1.0 Introduction

The downtown area of the City of Tyler is currently undergoing a construction renaissance. Smith County is building a new jail facility at Erwin and Fannin; and the City plans to construct a multilevel parking garage facility at the southwest corner at Broadway and Elm to accommodate current and anticipated commercial growth of the City. These construction activities will reduce available downtown surface and on-street parking and thus disrupt retail, service and governmental business activities. The City desires to minimize the impact of reduced parking spaces during this construction period for the benefit of its local citizens.

The purpose of this study is to determine the opportunities of using the City's existing transit resources (buses, drivers, and administrative staff) to mitigate the impact of construction activities currently facilitating the loss of on-street and surface parking lot facilities. To accomplish this, this study evaluates the feasibility of developing park and ride shuttle bus services that will transport riders from a city owned downtown parking lot located at Bonner near City Hall, to the Courthouse Square area located within the downtown's core. There are three primary market groups for this service. The first is the numerous construction workers who are, and will be engaged in the building of County, City and private sector projects within the study area. Second, are those individuals who are tenants of the Fair Building who use the surface parking lot that will be transformed into a structure parking garage. And third are office workers, professional, etc. working downtown, who typically work Monday through Friday, 8:00 AM to 5:00 PM.

2.0 Study Goals and Objectives

The City of Tyler initiated this study as a means to better serve the transportation and parking needs of City and County residents. The study's focus is to evaluate and develop a transit strategy that will directly enhance vehicle parking within the downtown study area.

The primary goal is to evaluate and test the feasibility of operating a downtown park and ride shuttle bus service that will promote more efficient use of downtown on-street and surface parking lot resources. Objectives include:

- Estimate potential park and ride shuttle bus service user demand by conducting a parking use and needs assessment of the downtown area;
- Develop the operational aspects of the shuttle bus service (i.e. route, stops, operational hours, etc.) that will provide a valued service to users.
- Determine the costs of providing such a service and conduct a break-even financial analysis;
- Maximize the use of Federal Transit funding; and
- Develop an implementation plan for the shuttle bus service.

3.0 Study Methodology

To achieve the goal of promoting more efficient use of downtown parking resources the study methodology is comprised of four components. The first is a description of the elements that comprise the downtown study area. The second is to develop and conduct a survey of the various businesses and governmental agencies located within the study area. The purpose of the survey is to collect information regarding the parking habits of persons who work in the downtown area; and to gain insight into the perceptions and/or parking needs of businesses, its employees, as well as customers and clients. The third is to estimate the potential user demand for the shuttle bus service. The fourth component is to conduct a financial break-even analysis to determine the financial implications of implementing a park and ride shuttle bus service.

3.1 Description of the Physical Study Area

The study area is bifurcated into east and west sections. The east section represents the 12 city block shuttle bus user downtown destination study area. This area is bounded by Bois De Arc by on the west; Erwin on the south; by Spring on the east; and Ferguson on the north. The area contains approximately 1,200 surface and on-street parking spaces.

The west section provides the physical continuity between the shuttle bus user downtown destination study area and the location of the City owned parking lot dedicated for the shuttle bus service. The proposed shuttle bus park and ride lot is located mid-block west of Bonner, between Ferguson and Erwin. There are approximately 1,000 surface and on-street parking spaces with this area.

Figures 1 and 2 presents maps of the study area and relevant parking resources respectively.

3.2 Survey of Businesses and Governmental Agencies within the Study Area

A survey was developed and conducted to obtain information regarding the perception of parking needs from individual businesses and governmental agencies. The survey consisted of eight questions designed to gather information:

- Relating to parking accommodations for employees and customers;
- Expressing the interviewee's perceptions of existing parking availability; and
- Soliciting their impressions for the value of, and their support for, a downtown shuttle bus service.

Members of the consultant team attempted to physically visit all businesses and governmental offices within the downtown study area. When business and government representatives were not initially available, a follow-up visit was conducted. In total, 70 businesses and governmental offices were surveyed. **Table 1** categorizes and presents the relevant information by business type and corresponding number of employees.

Table 1: Business Type

Business Type	Number of Businesses	Employees
Restaurant	6	70
Retail	2	8
Financial	7	30
Office	37	577
Entertainment	1	3
Bar	1	4
Government	5	268
Law	5	32
Other	5	28
Total	70	1,020

Of these, 57 percent were private and 27 percent were governmental offices. The remaining 16 percent of business were restaurants, law firms and financial. Of these, 70 percent of downtown employers provide parking for their employees; and 16 percent provided parking for their patrons and/or customers.

Further, the survey shows that more than 1,000 persons are employed by business and governmental organizations with the study area. Of these employees, a total of 78 percent of employees use long-term parking that is from 8:00 AM to 5:00 PM. Furthermore employee parking is segmented with 74 percent of persons using surface parking; six percent using parking garages; and 20 percent using on-street parking.

An additional feature of the survey included attitudinal questions. The purpose of questions is to gain insight into the "personal perceptions" of persons surveyed. For this study there are two specific areas that are particularly relevant. The first is the perception of employers regarding parking conditions within the study area. Survey results showed that 26 percent and 50 percent of businesses stated that parking was a difficultly for their employees and their patrons respectively.

The second is to determine the predisposition of potential users to the park and ride shuttle bus service concept. Worded differently, the question is whether employees would consider using the park and ride shuttle buses services if it were made available. Of the more than 300 respondents surveyed, 40 percent (120 respondents) said they would use the shuttle bus service; 27 percent (81 respondents) said they may use the service; and 33 percent (99 respondents) stated they would not use the service.

3.3 Characteristics of Park and Ride Shuttle Bus Services

After evaluating the results of the downtown parking needs survey, the street network was evaluated to determine the most effective shuttle bus route. Criteria used to design the route include:

- Maximizing the number of times the shuttle bus can circulate through downtown on a per hour basis;
- Making the route convenient for potential users by minimizing user travel time to their final downtown destinations; and
- Providing convenient and safe bus stop locations;

As stated previously, the City owned parking lot is located west of Bonner, between Ferguson and Erwin. It is located approximately four blocks from the center of the study area and is the anchor location for the shuttle bus service. The lot will provide a minimum of 150 parking spaces, and has capacity for additional parking spaces if demand warrants.

The shuttle bus route will begin service at the park and ride lot, which is proposed to be clearly marked by bus stop signage and a shelter. The route proceeds south to the intersection of Bonner and Erwin. The route turns east (i.e. left) on to Erwin and proceeds to College. At College, the route turns south (i.e. right) and proceeds to Elm. At Elm the route turns east (i.e. left) and proceeds to Broadway. At Broadway the route turns north (i.e. left) and proceeds to Erwin where it turns east (i.e. right). The route continues on Erwin until intersects with Spring. At Spring the route turns north (i.e. left) and proceeds to Ferguson. At Ferguson the route turns west (i.e. left) and proceeds the length of the study area until it comes to Bonner, where it turns south (i.e. left) and terminates at the proposed park and ride lot. The approximate total distance of the route is one mile. **Figure 3** map present the proposed park and ride shuttle bus route.

In addition to the park and ride lot, four locations have been identified as potential bus stops for the park and ride shuttle bus service. These four locations were chosen for their potential to:

- Maximize the potential for user ridership;
- Maximize convenience for users;
- Minimize bus conflicts with existing street traffic operations; and
- Promote shuttle bus user safety,

They are:

Stop 1 - is located at the southwest corner of Erwin and College. This location is ideal to serve potential shuttle bus users that office and work in the Petroleum and Bank of America buildings; and businesses located mid-block either side of College on Erwin.

Stop 2 - is located at mid-block on Elm, between College and Broadway. This location was chosen to conveniently accommodate the construction workers who will be involved in constructing the City's new multilevel parking garage.

Stop 3 - is located at the traffic island at Erwin and Spring. This location will serve business located along Spring, between Erwin and Ferguson, as well as the store-fronts located just east of Broadway. Additionally, this stop will be convenient for construction workers who are working on the new county jail complex located at Erwin and Fannin.

Stop 4 - is located near the northwest corner intersection of College and Ferguson. This location will serve workers located in the Federal, Petroleum (including renovation workers) and Bank of America buildings; as well as store fronts along Ferguson, east of College.

3.4 Components of an Effective Shuttle Bus Service

There are three key components that make for an effective park and ride shuttle bus service. One is to minimize the shuttle bus user's travel from the designated parking lot to their business destination. Second is providing bus service that circulates at frequent intervals within the downtown area and is reliable to users who rely upon the bus service being on time at a given stop. Third, is providing the shuttle bus user with parking that is cost competitive.

3.4.1 Walking Time from Shuttle Bus Parking Lot

Knowing the time it takes for a person to park their vehicle and walk to their work destination is critical in determining whether a park and ride shuttle bus service will be effective. A person's walking time is

compared to the travel time associated with riding the shuttle bus traveling the same route to a same destination in order to determine the time differential between the two modes of travel.

A well established analysis methodology was used to determine the average time it takes to walk from the shuttle bus park and ride lot to the four proposed shuttle bus stops. A person, walking at a moderate pace, recorded the time it took to walk from the proposed shuttle bus parking lot to each bus stop location. This was repeated multiple times, with the walking times averaged upon completion. It should be noted that the anticipated walking route of a person was the most direct that a person would use in getting from the shuttle bus parking lot to a proposed bus stop that is most convenient to a user's final destination. Therefore, the route take by the person conducting the walking survey, paralleled the proposed shuttle bus service route. **Table 2** presents the average walking times from the proposed park and ride lot located at Bonner to the four proposed shuttle bus stop locations.

TABLE 2: Average Walking Time by Location

Route: From the Proposed Park and Ride Lot to:	Average Walk Time
Stop 1 – College, midblock between Erwin and Elm	5 minutes, 36 seconds
Stop 2 – Elm, midblock between College and Broadway	7 minutes
Stop 3 - Erwin and Spring (at traffic island)	7 minutes, 38 seconds
Stop 4 – Northwest corner of College and Ferguson	4 minutes, 50 seconds

3.4.2 Shuttle Bus Travel Times

A well established analysis methodology was used to determine the travel time for the shuttle bus service, starting at the proposed park and ride lot and traveling the shuttle route. Using a city transit bus, three separate travel runs were completed. The physical starting point for shuttle bus travel time was the location for the proposed park and ride lot. For each route trip, the time required to travel to each stop was recorded. These individually recorded times were then averaged, smoothing out the effects of traffic movement and traffic signal influences. Additionally, for each bus stop a total of 15 seconds was added to bus travel, accounting for off-loading passengers during AM operations and loading passengers during PM operations. **Table 3** presents the shuttle bus route travel time.

TABLE 3: Average Bus Route Travel Times

Route: From the Proposed Park and Ride Lot to:	Average Travel Time
Stop 1 – Southwest corner of Erwin and College	I minute, 48 seconds
Stop 2 – Elm, midblock between College and Broadway	2 minutes, 36 seconds
Stop 3 - Erwin and Spring (at traffic island)	3 minutes, 36 seconds
Stop 4 – Northwest corner of College and Ferguson	5 minutes, 25 seconds
Stop 5 – Back to the Park and Ride Lot	6 minutes 28 seconds

After the individual person walking times and the shuttle bus travel times were determined, the next step in the analysis is to calculate the amount of time that can be saved by potential shuttle bus users. The personal value placed on the time saved by potential users, augmented by the comfort and controlled climate offered by the bus, and the convenience of door-to-door pick-up service will all be factors in attracting and maintaining shuttle bus ridership. **Tables 4 and 5** present the time difference between a person walking from the park and ride lot and riding the shuttle bus.

TABLE 4: Comparison of Walking verses Bus Travel Times (AM)

Location (Starting and the Park and Ride Lot)	Average Walking Time	Average Bus Travel Time	Difference
Stop 1 – Southwest corner of Erwin and College	5 min and 36 sec	1 min and 48 sec	3 min, 48 sec
Stop 2 – Elm, midblock between College and Broadway	7 minutes	2 min and 36 sec	4 min, 24 sec
Stop 3 - Erwin and Spring (at traffic island)	7 min, 38 sec	3 min and 36 sec	4 min, 2 sec
Stop 4 – Northwest corner of College and Ferguson	4 min, 50 sec	5 min and 25 sec	-(35 sec)*

*The shuttle bus user could reduce their bus travel time by approximately 3 minutes if they would exit the bus at Stop 1 and walk to their destination in the AM.

TABLE 5: Comparison of Walking verses Bus Travel Times (PM)

Location (Ending at the Park and Ride Lot)	Average Walking Time	Average Bus Travel Time	Difference
Stop 1 – Southwest corner of Erwin and College	5 min and 36 sec	4 min and 40 sec	56 seconds
Stop 2 – Elm, midblock between College and Broadway	7 minutes	3 min and 52 sec	3 min, 8 sec
Stop 3 - Erwin and Spring (at traffic island)	7 min, 38 sec	2 min and 52 sec	4 min, 46 sec
Stop 4 – Northwest corner of College and Ferguson	4 min, 50 sec	1 min and 03 sec	3 min, 47 sec

Results of the analysis shows that shuttle bus users will experience a significant savings in walking time for (ranging from 35 percent and 60 percent depending on shuttle bus stop location) 80 percent of the proposed shuttle bus stop locations.

Only at one shuttle bus stop (Northwest corner of College and Ferguson during the AM operating period) do bus shuttle users experience a negative time difference of 35 seconds compared to actual walking time. However, if the person getting off at the College and Ferguson bus stop were to exit the shuttle bus at Stop 1 (at the corner of Erwin and College) and walked one block the difference between their walking time and shuttle bus riding time would be a positive 3 minutes using the shuttle bus service.

As stated previously, in addition to the time-savings benefits of the bus shuttle service when compared to walking-times; there are a number of non-quantifiable benefits. First, is the personal comfort of being transported in an environmentally controlled vehicle. This is particularly relevant during periods of inclement weather such as rain, the summer heat and winter cold. Second, the location of the shuttle bus stops are such that a shuttle bus user will be approximately no more than one city block from their place of business. This would be of aid to anyone who may have limited walking ability.

3.4.3 Shuttle Bus Service Schedule Frequency and Dependability

Frequency and dependability of service are two important components in the success of shuttle bus service. Shuttle bus travel time runs show that a complete shuttle circuit starting at the park and ride lot, and traveling through the downtown study area can be completed within 6 minutes and 28 seconds. This means that a total of eight complete shuttle circuit trips can be made for each hour of operating time. Therefore a user's maximum wait time for shuttle bus service will be no more than seven minutes; with an average wait time of no more than three minutes.

Dependability is another important component of providing a successful shuttle bus service. Shuttle bus dependability means that schedule adherence is such that users know with confidence when a shuttle bus will be at a give bus stop. On-time performance of typical city bus operations has two fixed criteria. First is that a bus can never arrive and leave a stop ahead of the established schedule. If a bus should arrive at a stop early it must wait until time has elapsed putting the bus back on the correct travel schedule. Second is that a bus is considered on time (for a route with a headway of 30 and 60 minutes) if it arrives no later than five minutes per the given stop arrival time. However, for a shuttle bus service that operates on seven minute headways a late arrival time of no more than 30 seconds is an acceptable standard.

3.4.4 Determination of the Fares for the Shuttle Bus Service

The setting of fares for the downtown shuttle bus service has two primary functions; one is to financially incentivize potential users to use the service; and the other is recouping operating costs for providing the service. The former is a marketing function and the latter is a financial revenue issue. Therefore it is

appropriate at this point in the study report to examine the issue of fares as a marketing function. Fares as a financial revenue issue will be addressed later in the service cost section of this study report.

Consumer demand for a service or product is the basis for determining its value, and what the market will bear in terms of what will be paid for a given service. In the case of the downtown shuttle bus services, a number of factors come to in play in determining the value a potential user may place on the service. They include:

- The value a person places on the convenience and personal time savings afforded to them by the service;
- The disincentive value of transferring from one mode of transportation to another (i.e. going from a personal vehicle, to a bus, to their final destination as opposed from a personal vehicle to their final destination;
- The cost of private parking, and whether the cost is born by one's employer or by the user themselves; and
- Monthly rates for park and ride shuttle bus service verses the cost of commercially available long term parking.

The first two factors are qualitative in nature. They to not easily lend themselves to a quantitative determination; and to attempt to value as such are outside the scope of this study. However both of these factors are tangentially connected to the other factors: commercial parking rates and direct cost to the person whose commute trip requires them to pay for long-term parking. As such, the following discussion on determining the fare structure of the proposed park and ride shuttle service will focus on comparative commercial parking cost.

Commercial service parking that serves the parking needs of person within the study area range from $5 per day to $8 per day. Long-term contract rates for the same commercial surface lots range from $35 to $45 per month. And it is these monthly rates that are relevant in determining the appropriate fare structure of shuttle bus services.

Additionally, whether the person using the parking facilities personally bears the cost, partial or full, or an employer covers the cost as a benefit to their employees, will have a direct impact on the value a potential user will attribute to the shuttle bus service. For example, if office workers are financially responsible for their own parking costs, they will value the shuttle service more than if the cost of parking is subsidized by their employers. The more cost conscience a potential shuttle bus user is, the more value they will place on the shuttle bus service as a way to reduce their commuter costs.

To fully understand how a potential user will respond to monthly parking prices, a sensitivity analysis would need to be conducted which is outside the scope of this study. However, one can reasonable conclude that the value a potential user of the park and ride service would be less than they currently

pay for surface parking nearer to their place of work. Therefore, for the purposes of financial analysis component of this study it will be assumed that the competitive rate of $30 per month will be the price shuttle bus users are willing to pay for the use of the service.

3.5 Estimation of Potential Ridership for the Service

Park and ride operations are effective in serving commuters who need long-term parking in excess of 8 or more hours per day. These types of users park their personal vehicles at the beginning of their work day, leave the vehicles unused, and return to them at the end of the workday for the commute home.

There are two specific types of consumers that are ideal for park and ride shuttle bus services: construction and office workers. These consumers typically have set hours of work at a fixed location.

3.5.1 Construction Workers

One of the objectives of the study is to provide alternative parking for the many construction workers who are, and will be, engaged in the numerous construction activities in and around the central downtown area. These tradesman and workers typically begin their work day at 7:00 AM and end their workday at 4:00 PM. Unlike patrons of business and citizens accessing governmental agencies, whose need for parking is two hours or less, construction worker need for a parking space is typically eight to nine hours. This need of long-term parking within the busiest area of the downtown puts additional demand on limited parking resources.

During the height of the anticipated 18 months of downtown construction activities, it is estimated that construction worker numbers will reach as high as 160 per day, and will need a corresponding number of parking spaces. Unlike construction workers, consumers will occupy a given parking space typically for two hours or less. Thus, where 160 spaces will be needed to accommodate construction workers, the same number of parking spaces can serve potentially 640 consumer users (assumes a turnover every two hours) during a typical hour business day.

3.5.2 Office Workers

Office workers are another potentially fertile market for park and ride shuttle bus services. Office workers, similar to construction workers, maintain fixed work hours typically from 8:00 AM to 5:00 PM Monday through Friday. Their parking needs are also similar in that once the vehicle is parked in the morning; it is not used until the driver leaves in the late afternoon for their commute home.

A survey of the downtown businesses showed that 40 percent of persons interviewed stated that they would use the shuttle bus service if available. By extrapolation, if this 40 percent were applied to the

approximately 775 employees (working 8 AM to 5 PM) indentified in the survey, a pool of 310 office workers would be potential users.

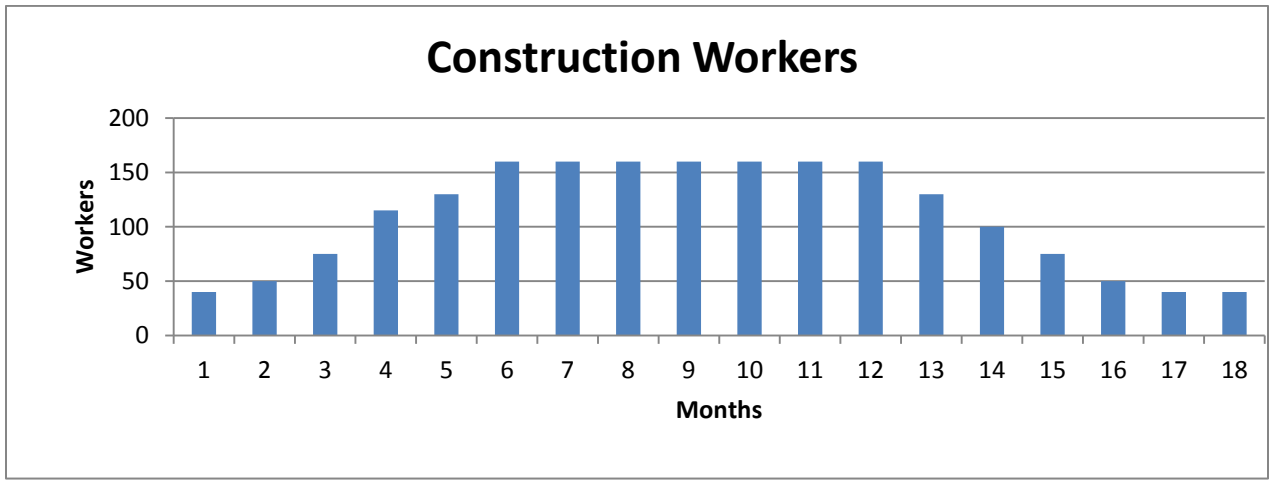
3.6 Analysis of Potential Shuttle Bus Service Users

An accurate estimation of potential ridership for the shuttle bus service is essential in determining the financial break-even point for the project. As with all prudent financial analyses, one should be conservative in their estimates. And since the ridership figures are the basis for the cash flow analysis for the project, reason dictates that a conservative estimate of potential ridership is in order.

For the purposes of this analysis, only the categories of construction workers and office workers (i.e. long-term parking) will be the considered as the pool for potential users of the shuttle bus service. That is not to say that other categories of potential users do not exist, but rather the quantifying their numbers for the purposes of this study is consider unreliable.

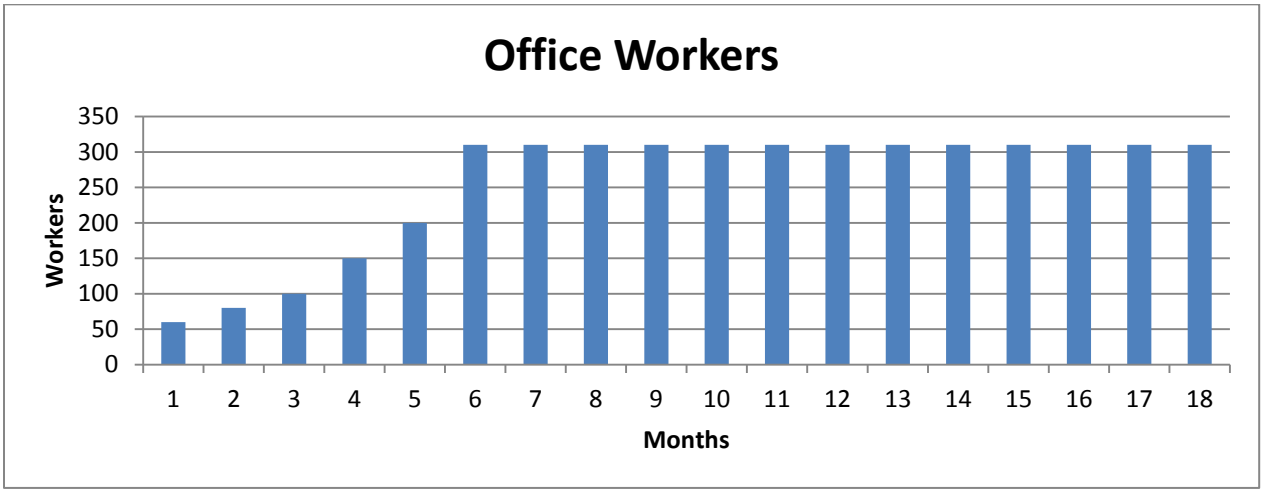
Per conversations with City and County officials and City staff, it is estimated that the two major governmental construction projects, the County jail expansion and the City's parking multilevel parking garage, will generate a construction workforce of approximately 160 persons during the peak of construction. Their associated vehicle parking needs will begin gradually; grow to its highest level during the peak construction period, then gradually taper down until the construction for the two projects as competed. **Table 6** shows an estimate of constructions worker and subsequent parking space needs over a construction period of 18 months.

TABLE 6: Estimate of Construction Workers Affecting the Study Area



The survey showed that 40 percent of office workers answered affirmatively when asked if they would avail themselves of the shuttle service. If you extrapolate this percent over the number of office workers identified in the survey (i.e. 775 persons) you would have a pool of 310 office workers potentially using the shuttle bus service. It is anticipated that the closure of the currently operating parking lot located at the southwest corner of Broadway and Elm where the City's multilevel parking garage will be built, will initially generate users for the shuttle bus service. Currently there are approximately 60 parking spaces contracted on a long-term monthly basis. Using 60 as the starting point for potential users, one could logically increase the number of potential office workers until demand maxes out at 310 users. **Table 7** below graphically presents potential pool of office workers available to use the shuttle bus service over an 18 month period.

TABLE 7: Estimate of Officer Workers as Potential Shuttle Bus Users



3.7 Revenue Estimates

As stated previously, any financial estimate that is based upon the ridership projections, especially for a new service, must be approached conservatively. For the purpose of this study, two different revenue scenarios have been developed for the financial analysis. Scenario 1 assumes a capture rate of 60 percent of the estimated construction worker pool (peak of 160 workers) and a capture rate of a base of 60 (contact parkers being displaced by construction of the City's parking garage) plus 25 percent of office worker pool (peak of 310 workers).

Scenario 2 assumes a capture rate of 75 percent of the estimated construction worker pool (peak of 160 workers), and a capture rate of a base of 60 plus 40 percent of the estimated office worker pool (peak of 310 workers). Using a monthly parking rate of $30 revenues can be projected. **Table 8** presents a range of revenue estimates by quarter over an 18 month period of operations.

TABLE 8: Revenue Estimates by Quarter

Estimated Revenues	Q 1	Q2	Q3	Q4	Q 5	Q6
Scenario 1	$9,720	$1,7655	$23,040	$23,040	$19,890	$16,740
Scenario 2	$11,273	$22,425	$30,600	$30,600	$26,663	$22,725

It should be noted that the rise and fall of estimated revenues throughout the calendar quarters is due to the anticipated ramping up/down of construction worker activities.

3.8 Costs of Providing the Shuttle Bus Service

There are two areas of costs associated with the implementation of a shuttle bus service; one is capital costs and the other is operating costs. The City will minimize capital costs associated with the shuttle bus service by using its existing bus fleet to provide the shuttle bus service. These buses have a seating capacity for 28 passengers, and thus can comfortably accommodate up 154 persons per hour of shuttle bus operations. Other capital costs include providing shuttle bus stop signs (fabricated and installed by the City), bus shelter located at the parking lot, maintenance of the buses and any physical bus markings needed to identify and promote the buses deployed for the shuttle service, such as flag banners affixed to the buses during service operations.

Operating costs are those costs that are incurred providing the ongoing service. This includes fuel, labor (i.e. drivers), etc. The City maintains an extensive reporting system that tracks all of the operating costs associated with providing transit service on a monthly basis. This detailed record keeping is also a requirement for obtaining federal transit funding.

Using available cost data, operating costs for transit services can be conveniently expressed in cost per "bus hour" of operation. The City's most recent analysis of transit service shows an hourly bus operating cost (both operating and capital expenditures) of $82.17. Fortunately the City does not have to bear the full cost of transit operations. The Federal Transit Agency (FTA) provides up to 50 percent of transit operating costs and 80 percent for capital costs.

As previously stated, it is anticipated that the shuttle will operate a total of four hours per weekday (2 hours in the AM and 2 hours in the PM). Extending the operating hours an average of 22 weekdays per month, total monthly bus hours of operation will be 88. **Table 9** presents the operating costs associated with providing the downtown park and ride shuttle bus service.

TABLE 9: Monthly Bus Operating Costs

Shuttle Bus Service	Cost per Bus Hour	Monthly Hours	Cost Per Month
With Federal Funds	$32.60	88	$2,869
Without Federal Funds	$82	88	$7,231

To determine how many parking spaces would have to be rented to recover the City's operating cost for providing the shuttle bus service is a straight forward calculation. The total monthly cost is simply divided by the rent price per month. Using a rental value of $30 per month as identified in Section 3.4 of this document the City would need to rent 96 space (with Federal Funding) and 241 spaces (without federal funding to break-even for providing the park and ride shuttle bus service. **Table 10** presents sensitivity analysis of the number of rented parking spaces needed to cover operating cost at different pricing levels.

TABLE 10: Number of Leased Spaces to Cover Operating Cost

Shuttle Bus Service	Monthly Operating Costs	Lease Spaces to Cover Cost ($25 per Month)	Lease Spaces to Cover Costs ($30 per Month)	Lease Spaces to Cover Costs ($35 per Month)
With Federal Funding	$2,869	115	96	82
Without Federal Funding	$7,231	289	247	207

3.9 Revenue-Cost Analysis

To determine the financial impact of providing the shuttle bus service a comparison of the cash flows per quarter must be compared to quarterly costs. **Tables 11 and 12** shows the estimated quarterly revenues and costs for two different ridership capture rate scenarios (with and without federal funds). Scenario 1 assumes a capture rate of 60 percent of the estimated construction worker pool (peak of 160 workers) and a capture rate of a base of 60 (contact parkers being displaced by construction of the City's parking garage) plus 25 percent of office worker pool (peak of 310 workers).

Scenario 2 assumes a capture rate of 75 percent of the estimated construction worker pool (peak of 160 workers), and a capture rate of a base of 60 plus 40 percent of the estimated office worker pool (peak of 310 workers).

TABLE 11: Revenue-Cost Analysis with Federal Funding
(Construction and Office Worker Scenarios 1 & 2 Captures Rates)

Revenues and Costs with Federal Funds	Q1	Q2	Q3	Q4	Q5	Q6	Total Cash Flows
Scenario 1 Revenues	$8,820	$16,290	$19,655	$19,655	$16,515	$13,365	$94,300.00
Scenario 1 Costs	$8,606	$8,606	$8,606	$8,606	$8,606	$8,606	($51,636.00)
Difference	$214	$7,684	$11,049	$11,049	$7,909	$4,759	$42,664.00
Scenario 2 Revenues	$9,833	$20,273	$25,200	$25,200	$21,263	$17,325	$119,094.00
Scenario 2 Costs	$8,606	$8,606	$8,606	$8,606	$8,606	$8,606	($51,636.00)
Difference	$1,227	$11,667	$16,594	$16,594	$12,657	$8,719	$67,458.00

TABLE 12: Revenue-Cost Analysis without Federal Funding
(Construction and Office Worker Scenarios 1 & 2 Captures Rates)

Revenue and Costs without Federal Funds	Q1	Q2	Q3	Q4	Q5	Q6	Total Cash Flows
Scenario 1 Revenues	$9,720	$17,640	$21,015	$21,015	$17,865	$14,715	$101,970.00
Costs	($21,648)	($21,648)	($21,648)	($21,648)	($21,648)	($21,648)	($129,888.00)
Difference	($11,928)	($4,008)	($633)	($633)	($3,783)	($6,933)	($27,918.00)
Scenario 2 Revenues	$11,273	$22,433	$27,360	$27,360	$23,423	$19,485	$131,334.00
Costs	($21,648)	($21,648)	($21,648)	($21,648)	($21,648)	($21,648)	($129,888.00)
Difference	($10,375)	$785	$5,715	$5,718	$1,775	($2,163)	$1,446.00

The revenue-cost analysis shows that under Scenario 1 revenues, where Federal funds are eligible to defray operating and capital costs ($8,606 per quarter), and ridership captures of 60 percent and 25 percent of the construction worker and office work markets respectively, cash flow is positive for all six calendar quarters of operations. Total revenues for the six quarters of operation total $94,300, and

costs for the same period total to $51,636. Thus, providing a projected surpass of approximately $43,000 over the operating period.

The revenue-cost analysis shows that under Scenario 2 revenues, where Federal funds are eligible to defray operating and capital costs; and ridership captures of 75 percent and 40 percent of construction worker and office worker markets respectively, cash flow is positive for all six calendar quarters of operation. Total revenues for the operating period are $119,094, and costs for the same period are $51,636. Revenues surplus accumulates to approximately $67,000 the operating period.

The cost-revenue analysis shows that under Scenario 1 revenues, where federal funds are not eligible to defray any of the shuttle bus services operating costs ($21,648 per quarter), and ridership captures 60 percent and 25 percent of the construction worker and office work markets respectively, cash flow is negative for all six calendar quarters of operations. Total revenues for the operating period are $101,977, and costs for the same period are $129,888. Revenue losses total to approximately $28,000 for the operation period.

The break-even analysis shows that under Scenario 2 revenues, where Federal funds are not eligible to defray operating and capital costs, but where ridership captures 75 percent and 40 percent of construction worker and office work markets respectively, cash flow is negative for the first and last calendar quarters of operations. Total revenues for the operation period are $131,334, and costs for the same period are $129,888. Revenue surplus accumulates to approximately $1,446 for the operating period.

It should be noted at this point that a minimum variation in the number of projected users can cause substantial movements (positive or negative) in estimated cash flows. Again, this should reinforce the prudence in using a conservative analysis methodology for determining ridership estimates.

4.0 Marketing of the Shuttle Bus Service

The success of the park and ride shuttle bus service will require the City to engage in a direct marketing campaign to vigorously promote the shuttle service to the public. Initially, this campaign should include radio and television public service announcements, as well as service information on the City's and County's websites. These service announcements should focus on highlighting the 3Cs of marketing for transit services: convenience, comfort and cost.

Conveniences of the shuttle bus service includes: frequency of the service (bus available every 7 minutes), and door to door curb service. Comfort of the service includes being transported using climate controlled buses that eliminates a user's exposure to unfavorable weather conditions (i.e. heat,

cold, rain, etc.) Costs for the service will be competitive (less than) the currently going commercial rates for long-term surface parking.

However, the marketing described above are all traditional passive marketing techniques for typical transit services. Although very necessary and useful in building ridership, these techniques will need to be augmented by other, more pro-active marketing actions. These techniques include:

- Direct selling of parking passes to users;
- Staffing store fronts within the study area to promote and sell parking passes directly;
- Enlisting the help of local civic organizations in promoting the service;
- Providing weekly promotional prizes (such as gas cards) to customers; and
- Making the purchase of parking passes easy and convenient by accepting credit and debit cards at the point of purchase.

Branding of the service is another critical component for the successful implementation of the shuttle bus service. The purpose of branding is to make the service being offered memorable and desirable to potential users. This is very important when marketing to persons who have personal mobility and financial options.

Branding of the shuttle bus service will have two differentiating attributes: physical and customer service. Physically branding the service means that the buses, bus stop signs and even the parking lot must have a distinct character all its own that separates the service for exist bus services. This can easily be done by creating a unique logo for the service that is physically displayed on the bus, bus stop, and park lot shelter.

Customer service branding relates to how the service delivered to the potential users. Customer service branding includes: proactive driver interactions with users, continuous quality of service surveys, and using technology to interface directly with a users phone, computer and tablet as a means of providing relevant information to the shuttle bus service users.

5.0 Maximizing the use of Federal and State Transit Funds

Federal and state funding of transit services is a significant financial component of providing local transit services. Operational costs for approved transit services are funded at a 50 percent level by the Federal Transit Agency (FTA), and the remaining 50 percent is funded by the City; either through the collection of bus fares, general revenue funds and/or a combination thereof. This process is well documented, understood, and executed by City's transit department and requires no future discussion within the context of this study.

But less understood is the process and requirements for using local in-kind City services as "match" funding for federal and state dollars in providing local transit services. In-kind services are local resources and services that provide direct value to a transit service. These services, quantified in dollar terms, can be used directly by the City as part of their 50 percent portion of funding for providing a specific transit service, such as the downtown park and ride shuttle bus service. Examples include:

- The value (rent per space per month) of the City owned park and ride shuttle bus parking lot may be recognized as part of the City's 50 percent match for federal funding for the shuttle bus service.

- Local businesses that provide discounts (not donations) in services or equipment that directly supports the shuttle bus service may qualify as in-kind match funds.

- City incurred costs associated with maintaining the parking lot for the service (i.e. cleaning the bus shelter, trash pickup, swiping the parking lot, etc.) are eligible as in-kind matching funds for providing the service.

To date there has been some confusion as to the specific criteria and process used in qualifying local resources for in-kind matching funds. This confusion stems from the coordination of information between the federal and state transit agencies that are responsible for overseeing the governmental funding process. However, this situation should be remedied soon as the Texas Department of Transportation (TxDOT) Transit Division is currently preparing definitive documentation on the subject to be presented to local transit agencies later this year.

6.0 Implementation Plan Outline

The purpose of an implementation plan is to provide a documented process that identifies the project management actions that need to be taken by the City to effectively implement the shuttle bus service. Elements of an effective implementation plan includes: project management, development of an implementation schedule and the establishment of performance criteria evaluate the progress and effectiveness of the service.

6.1 Program Management

To implement the shuttle service successfully a management structure must be established. Although service implementation will involve a number of persons at the City, a single individual (i.e. a project manager) should be identified and given the responsibility for the overall implementation and monitoring of the shuttle bus service. This person will be responsible for interfacing with the public (employers and employees), directly promoting the service and addressing any issues related to implementing the service. The duties of this person include:

- Determining the design activities necessary for "branding" the shuttle bus service;
- Overseeing the design, manufacture and installation of the service's bus stop signs;
- Determining and overseeing the physical branding of the buses to be used for the service;
- Overseeing the design, production and distribution of the shuttle bus parking passes;
- Overseeing the training of the bus drivers who will be assigned to the service;
- Overseeing startup activities (AM and PM) to insure proper implementation of the service;
- Periodically conducting interviews of users to determine their satisfaction (or non-satisfaction) with the service;
- Developing a direct marketing campaign (i.e. TV, radio, internet, newspaper, etc. public service ads) promoting the service;
- Making personal presentations to business, governmental and civil groups promoting the service; and,
- Preparing monthly project progress reports that present analysis of ridership and financial information.

Task 6.2 Development of an Implementation Schedule

There are a number of actions that must be taken to implement the shuttle bus service. The project manager should prepare a simple critical path analysis to identify individual project components, their sequence of implementation, and the time required to implement each component. Once this is completed it can easily be determined the order in which actions must be taken. Elements of the schedule should include:

- Time needed to physically brand buses;
- Time needed to manufacture and install bus stops;
- Time needed to produce and implement bus pass materials;
- Time needed to install bus shelter at park and ride lot;
- Time needed to train bus driving staff; and
- Time needed to organize, prepare and implement marketing materials and plan.

After the project manager has determined the time required to implement each of the above project components she or he should determine which elements make up the critical path of the services implementation. This critical path will show which elements drive (i.e. necessary sequence of completion) the implementation schedule. From this, the project manager can determine the linear maximum time period needed for implementation of the service.

6.3 Development of Performance Criteria

Performance criteria are needed to determine how well the shuttle service is meeting its operational goals. Standard transit service performance criteria include: schedule adherence, number of passengers carried, number of parking spaces used, etc. These criteria will tell the City how well the

service is performing in support of the primary goal of attracting sufficient number of users to financially cover the expenses for providing the service.

However, there are other performance criteria that can be very useful in "predicting" how likely a new shuttle service will attract ridership. These performance criteria focus on the pre-implementation actions taken by the City to promote the new service. These criteria include:

Pre-Selling Services to Downtown Business: The level of effort dedicated by the City to sell shuttle bus service to downtown businesses is a good indicator of future use of the shuttle service. The more effort (direct contact with) the City puts into directly to promoting the service to downtown businesses, the greater the use of the service. The number of contacts (physically, telephone, etc.) per month should be considered as the performance criteria for this effort.

Pre-Selling Services to Downtown Workers: Selling the service to downtown workers is similar to that of pre-selling to businesses. The more the City directly markets the service to downtown workers, the greater the use of the service. The number of contacts (physically, telephone, etc.) per month should be considered as the performance criteria for this effort.

Frequency of Public Service Announcements (PSA): Public awareness of the shuttle service and its benefits will directly impact the number of potential users of the service. There is a positive correlation between the frequency of public service announcements and potential users. The number of PSAs (radio, television, newspaper, etc.) per month should be considered as the performance criteria for this effort.

Number of Outlets to Distribute Shuttle Bus Parking Passes: The more convenient it is for potential users to obtain park and ride shuttle bus parking passes the greater number of potential users. City should consider establishing multiple locations within the service area where potential users can obtain parking passes. These locations may include the public library, county court house, federal building, etc. The number of established outlets should be considered as the performance criteria for this effort.

Finally, the City should examine the feasibility of having potential users to purchase their parking passes on-line via personal computers.

7.0 Recommendations

The study analysis shows that the proposed park and ride shuttle bus service can help mitigate the temporary loss of downtown parking facilities due to local construction activities. This proposed shuttle bus service will provide users with a surface parking lot, supplemented with convenient bus transport from the parking lot to their place of work from 6:30 AM to 8:30 AM and from 4:00 PM to 6:00 PM, Monday through Friday.

Cost to the City for providing this service is estimated at $2,869 per month (using federal matching funds). Analysis shows that the City will have to attract approximately 100 parking and ride users per month to financially support the service. The following are recommended actions the City should take in providing the park and ride shuttle bus service.

- The City should appoint a specific project manager to plan, implement and oversee daily operations of the service;
- The service should be uniquely branded to give the it greater visibility and marketability;
- Pre-selling of service to potential users using direct contact, PSAs, establishing multiple store front locations, etc. should start one month prior to implementation of the service; and
- Direct contact between the project manager and the users of the service as a way to monitor the quality and effectiveness of the service.

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