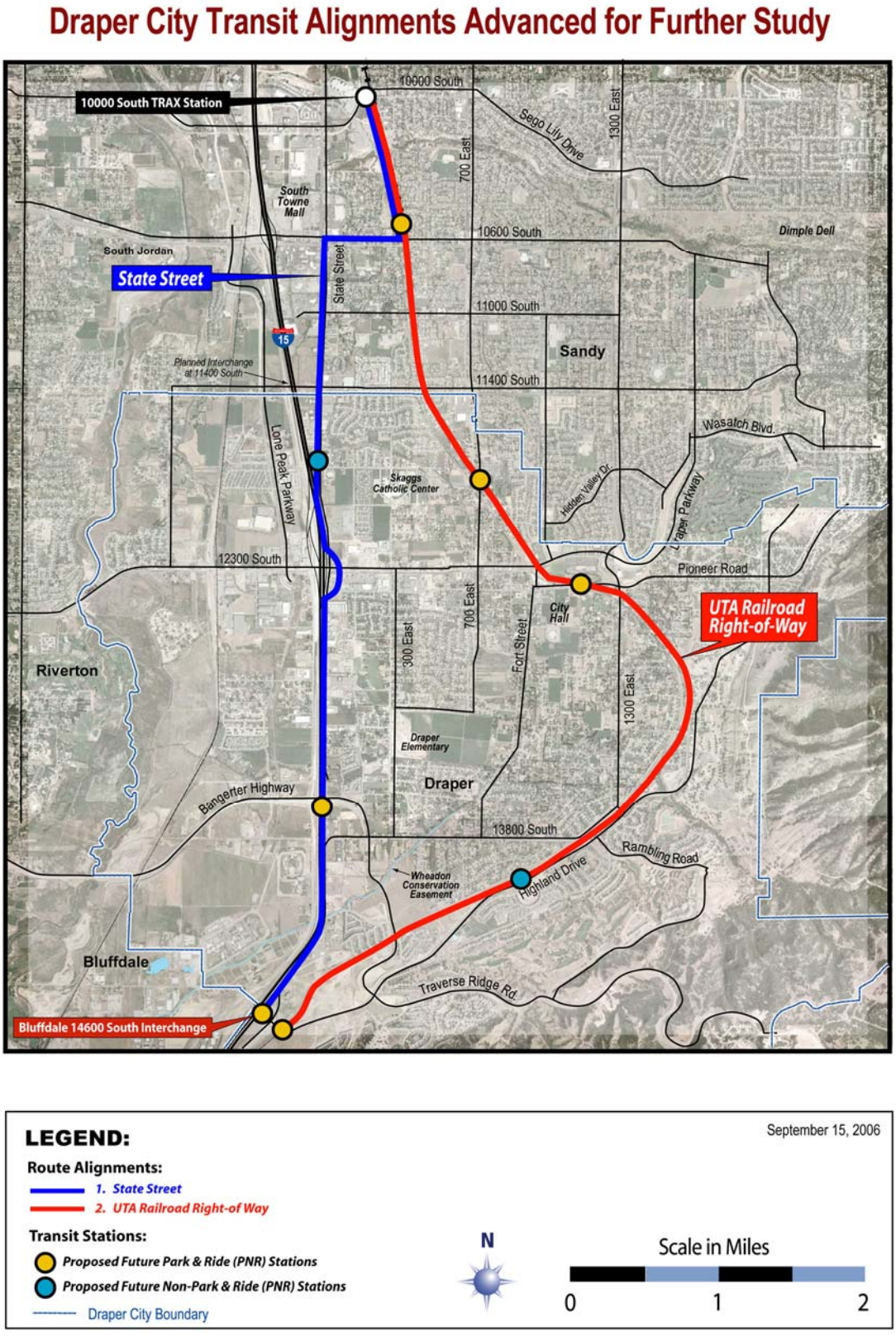
3.4.1 Alternative 1: No-Build

This alternative incorporates the existing corridor transportation system and projects that are currently under construction or included in the financially constrained Wasatch Front Regional Council 2030 Urban Area Long Range Transportation Plan Update (December 2003).

3.4.2 Alternative 2: LRT Extension on State Street

This alternative would include light rail transit (LRT) on the State Street alignment. The State Street alignment is located along a major commercial corridor located between Sandy City and Draper City. This alignment proposes one of the most direct north-south transit routes through Draper City. The alignment begins at the 10000 South TRAX station in Sandy City, travels south along the UTA railroad right-of-way (former Union Pacific Provo Industrial Lead Railroad right-of-way) to 10600 South and then west along 10600 South to State Street and then south along State Street until 12300 South. South of 12300 South, the alignment travels within the Minuteman Drive frontage road until the road ends at Bangerter Highway. At Bangerter Highway, the corridor veers diagonally to the southeast dissecting the parcel (and existing condominium development) on the northeast quadrant and crosses over Bangerter Highway on an elevated structural section. South of Bangerter Highway, the elevated section continues and "touches down" onto South 100 East. The alignment then turns west on 13800 South and then south onto Minuteman Drive where it continues parallel to I-15. The "State Street corridor" alignment travels south along Minuteman Drive and terminates at the 14600 South Interchange.

FIGURE 3-1: DRAPER CITY TRANSIT ALIGNMENTS ADVANCED FOR FURTHER STUDY



Light rail station stops are proposed to be located a 10600 South, 11800 South, Bangerter Highway and a new terminal station at 14600 South. With the exception of the 11800 South station, each station is assumed to have park-and-ride facilities. The park-and-ride facility sizes are determined by both ridership projections and concurrence with Draper and Sandy City master plans.

3.4.2.1 Detailed Description of the State Street Alignment

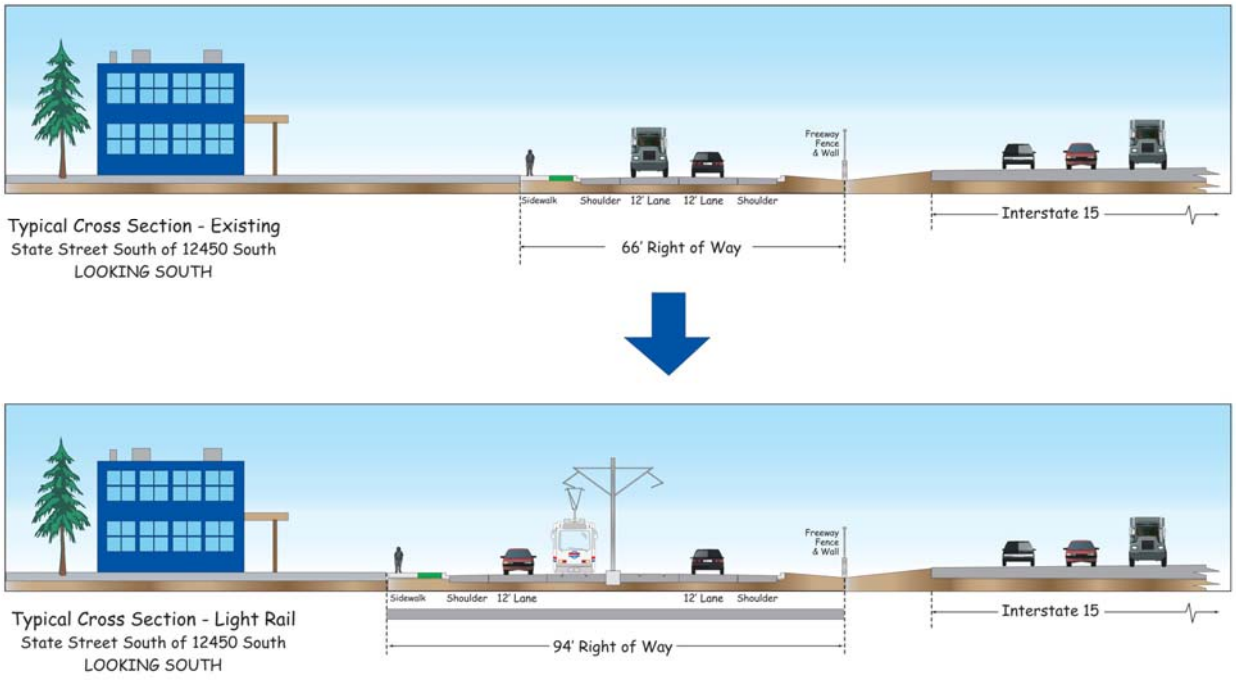
The "State Street Alignment" begins at the existing TRAX terminal station at 10000 South and travels south along surface streets to 14600 South. The State Street Alignment has six crossings of major arterials. The crossings are located at 10000 South, 10600 South, 11000 South, 11400 South, 12300 South and Bangerter Highway.

Beginning at the TRAX Station, the light rail alignment would be located on the UTA ROW (former Union Pacific Provo Industrial Lead Railroad right-of-way) and then at the 10600 South crossing turn west crossing into the median of 10600 South at-grade. From the UTA railroad ROW to State Street (approximately 2,600 feet); the LRT would be located in its own median alignment. At 10600 South and State Street, the LRT would turn south and cross into the State Street median at-grade.

Between 10000 South and 12300 South, the LRT alignment is located in the median of State Street as illustrated in the typical cross-section presented in Figure 3-2. In this section of State Street, the roadway is a five-lane facility with a 45 mph posted speed limit. Between 10000 South and 11800 South, commercial land uses border both the east and west sides of State Street. The South Town Mall and Auto Mall are located on the west side of State Street at 10600 South. At 11400 South, commercial and office land uses are located on both the east and west sides of State Street.

To accommodate the LRT, the center lane would be removed and replaced with the LRT cross-section. Left-turns would be limited to controlled signalized intersections.

FIGURE 3-2: CROSS-SECTION OF STATE STREET ALIGNMENT WITH LIGHT RAIL TRANSIT



LRT Stations are proposed to be located at the intersection of 10600 South & State Street and at 11800 South & State Street. The stations are initially proposed as park-and-ride. The 11800 South Station would serve the major activity centers of the St. Mark's Hospital future planned hospital and the Skaggs Catholic Center Complex to the east, as well as the surrounding neighborhoods.

Proceeding south along State Street and approaching the 12300 South, the LRT would cross 12300 South as a grade-separated (overhead structure) due to the traffic volumes and the proximity of the I-15/12300 South interchange. The 12300 South arterial is a major east-west commercial corridor serving the Draper and Sandy communities.

Between 12300 South and 14600 South, the LRT would operate in an exclusive right-of-way on the east side of the street. Minuteman Drive is a two-lane road with a posted speed limit of 35 mph. South of 12300 South, land uses along Minuteman Drive are all located on the east side of the street and consist mostly of commercial, office and light industrial uses. To accommodate the LRT in this section of the alignment, right-of-way would be required along the east-side of Minuteman Drive; control of access to the existing uses that remain would be required.

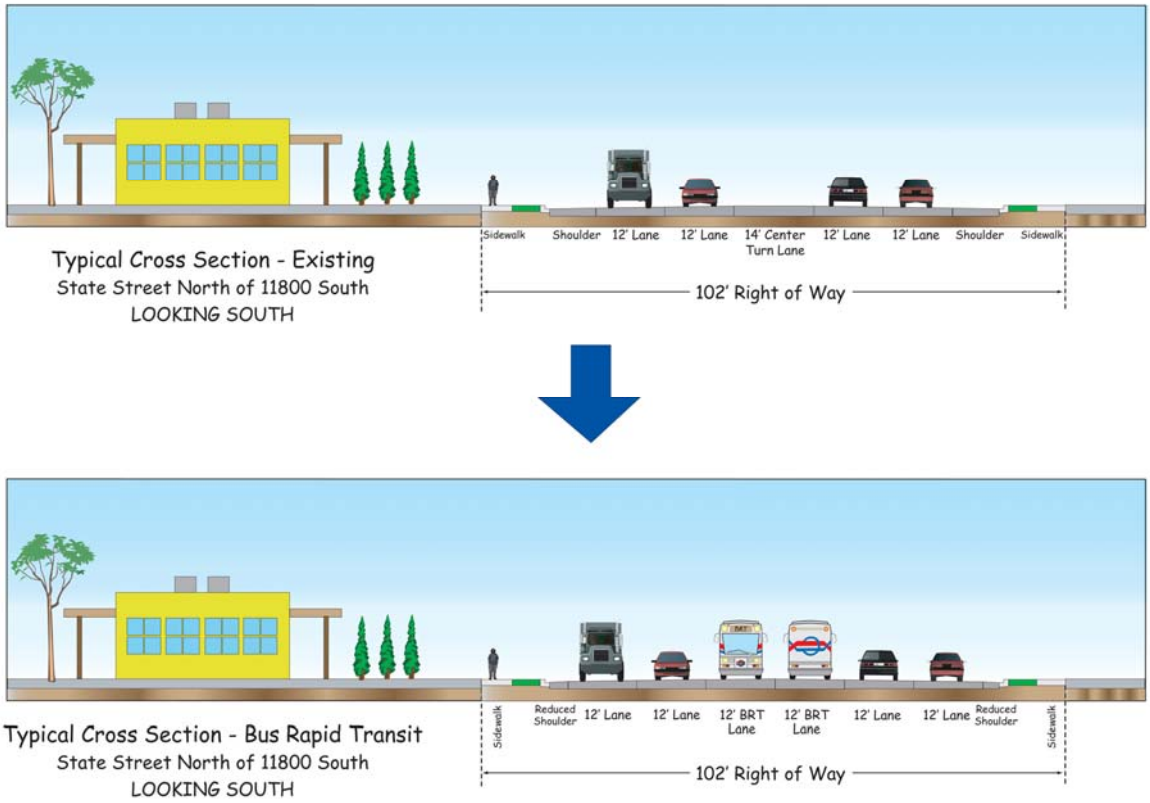
Just north of Bangerter Highway, Minuteman Drive ends and the LRT alignment would transition to the east and into a grade-separated crossing (overhead structure) of the Bangerter Highway off-ramp due to the traffic volumes and the proximity of the I-15/Bangerter Highway interchange.

The crossing would impact the existing condominium development located in the northeast quadrant. Relocation of approximately 47 units would be required. South of Bangerter Highway, an LRT Station would be located just north of 13800 South. This area is transitioning to higher-density residential and office uses. The LRT alignment would then turn west crossing onto 13800 South at-grade and would continue in an exclusive right-of-way on which Minuteman Drive continues as a two-lane road with a posted speed limit of 35 mph until it approaches 14600 South. The LRT would cross 14600 at-grade and a terminal LRT Station with park-and-ride facilities would be located in the southeast quadrant of the intersection.

3.4.3 Alternative 3: BRT on State Street

This alternative would include bus rapid transit (BRT) technology operating in its own exclusive right-of-way similar to LRT. For the "State Street alignment", the BRT would follow an identical path and concept as presented in Alternative 2. BRT Stations would be at the same locations and the crossing of major streets would be as defined in Alternative 2. Figure 3-3 illustrates a typical cross-section of the BRT concept on State Street.

FIGURE 3-3: CROSS-SECTION OF STATE STREET ALIGNMENT WITH BUS RAPID TRANSIT



3.4.4 Alternative 4: LRT Extension on UTA Right-of-Way

As illustrated in Figure 3-2, this alternative would include light rail transit (LRT) on the UTA Railroad Right-of-Way (former Union Pacific Provo Industrial Lead Railroad right-of-way) alignment from existing TRAX terminal station at 10000 South to a new terminus at 14600 South.

Light rail stations with park and ride facilities would be located at 10600 South, 11400 South/700 East, Pioneer Road, South Mountain (no park-and-ride is assumed), and a new terminal station at 14600 South. Except for park-and-ride lots, no additional ROW is required for this alignment alternative.

3.4.4.1 Detailed Description of the UTA Alignment

The UTA ROW alignment extends from the 10000 South TRAX Station in Sandy City south to the I-15/14600 South Interchange (and beyond). The width of the right-of-way varies from 66-feet to 200-feet in locations.

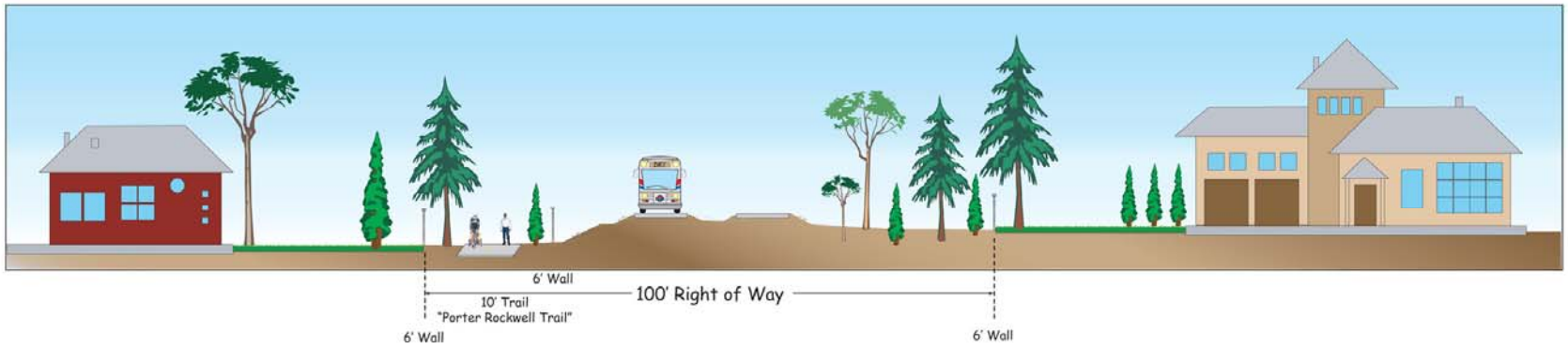
In early 1993, UTA purchased the Union Pacific Railroad (UPRR) right-of-way between Salt Lake City and Sandy City. In 2002, UTA acquired the continuation of the UPRR right-of-way (Provo Industrial Lead) through Draper City and into Utah County. While some freight service still operates as far south as the Intermountain Farmers Association (IFA) facility in Draper City (approximately 12400 South), the line south of IFA to State Road 92 in Lehi is no longer actively used for any rail service.

Along the UTA line, all major traffic at-grade crossings (as defined by higher volumes) between 10000 South TRAX station and the IFA property have controlled and gated crossings. Major at-grade crossings of the UTA ROW are at 10600 South, 11000 South, 11400 South, 700 East, 12300 South/Draper Parkway, 1300 East and 13200 South. Minor at-grade crossings (as defined by low traffic volumes) exist at 12200 South and 12700 South. These crossings are signed, but not gated. The UTA line crossing at Pioneer Road is not gated or signalized; and grade-separated crossings occur at 1300 East, 300 East, and 14600 South.

Land uses adjacent to the UTA ROW are single family residential with commercial and office along the major arterials such as 12300 South and 700 East. Along 700 East between 11400 South and the UTA rail line, land uses are office, service and residential. The UTA ROW passes through the Draper City Town Center master plan area. Areas near the UTA ROW south of the Draper Town Center area are low and medium density residential. The planned unit development at South Mountain presently has town-home development and proposes a mix of single family and multifamily developments as well as public recreation and entertainment facilities adjacent to the corridor.

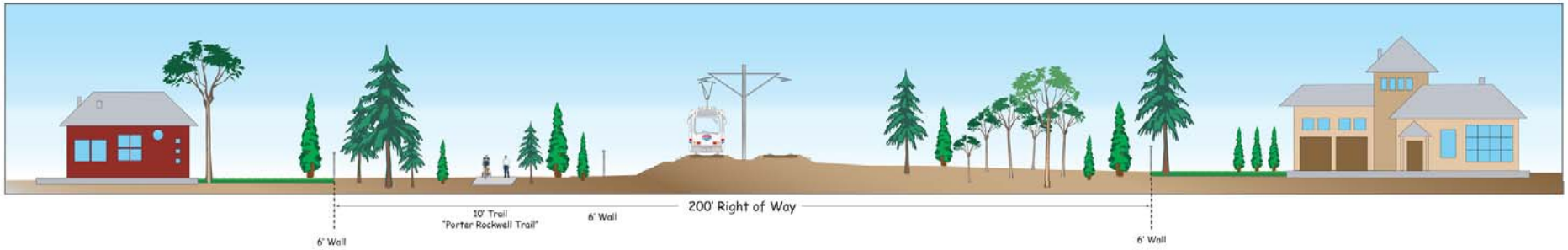
A key concern raised in the community meetings was what affect would the LRT concept have on the existing multi-use Porter-Rockwell Trail located in the UTA ROW from approximately 13200 South to 14600 South (approximately 3.5 miles). Figures 3-4 and 3-5 illustrate a typical cross-section of the UTA ROW with the BRT concept and the LRT concept respectfully. These figures illustrate the conceptual relocation of this trail within the existing right-of-way.

FIGURE 3-4: TYPICAL CROSS-SECTION OF THE UTA RAILROAD RIGHT-OF-WAY WITH BRT



Typical Cross Section - Bus Rapid Transit
North of 13200 South on UTA Alignment

FIGURE 3-5: TYPICAL CROSS-SECTION OF THE UTA RAILROAD RIGHT-OF-WAY WITH LRT



Typical Cross Section - Light Rail
South of 13200 South on UTA Alignment

3.4.5 Alternative 5: BRT on UTA Right-of-Way

This alternative would include BRT on the UTA Railroad Right-of-Way alignment (former Union Pacific Provo Industrial Lead Railroad right-of-way), similar to Alternative 4

3.5 Summary of Key Operational Parameters and Engineering Issues or Concerns

Table 3-4 presents a summary of the operating parameters and engineering issues or concerns associated with the five alternatives that were evaluated in detail.

TABLE 3-4: SUMMARY OF PARAMETERS AND ISSUES

Alternative	Operating Parameter(s)	Key Engineering Issues or Concerns
1 – No Build	Continuation of existing plus already committed to bus transit services	➢ Traffic and congestion on existing streets projected to increase (See Figure 2-1). ➢ State Street and UTA ROW would remain as they are today (assuming no other roadway or transportation development plans are enacted in the future to meet travel demands).
2 – LRT on State Street	LRT service operating at peak/off-peak headways of 15/30 Minutes	➢ At-grade street crossings may have traffic impacts ➢ Two grade separations required which adds to expense ➢ Significant ROW concerns; especially at Bangerter ➢ Left-turn access across State Street allowed only at signalized intersections ➢ No additional engineering issues identified to-date ➢ Constructability issues
3 – BRT on State Street	Bus Rapid Transit service operating at peak/off-peak headways of 15/30 Minutes	➢ Similar issues as for LRT on State Street ➢ No additional engineering issues identified to-date
4 – LRT on UTA ROW	LRT service operating at peak/off-peak headways of 15/30 Minutes	➢ Uncontrolled grade crossings require traffic and train controls ➢ Development of concept that accommodates the Porter-Rockwell Trail is necessary ➢ No additional engineering issues identified to-date ➢ No significant constructability issues identified to-date
5 – BRT on UTA ROW	Bus Rapid Transit service operating at peak/off-peak headways of 15/30 Minutes	➢ Similar issues as for LRT on UTA ROW ➢ No additional engineering issues identified to-date

CHAPTER 4 – FUNDING AND COST CONSIDERATIONS

A preliminary financial analysis was conducted as part of this alternatives analysis to identify the costs associated with each alternative and potential funding strategies for implementing a project. This analysis included developing conceptual cost estimates, identifying key issues for consideration in developing funding strategies, developing a conceptual funding scenario, comparing the costs and funding, and identifying next steps in the development of a funding and financing strategy.

4.1 Introduction and Key Issues

A conceptual cost estimate was prepared for the five alternatives studied. Funding scenarios and information was prepared by UTA Staff and provided to the Team. In both cases, separate projected capital costs and the projected operating and maintenance (O&M) costs and funding were developed.

The key issues identified which need to be addressed are listed below:

- What are the anticipated capital and O&M costs associated with each of the alternatives evaluated?
- What are the funding options available to UTA and the region to fund both the cost of expanding transit services and the on-going cost of operating these services?
- Does the region have sufficient resources to accomplish the financial goals?
- Are there, "What if?" scenarios that would apply and what affect do they have on these alternatives?

4.2 Capital Costs

There are four "Build" alternatives that have been studied and for which capital costs have been prepared. The capital costs are estimated costs in Year 2006 dollars ($ 2006) and are based on the conceptual engineering-derived construction elements and quantities. The costs are broken down into the eight principal-cost categories designated by the Federal Transit Administration (FTA). The categories are:

1. Total Costs – A sum of all the cost elements for the alternative;
2. Guideway and Track – The costs associated with the construction of the track & rail (applicable) and structures (overpasses);
3. Stations – Costs associated with the construction of the stations;
4. Yards & Shops – In this case, the costs are $0 as no additional yards or maintenance facilities are required;
5. Sitework – Costs associated with roadwork, utilities, landscaping, etc.;
6. Right-of-Way (ROW) – Costs associated with the acquisition of ROW necessary for the facility and park-and-ride lots;
7. Vehicles – The costs associated with the acquisition of transit vehicles (light rail or bus rapid transit); and
8. Design and Management Services – The costs associated for the design, construction administration, survey & testing, legal & permits and other associated construction-related services.

It is noted that "contingencies" have been embedded into each of the cost items. The capital costs are presented in Table 4-1.

TABLE 4-1: ESTIMATED CAPITAL CONSTRUCTION COSTS (MILLION $ 2006)

Alternative	Total Cost	Guideway & Track	Stations	Yards & Shops	Site Work	Systems	ROW	Vehicles	Design & Mgmt
2 – LRT on State Street	$272.6	$39.3	$4.1	$0	$33.4	$41.7	$41.4	$73.6	$39.1
3 – BRT on State Street	158.3	16.7	3.1	0	33.4	10.1	41.4	32.4	21.0
4 – LRT on UTA ROW	245.1	29.4	5.2	0	26.5	55.4	16.5	73.6	38.5
5 – BRT on UTA ROW	139.8	12.5	3.8	0	26.5	25.5	16.5	32.4	22.5

Source: Parsons Brinckerhoff, 2006; Note: Due to rounding, some totals may vary slightly.

As presented in Table 4-1, the estimated capital cost of the alternatives range from a low $139.8 million to a high of $272.6 million. It is noted that the State Street alignment is approximately 1.7 miles shorter in length, as compared to the UTA Railroad right-of-way alignment.

4.3 Operating and Maintenance Costs

In addition to capital costs, each alternative has on-going operations & maintenance (O&M) costs. These costs are derived from existing UTA O&M cost allocations and are based on the proposed operating scenarios as illustrated in the following table. Table 4-2 presents the operating scenarios and projected annual operating costs for the four "build" alternatives.

As illustrated in Table 4-1 above, the estimated annual operating costs for the proposed transit alternatives ranges from $1,184,748 to $6,035,397depending upon the alternative. In each case the operating scenarios are the same, namely each would be operating in its own dedicated right-of-way from 10000 South in Sandy to 14600 in Draper on 15-minute headways during all hours of operation.

TABLE 4-2: OPERATING SCENARIOS AND ESTIMATED ANNUAL OPERATING COSTS

	Headways (Minutes)	Distance (Miles)	Time (Min)	Annual Operating Days	Estimated Annual Operating Cost
2 – LRT on State Street	15 Min-All Day Service	6.72	12.6	292	$4.8 million
3 – BRT on State Street	15 Min–All Day Service	6.72	12.6	292	$1.2 million
4 – LRT on UTA ROW	15 Min–All Day Service	7.99	13.08	292	$4.2 million
5 – BRT on UTA ROW	15 Min–All Day Service	7.99	13.08	292	$1.1 million

Source: UTA, 2006

4.4 Revenues & Expenses

Fare-box recovery (as a percent of O&M) on an extension of the light rail system through Draper is expected to be approximately 30%.The following table illustrates the expenses and revenue streams that are projected through the year 2030 using the current assumptions of sales tax increases in Salt Lake County.

TABLE 4-3: PROJECTED REVENUES AND EXPENSE STREAMS

Revenue through 2030	
Sales Tax & Other Revenue	$346,215,822
Fare Box Revenue	$19,787,537
Federal Funds	$0
	$366,003,359
Expenses through 2030	
O&M	$67,770,836
Capital	$298,232,522
	$366,003,359

Source: UTA, 2006

4.5 Planned Capital and O&M Funding

The project, as an extension of the Draper light rail line along the UTA owned ROW in Salt Lake County, is recognized as a planned project in the currently adopted, financially constrained Long Range Plan (WFRC 2003). In that document, the construction of a light rail extension from 10000 South in Sandy to 12300 South in Draper is anticipated sometime in Phase I of the plan (2004-2012). The next section of the line, from 12300 South to 14600 South is scheduled on the Long Range Plan for completion sometime in Phase II (2013-2022). Discussions are on-going regarding how much sales tax revenue will be available for projects on the long range transportation plan. Depending on how both the WFRC and Utah

State Legislature determine to spend sales tax revenues, a light rail extension through Draper could be constructed as soon as 2015 or as late as 2030.

4.6 Conclusions

It is anticipated that, given the current positive state of the economy and positive projections for long term sales tax revenue growth in Salt Lake County, the transportation plan as established in the WFRC Long Range Plan can be sustained through projected revenues. In addition, the completion of the published plan can be achieved by 2030, including the extension of a new light rail line from 10000 South in Sandy through 14600 South in Draper.

CHAPTER 5 – COMMUNITY INPUT

An integral component of the Draper Transit Alternatives Study (DATS) is the engagement and consideration of comments received from the public. This section provides an overview of the process, results, and considerations.

5.1 Overview of Community Involvement Process

The DATS effort consisted of several activities to bring the community into to process.

A formal public open house was held on March 29, 2006 at Draper City Hall sponsored by Draper City and UTA. The Open House included a series of information items for attendee to view and one-on-one discussions with agency and consultant staff. A presentation was held during the Open House about the project, the alignment concepts, and modes under consideration. Attendees were encouraged to express their ideas and concerns.

At the first Open House, the "long list" of transit technologies and alignment concepts as discussed in Chapter 3 was presented to the community for their input. It was explained to participants that the DTAS effort would address the following fundamental questions regarding an investment in a major transit concept for the Draper City area:

- What is the best alignment?
- What is the best mode?
- Where should stations be located?
- How many people will use it?
- How much will it cost to build and operate?
- How will traffic be impacted around stations?
- How will it affect the natural and built environment?

FIGURE 5-1:
FLYER FOR FIRST OPEN HOUSE

Approximately 75 people attended the public meeting with the majority of these individuals from the city of Draper City, a few from Sandy, and the remaining from various other areas in the region. Comments from this group, and others who did not attend, were received via comment forms, telephone messages, and e-mail. A summary of the all of comments received is presented in the following section.

On May 30, 2006, the UTA Project Manager presented an update of project progress to the Draper City Council. This presentation was a scheduled item on the Council agenda and the public was invited to attend this meeting. At the end of the presentation to the Council, there was an opportunity for the public to stand and voice comments and concerns to the Council about the proposed alternatives. The comments, along with the names and addresses of those concerned citizens that stood and spoke, were transcribed and considered as part of this study. Fourteen people stood and made comments at this meeting.

A second Open House was held on October 11, 2006 at the offices of Draper City Hall. The Open House again provided attendees with the opportunity to view a series of information boards, to meet and talk with agency and consultant staff, to listen to a presentation, and to provide written and verbal feedback.

At this second Open House, the five alternatives that were derived from the screening process were presented along with technical information regarding potential station locations, projected number of users, costs, traffic impacts, and environmental affects of the alternatives. A draft Evaluation Matrix presented the consultant's assessment of the alternatives and their recommendation of a preferred (best) alignment and mode for a future major transit investment.

The summary of the comments received from the second Open House is included in project documentation and is advanced with the project to subsequent phases.

Based on the comments received, the Draper community was able to contribute ideas and voice concerns that positively shaped the process and the alternatives in a number of ways. This contribution is discussed in the last section of this chapter.

5.2 Summary of Comments Received on Alternatives for Screening

The consideration of comments received during the first Open House in March 2006 was an important part in the screening of the alignment concepts and modes. As noted in Chapter 3, public comments were one of the screening criteria used to develop the four "build" alternatives for more-detailed study.

The DTAS alternatives for screening were affected, in part in response to public comments, in the following ways:

- Alignments – The preferred alignments were UTA ROW and State Street. There was little or no support for other alignments and these were subsequently dropped from further consideration.
- Modes – LRT was the mode the community selected most often as the preferred technology. LRT is one of two modes ultimately taken forward for further study. There was no support for, and some opposition to simply putting more diesel-powered busses on the street. While no specific comments were received either in support of or opposed to the bus rapid transit (BRT) mode, this mode was also carried forward by the study team as a comparative technology.
- Impacts to the natural and built environment – Some concerns focused on alignments that were subsequently screened out. Other comments focused on the impact a major transit investment in the UTA Railroad ROW would have on the existing and planned sections of the Porter Rockwell Trail. This concern was identified by the study team as a key environmental issue that required further study and potentially a mitigation strategy.

The public identified many issues for consideration during this phase of study. The key issues are summarized below in Table 5-1.

TABLE 5-1: SUMMARY OF COMMENTS RECEIVED AT FIRST OPEN HOUSE

General Area of Expression	Comments Received
Alignment Concepts	➢ While not unanimous, a majority of attendees expressed support for using the UTA alignment and continuing the LRT mode south to Draper City. ➢ There was some, but less support for the State Street alignment. ➢ There was little or no support for any of the remaining alignments (300 East, 700 East, Fort Street, and 1300 East) due to the envisioned impacts a transit-way would have and the incompatible nature of the land uses. ➢ There was support for using the adopted Draper City General Plan alignment (the UTA ROW) and limited support for not being consistent with the General Plan.
Technology	➢ There was greater support for deployment of light rail transit, rather than for deployment of a modern or vintage streetcar or bus rapid transit technology. ➢ Several individuals noted the convenience of boarding the existing LRT system at the TRAX Station at 10000 South in Sandy and could envision the technology being extended to Draper. ➢ Few comments were received about the desire to expand existing bus service.
Community Concerns and Input	➢ The greatest level of concern recorded focused on the potential effect on pedestrians and equestrians in general and the Porter Rockwell Trail specifically. These comments were in the general groups as follows: o Concerns expressed by pedestrians, equestrian users and other trail users that the trail would be inaccessible and/or closed off to the recreational users if the UTA ROW was used for a major transit investment such as BRT or LRT. o Concerns about user safety if the UTA corridor was used for a major transit investment and remained open to trail users. ➢ Comments were received about existing and future congestion levels and the need to make improvements. ➢ Comments were received about the potential location of the alignments and the impacts they would have on the adjacent neighborhoods and development. ➢ Concern for keeping the flavor of “Old Draper” was expressed ➢ Generally, support was for either State Street or the UTA alignment with little or no support for other corridors. ➢ Concern regarding air quality and diesel fume impacts was noted with the majority of the respondents voicing support for the electrified modes such as LRT or Modern Streetcar. ➢ Comments regarding park-and-ride lot locations either supported moving the 10000 South location further south or were concerned about through traffic coming from I-15 to the stations and impacting Draper City streets and residents.

Source: Comments compiled by Parsons Brinckerhoff

5.3 Summary of Comments Received on Final Alternatives

Four “build” alternatives and a “No-Build” alternative were developed and studied in greater detail based in part on the comments received at the first Open House in March 2006,. These five final alternatives were then presented to the community in an October 2006 Open House with a preferred alternative identified from among the five alternatives.

The information presented at the second Open House focused on the seven fundamental questions provided at the beginning of this chapter and presented the Locally Preferred Alternative to the public. What is the best alignment and mode? How many people will use it and how much will it cost? Where are the stations and what are the traffic impacts around the stations anticipated to be? What are the anticipated environmental impacts and how will they be dealt with, and especially as an alternative relates to the Porter Rockwell Trail along the UTA Railroad ROW.

CHAPTER 6 – EVALUATION OF ALTERNATIVES

The five alternatives were evaluated and the results are presented in this chapter of the document. This evaluation process entailed five levels and responded to the goals and objectives developed for the study. Tabular comparisons of results of the alternatives are presented where quantitative information is applicable. Where comparative evaluation measures were prepared (e.g. Section 6.4 Environmental Evaluation), the comparative results are presented in matrix format. At the end of this chapter an overall Comparative Summary of Differentiating Evaluation Measures is presented in matrix format.

Section 6.1 addresses the Mobility and Access category of the goals. Section 6.2 focuses on the Development and Study Area Growth aspects of the alternatives. Section 6.3 documents the cost effectiveness considerations. Section 6.4 provides the environmental evaluation. Section 6.5 presents the comparison of the alternatives to the vision of the Draper City community and long-term planning. And finally, Section 6.6 provides a comparative summary of all evaluation measures based upon the technical data and screening information that was developed.

6.1 Mobility and Access Evaluation of Alternatives

Mobility and access are two terms which describe the quality of transportation services being evaluated. Mobility refers to the choices that are available to make trips and access refers to the number of individuals who have either reasonable walk access (typically within ¼-mile) or are anticipated (forecasted) to use the stations and park-and-ride facilities. Table 6-2 presents the results of this evaluation component. A comparative summary of this indicator is presented in Table 6-7.

Three station configuration scenarios were evaluated and associated with the UTA ROW analysis. The first scenario used station locations identified in the Draper City General Plans and Master Transportation Plan. This configuration included stations at 11800 South, 12300 South, South Mountain and 14600 South (UTA #1). The second scenario used stations identified in the South Salt Lake County Transit Corridor Analysis; these were located at 11400 South, 12300 South, 1300 East and 14600 South (UTA #2). Subsequent discussions with Draper City staff led to a third scenario and variation of UTA #2 with South Mountain having only walk and transit access. The results from the third configuration are presented in Table 6-2.

TABLE 6-1: INITIAL UTA ROW STATION COMPARISONS (NORTHERN SEGMENT OF CORRIDOR)

Alternatives	Total Daily Line Boardings	Additional Riders with New Project
No Build (TRAX to Sandy 10000 South)	27,184	NA
BRT on State Street	30,320	3,136
BRT on UTA ROW #1 (11800 So & South Mountain)	30,482	3,298
BRT on UTA ROW #2(11400 So & 1300 East)	30,583	3,399
LRT on State Street	30,692	3,508
LRT on UTA ROW #1 (11800 So & South Mountain)	30,722	3,538
LRT on UTA ROW #2 (11400 So & 1300 East)	30,911	3,727

TABLE 6-2: MOBILITY AND ACCESS EVALUATION RESULTS

Measures	Alt 1 – No Build	Alt 2 – LRT on State Street	Alt 3 – BRT on State Street	Alt 4 – LRT on UTA ROW	Alt 5 – BRT on UTA ROW
Population and Employment within ¼- Mile of Corridor (2030)[1]	N/A	9,900 Pop. And 13,400 Employees	Same as Alt 2	17,800 Pop. And 4,400 Employees	Same as Alt 4
Population and Employment within ½- Mile of Corridor (2030)[1]	N/A	21,400 Pop. And 27,400 Employees	Same as Alt 2	35,800 Pop. And 10,600 Employees	Same as Alt 4
Coordinated Transportation System	Least coordinated of the alternatives	More coordinated system	BRT to LRT transfer reduces the overall coordination of the system	More coordinated system	BRT to LRT transfer reduces the overall coordination of the system
Transit Travel Times[2] (From 100th So. to 146th So.)	N/A	12 1/2 Minutes	12 1/2 Minutes	13 Minutes	13 Minutes
Average New Weekday Boardings (2030)[3]	N/A	3,510	3,135	3,540	3,300
Estimated Vehicle Trip Reduction[3]	N/A	950	-- 190 (# of Trips Increases)	1,150	-- 71 (# of Trips Increases)
Vehicle Hours of Delay Savings in Salt Lake County[3]	N/A	750	-- 670 (Delay Increases)	5	-- 116 (Delay Increases)
Vehicle Hours of Delay Savings in Study Area[4]	N/A	50	14	73	30
Vehicle Miles of Travel Savings in Salt Lake County[3]	N/A	7,050	-- 9,800 (VMT Increases)	8,700	1,300
Vehicle Miles of Travel Savings in Study Area[4]	N/A	350	260	1,530	815

Measures	Alt 1 – No Build	Alt 2 – LRT on State Street	Alt 3 – BRT on State Street	Alt 4 – LRT on UTA ROW	Alt 5 – BRT on UTA ROW
Enhance Transit Reliability	Congestion and lack of alternatives decrease reliability	Most reliable of the alternatives	Less reliable as compared to LRT due to need for transfer between modes	Most reliable of the alternatives	Less reliable as compared to LRT due to need for transfer between modes

Source: Parsons Brinckerhoff, 2006

Notes: [1] Demographic data are based on Wasatch Front Regional Council projections, 2006.

[2] The State Street alignment is approximately 6.7 miles and would operate at an average estimated speed of 37 mph for LRT and for BRT. By comparison, the UTA ROW alignment is approximately 8.0 miles and would operate at an average estimated speed of 37 mph for LRT and for BRT.

[3] Travel forecasts based on operating scenarios and station locations; applying 2030 demographics and using WFRC Regional Model, v5.

[4] "Study Area" is the area illustrated in Figure 1-2.

6.2 Development and Study Area Growth Evaluation of Alternatives

This evaluation measure is used to determine which alternatives encourage more development/redevelopment that promotes economic growth and is deemed to be "smart growth". Table 6-3 illustrates the results of this evaluation; the comparative summary of this indicator is presented in Table 6-7.

TABLE 6-3: STUDY AREA GROWTH EVALUATION

Measure	Alt 1 – No Build	Alt 2 – LRT on State Street	Alt 3 – BRT on State Street	Alt 4 – LRT on UTA ROW	Alt 5 – BRT on UTA ROW
Encourage Patterns of Smart Growth and Economic Development	Least likely to encourage smart growth and/or additional economic development. Due to congestion, could hinder policy achievement.	LRT appears to be more likely to promote smart growth in communities. State Street has an identified opportunity at 11800 South; infill and smart growth opportunities exist elsewhere as well. Alignment would adversely impact one or more, higher density developments.		LRT appears to be more likely to promote smart growth in communities. The UTA ROW has several opportunities for smart growth and is relatively more consistent with the Draper City General Plan for this type and location of development. Opportunities are improving along the south end of the line where an office campus and higher-density housing are planned.	

6.3 Cost Effectiveness Comparison of Alternatives

The cost-effectiveness of alternatives is determined based on identifying those alternatives which maximize operating efficiency while minimizing capital and operating costs. "Maximizing operating efficiency" is a combination of the number of transit users and the travel times associated with their trips. Costs for each alternative were presented in Chapter 4 of this document. Table 6-4 presents the results of this evaluation category.

TABLE 6-4: COST EFFECTIVENESS EVALUATION RESULTS

Measures (in millions)	Alt 1 – No Build	Alt 2 – LRT on State Street	Alt 3 – BRT on State Street	Alt 4 – LRT on UTA ROW	Alt 5 – BRT on UTA ROW
Estimated Capital Cost of Alternative (Millions of $)	N/A	$272.6	$158.3	$245.1	$139.8
Estimated Operating and Maintenance Cost	N/A	4.8	1.2	4.2	1.1
Number of New Riders	N/A	3,510	3,135	3,540	3,300

6.4 Environmental Evaluation of Alternatives

A qualitative evaluation of potential environmental issues for the transit alternatives has been completed for this study. The purpose of this evaluation is to review potential economic, social and environmental impacts of the alternatives to use for comparison and selection of the Locally Preferred Alternative (LPA). The results of this evaluation are presented in Table 6-5, Comparative Evaluation of Environmental Measures. The issues that are of concern and will require additional study once the LPA is selected are identified as follows:

- Visual impacts associated with the UTA alignment due to the number of residential properties located along the corridor is of concern. Additional environmental analysis is needed to determine impacts to residents and possible solutions that can be accommodated with a design.
- Two small sections of the Porter Rockwell trail may need to be moved away from the UTA alternative. This will occur in two locations where the trail bends toward the UTA alignment. The trail would need to be reconstructed away from the tracks.
- There is the potential for increased noise along the UTA alignment since much of this corridor is adjacent to residential properties
- Right of way constraints located along the State Street alignment between 12300 South and Bangerter Highway are likely to impact property access and land uses for the LRT and BRT alternatives.
- Both alignments will have an impact on land use, economics, transportation patterns, development, and neighborhood character. Impacts may be beneficial or adverse and will be studied further for the LPA.

6.4.1 Environmental Study Process

The environmental study process used for this project follows the UTA process for non-federally funded projects and was illustrated in Chapter 1. The first in a series of steps used to determine the Locally Preferred Alternative (LPA) is an Alternatives Analysis. The analysis at this stage in the environmental process is a preliminary qualitative assessment used to identify possible differences between the alternatives with regard to potential economic, social, and environmental impact. A more in-depth analysis, and greater level of detail with regard to the environmental analysis, is performed once the LPA is selected. The more detailed environmental analysis includes analysis of the affected environment, social, economic conditions, potential impacts, and mitigation strategies.

The environmental analysis process for this study consisted of field reviews, review of existing GIS data, agency consultation, and public input. Environmental criteria that was applied to assist in determining the LPA is shown in Table 6-5 and is described as follows:

- **Number of Acres to be Acquired as New Right-of-Way For Each Alignment -** The number of acres required for the alignment right-of-way (ROW) was determined from a conceptual engineering design developed for this study and the UTA. The total number of acres estimated for the State Street Alignment is 36 acres. This includes linear ROW plus ROW for four (3) park and ride lots. Much of the State Street alignment is in public street right-of-way.

The right-of-way needs for the UTA alignment is estimated to be approximately 25 acres. This need only includes the area needed for four (4) park and ride lots since UTA already owns the linear railroad alignment ROW.

- **Number of Parcels Impacted by Alignments -** The State Street alignment impacts 25 parcels and the UTA alignment impacts 11 parcels. Parcel impacts are associated with the linear alignment and park and ride lots on the State Street alignment. Parcel impacts on the UTA alignment are only associated with the park and ride lots.
- **Potential Community Land Use Impacts -** Potentially adverse community land use impacts could occur in areas where the community character is established and land use changes are not desired by the community as a whole. Impacts may occur when higher densities and mixed land uses are encouraged by the marketplace and would support the transit line, but may be inconsistent with the vision of the community for more traditional and/or lower density land uses.
- **Potential Changes in Travel Patterns and Crossings -** Potential impacts to access and mobility may result for both the State Street and UTA alignments. The State Street alignment will have impacts to a significant number of businesses and increased impacts to mobility in general may result with the alignment's greater number of at-grade crossings. Access to residences and mobility at cross-streets may be impacts near stations located along the UTA alignments.
- **Potential Impact to Archeological Resources -** An archeological resources survey was performed for the UTA line in conjunction with the I-15 EIS. The State Street alignment was not studied. While no archaeological impacts have been identified, further study will occur in the next phase of environmental analysis.
- **Potential Impact to Ecologically Sensitive Areas -** Sensitive areas for migratory bird habitat for the Draper Area was studied as part of the I-15 EIS. The US Fish and Wildlife Service was contacted; no major sensitive areas will be impacted by the alignments under study.
- **Potential Impact to Flood Level or Floodplain -** FEMA flood zone maps were used to determine impacts to 100 Year floodplains. No impacts are expected because the design of the transit alignments will accommodate impacts to the floodplain.
- **Potential Impact to Hazardous Materials Sites -** The Utah Division of Hazardous Waste sites were reviewed for the analysis. Specifically, locations of Leaking Underground Storage Tanks (LUST) were identified along the alignments. However, the project-related impacts are unknown and still to be determined when the exact right-of-way needs are specifically identified.
- **Potential Noise and Vibration Impacts -** Sensitive receptors for noise and vibration include residential properties located along the corridors. State Street is mostly commercial and is located next to I-15 freeway. The UTA alignment is surrounded in many locations with residential housing and therefore has the potential for more impacts.
- **Potential Changes in the Incidence of Crime -** Through discussions with the senior manager for security at UTA it was determined that while there are incidences of crime in proximity to the existing UTA TRAX line, the levels of criminal activity are commensurate with the level of criminal activity for the larger community surrounding that station. Offenses that have been encountered along the existing UTA TRAX line range from public intoxication to automobile burglaries at the park-and-ride locations. Through joint efforts with local law enforcement, UTA police have captured criminals attempting to use the TRAX system to escape a crime scene.

The UTA Police forces work closely with local law enforcement of the various cities that TRAX serves and UTA does not have any evidence as to an increase in burglaries or vandalism in adjoining neighborhoods near stations or park-and-ride lots. All UTA-owned park-and-ride lots are equipped with overhead night lights and are patrolled regularly by the UTA police force. There are no surveillance cameras installed at this time.

It is the opinion of UTA security that there will not be any significant change in crime levels associated with any of the DTAS alternatives under consideration.

- **Potential Impacts to Parklands -** Parklands were identified along the proposed corridors. The State Street and UTA alignments are not expected to impact parks.
- **Potential Impacts to Trails -** The public expressed during the open house meeting that impacts to the Porter Rockwell trail, which is located within the UTA right-of-way, is a concern since the trail is an important community recreational facility. Moreover, Draper City is expanding the trail north to 11400 South and south to the Utah County line. And, UTA and Draper City are currently working on an agreement to extend the trail further north.

  The UTA right-of-way is sufficient to accommodate future expanded transit use and trail use. Minor locational impacts during and after construction and potential changes in uses of the trail may occur as a result of adding a major transit investment to the UTA alignment. These impacts consist of potentially moving the trail away from the alignment in at least two locations. And, the present equestrian use on the trail may also need to be re-evaluated in the next phase of analysis due to potential safety concerns.
- **Potential Section 4(f) Impacts -** Historical properties along the UTA-owned alignment were surveyed as part of the I-15 Corridor DEIS. State Street was not studied. Two historical properties were located along the UTA alignment, which are both linear structures and consist of the UPRR rail line and the Draper irrigation canal. It is likely that impacts to these historic resources would fall under the "deminimus" classification for impacts to Section 4(f) properties. This means that an avoidance alternative is not required as part of the alternatives analysis.
- **Potential Impact to Threatened and Endangered Species -** The US Fish and Wildlife Service was contacted for input about protected species in the study area. According to their input, it is not likely that protected species would be impacted by the alignments. The agency was concerned about the protection of migratory bird habitat in any areas located along the UTA ROW corridor. This issue will be studied further.
- **Potential Impact to Visual Quality -** A potential exists for LRT to change the viewsheds and viewshed quality of residents along the UTA-owned alignment. Viewsheds along the UTA alignment may have visual impacts associated with the overhead catenary (guide wires and electrical lines) used to power the light rail vehicles.

The primary differences between the two alignments is the greater parcel and right-of-way impacts associated with the State Street alignment and the higher number of sensitive receptors to noise and potential impacts to residential property viewsheds along the UTA alignment. Figure 6-1 illustrates these key issues. Table 6-5 on page 6-10 summarizes the anticipated environmental issues of the corridors and alternatives on a comparative basis.

A more in-depth environmental analysis is required as part of the next phase of environmental study to determine what the actual impacts to the above resources are and what mitigations might be developed to reduce or minimize these impacts. During future environmental analysis, meetings are needed with local residents and business owners to discuss potential impacts and receive their input. Mitigation measures will also be discussed with the public to minimize impacts and to address potential issues before they arise

FIGURE 6-1: ENVIRONMENTAL AND ENGINEERING ISSUES

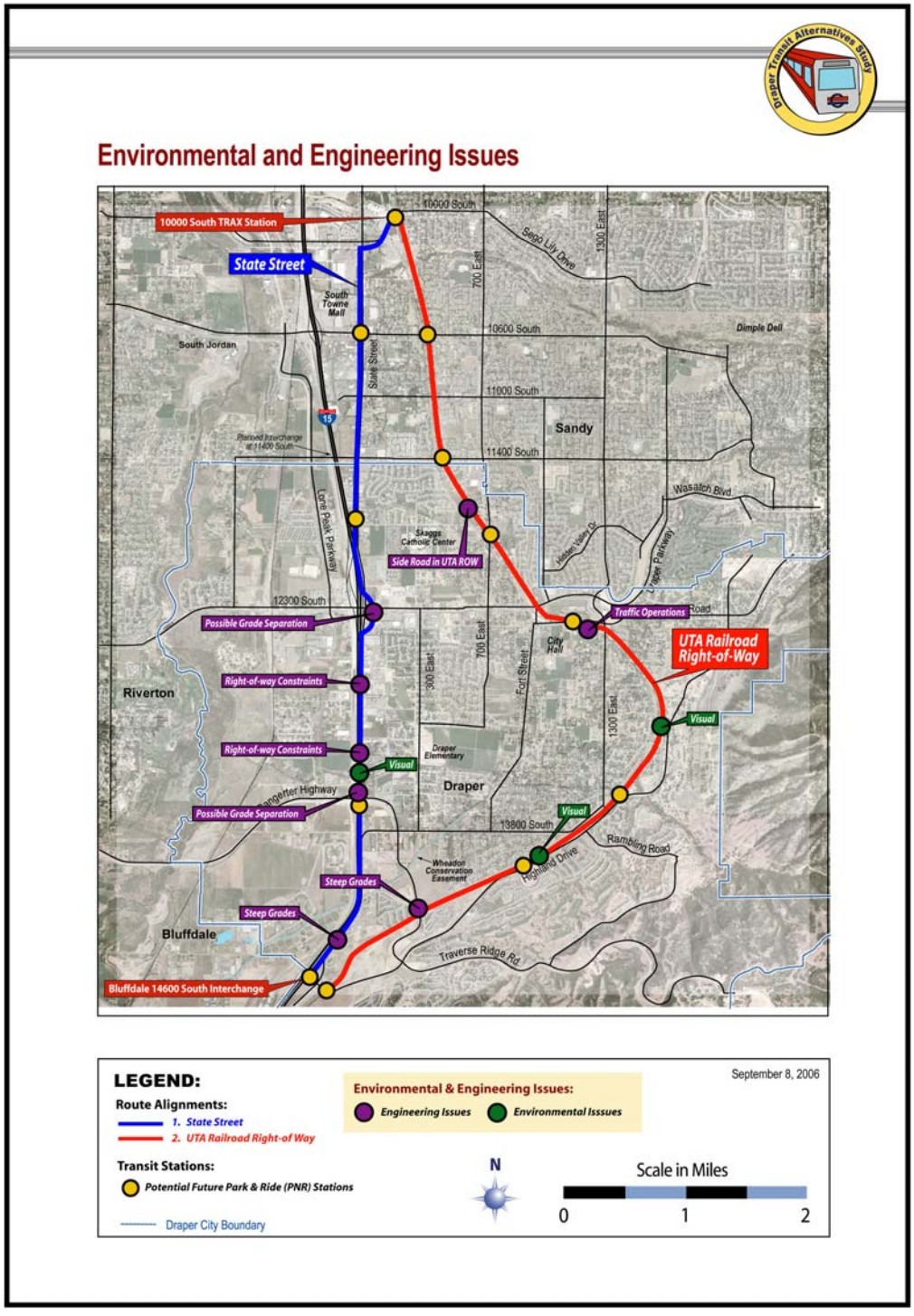


TABLE 6-5: COMPARATIVE EVALUATION OF ENVIRONMENTAL MEASURES

MEASURES	Alt 1 – No Build	Alt 2 – LRT on State Street	Alt 3 – BRT on State Street	Alt 4 – LRT on UTA ROW	Alt 5 – BRT on UTA ROW	Notes
Number of Acres to be Acquired as New Right-of-Way for Each Alignment	No right-of-way is required.	36 ac impacted includes linear takes along State Street and park-and-ride lots.	36 ac impacted includes linear takes along State Street and park-and-ride lots.	25 ac impacted, only includes park-and-ride lots since UTA owns the right-of-way for the mainline.	25 ac impacted, only includes park-and-ride lots since UTA owns the right-of-way for the mainline.	Same assumptions made for assessment of parcels impacted.
Number of Parcels Impacted by Alignments	No parcels will be impacted.	25 parcels; including multi-family condo complex in NW quadrant of Bangerter & Minuteman.	25 parcels; including multi-family condo complex in NW quadrant of Bangerter & Minuteman.	11 parcels.	11parcels.	Based on conceptual engineering.
Potential for Community Land Use Impacts	Land use will changes are anticipated to be consistent with current land use plans and zoning.	Potential land use changes are anticipated to be consistent with existing land uses. Potential land use changes could include upzoing to higher densities and mixing commercial uses with residential uses.	Potential changes are anticipated to be consistent with existing land uses. Potential land use changes could include upzoing to higher densities and mixing commercial uses with residential.	Potential land use changes may occur in the low density residential areas that line the UTA Corridor. Changes may include up zoning and mixed use zoning.	Potential land use changes may occur in the low density residential areas that line the UTA Corridor. Changes may include up zoning and mixed use zoning.	Land use changes may be considered beneficial or adverse.

MEASURES	Alt 1 – No Build	Alt 2 – LRT on State Street	Alt 3 – BRT on State Street	Alt 4 – LRT on UTA ROW	Alt 5 – BRT on UTA ROW	Notes
Potential for Changes in Travel Patterns and Crossings.	No changes are anticipated.	Potential for impacts to a number of major and minor cross streets. Business and residential access will also be impacted. Additional traffic impacts may occur near stations.	Potential for impacts to cross streets and business access. Business and residential access will also be impacted. Additional traffic impacts may occur near stations.	Lower potential for impact than State Street because UTA already owns the right-of-way. Impacts may occur at the 700 E, 118th, 114th crossings. Impacts only include potential delays. Minimal rerouting or closure of cross streets may be needed. Additional traffic impacts may occur near stations.	Lower potential for impact than State Street because UTA already owns the right-of-way. Impacts may occur at the 700 E, 118th, 114th crossings. Impacts only include potential delays. Minimal rerouting or closure of cross streets may be needed. Additional traffic impacts may occur near stations.	
Potential Impact to Archeological Resources	No resources will be impacted.	Further Study needed to determine possible sites.	Further Study needed to determine possible sites.	No archeological resources along the alignments. Further study needed to determine possible sites at stations and park-and-ride lots.	No archeological resources along the alignments. Further study needed to determine possible sites at stations and park-and-ride lots.	Cultural resources survey was performed in conjunction with the I-15 EIS. The State Street alignment was not studied.

MEASURES	Alt 1 – No Build	Alt 2 – LRT on State Street	Alt 3 – BRT on State Street	Alt 4 – LRT on UTA ROW	Alt 5 – BRT on UTA ROW	Notes
Potential Impact to Ecologically Sensitive Areas	No expected impacts to sensitive areas.	No expected impacts to sensitive areas.	No expected impacts to sensitive areas.	No expected impacts to sensitive areas.	No expected impacts to sensitive areas.	
Potential Impact to Flood Level or Floodplain	No expected impacts to floodplain.	No expected impacts to floodplain.	No expected impacts to floodplain.	No expected impacts to floodplain.	No expected impacts to floodplain.	FEMA 100 year flood zones are located in 3 locations along the State Street Alignment and 3 locations along the UTA Alignment. It is assumed that the design will accommodate floodplain requirements.
Potential for Impact to Hazardous Materials Sites	No potential for impacts associated with LUST sites.	Low potential for impacts associated with LUST sites.	Low potential for impacts associated with LUST sites.	Low potential for impacts associated with LUST sites.	Low potential for impacts associated with LUST sites.	Three LUST Sites are located near to State Street. Four LUST sites are located near to the UTA corridor.

MEASURES	Alt 1 – No Build	Alt 2 – LRT on State Street	Alt 3 – BRT on State Street	Alt 4 – LRT on UTA ROW	Alt 5 – BRT on UTA ROW	Notes
Potential for Noise And Vibration Impacts	No expected impacts.	Low potential noise and vibration impacts for most areas along the alignment. A possibility for impacts may occur at the multifamily developments along Minutemen Drive.	No expected impacts along most of State Street. A possibility for impacts may occur at the multifamily developments along Minutemen Drive.	High potential noise and vibration impacts to residences located along the alignment and adjacent to park-and-ride lots.	Some potential impacts from noise to receptors along the alignment and adjacent to park-and-ride lots.	
Potential Changes in Crime Levels Associated With Transit Stations and Park and Ride Lots.	Not Applicable.	The level of criminal activity at existing transit stations is commensurate with the level of criminal activity for the larger community surrounding that station. UTA security does not anticipate any changes in crime activity in adjacent neighborhoods with any of the alternatives or station locations under study.				Based on discussions with UTA Security management.
Potential Impacts to Parklands	No impacts to parklands are expected.	No impacts to parklands are expected.	No impacts to parklands are expected.	No impacts to parklands are expected.	No impacts to parklands are expected.	

MEASURES	Alt 1 – No Build	Alt 2 – LRT on State Street	Alt 3 – BRT on State Street	Alt 4 – LRT on UTA ROW	Alt 5 – BRT on UTA ROW	Notes
Potential Impacts to Trails	No trail impacts are expected.	No trail impacts are expected.	No trail impacts are expected.	Porter Rockwell trail is located in the UTA right-of-way. Impacts are expected to minimal and temporary during construction. Potential impacts could include moving the trail away from the alignment and changes in trail uses. Equestrian uses may be found incompatible with transit.	Porter Rockwell trail is located in the UTA right-of-way. Impacts are expected to minimal and temporary during construction. Potential impacts could include moving the trail away from the alignment and possible changes in trail uses. Equestrian uses may be found incompatible with transit.	
Potential Section 4(F)	No impact to 4(f) properties.	Historic property survey not yet completed.	Historic property survey not yet completed.	Low potential for impacts to historic resources within alignment. Historic resources are linear features and are likely to fall under the deminimus classification.	Low potential for impacts to historic resources within alignment. Historic resources are linear features and are likely to fall under the deminimus classification.	Two historical resources are located within the UTA alignment. This is the UPRR railroad line and Draper Irrigation Canal.

MEASURES	Alt 1 – No Build	Alt 2 – LRT on State Street	Alt 3 – BRT on State Street	Alt 4 – LRT on UTA ROW	Alt 5 – BRT on UTA ROW	Notes
Potential Impact to Threatened and Endangered Species	No impacts expected to threatened and endangered species.	No impacts expected to threatened and endangered species.	No impacts expected to threatened and endangered species.	No impacts expected to threatened and endangered species.	No impacts expected to threatened and endangered species.	
Potential Impact to Viewsheds and Visual Quality	No effect on viewsheds.	Low potential impacts. State Street is a commercial corridor adjacent to I-15.	Low potential impacts. State Street is a commercial corridor adjacent to I-15.	High potential impacts. Residences adjacent to the corridor with views of the valley and mountains may be impacted by views the LRT. There may be visual impacts associated with park-and-ride lots.	Moderate potential impacts. BRT has less visual impacts than LRT because no transmission lines or guide wires are used. There may be visual impacts associated with park-and-ride lots.	
Potential Impact to Water Quality	No potential impact.	No potential impact.	No potential impact.	No potential impact.	No potential impact.	It is assumed that the design will accommodate proper water quality standards.
Potential Impact to Jurisdictional Wetlands	There will be no impact to wetlands.	Wetlands survey not completed.	Wetlands survey not completed.	Impacts to wetlands are not anticipated.	Impacts to wetlands are not anticipated.	Wetlands for UTA alignment were field verified as part of the I-15 Corridor DEIS.

6.5 Community Vision and Response to the Alternatives

The community vision is reflected in a number of ways and then evaluated. One measure used for evaluation builds upon past and current planning efforts, adopted plans, and the demonstrated level of consistency with those plans. This measure reflects the broader and more "historic" perspective of the community. In the case of the Draper Transit Alternatives Study, several locally adopted growth, land use, and transportation plans apply:

- Draper City General Plan Master Transportation Plan (April 2003)
- Final Report Salt Lake County Transit Corridors Analysis (December 2000)
- Sandy City General Plan (February 1998)
- Wasatch Front Regional Council 2030 Urban Area Long Range Transportation Plan Update (December 2003)
- Wasatch Front Growth Principles and Objectives for Transportation Planning

In addition to these planning documents, the community has shared its perspective via two public open houses *(one still pending)* as described and summarized in Chapter 5. Combined, these data sources provide the basis for evaluating the alternatives; the results of this evaluation are presented in Table 6-6.

TABLE 6-6: COMMUNITY VISION EVALUATION RESULTS

Measures	Alt 1 – No Build	Alt 2 – LRT on State Street	Alt 3 – BRT on State Street	Alt 4 – LRT on UTA ROW	Alt 5 – BRT on UTA ROW
Consistency with Current and Past Land Use and Transportation Planning Efforts and Policies	Is not consistent	Is not consistent	Is not consistent	Both corridor and mode are consistent	Corridor, but not mode, is consistent
Community Response From First Open House	Little or no support	Some support for mode and corridor	Little or no support	Support for mode and corridor; some opposition	Support for corridor, but not mode; little or no support for concept overall
Community Response From Second Open House	*The summary of the comments received from the second Open House will be included in the project documentation and advanced with the project to subsequent phases.*				
Overall Community Vision Assessment	Is not consistent	Is not consistent with overall vision of Draper City	Is not consistent with overall vision of Draper City	Most consistent overall with Draper City long-term vision	Is not consistent with overall vision of Draper City

6.6 Comparative Summary of Evaluation Measures

A comparative summary of evaluation measures and information presented in previous sections of this chapter has been prepared and is presented in Table 6-7. The table identifies the alternatives (across the top) and the Goals and Objectives of the Draper Transit Alternatives Study that were adopted. Based on the information developed and evaluated, the "performance" of each alternative relative to the goals and objectives is noted. The "Objectives" are summarized with a "Low" to "High" measure and then the overall performance of each alternative relative to the "Goal" is summarized by the range of circles.

TABLE 6-7: COMPARATIVE SUMMARY OF DIFFERENTIATING EVALUATION MEASURES

GOALS and OBJECTIVES	Alt 1 – No Build	Alt 2 – LRT on State Street	Alt 3 – BRT on State Street	Alt 4 – LRT on UTA ROW	Alt 5 – BRT on UTA ROW	Notes
GOAL 1: Improve Corridor Mobility and Access to Activity Centers						
➢ Coordinated and balanced	Low	High	Med	High	Med	Based on LRT provides improved coordination as compared to BRT
➢ Reduce travel times	Low	High	Low	Med	Low	Based on route distance, transfer requirement for BRT and # of stations
➢ Increase daily transit trips	Low	High	Med	High	Med	Based on travel forecasts showing best performance with Alt 4 in terms of highest number of transit trips and largest reduction in study-area vehicle trips and delay
➢ Reduce vehicle trips & delay	Low	Med	Low	High	Low	
➢ Enhance transit convenience & reliability	Low	High	Low	High	Low	Based on BRT requires transfer and reduces system convenience
GOAL 2: Encourage Patterns of Smart Growth and Economic Development						
➢ Encourage compatible transportation and land uses	Low	High	Med	Med	Med	Based on Draper City planning documents envision LRT in the
➢ Promote transit oriented development	Low	High	Med	High	Med	

➢ Achieve land use policies in the study area	Low	Med	Med	High	Med	
GOALS and OBJECTIVES	**Alt 1 – No Build**	**Alt 2 – LRT on State Street**	**Alt 3 – BRT on State Street**	**Alt 4 – LRT on UTA ROW**	**Alt 5 – BRT on UTA ROW**	**Notes**
GOAL 3: Find a Cost-Effective Transportation Solution						
➢ Cost-Effective Alternative	N/A	Low	High	Med	High	Based on BRT in UTA ROW is relatively more cost-effective than other alternatives
➢ Maximize Operating Efficiency and Minimize Travel Times	N/A	Med	Low	Med	Low	Based on LRT is most efficient operationally and the State Street alignment is shorter than the UTA alignment and has lowest travel time
GOAL 4: Avoid, Minimize and Mitigate Adverse Impacts to the Natural and Built Environments						
➢ Avoid, minimize and/or mitigate impacts	N/A	Med	Med	Med	Med	Further environmental analysis required in subsequent studies to determine mitigations required
➢ Minimize impacts to various natural and man-made resources	N/A	Low	Low	Med	Med	
➢ Maximize benefits to community and resources	N/A	Med	Low	High	Low	Based on ridership and reduced traffic congestion

GOAL 5: Provide Consistency With Locally Adopted Growth, Land Use and Development Plans						
➢ Consistency with local plans	Low	Low	Low	High	Med	Based on LRT on UTA ROW is most consistent
➢ Build on past and current documents and plans	Low	Low	Low	High	Med	Based on previous planning efforts supported UTA corridor and rejected State Street
➢ Community input	Low	Med	Low	Med	Low	Based on community input has been mixed with general support for LRT; little or no support for BRT; little or no support for State Street; and mixed-support/opposition to the UTA Corridor
Overall Performance Relative to Draper Transit Alternatives Study Goals and Objectives:						
Performance Rating Scale:  **Poor (Low)---------- Good (High)**						

CHAPTER 7 – SELECTION OF A LOCALLY PREFERRED ALTERNATIVE AND THE NEXT STEPS

7.1 Introduction

A number of alternatives, both corridor alignments and mode technologies were evaluated within the Draper Transit Alternatives Study (DTAS) area as illustrated in Figure 1-1. It is the purpose of this document to present an analysis of these preliminary alternatives, summarize the results of the analysis, and identify a "locally preferred alternative" (LPA). This LPA represents the best major transit investment, both corridor alignment and mode technology, to meet the long-term mobility needs of the Draper City community while minimizing the effects of that investment.

As previously noted, the purpose of the DTAS project is to "address mobility needs within the study area through 2030, principally focusing on accommodating the travel movements to and from the north." Need for this project is demonstrated by the forecasted population and employment growth along the Wasatch Front and its resulting projected increase in travel. Without major transit investments, unacceptable levels of congestion are forecasted to occur in the region, including within the Draper City community. Figure 1-1 on page 1-2 illustrates the study area and Figure 2-1 on page 2-6 illustrates the existing and projected traffic congestion levels for the Draper area.

A two-step screening and evaluation process was undertaken to determine a recommended LPA as documented herein. In the first phase of screening, discussed in Chapter 3, seven corridor alignments and 4 modal options were assessed. Based on this assessment and screening, four "build" plus a "no-build" alternative were identified for further study. The second step of the evaluation process then focused on these five final alternatives.

The evaluation of the five final alternatives was guided by the Goals and Objectives developed for the project, presented in Table 1-1. For the DTAS effort, forecasted travel was developed using the Wasatch Front Regional Council travel demand model. Conceptual design and resulting cost estimates were prepared, and an initial assessment of the potential environmental impacts was completed. This combined information and data was summarized. A comparative summary of differentiating evaluation measures was prepared and is presented in Table 6-7 on page 6/18. An LPA was selected using this information.

7.2 Selecting the Locally Preferred Alternative (LPA)

The LPA represents the best alternative that can be developed based on all of the criteria and analysis that has gone into the study. This criterion includes, but is not limited to, preferences of Draper City staff and City Council as outlined in the city's General Plan and Master Transportation Plan. The criterion also includes the minimization of impacts to the community, both the social and natural environment. And finally, the LPA represents the general opinion of the constituents of the city where the project is being proposed.

Based on the results of this Alternatives Analysis, it was determined that the LPA is an extension of the existing UTA TRAX light rail system along the existing UTA ROW from 10000 South to 14600 South and I-15. The overall advantages and disadvantages of each alternative and mode are outlined in Table 7-1 on the following page.

TABLE 7-1: PERFORMANCE OF ALTERNATIVES COMPARED TO GOALS & OBJECTIVES

Category	Goal		Alt 1 – No Build	Alt 2 – LRT on State Street	Alt 3 – BRT on State Street	Alt 4 – LRT on UTA ROW	Alt 5 – BRT on UTA ROW
Mobility and Access	**Improve Corridor Mobility and Access to Activity Centers**	**Advantages**	None	Serves a higher employment corridor; but less riders overall	Similar to Alternative 2; however BRT attracts fewer riders than LRT because of need for transfer to TRAX system at 10000 South	Provides the highest level of ridership for the community	Similar to Alternative 4; however BRT attracts fewer riders than LRT because of need for transfer to TRAX system at 10000 South
		Disadvantages	Results in "unacceptable" levels of congestion by 2030	Increases congestion along State Street and adversely affects access to adjacent properties by auto users	Similar to Alternative 2	Does not serve the core employment corridor of State Street; but does serve Town Center	Similar to Alternative 4

Category	Goal		Alt 1 – No Build	Alt 2 – LRT on State Street	Alt 3 – BRT on State Street	Alt 4 – LRT on UTA ROW	Alt 5 – BRT on UTA ROW
Development and Study Area Growth	**Encourage Patterns of Smart Growth and Economic Development**	**Advantages**	None	Encourages patterns and would serve locations at 11800 and 14600 among other locations of existing or future higher density development	Similar to Alternative 2	Encourages smart growth developments at Town Center, South Mountain and 14600 that are planned or underway	Similar to Alternative 4
		Disadvantages	Does not encourage smart growth or economic development; rather encourages sprawl into adjacent areas	Adversely affects a major hi-density development at Bangerter and Minuteman	BRT does not encourage land use patterns to the extent LRT does because of the perceived "long term commitment" of LRT infrastructure	Could result in growth patterns in areas unacceptable to the Draper community	BRT does not encourage land use patterns to the extent LRT does because of the perceived "long term commitment" of LRT infrastructure
Cost Effectiveness	**Find a Cost-Effective Transportation Solution**	**Advantages**	Not Applicable	Carrying capacity higher than BRT	Less expensive than LRT	Carrying capacity higher than BRT	Less expensive than LRT
		Disadvantages	Not Applicable	Is the highest cost alternative studied	Less ridership and less cost-effective overall compared to LRT	Is the 2nd highest cost alternative studied	Less ridership and less cost-effective overall compared to LRT

Category	Goal		Alt 1 – No Build	Alt 2 – LRT on State Street	Alt 3 – BRT on State Street	Alt 4 – LRT on UTA ROW	Alt 5 – BRT on UTA ROW
Environmental	**Avoid, Minimize and Mitigate Adverse Impacts to the Natural and Build Environments**	**Advantages**	None	Of the two LRT alternatives, has the least number of identified impacts	Same as Alternative 2	ROW is available and has minimal construction impacts	Same as Alternative 4
		Disadvantages	Results in increased traffic congestion and associated environmental impacts	Impacts on State Street and Minuteman Drive; especially in NE quadrant of Bangerter & Minuteman	Same as Alternative 2	Concerns regarding viewsheds and trails identified	Same as Alternative 4; less of a viewshed concern
Land Use and City Vision	**Provide Consistency with Locally Adopted Growth, Land Use and Development Plans**	**Advantages**	None	Mode is consistent (but not alignment)	None	Most consistent with adopted local (and regional) plans	None
		Disadvantages	Inconsistent with local plans	Inconsistent with local plans	Inconsistent with local plans	None	Mode is inconsistent

7.3 Next Steps

The next immediate step in the process is to advance the project to a preliminary engineering and design phase. This next phase will provide a more robust cost estimate so that UTA can identify the capital funding source for construction and implementation of the LPA. The step to follow preliminary engineering would be to identify a capital funding source.

7.4 Areas of Concern to be Addressed in Subsequent Phases of Project Development

It is acknowledged that there are several areas of concern as identified herein that will need to be addressed in subsequent phases of project development. Chapter 6 describes these areas of concern. As illustrated in Figure 1-2: The UTA Non-Federal Project Environmental Process; additional project development efforts including environmental study, detailed engineering and design, refined cost estimates, and additional public meetings and hearings will occur as the project development moves forward.

EXECUTIVE SUMMARY

ES.1 Introduction and Overview

Draper City, in cooperation with the Utah Transit Authority (UTA), is considering extending a higher-level public transit service through Draper City to the south end of Salt Lake County. The purpose of this Transit Alternatives Study is to evaluate and document the potential transit alignment and mode alternatives that address this potential extension and recommend an alternative and implementation strategy to continue the development of a locally preferred alternative.

The study area is located approximately 18 miles south of Salt Lake City in the southeastern part of Salt Lake County and includes Draper City and portions of Sandy City The transit alternatives evaluated and presented in this document are located within the defined limits of this study area. Figure 1-1 in Chapter 1 illustrates the Study Area.

This area is located in a rapidly growing part of Salt Lake County. Future growth projections indicate that population and employment will continue to increase through 2030, the planning horizon for this study. The Utah Governor's Office of Planning and Budget in the *Quality Growth Efficiency Tools (QGET) 2003 Baseline Study* indicated the following about the Greater Wasatch Area:

- The annual rate of population increase is approximately twice the national average.
- Natural increase is projected to account for 80% of the new growth.
- The Greater Wasatch Area will average approximately 42,300 new residents a year between now and 2030. These new residents will require government services and infrastructure; increase the levels of congestion; and place tremendous pressures on open space, farmlands, and air quality.

Utah's economy is projected to continue to grow more rapidly than that of the nation and its industrial structure is assumed to continue to diversify.

Five goals are guiding the DTAS effort. These goals are: mobility, growth patterns, cost-effectiveness, the environment (natural and man-made) and land use consistent with Draper City's vision for the future. A detailed description of the goals and objectives is presented in Chapter 1, Table 1-1. The application of these goals and objectives as the basis of evaluating the final alternatives is presented in Tables 6-6 and 7-1 in Chapters 6 and 7 of this document respectively.

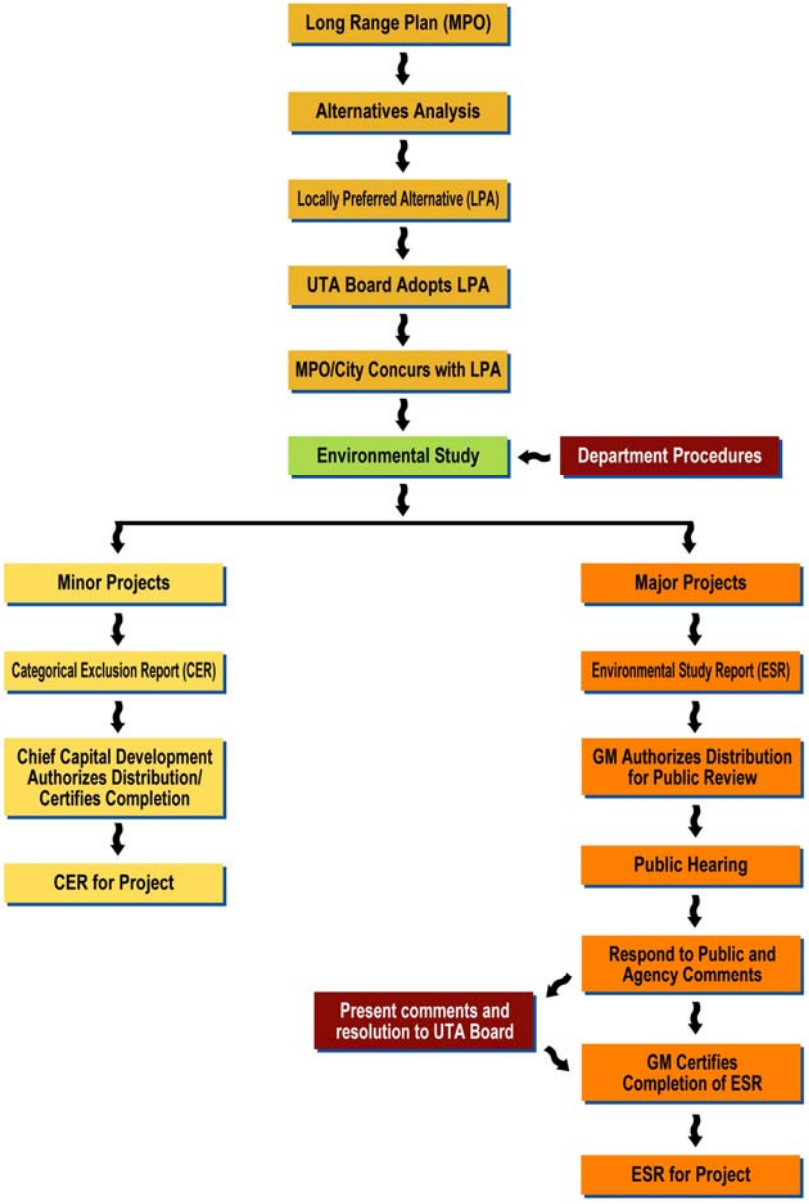
The Draper Transit Alternatives Study (DTAS) identifies a recommended Locally Preferred Alternative (LPA), selected from a set of potential alternatives under consideration. If adopted, the LPA would then be carried forth into further analysis in subsequent stage(s) of project development as illustrated in Figure ES-1. The process of selecting the LPA includes a technical evaluation of transportation performance characteristics, an assessment of environmental considerations, and an engineering assessment of capital investment considerations. Combined, these will result in the development of project costs. The process also includes community desires and concerns as input into selection of the LPA.

ES.2 Purpose and Need

The purpose of the proposed DTAS project is to address the mobility needs within the study area through 2030, principally focusing on accommodating the travel movements to and from the north.

The transportation need to maintain mobility and meet the long-term travel needs of the region as discussed in WFRC's 2030 Long Range Transit Plan is addressed by extending public transit through Draper City. Increasing population and employment in Draper and Salt Lake County's southern end, combined with increasing freight travel on Interstate 15, is projected to result in unacceptable levels of congestion (as illustrated in Figure 2-1 in Chapter 2) and traveler delays on the existing roadway network. As illustrated in Figure 2-2 in Chapter 2, the study area is a net "producer" of trips, which simply means that there is more population than employment within the study area. This finding is consistent with the development patterns along the Wasatch Front. The transportation need for additional improvements results from this combination of growth in travel and continued focus on travel to/from the north in the region.

FIGURE ES-1: THE UTA NON-FEDERAL PROJECT ENVIRONMENTAL PROCESS



ES.3 The Study Alternatives

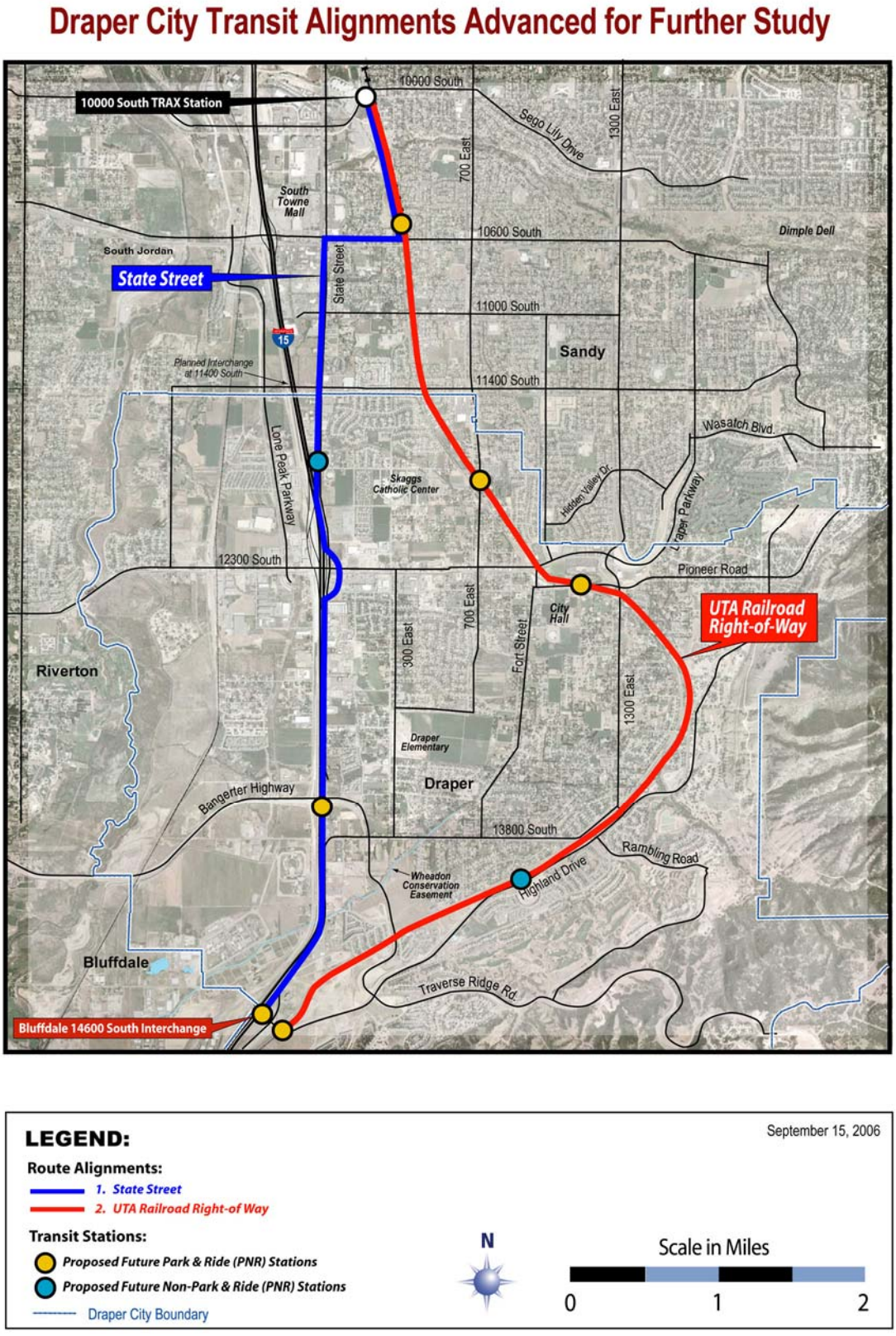
The DTAS study followed a two-step process. Initially, seven possible transit alignment concepts plus four modal concepts as presented in Table ES-1 were identified. The first-step of the screening process resulted in identifying five alternatives for more-detailed analysis and evaluation. Based on the results of this initial screening process, the candidate alignments and technologies were combined into five conceptual alternatives. These five final alternatives were then defined in greater detail for the purposes of determining their benefits and impacts in a final screening process. This second step of screening resulted in identifying a single alternative as the locally preferred alternative. Figure ES-1 presents the final alternatives for more-detailed study.

TABLE ES-1:
ALTERNATIVES SCREENING RESULTS

Step 1 Screening (Long List)	**Alignment Alternatives Considered**	**Transit Modes Considered**
	➢ State Street/Minuteman/ I-15 ROW ➢ Street and 300 East ➢ 300 East exclusively ➢ 700 East/300 East ➢ Fort Street ➢ 1300 East ➢ UTA RR ROW (former UP Provo Industrial Lead RR)	➢ Enhanced bus transit ➢ Bus rapid transit ➢ Streetcar transit ➢ Light rail transit
Step 2 Screening (Short List)	**Alignment Alternatives Considered**	**Transit Modes Considered**
	➢ State Street/Minuteman ➢ UTA RR ROW (former UP Provo Industrial Lead RR)	➢ Bus rapid transit ➢ Light rail transit
Step 3 (Select the Locally Preferred Alternative)	**Recommended Alignment**	**Recommended Transit Mode**
	➢ UTA RR ROW (former UP Provo Industrial Lead RR) from existing TRAX terminus at 10000 South to 14600 South	➢ Light rail transit extension from existing TRAX terminus

Figure ES-2 on the following page illustrates the DATS transit alignments advanced from the first step of screening for more-detailed study.

FIGURE ES-2: DRAPER CITY TRANSIT ALIGNMENTS ADVANCED FOR FURTHER STUDY



ES.4 Funding Considerations

A conceptual cost estimate was prepared for the five alternatives studied. Funding scenarios and information was prepared by UTA Staff and provided to the Team. In both cases, separate projected capital costs and the projected operating and maintenance (O&M) costs and funding were developed.

The key issues identified and which need to be addressed were:

- What are the anticipated capital and O&M costs associated with each of the alternatives evaluated?
- What are the funding options available to UTA and the region to fund both the cost of expanding transit services and the on-going cost of operating these services?
- Does the region have sufficient resources to accomplish the financial goals?
- Are there, "What If?" scenarios that would apply and what affect do they have on these alternatives?

There are four "Build" alternatives that have been studied and for which capital costs have been prepared. The capital costs are estimated costs in Year 2006 dollars ($ 2006) and are based on the conceptual engineering-derived construction elements and quantities. The costs are broken down into the eight principal cost categories designated by the Federal Transit Administration (FTA). It is noted that "contingencies" have been embedded into each of the cost items. The capital costs are presented in Table ES-2.

TABLE ES-2: ESTIMATED CAPITAL CONSTRUCTION COSTS (MILLION $ 2006)

Alternative	Total Cost	Guideway Track & Aerial Stations	Stations	Yards & Shops	Site Work & Special Conditions	Systems	ROW	Vehicles	Design & Mgmt
2 – LRT on State Street	$272.6	$39.3	$4.1	$0	$33.4	$41.7	$41.4	$73.6	$39.1
3 – BRT on State Street	158.3	16.7	3.1	0	33.4	10.4	41.4	32.4	21.0
4 – LRT on UTA ROW	245.1	29.4	5.2	0	26.5	55.4	16.5	73.6	38.5
5 – BRT on UTA ROW	139.8	12.5	3.8	0	26.5	25.5	16.5	32.4	22.5

Source: Parsons Brinckerhoff, 2006; Note: Due to rounding, some totals may vary slightly.

As presented in Table 4-1, the estimated capital cost of the alternatives range from a low $139.8 million to a high of $272.6 million. It is noted that the State Street alignment is approximately 1.7 miles shorter in length, as compared to the UTA Railroad right-of-way alignment.

In addition to capital costs, each alternative has on-going operations & maintenance (O&M) costs associated with them. These costs are derived from existing UTA O&M cost allocations and are based on the proposed operating scenarios. The estimated annual operating costs for the proposed transit alternatives ranges from $1.2 million to $4.8 million depending upon the alternative. In each case the operating scenarios are the same, namely

each would be operating in its own dedicated right-of-way from 10000 South in Sandy to 14600 in Draper on 15 minute headways during all hours of operation.

ES.5 Community Input

An integral component of the Draper Transit Alternatives Study (DATS) is the engagement and consideration of the comments received from the public. Two public open houses were held as part of this effort. Participants were informed that the DTAS effort would address the following fundamental questions regarding an investment in a major transit concept for the Draper City area:

- What is the best alignment?
- What is the best mode?
- Where should stations be located?
- How many people will use it?
- How much will it cost to build and operate?
- How will traffic be impacted around stations?
- How will it affect the natural and built environment?

The first open house occurred on March 29, 2006 at the Draper City Hall; the second occurred on October 11, 2006. In both cases, an "open house" format was used whereby residents and interested individuals could attend, review presentation materials, and talk informally with staff. A formal presentation was also presented to attendees by the UTA Project Manager. Over 100 individuals attended both open houses. In addition to these events, the UTA Project Manager provided presentation updates to the Draper City Council on May 30, 2006, September 26, 2006, and October 17, 2006. Table ES-4 on the following page presents a summary of comments received.

The Draper community was able to contribute ideas and voice concerns. The process and alternatives were positively affected in a number of ways based on comments received. A summary of the comments received from the second open house and last City Council presentation are included in the project documentation and will advance with the project to subsequent phases.

ES.6 Evaluation of Alternatives

The five alternatives were evaluated. This process entailed five levels of evaluation which responded to the goals and objectives developed for the study. At the end of this Executive Summary, an overall Comparative Summary of Differentiating Evaluation Measures is presented in matrix format. Table ES-3 identifies the key environmental factors initially assessed for potential impacts.

TABLE ES-3: ENVIRONMENTAL FACTORS INITIALLY ASSESSED

Acreage Requirements	Impacts to Floodplains	Parklands Affected
Parcels Impacted	Impacts to Hazardous Materials Sites	Trails Impacted
Land Use Issues	Noise & Vibration Impacts	Section 4(f) Issues
Changes in Travel Patterns	Changes in Crime Incidence	Impacts to Threatened & Endangered Species
Archaeological Issues	Ecologically Sensitive Areas Impacts	Impacts to Visual Quality

An evaluation was also conducted for each of the goals and the results reported. The result of the "Mobility and Access" goal and evaluation measures is presented in Table ES-5 (on pages ES-8 and ES-9). The key environmental concerns were identified and they, along with the engineering issues, are illustrated in Figure ES-3 (on page ES-10).

TABLE ES-4: SUMMARY OF COMMENTS RECEIVED AT FIRST OPEN HOUSE

General Area of Expression	Comments Received
Alignment Concepts	➢ While not unanimous, a majority of the attendees expressed support for using the UTA alignment and continuing the LRT mode south to Draper City. ➢ There was some, but less support for the State Street alignment. ➢ There was little or no support for any of the remaining alignments (300 East, 700 East, Fort Street, and 1300 East) due to the envisioned impacts a transit-way would have and the incompatible nature of the land uses. ➢ There was support for using the adopted Draper City General Plan alignment (the UTA ROW) and limited support for not being consistent with the General Plan.
Technology	➢ There was greater support for the deployment of light rail transit, rather than for deployment of a modern or vintage streetcar or bus rapid transit technology. ➢ Several individuals noted the convenience of boarding the existing LRT system at the TRAX Station at 10000 South in Sandy and could envision the technology being extended to Draper. ➢ Few comments were received about the desire to expand existing bus service.
Community Concerns and Input	➢ The greatest level of concern recorded was focused on the potential effect on pedestrians and equestrians in general and the Porter Rockwell Trail specifically. These comments were in the general groups as follows: o Concerns expressed by pedestrians, equestrian users and other trail users that the trail would be inaccessible and/or closed off to the recreational users if the UTA ROW was used for a major transit investment such as BRT or LRT. o Concerns about user safety if the UTA corridor was used for a major transit investment and remained open to trail users. ➢ Comments were received about existing and future congestion levels and the need to make improvements. ➢ Comments were received about the potential location of the alignments and the impacts they would have on the adjacent neighborhoods and development. ➢ Concern for keeping the flavor of "Old Draper" was expressed ➢ Generally, the support was for either State Street or the UTA alignment with little or no support for the other corridors. ➢ Concern regarding air quality and diesel fume impacts was noted with the majority of the respondents voicing support for the electrified modes such as LRT or Modern Streetcar. ➢ Comments were expressed about park-and-ride lot locations which either supported moving the 10000 South location further south or were concerned about through traffic coming from I-15 to the stations and impacting Draper City streets and residents.

Source: Comments compiled by Parsons Brinckerhoff

TABLE ES-5: MOBILITY AND ACCESS EVALUATION RESULTS

Measures	Alt 1 – No Build	Alt 2 – LRT on State Street	Alt 3 – BRT on State Street	Alt 4 – LRT on UTA ROW	Alt 5 – BRT on UTA ROW
Population and Employment within ¼- Mile of Corridor (2030)[1]	N/A	9,900 Pop. And 13,400 Employees	Same as Alt 2	17,800 Pop. And 4,400 Employees	Same as Alt 4
Population and Employment within ½- Mile of Corridor (2030)[1]	N/A	21,400 Pop. And 27,400 Employees	Same as Alt 2	35,800 Pop. And 10,600 Employees	Same as Alt 4
Coordinated Transportation System	Least coordinated of the alternatives	More coordinated system	BRT to LRT transfer reduces the overall coordination of the system	More coordinated system	BRT to LRT transfer reduces the overall coordination of the system
Transit Travel Times[2] (From 100th So. to 146th So.)	N/A	12 1/2 Minutes	12 1/2 Minutes	13 Minutes	13 Minutes
Average New Weekday Boardings (2030)[3]	N/A	3,510	3,135	3,540	3,300
Estimated Vehicle Trip Reduction[3]	N/A	950	-- 190 (# of Trips Increases)	1,150	-- 71 (# of Trips Increases)
Vehicle Hours of Delay Savings in Salt Lake County[3]	N/A	750	-- 670 (Delay Increases)	5	-- 116 (Delay Increases)
Vehicle Hours of Delay Savings in Study Area[4]	N/A	50	14	73	30
Vehicle Miles of Travel Savings in Salt Lake County[3]	N/A	7,050	-- 9,800 (VMT Increases)	8,700	1,300
Vehicle Miles of Travel Savings in Study Area[4]	N/A	350	260	1,530	815

Measures	Alt 1 – No Build	Alt 2 – LRT on State Street	Alt 3 – BRT on State Street	Alt 4 – LRT on UTA ROW	Alt 5 – BRT on UTA ROW
Enhance Transit Reliability	Congestion and lack of alternatives decrease reliability	Most reliable of the alternatives	Less reliable as compared to LRT due to need for transfer between modes	Most reliable of the alternatives	Less reliable as compared to LRT due to need for transfer between modes

Source: Parsons Brinckerhoff, 2006

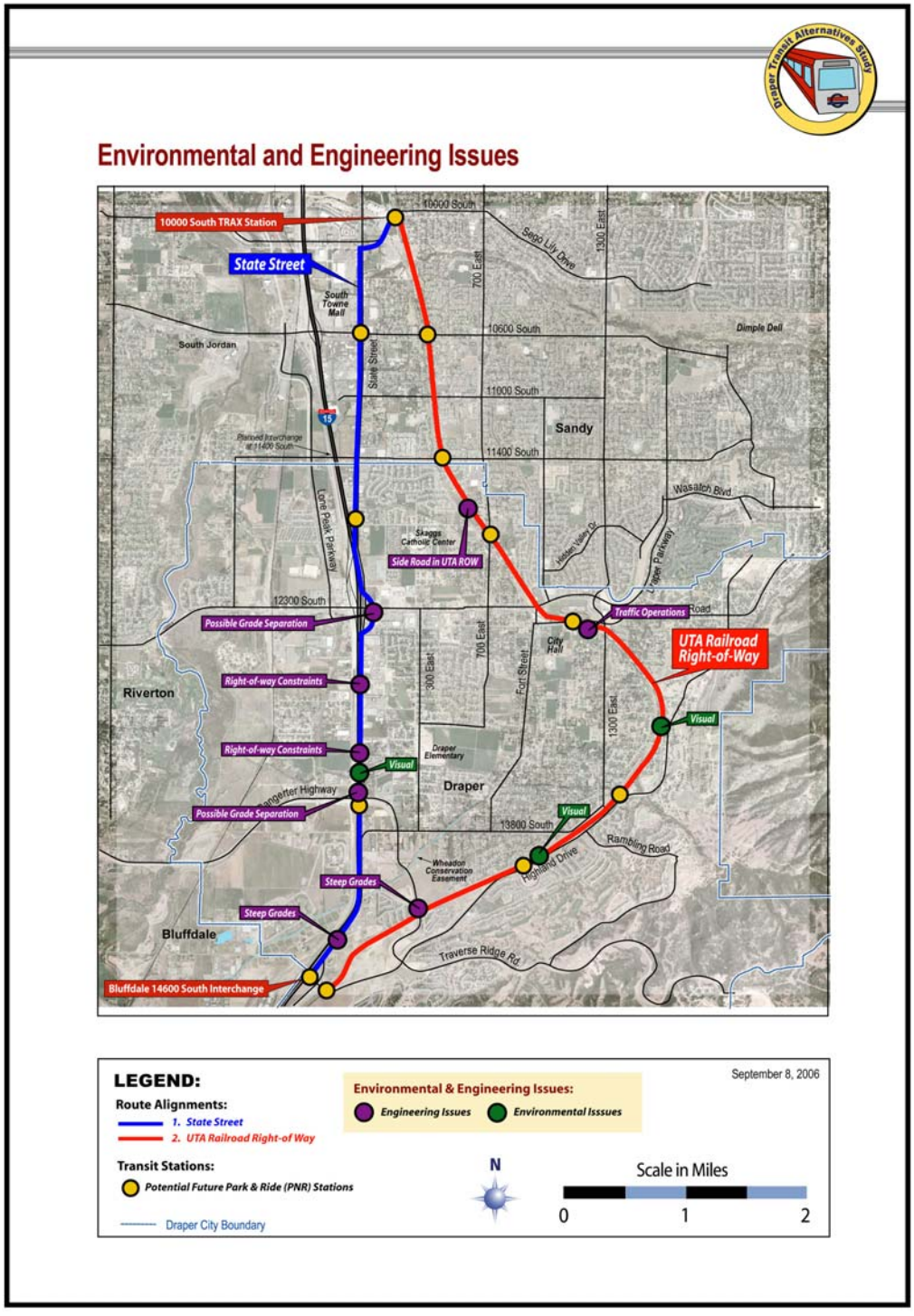
Notes: [1] Demographic data are based on Wasatch Front Regional Council projections, 2006.

[2] The State Street alignment is approximately 6.7 miles and would operate at an average estimated speed of 37 mph for LRT and for BRT. By comparison, the UTA ROW alignment is approximately 8.0 miles and would operate at an average estimated speed of 37 mph for LRT and for BRT.

[3] Travel forecasts based on operating scenarios and station locations; applying 2030 demographics and using WFRC Regional Model, v5.

[4] "Study Area" is the area illustrated in Figure 1-2.

FIGURE ES-3: ENVIRONMENTAL AND ENGINEERING ISSUES



A comparative evaluation of the differentiating measures was conducted based on the technical information developed in the course of the DATS effort. Table ES-6 presents the results of this evaluation in summary format. Following this effort, a selection of the Locally Preferred Alternative (LPA) was completed and the results presented to the Draper community in October 2006.

ES.7 Selection of a Locally Preferred Alternative

As previously noted, the purpose of the DTAS project is to "address mobility needs within the study area through 2030, principally focusing on accommodating the travel movements to and from the north." The need for this project is demonstrated based on the forecasted population and employment growth along the Wasatch Front and its resulting projected increase in travel. Without major transit investments, unacceptable levels of congestion are forecasted to occur in the region, including within the Draper City community**.** It is the purpose of this document to present an analysis of the preliminary alternatives, summarize the results of the analysis, and identify a "locally preferred alternative" (LPA).

The LPA represents the best major transit investment, both corridor alignment and mode technology, to meet the long-term mobility needs of the Draper City community while minimizing the effects of that investment. The LPA also represents the best alternative that can be developed based on all criteria and analysis that has gone into the study. The criterion includes, but is not limited to preferences of Draper City staff and City Council as outlined in the city's General Plan and Master Transportation Plan. The criterion also include the minimization of impacts to the community; both the social and natural environment. And finally, the LPA represents the general opinion of the constituents of the city where the project is being proposed.

Based on the results of this alternatives analysis, it is determined that the LPA is an extension of the existing UTA TRAX light rail system along the existing UTA ROW from 10000 South to 14600 South and I-15. The overall advantages and disadvantages of each alternative and mode are outlined in Table ES-7 on pages ES-14 through ES-17.

TABLE ES-6: COMPARATIVE SUMMARY OF DIFFERENTIATING EVALUATION MEASURES

GOALS and OBJECTIVES	Alt 1 – No Build	Alt 2 – LRT on State Street	Alt 3 – BRT on State Street	Alt 4 – LRT on UTA ROW	Alt 5 – BRT on UTA ROW	Notes
GOAL 1: Improve Corridor Mobility and Access to Activity Centers						
➢ Coordinated and balanced	Low	High	Med	High	Med	Based on LRT provides improved coordination as compared to BRT
➢ Reduce travel times	Low	High	Low	Med	Low	Based on route distance, transfer requirement for BRT and # of stations
➢ Increase daily transit trips	Low	High	Med	High	Med	Based on travel forecasts showing best performance with Alt 4 in terms of highest number of transit trips and largest reduction in study-area vehicle trips and delay
➢ Reduce vehicle trips & delay	Low	Med	Low	High	Low	
➢ Enhance transit convenience & reliability	Low	High	Low	High	Low	Based on BRT requires transfer and reduces system convenience
GOAL 2: Encourage Patterns of Smart Growth and Economic Development						
➢ Encourage compatible transportation and land uses	Low	High	Med	Med	Med	Based on Draper City planning documents envision LRT in the
➢ Promote transit oriented development	Low	High	Med	High	Med	

➢ Achieve land use policies in the study area	Low	Med	Med	High	Med	
GOALS and OBJECTIVES	**Alt 1 – No Build**	**Alt 2 – LRT on State Street**	**Alt 3 – BRT on State Street**	**Alt 4 – LRT on UTA ROW**	**Alt 5 – BRT on UTA ROW**	**Notes**
GOAL 3: Find a Cost-Effective Transportation Solution						
➢ Cost-Effective Alternative	N/A	Low	High	Med	High	Based on BRT in UTA ROW is relatively more cost-effective than other alternatives
➢ Maximize Operating Efficiency and Minimize Travel Times	N/A	Med	Low	Med	Low	Based on LRT is most efficient operationally and the State Street alignment is shorter than the UTA alignment and has lowest travel time
GOAL 4: Avoid, Minimize and Mitigate Adverse Impacts to the Natural and Built Environments						
➢ Avoid, minimize and/or mitigate impacts	N/A	Med	Med	Med	Med	Further environmental analysis required in subsequent studies to determine mitigations required
➢ Minimize impacts to various natural and man-made resources	N/A	Low	Low	Med	Med	
➢ Maximize benefits to community and resources	N/A	Med	Low	High	Low	Based on ridership and reduced traffic congestion

GOAL 5: Provide Consistency With Locally Adopted Growth, Land Use and Development Plans						
➢ Consistency with local plans	Low	Low	Low	High	Med	Based on LRT on UTA ROW is most consistent
➢ Build on past and current documents and plans	Low	Low	Low	High	Med	Based on previous planning efforts supported UTA corridor and rejected State Street
➢ Community input	Low	Med	Low	Med	Low	Based on community input has been mixed with general support for LRT; little or no support for BRT; little or no support for State Street; and mixed-support/opposition to the UTA Corridor
Overall Performance Relative to Draper Transit Alternatives Study Goals and Objectives:						
Performance Rating Scale:  **Poor (Low)---------- Good (High)**						

TABLE ES-7: PERFORMANCE OF ALTERNATIVES COMPARED TO GOALS & OBJECTIVES

Category	Goal		Alt 1 – No Build	Alt 2 – LRT on State Street	Alt 3 – BRT on State Street	Alt 4 – LRT on UTA ROW	Alt 5 – BRT on UTA ROW
Mobility and Access	**Improve Corridor Mobility and Access to Activity Centers**	**Advantages**	None	Serves a higher employment corridor; but less riders overall	Similar to Alternative 2; however BRT attracts fewer riders than LRT because of need for transfer to TRAX system at 10000 South	Provides the highest level of ridership for the community	Similar to Alternative 4; however BRT attracts fewer riders than LRT because of need for transfer to TRAX system at 10000 South
		Disadvantages	Results in "unacceptable" levels of congestion by 2030	Increases congestion along State Street and adversely affects access to adjacent properties by auto users	Similar to Alternative 2	Does not serve the core employment corridor of State Street; but does serve Town Center	Similar to Alternative 4

Category	Goal		Alt 1 – No Build	Alt 2 – LRT on State Street	Alt 3 – BRT on State Street	Alt 4 – LRT on UTA ROW	Alt 5 – BRT on UTA ROW
Development and Study Area Growth	**Encourage Patterns of Smart Growth and Economic Development**	**Advantages**	None	Encourages patterns and would serve locations at 11800 and 14600 among other locations of existing or future higher density development	Similar to Alternative 2	Encourages smart growth developments at Town Center, South Mountain and 14600 that are planned or underway	Similar to Alternative 4
		Disadvantages	Does not encourage smart growth or economic development; rather encourages sprawl into adjacent areas	Adversely affects a major hi-density development at Bangerter and Minuteman	BRT does not encourage land use patterns to the extent LRT does because of the perceived "long term commitment" of LRT infrastructure	Could result in growth patterns in areas unacceptable to the Draper community	BRT does not encourage land use patterns to the extent LRT does because of the perceived "long term commitment" of LRT infrastructure
Cost Effectiveness	**Find a Cost-Effective Transportation Solution**	**Advantages**	Not Applicable	Carrying capacity higher than BRT	Less expensive than LRT	Carrying capacity higher than BRT	Less expensive than LRT
		Disadvantages	Not Applicable	Is the highest cost alternative studied	Less ridership and less cost-effective overall compared to LRT	Is the 2nd highest cost alternative studied	Less ridership and less cost-effective overall compared to LRT

Category	Goal		Alt 1 – No Build	Alt 2 – LRT on State Street	Alt 3 – BRT on State Street	Alt 4 – LRT on UTA ROW	Alt 5 – BRT on UTA ROW
Environmental	**Avoid, Minimize and Mitigate Adverse Impacts to the Natural and Build Environments**	**Advantages**	None	Of the two LRT alternatives, has the least number of identified impacts	Same as Alternative 2	ROW is available and has minimal construction impacts	Same as Alternative 4
		Disadvantages	Results in increased traffic congestion and associated environmental impacts	Impacts on State Street and Minuteman Drive; especially in NE quadrant of Bangerter & Minuteman	Same as Alternative 2	Concerns regarding viewsheds and trails identified	Same as Alternative 4; less of a viewshed concern
Land Use and City Vision	**Provide Consistency with Locally Adopted Growth, Land Use and Development Plans**	**Advantages**	None	Mode is consistent (but not alignment)	None	Most consistent with adopted local (and regional) plans	None
		Disadvantages	Inconsistent with local plans	Inconsistent with local plans	Inconsistent with local plans	None	Mode is inconsistent

The next step in the process is to advance the project to a preliminary engineering and design phase. This next phase will provide a more robust cost estimate so that UTA can identify the capital funding source for construction and implementation of the LPA. The following step, after preliminary engineering is to identify a capital funding source. It is acknowledged that there are several areas of concern as identified herein that will need to be addressed in subsequent phases of project development. Chapter 6 describes these areas of concerns. As illustrated in Figure 1-2, the UTA Non-Federal Project Environmental Process, additional project development efforts including environmental study, detailed engineering and design, refined cost estimates, and additional public meetings and hearings will occur as the project development moves forward.