Ames Transit Feasibility Study

Final Report

June 2007

Submitted to:

CyRide

1700 West Sixth Street
Ames, Iowa 50014

Submitted by:

URS

700 Third Street South
Suite 600
Minneapolis, Minnesota 55415

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1.0 SUMMARY

The genesis of the Ames Transit Feasibility Study was an idea by an Iowa State University (ISU) student to reestablish the Dinkey, a steam-powered train connecting downtown Ames to the ISU campus that was operated in the early 1900s. Further consideration of the historic Dinkey resulted in a redefinition to a streetcar study. In this context, the success of modern and historic streetcar systems in cities like Portland, Oregon and Kenosha, Wisconsin were cited.

Along with the discussion of a streetcar study, it became apparent that the larger goal is to address the feasibility of a fixed guideway transit system to serve Ames. According to the National Transit Database[1], fixed guideway is "a public transportation facility using and occupying:

- A separate right-of-way (ROW) or rail for the exclusive use of public transportation and other high occupancy vehicles (HOV), or
- A fixed catenary system useable by other forms of transportation.

Key to the feasibility study is defining the transportation problem so that the recommended solutions address the specific problems, because a single concept, such as the fixed guideway concept, would not be an appropriate solution to be implemented throughout the community.

The transportation corridors and study areas (Figure 1-1) that are the focus of the feasibility study are listed below:

- Corridor 1 – Iowa State Center parking to the ISU campus
- Corridor 2 – ISU to downtown Ames
- Corridor 3 – Thirteenth Street serving the site of the proposed new shopping mall
- Corridor 4 – South Duff retail area
- Corridor 5 – Future development in the area of Mortensen Road (west Ames)
- Study Area 1 – North Grand Avenue and North Grand Mall
- Study Area 2 – Northwest Ames planned growth area

The overall purpose of the Ames Transit Feasibility Study is to evaluate the need for and feasibility of new or modified transit services in the identified corridors and study areas.

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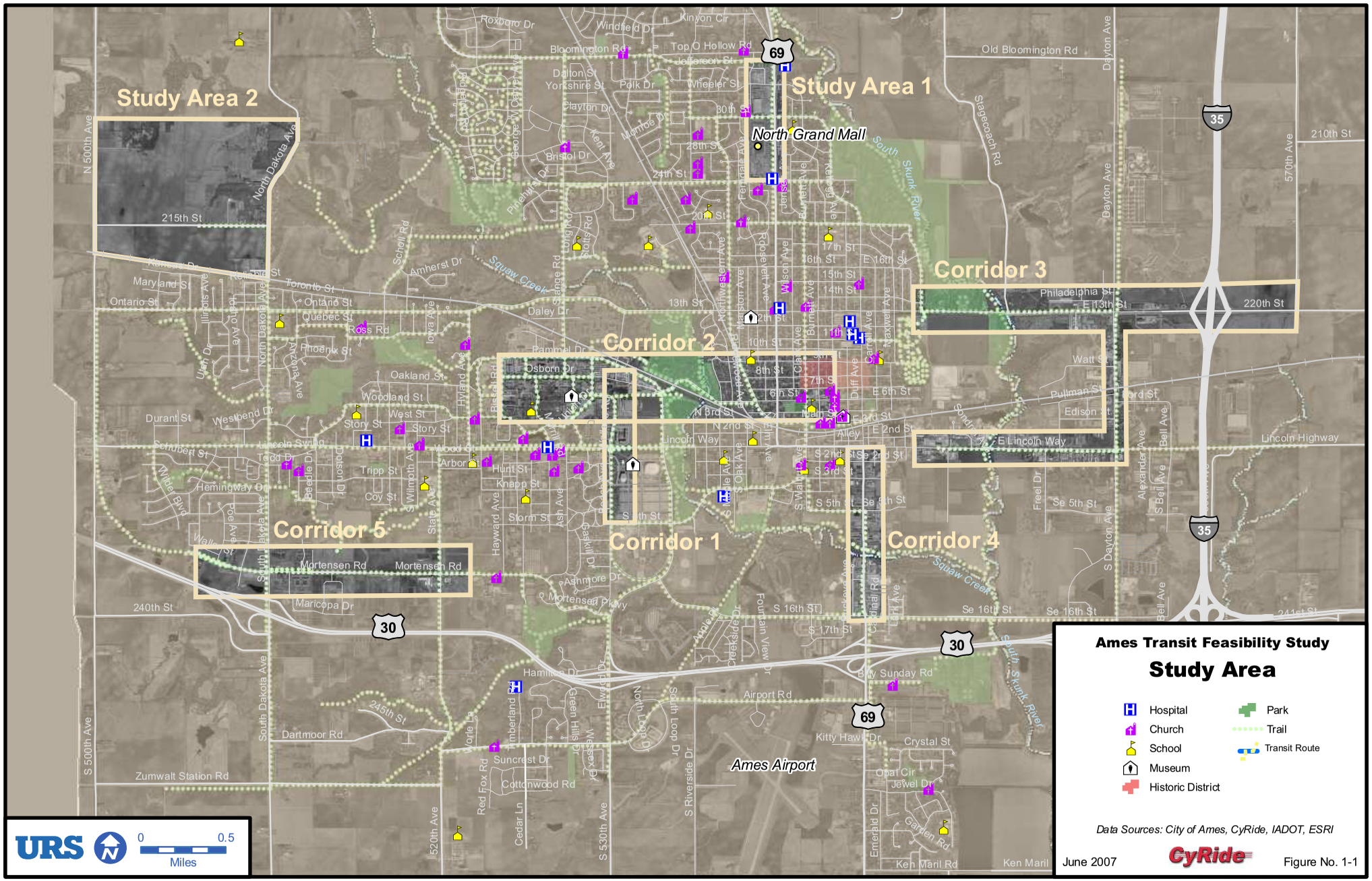
[1] The National Transit Database is the Federal Transit Administration's primary national database for statistics on the transit industry.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School
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1.1 Goal of the Project

The goal of the Ames Transit Feasibility Study is to provide information to decision-makers regarding the feasibility of transit improvements in selected corridors and to assist in prioritizing these corridors.

1.2 Existing Transit Operation

CyRide operates a system encompassing 10 fixed routes, Dial-A-Ride service, and a late night service called Moonlight Express. The fixed route and demand response services operate every day except on Thanksgiving, Christmas and New Year's days. Moonlight Express operates on Friday and Saturday nights when the university is in session. The system operates on headways typically ranging from 10 minutes to 40 minutes. Exceptions to the range include:

- Orange Route: Headways in the peak period run approximately two to three minutes.
- Cardinal Route: Headways run approximately seven minutes.
- Gray: Headways are 60 minutes.

Dial-A-Ride is a door-to-door service operated by CyRide during the same hours as fixed route service. The opportunity to use the service is available to everyone, although patrons eligible for paratransit service as defined by the Americans with Disabilities Act receive a substantially discounted fare. Rides may be scheduled up to two weeks in advance and must be scheduled by 6:00 PM of the night before a trip. Same-day calls will be accepted if there are time and space available.

Ridership Trends

CyRide's current ridership is approximately 4.2 million passengers per year (2006). Over the last 10 years, CyRide's ridership has increased at an average rate of about 4.3 percent per year. In fiscal year 2005 – 2006, 70 percent of CyRide's ridership is served by three routes:

- Orange Route.
- Blue Route.
- Red Route.

Over the same 10-year period the Dial-A-Ride service ridership has declined 36 percent.

Operating Expenses

CyRide's operating expense for the ten-year period from 1996 through 2006 have grown annually from $3.13 million in fiscal year 1996-1997 to $5.34 million in 2005-2006, reflecting an average growth rate of 5.5 percent per year. Operating cost per passenger has only grown 12 percent over this ten-year period, from $1.14 to $1.28. In contrast, operating cost per revenue mile has increased by 27 percent over the same time period.

Revenue Sources

CyRide's revenue sources for fiscal year 2005-2006 totaled approximately $5.65 million. Over 40 percent of this revenue comes from ISU's Government of Student Body ($2.42 million). Another 18 percent ($1.02 million) are from tax levies, while ISU, Iowa Department of Transportation and the Federal Transit Administration (FTA) each contribute eight to 10 percent.

1.3 Travel Demand Forecasts

URS developed a process for adapting the available travel model datasets through incorporating mode split and boarding/alighting information from readily available sources to create a tool for completing the transit ridership forecasts.

The forecasting process was executed through the following four steps:

- Step 1: Convert vehicle trips to person trips.
- Step 2: Estimate existing transit mode share in study areas/corridors using boarding/alighting information from CyRide.
- Step 3: Review forecasted person trip growth between today and 2030.
- Step 4: Develop and apply transit use factors to the 2030 person trips to forecast 2030 transit ridership for study areas/corridors.

The 2030 CyRide ridership forecasts resulting from Step 4 are documented in Table 1-1, which reports forecasted CyRide boardings and alightings.

Table 1- 1
Forecasts of CyRide Boardings and Alightings, by Analysis District[1]

Corridor/Study Area	Description	2030 Person Trip Ends (All Modes)	Forecasted CyRide Mode Share	Forecasted 2030 CyRide Boardings and Alightings
Corridor 1	Iowa State Center to ISU Campus	40,700	26.9 percent	10,960
Corridor 2	Downtown Ames to ISU Campus	23,200	1.4 percent	330
Corridor 3	Downtown to Proposed Regional Retail Site (I-35/13th Street)	44,100	2.0 percent	900
Corridor 4	South Duff Avenue Corridor	71,800	0.4 percent	310
Corridor 5	Mortensen Road Corridor	50,300	9.6 percent	4,850
Study Area 1	North Grand Mall Area	43,100	2.6 percent	1,140
Study Area 2	Northwest Growth Priority Area	29,600	4.9 percent	1,450

1.4 Alternatives Considered

Numerous improvement options ranging from adjusting the existing bus service in a corridor/study area to changing the technology employed to introduction of new routes have been considered in this feasibility study. The breadth of alternatives identified for evaluation in each corridor/study area took into account:

- Current service levels in the corridor, including frequency and hours of service.
- Anticipated development within a corridor or study area.
- Current and forecasted ridership in a corridor relative to generalized thresholds for sustainability of a specific technology or service plan.
- Cost of providing service.

Thus, a consistent but possibly unique set of improvement alternatives was identified for each unique corridor or study area. The range of potential solutions includes:

- Maintain existing service (No Action).
- Expand or initiate standard bus service to the corridor or study area.

[1] Source: URS Corporation.

- Modify the type of bus vehicle used in a corridor. The technology would still be a bus, but a vehicle larger than the 40-foot buses currently used would be initiated to increase capacity without substantially changing the frequency of service. Articulated buses that can seat 105 persons, up from the current capacity of 70 persons, were evaluated as the primary larger vehicle.

- Initiate bus rapid transit (BRT) in the corridor or study area in a combination of mixed-flow and dedicated guideway.

- Initiate streetcar service in the corridor to increase passenger capacity without substantially increasing frequency. The streetcar concept would include a combination of mixed-flow and dedicated guideway service.

- Initiate light rail transit (LRT) service in the corridor to replace the current standard bus service in the corridor or study area. LRT service would require dedicated guideway for the entire length of the implementation corridor.

1.5 Alternatives Evaluation

The evaluation process used in the feasibility study was developed expressly with the breadth of the study area conditions in mind. Each of the alternatives was evaluated relative to a broad range of criteria that incorporated various perspectives (engineering feasibility, environmental impacts and social acceptance).

Each of the key steps in the evaluation process is summarized below:

- Inventory existing conditions and forecast future conditions: The primary purpose in the overall alternatives analysis process of these tasks is to provide input material for the purpose and need for action. Additionally, for the concepts evaluation, the information provided for the current and future conditions is used to provide quantifiable measures for the assessment from various perspectives. For example, the service cost information and ridership are combined in the analysis to allow quantification of incremental cost associated with a service change.

- Feasibility screening: Evaluation of the range of alternatives in each of the corridors/study areas employed a two phase methodology. Through the initial phase current and estimates of future ridership (2030) were reviewed relative to the current type and level of transit service, and a determination was made as to whether the current service reasonably reflects the current/future needs of the specific corridor and/or study area.

- In addition to evaluating in Phase I whether the current service levels reflect existing/future needs, an evaluation was completed to determine from the range of technology alternatives which concepts could reasonably be supported by current/future ridership. For each of the corridors/study areas, the two-step Phase I assessment produced one of the following products:

  - The conclusion that the current technology and service level reasonably address current and/or future needs in the corridor/study area.

  - An increased level of transit service is needed or could be supported in a specific corridor/study area and that an identified subset from the universe of technology alternatives warrant additional analysis. In the refined analysis (Phase II), more specific details on the service level parameters would be evaluated.

  In Phase II of the alternatives screening, service level parameters (frequency, routing, etc.) for those technology concepts that were identified in Phase I as reasonable were assessed relative to a consistent set of criteria. The specifics of the criteria are documented in the next section.

- Development of the Locally Preferred Alternatives: The goal of the study is to identify those improvement concepts that meet the purpose and need within each of the corridors/study areas. Weighing the results of various perspective assessment tests and input received from stakeholders (including university students/faculty/staff, business interests, city officials, the CyRide Board and the public), a set of recommendations was developed.

1.6 Recommendations

Based on the evaluation process and assessment documented in Chapter 8, the following corridor/study area action needs ranking was developed. This ranking represents the priority that would be followed for making investments in improved transit service.

Each of the corridors has been ranked based on the assessment of the current and future needs. As Corridor 1 (Iowa State Center to the ISU central campus) demonstrates a high need in both the current and horizon year conditions, it has been identified has the highest priority corridor. The individual period need values and resulting priority ranking for each corridor/study area is provided.

Corridor- and Study Area-Specific Recommendations

Priority 1 – Corridor 1 Transit Enhancement: BRT

Corridor 1 offers a unique opportunity to potentially obtain federal New Starts funding for transit improvements for a BRT application. As the recommended BRT concept would include an articulated bus vehicle, and the current facility provides at best marginal facilities for an

articulated vehicle, it is recommended that a new bus barn facility be pursued to effectively store and maintain vehicles. The New Starts program will allow capital expenses for a guideway, vehicles, maintenance facilities and BRT amenities as part of the cost of implementing the BRT project. Even with the estimated cost of $7.6 million to $9.6 million for a new maintenance facility, the overall cost of the BRT project would be less than $16 million.

Access to Osborn Drive between Wallace Road and Bissell Road is currently limited to transit and service vehicles by access gates.

Osborne Drive between Wallace Road and Bissell Road currently functions transit right of way. The project would include development of an exclusive bus lane along Beach Avenue between the Iowa State Center and Lincoln Way and a designated diamond lane within the Iowa State Center. The combination of these corridor modifications would result in meeting the 50 percent of the route as a fixed guideway criterion.

The project would be defined to include transit signal priority at the intersections of Beach/ Lincoln Way and Wallace Road/Osborne Drive. Transit signal priority would include optimization of the traffic signal timing and provide for a leading and/or lagging green for the BRT movements on Beach Avenue and Wallace Road.

Priority 2 – Corridor 5 Transit Enhancement

To reduce the need for "extras" and to better accommodate the passenger demand, it is recommended that CyRide acquire four articulated buses for use on this route. The articulated buses would allow CyRide to provide additional passenger capacity while reducing overall operating costs.

The primary challenge associated with this recommendation is the need to provide new or upgraded maintenance facilities to accommodate storage for the articulated buses. As noted above, the Corridor 1 BRT program could include development of a new CyRide maintenance facility that would resolve this issue.

Priority 3 – Corridor 3 Transit Service to New Mall

It is estimated that the proposed new retail mall and other new development in the vicinity of 13th Street and I-35 would generate bus ridership of approximately 900 trips per day. This level of ridership would warrant bus service to regional retail area. The service could be provided either as a branch of the Red Route or as an extension of the Blue Route. A new route could also be developed between Ames City Hall and the new mall. All options are expected to have similar cost implications and ridership potential.

Service in this corridor should not be initiated until the proposed mall is substantially complete and open for business, but prior to travel behavior patterns for potential transit customers are established.

Priority 4 – Study Area 2 Transit Service to Northwest Growth Area

It is estimated that the proposed development in the Northwest Growth Area will generate approximately 700 bus trips per day. This level of ridership would marginally warrant bus service to this area. This service could be provided either as a branch of the Green Route or as a new route from the university. A new route could provide service on Dakota Avenue between Lincoln Way and Ontario Avenue, which currently does not have any bus service.

Service in this corridor should not be initiated until the anticipated northwest growth area development is substantially complete. If the overall density of development in this area is reduced, additional service in this corridor may not be warranted.

Priority 5 – Corridor 2 Enhanced Service between ISU and Downtown Ames

The demand for transit service between ISU and downtown Ames is relatively low and is adequately accommodated by the existing Red and Green Route service. Given the current zoning, levels of development and transit ridership, the recommendation is to maintain current service. The recommendation is taking No Action.

Priority 6 – Corridor 4 Enhanced Service to South Duff

Ridership on the Yellow Route within this corridor is the lowest of all the routes in the CyRide system. New development in this corridor will generate some additional ridership, but not enough to warrant any significant change in service.

The land uses in this corridor are generally auto-oriented, big box uses, which are difficult to serve with transit. While there has been an expressed desire for transit access to these discount retail uses, utilization of the existing service would not warrant any service expansion. However, services may be warranted for the transit-dependent and access to jobs within this corridor.

The recommendation is taking No Action.

Priority 7 – Study Area 1 – Enhanced Service to the North Grand Mall

The North Grand Mall is currently served by the Blue, Brown, Green and Red Routes. An expansion of the North Grand Mall is expected to increase transit ridership by approximately 140 passengers per day. Given the high level of service currently provided to the North Grand Mall, no additional service to this study area is warranted. The recommendation is taking No Action.

1.7 Community Involvement

Advisory Committee

Development of the study was guided and directed by a study Advisory Committee. The committee met four times during the study to review interim products and discuss transit operations, issues and concerns.

Focus Groups

Three focus group meetings were held on February 20, 2007, with the purpose of the of determining what the City of Ames' students, institutions, businesses, community leaders and citizens perceive to be the current and future key transportation issues.

The focus group meetings included an introduction to the project – its purpose and a general description of the various corridors under study.

Public Meetings

On March 29, 2007, two public meetings were held to solicit public comments on preliminary study results and transit alternatives. Both meetings were conducted in an open house format with CyRide and consultant staff available to answer questions and guide people through the project display.

In addition to these public meetings, a presentation of preliminary study results was made to the Government of the Student Body (GSB) at ISU on March 28, 2007.

Transit Board Meeting

A summary of the study recommendations was presented to the CyRide Board on April 23, 2007. The CyRide Board currently has six members representing the City of Ames, ISU and the GSB, listed as follows:

- Steve Schainker – Ames City Manager
- Warren Madden – ISU Vice President of Business and Finance
- Matthew Goodman – Ames City Council (appointed by the City Council)
- Dennis Kroeger – Mayoral Appointee
- John Franklin – GSB Representative (appointed by the GSB President)
- Sheena Spurgin – GSB Senator (appointed by the GSB President).

2.0 INTRODUCTION

2.1 Study Purpose

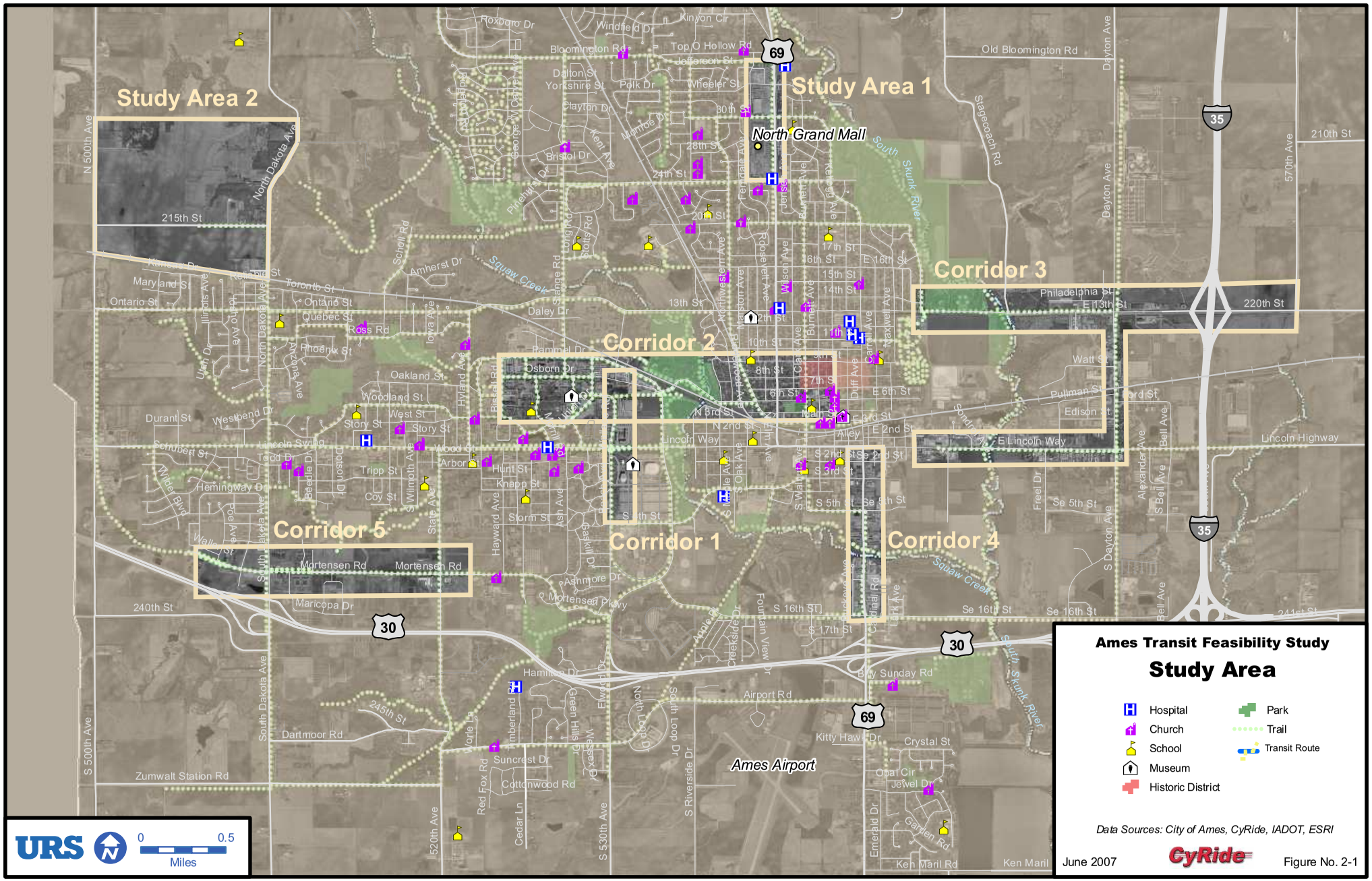
The genesis of the Ames Transit Feasibility Study was an idea by an ISU student to reestablish the Dinkey, a steam-powered train connecting downtown Ames to the ISU campus. The Dinkey operated between 1893 and 1929, a different era for transportation. At the time, students and visitors arriving in Ames did so by train at the downtown Ames depot. If their final destination was the ISU campus, then they could get there by walking, horse-drawn carriage, or the Dinkey. As such, the Dinkey was successful, offering a unique convenience to travelers, access from ISU campus to diverse retail shopping downtown and other services for students and university community.

Further consideration of the historic Dinkey resulted in a redefinition to a streetcar study. In this context, the success of modern and historic streetcar systems in cities like Portland, Oregon and Kenosha, Wisconsin were cited. A new streetcar connecting downtown Ames, ISU's main campus and the Iowa State Center might spur economic development. Further, if a streetcar between downtown Ames and ISU was a good idea nearly a century ago, then perhaps so would streetcar lines linking major destinations such as the North Grand Mall, South Duff Avenue area and planned new developments.

Along with the discussion of a streetcar study, it became apparent that the larger goal is to address the feasibility of a fixed-guideway transit system to serve the City of Ames. Key to this determination is defining the transportation problem so that the most appropriate solutions address the specific problems. This approach is the basis for the Ames Transit Feasibility Study.

The overall purpose of the Ames Transit Feasibility Study is to evaluate the need for and feasibility of new or modified transit services for the selected transportation corridors shown on Figure 2-1 and listed below:

- Corridor 1 – Iowa State Center parking to the ISU campus
- Corridor 2 – ISU to downtown Ames
- Corridor 3 – Thirteenth Street serving the site of the proposed new shopping mall
- Corridor 4 – South Duff retail area
- Corridor 5 – Future development in the area of Mortensen Road (west Ames)
- Study Area 1 – North Grand Avenue and North Grand Mall
- Study Area 2 – West Ames planned development (north of Lincoln Way)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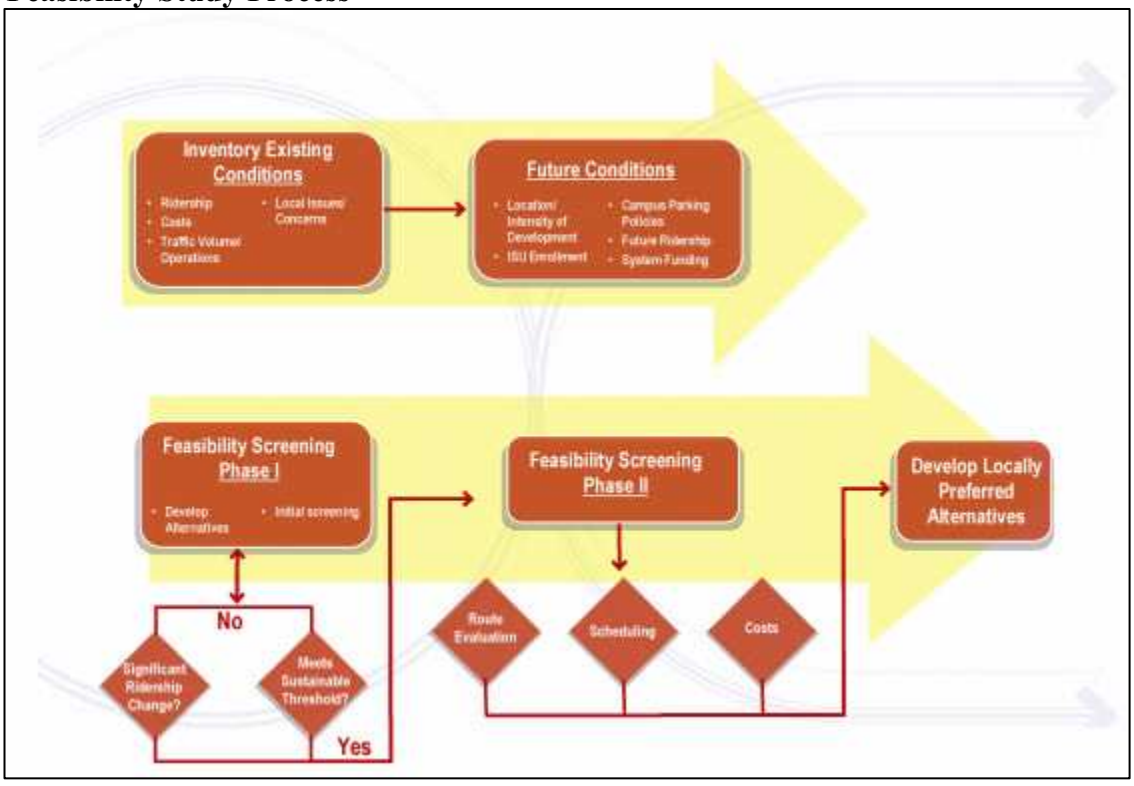
2.2 Goal of the Project

The goal of the Ames Transit Feasibility Study is to provide information to decision-makers regarding the feasibility of transit improvements in selected corridors and to assist in prioritizing these corridors. The information that this study will yield includes:

- Documentation of transportation issues and problems in the City of Ames
- An estimate of potential transit ridership
- Identification of appropriate transit mode(s) to satisfy forecast transit ridership
- A physical assessment to identify potential route characteristics and potential fatal flaws
- An estimate of the potential range of capital and operating costs consistent with the planning nature of this project
- An assessment of potential construction funding for the project through the federal New Starts program.

The study process is illustrated in Figure 2-2.

Figure 2-2
Feasibility Study Process



2.3 FTA New Starts Program

The FTA's discretionary New Starts program is the federal government's primary financial resource for supporting locally-planned, implemented, and operated transit "guideway" capital investments. The program is intended to fund a variety of transit projects ranging from heavy rail to LRT, from commuter rail to BRT systems.

The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) authorized $6.6 billion in New Starts funding through fiscal year 2009. $600 million of this funding is set-aside for "Small Starts;" that is, major transit capital projects costing less than $250 million, and requiring less than $75 million in Small Starts resources. While the level of New Starts funding has never been higher, neither has the demand for it. SAFETEA-LU authorizes over 330 projects nationwide to compete for these discretionary federal dollars.

The FTA has established the following funding categories for New Start/Small Start funding.

Table 2- 1
FTA Funding Categories

	New Start	Small Start	Very Small Start
Maximum Project Cost	Unlimited	$250 million	$50 million
Maximum FTA Contribution	Unlimited	$75 million	$25 million
Maximum Federal Share	50%	50%	50%

Projects proposed for New Start or Small Start funding must meet certain criteria as described below:

Project Planning

Alternatives Analysis, Preliminary Engineering and Final Design constitute the planning and project development process for New Starts investments. The planning and project development process is the forum for the development and refinement of the project justification and local financial commitment New Starts criteria (on the following page), and for addressing other planning, environmental, engineering, and design issues and requirements.

Project Justification

New Starts projects need to be justified based on several project justification criteria, including the following:

- Mobility Improvements
- Environmental Benefits

- Operating Efficiencies
- Cost Effectiveness
- Transit Supportive Land Use Policies and Future Patterns

Local Financial Commitment

New Starts project sponsors must demonstrate adequate local support for the project, as measured by:

- The proposed share of total project costs from sources other than from the New Starts program, including federal formula and flexible funds and state and local funding;
- The strength of the proposed project's capital financing plan; and
- The ability of the sponsoring agency to fund operation and maintenance of the entire system – existing and planned – as planned once the guideway project is built.

Project sponsors submit information about their proposed project to the FTA. The FTA uses this information to evaluate and rank each individual project. These project rankings form the basis for deciding if a project should continue in the project development process and if a project should receive New Start funding.

The Small Start category of projects was created to provide for a simplified project evaluation process for relatively low cost projects. A Small Start project must meet one of the following criteria:

1. Be a fixed guideway for at least 50% of the project length in the peak period

   AND/OR

2. Be a corridor-based bus project with the following minimum elements:

   - Substantial transit stations
   - Signal priority/preemption (for Bus or LRT)
   - Low-floor/level boarding vehicles
   - Special branding of service
   - Frequent service: 10 minutes during peak and 15 minutes during off peak periods
   - Service is offered at least 14 hours per day.

A Very Small Start project must meet the Small Start criteria and:

- Existing corridor ridership exceeds 3,000 passengers per day
- Less then $50 million in total cost
- Less then $3 million per mile (excluding vehicles)

The advantage of a Very Small Start project is that it is assumed to be cost effective and is therefore subject to a more simplified project evaluation process.

3.0 EXISTING TRANSIT OPERATION

This section describes the overall service area and operating characteristics of transit in the City of Ames to evaluate CyRide's system performance.

3.1 Fare Structure

The following is CyRide's current fare structure for its fixed route service:

- Regular fare is $1.00
- Reduced fares are available to K-12 students, persons over 65 years old, persons with disabilities, and Medicare card holders. CyRide requires proper identification to be eligible for this fare.
- ISU students with current ISU card ride for free
- Children five years and younger ride free.

Transit passes are available by month, semester and school year for cost savings and convenience. Ticket books are also available for purchase in ten-ride increments.

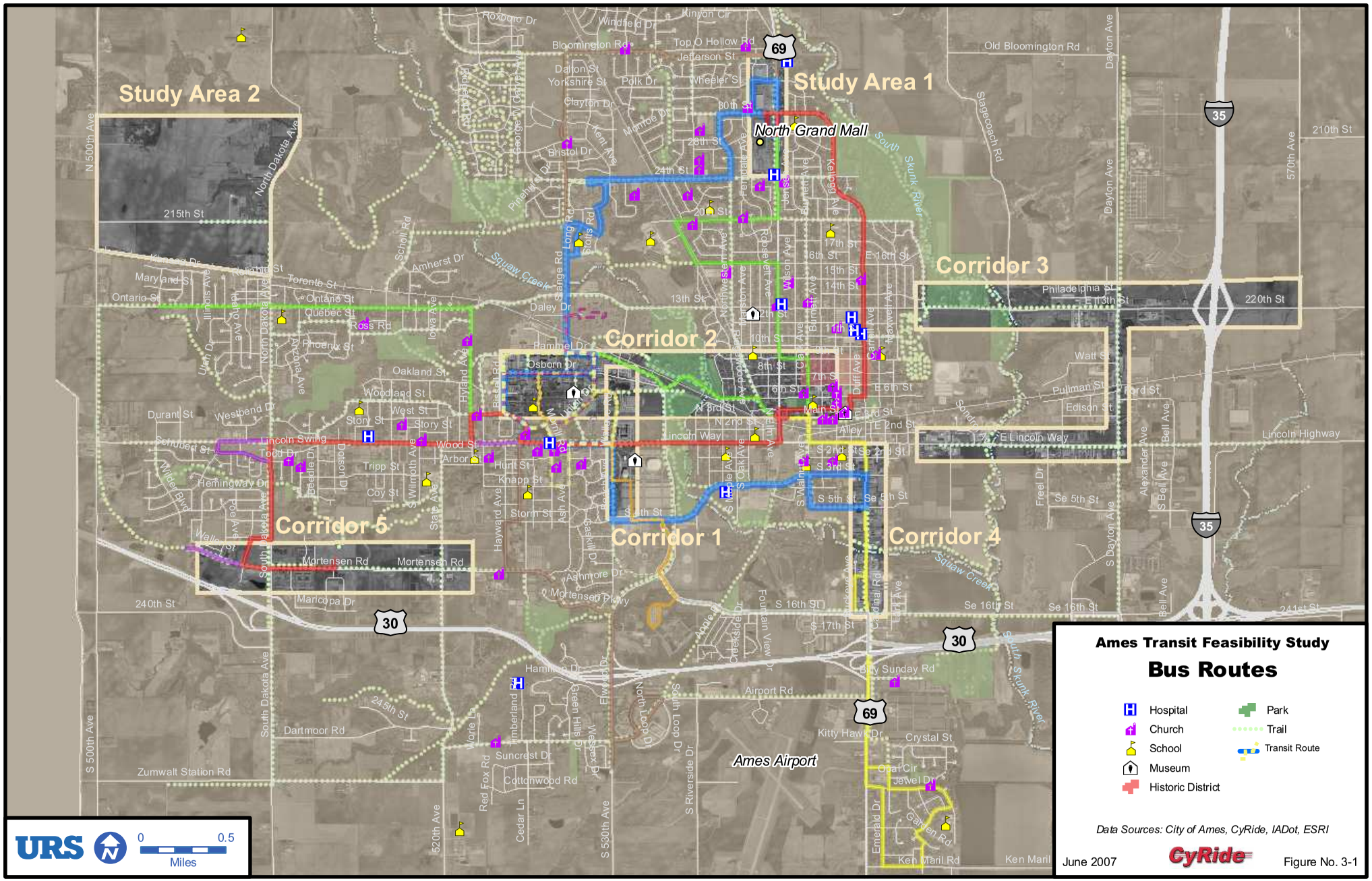
3.2 Route Structure

Figure 3-1 presents the CyRide transit system map. CyRide operates 10 fixed routes, Dial-A-Ride service, and a late night service called Moonlight Express. The fixed route and demand response services operate every day except on Thanksgiving, Christmas and New Year's days. Moonlight Express operates on Friday and Saturday nights when ISU is in session.[1] Following is a description of the routes that CyRide currently operates. Fixed routes generally run seven days a week, unless noted.

Fixed Routes

- Route 1/Red – The Red Route serves the southwestern part of Ames via Mortensen Road and South Dakota Avenue; downtown via Lincoln Way and Main Street; and the North Grand Mall area via Duff Avenue. On weekdays, it operates generally between 6:00 AM through 1:00 AM. Major stops along the route include the North Grand Mall, Mary Greeley Hospital, Ames Public Library, City Hall, the ISU campus and Ames Middle School. The Red route would continue service to the west or north upon request. Further, the Red Route picks up and drops off passengers at the intersection of North Dakota Avenue and Ontario Street when the Green Route is not in operation.

[1] Source: www.cyride.com.


Study Area 2
Study Area 1
Corridor 1
Corridor 2
Corridor 3
Corridor 4
Corridor 5
North Grand Mall
Ames Airport
Ames Transit Feasibility Study
Bus Routes
Hospital
Church
School
Museum
Historic District
Park
Trail
Transit Route
Data Sources: City of Ames, CyRide, IADot, ESRI
June 2007
CyRide
Figure No. 3-1
URS
0
0.5
Miles
URS Corporation N:\31810249\Projects\transit_rts.mxd Date: 4/20/2007 9:47:04 AM Name: etoile_strachota

- Route 2/Green – The Green Route serves the northwest part of Ames via Ontario Street, the ISU central campus, and the North Grand Mall area via Grand Avenue (U.S. Highway 69). On weekdays, it operates between 6:00 AM through midnight. Major stops along the Green Route include North Grand Mall, Ames High School, Ames City Hall, and Kildee Hall at the ISU campus.

- Route 3/Blue – The Blue Route serves downtown Ames, Jack Trice Stadium, and part of the South Duff Avenue commercial area. On weekdays, the Blue Route operates between 6:00 AM and 1:00 AM. Major stops along the Blue Route include the North Grand Mall, University Village/Schilletter Apartments, Kildee Hall at the ISU campus, Jack Trice Stadium and Fifth Street/South Duff Avenue.

- Route 4/Gray – Route 4 operates on weekdays and serves the 16th Street/South Dayton Area. It complements the Orange Route (Route 23), operating generally from 7:00 AM to 5:30 PM.

- Route 5/Yellow – Route 5 operates between 6:00 AM and 7:00 PM on weekdays, serving the South Duff commercial area, Kate Mitchell School and downtown Ames.

- Route 6/Brown – The Brown Route operates between 6:00 am to 7:00 pm and serves the ISU Research Park and North Grand Mall.

- Route 6A/Brown Towers Shuttle – This route operates on weekdays when ISU is in session. Service hours are generally between 11:00 AM and 11:00 PM. They do not operate from on the week of Thanksgiving, Christmas break and Spring break.

- Route 7/Purple – The purple route serves Memorial Union and West Ames, operating generally between 6:00 AM and 6:00 PM.

- Route 21/Cardinal – This circulator route operates when ISU is in session, generally between 7:00 AM and 10:00 PM. Its service area is ISU's Frederiksen Court.

- Route 22/Gold – This circulator route serves ISU's central campus and operates on weekdays from 7:00 AM to 6:00 PM, when ISU is in session. It generally operates the opposite direction of the Route 23 (Orange), but also travels to Pammel Drive.

- Route 23/Orange – The Orange Route serves the School of Veterinary Medicine via the Iowa State Center commuter parking area. It operates from 6:00 AM to 11:00 PM. This circulator route has the highest ridership in the system.

- Route 51/Billy Sunday/University Plains – This route serves Billy Sunday Road/University Plains area and ISU. Its operating hours are approximately 7:00 AM and 6:00 PM. Service fom Billy Sunday Road and University Plains is provided by Central Iowa Transit.

- Moonlight Express – Moonlight Express operates on Friday and Saturday nights from 10:30 PM to 3:00 AM when ISU is in session. Shuttle bus routes serve campustown, downtown, west Ames and southeast Ames. Door-to-door service is also available in areas of Ames not covered by shuttle bus routes. On nights when ridership is low, some shuttle routes may not be in service. Rides are scheduled by telephone.

Table 3-1 presents the days of service and frequency of CyRide's fixed routes.

Table 3-1
Existing Transit Service Frequency

Route		Frequency (minutes)		
		Weekday	Saturday	Sunday
1	Red	10	20 to 40	35 to 40
2	Green	20	40	40
3	Blue	20	20 to 40	35 to 40
4	Gray	60		
5	Yellow	30	30	
6	Brown	20	40	
7	Purple	40		
21	Cardinal	7		
22	Gold	20		
23	Orange	2 to 3		

Dial-A-Ride

Dial-A-Ride is a door-to-door service operated by CyRide during the same hours as fixed routes. Service is available to everyone, although patrons eligible for paratransit service as defined by the Americans with Disabilities Act receive a discounted fare. The current fare schedule is presented in Table 3-2.

Table 3- 2
Dial-A-Ride Fare Structure

Within ¾-Mile of Fixed Route	**ADA Eligible**	**General Public**
Full Fare	$2.00	$18.00
ISU Student	Free	$18.00
East of Skunk River	**ADA Eligible**	**General Public**
Full Fare	$5.00	$18.00
ISU Student	$5.00	$18.00

Rides may be scheduled up to two weeks in advance and must be scheduled by 6:00 PM of the night before a trip. Same-day calls will be accepted if there are time and space available.

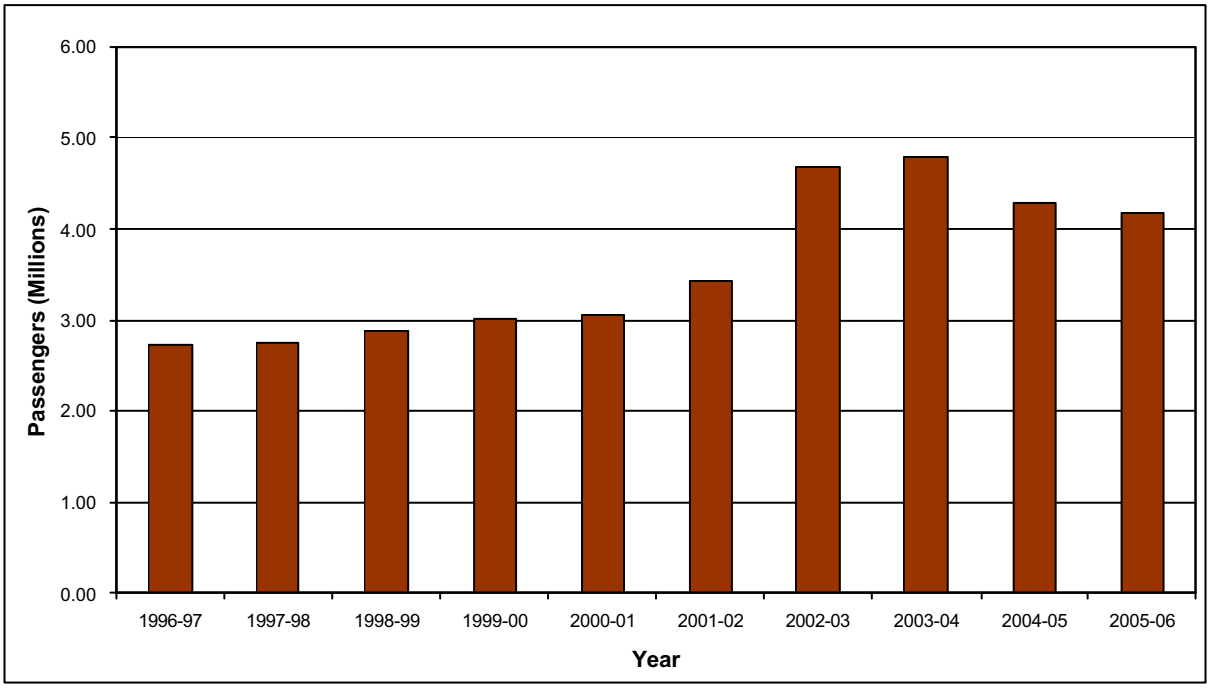
Des Moines Airport Shuttle

The Des Moines Airport Shuttle operates on three major holidays: Thanksgiving, Semester Break, and Spring Break. Service is generally available between 6:00 AM and 11:00 PM, depending on whether a trip is originating at the Des Moines Airport or Ames. Reservation is required and arranged directly with CyRide. Fare is $10 each way ($5 for passengers eligible for fixed route Reduced Fare). Children under six years old ride free when accompanied by an adult.

3.3 Ridership Trends

Figure 3-2 presents CyRide's annual patronage 1996 and 2006. CyRide's current ridership is approximately 4.2 million passengers. Generally, CyRide's ridership has increased steadily over this ten-year period, averaging about 4.3 percent per year. The significant gains in ridership in 2002 and 2003 have offset the slight decrease and the relatively flat growth in ridership between 1997 and 2001.

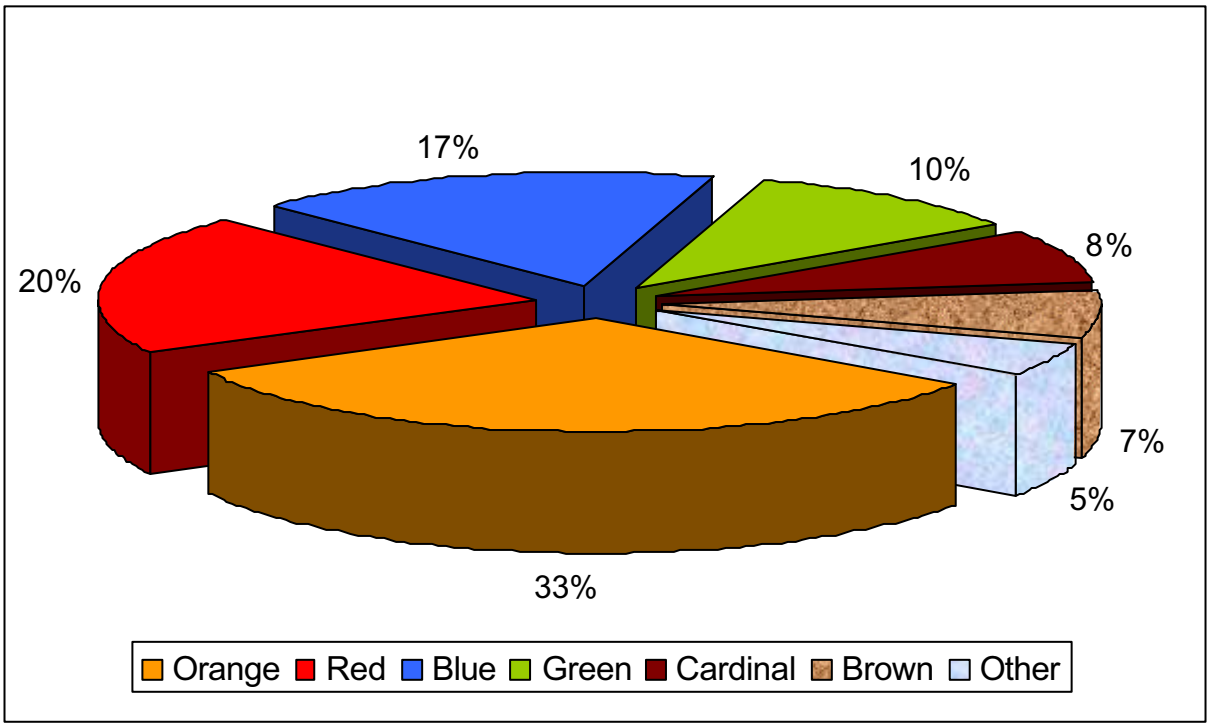
Figure 3-2
CyRide Annual Ridership[1]



[1] Source: CyRide.

In fiscal year 2005 – 2006, 70 percent of CyRide's ridership is served by three routes – the Orange, Blue and Red Routes, as illustrated in Figure 3-3. Because of the significant differences in ridership between the various CyRide routes, this study has placed each route into three different tiers, based on their current patronage. Figure 3-4 graphically represents ridership by route relative to CyRide's service area. The thickest lines shown on Figure 3-4 denote the routes that have the highest patronage, namely the Orange, Red, Blue and Green Routes. The range of monthly ridership among CyRide's routes is from 700 to 170,000. This information is illustrated in Figures 3-5 through 3-7.

Figure 3-3
2005 – 2006 Percentage of Ridership by Route[1]



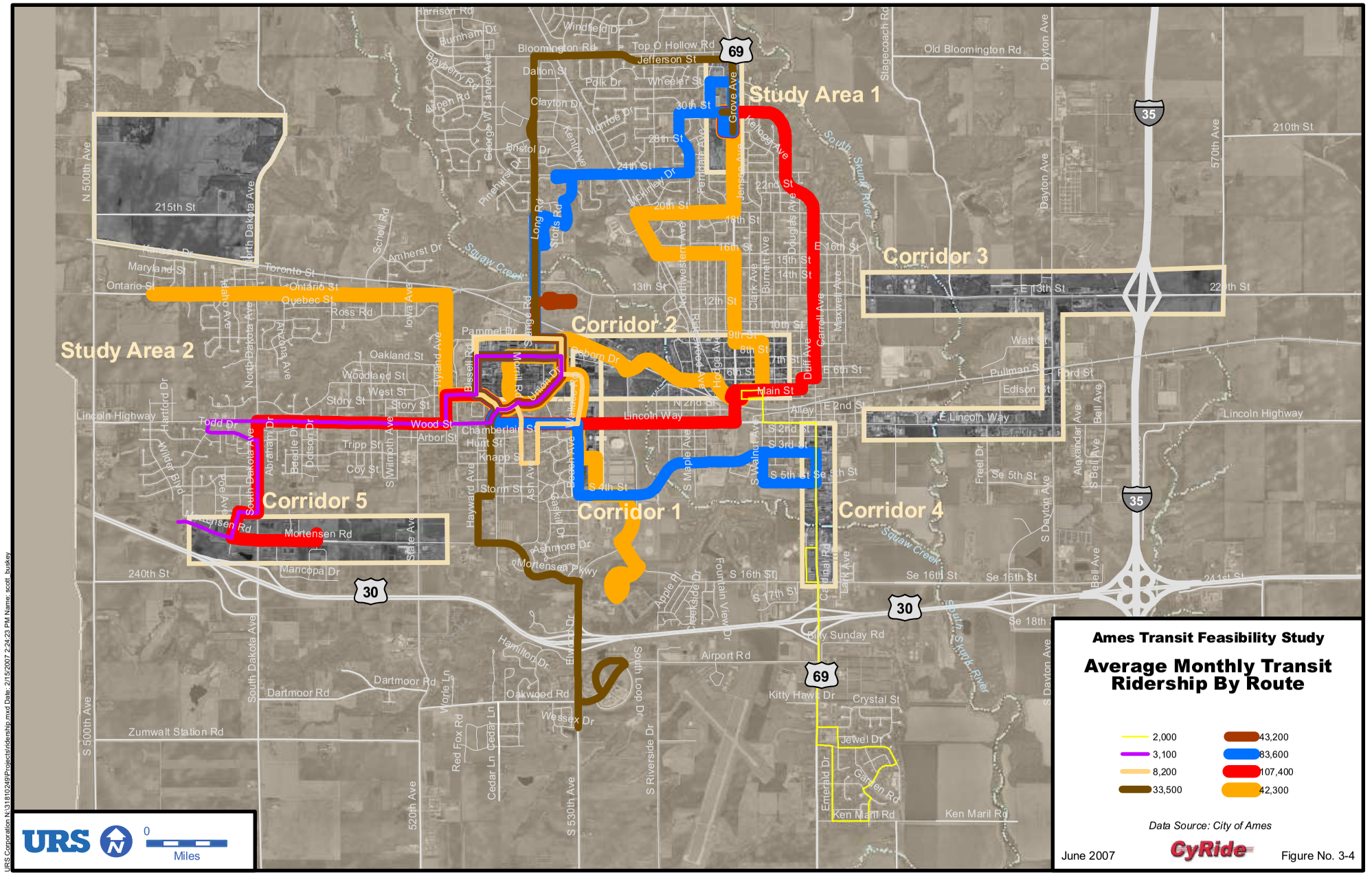


Figure 3-5
Monthly Ridership by Route – Top Three Routes

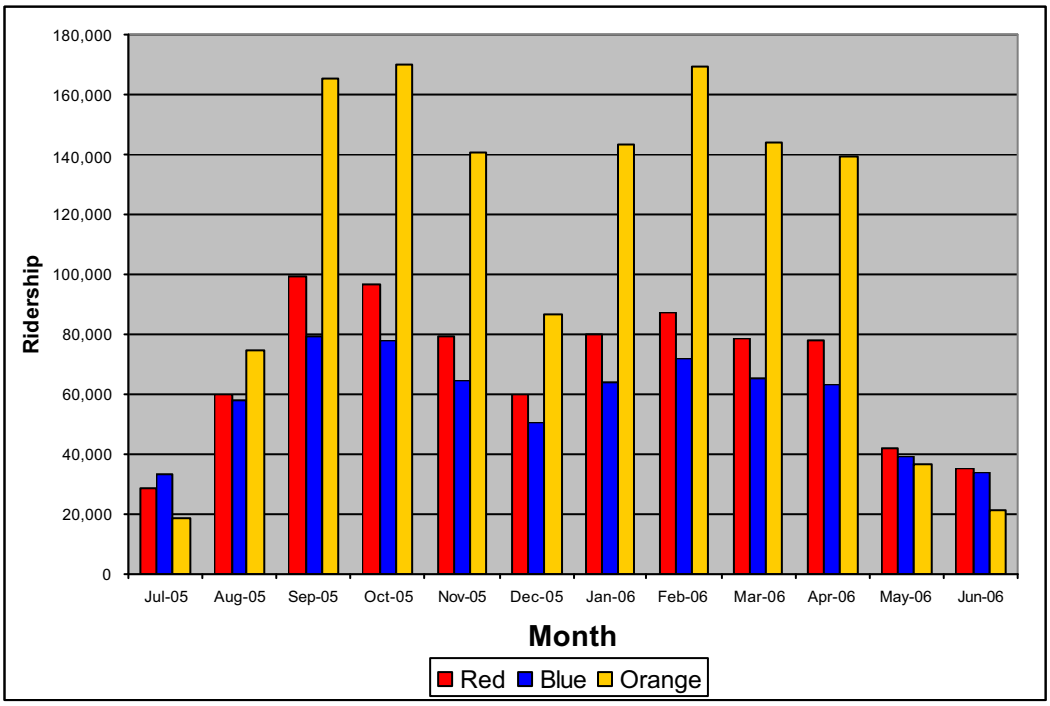


Figure 3-6
Monthly Ridership by Route – Second-Tier Routes

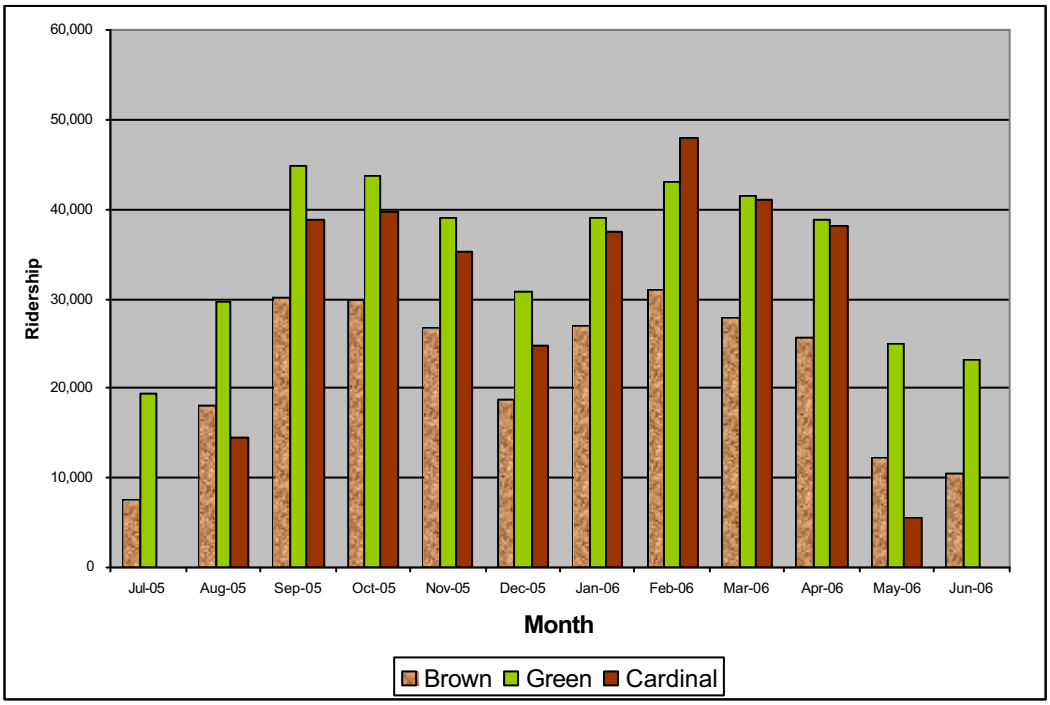
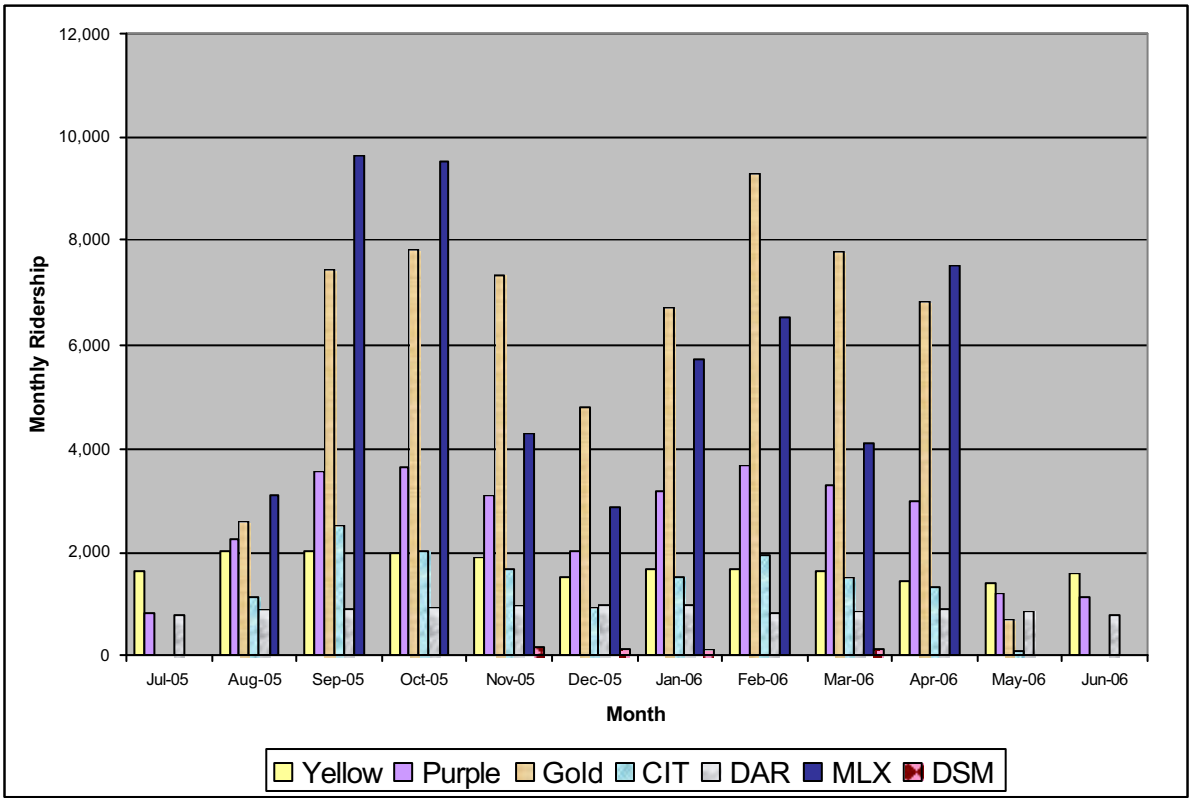
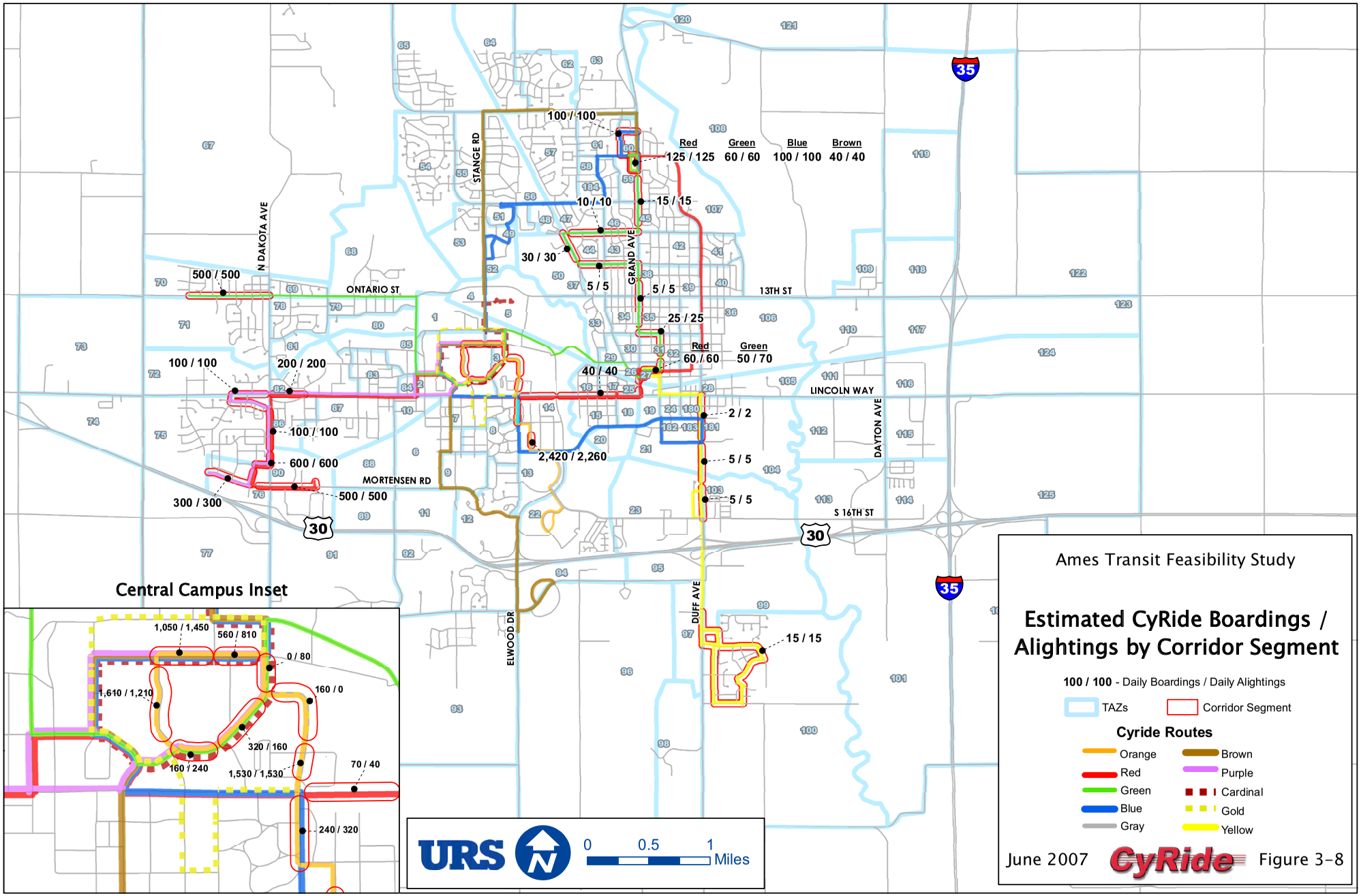


Figure 3-7
Monthly Ridership by Route – Third-Tier Routes



Transit Boardings

Figure 3-8 illustrates the estimated number of transit boardings and alightings in locations throughout Ames. These estimates were provided by CyRide and are focused on the corridors and study areas.


Ames Transit Feasibility Study
Estimated CyRide Boardings / Alightings by Corridor Segment
100 / 100 - Daily Boardings / Daily Alightings
TAZs
Corridor Segment
Cyride Routes
Orange
Red
Green
Blue
Gray
Brown
Purple
Cardinal
Gold
Yellow
June 2007
CyRide
Figure 3-8
Central Campus Inset
URS
0
0.5
1
Miles
Red
Green
Blue
Brown
125 / 125
60 / 60
100 / 100
40 / 40
Red
Green
60 / 60
50 / 70
100 / 100
30 / 30
10 / 10
15 / 15
5 / 5
5 / 5
25 / 25
40 / 40
200 / 200
500 / 500
100 / 100
600 / 600
500 / 500
300 / 300
2,420 / 2,260
2 / 2
5 / 5
5 / 5
15 / 15
1,050 / 1,450
560 / 810
0 / 80
160 / 0
1,610 / 1,210
320 / 160
160 / 240
1,530 / 1,530
70 / 40
240 / 320
N DAKOTA AVE
STANGE RD
ONTARIO ST
GRAND AVE
13TH ST
LINCOLN WAY
DAYTON AVE
MORTENSEN RD
S 16TH ST
ELWOOD DR
DUFF AVE
30
35

Average Daily Ridership

Table 3-3 shows the average weekday daily ridership by route. This average weekday ridership represents a typical weekday when school is in session at ISU.

Table 3- 3
Average Daily Boardings By Route – FY 2005-06 Passengers [1]

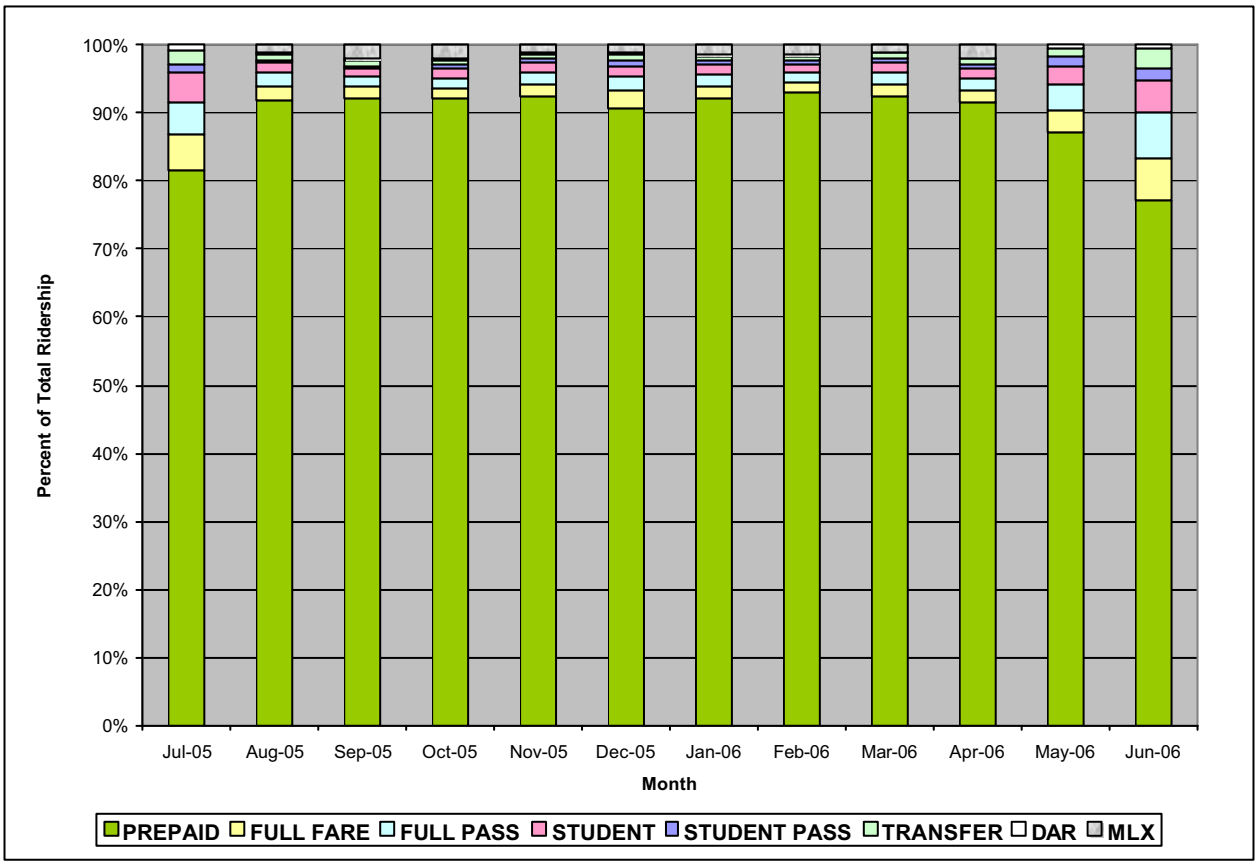
Route	Average Daily Ridership by Quarter				Weighted Daily Average	Weighted Weekday Average
	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun		
#1 Red	3,410	3,270	3,250	2,610	3,200	4,060
#2 Green	1,540	1,520	1,610	1,290	1,530	2,020
#3 Blue	2,740	2,620	2,620	2,100	2,570	3,160
#23 Orange	7,910	8,240	8,410	6,980	8,060	8,060
#5 Yellow	80	80	70	60	70	80
#6 Brown	1,440	1,490	1,520	1,280	1,460	1,460
#7 Purple	180	180	180	150	180	180
#4 Gray						
#21 Cardinal	1,840	2,060	2,340	1,900	2,100	2,100
#22 Gold	350	420	440	340	400	400
Billy Sunday/Univ. Plains	130	100	90	70	100	100
Dial-A-Ride (DAR)	30	30	30	30	30	40
Moonlight Express (MLX)	1,050	980	850	800	920	940
Other	120	90	80	140	100	80
System Totals						
Daily Average	16,730	16,750	17,700	13,480	16,650	
Weekday Only Average	22,000	22,400	22,470	19,080	21,890	
Daily Fixed Average	16,330	16,390	17,420	13,200	16,330	
Weekday Only Fixed Average	21,640	22,100	22,250	18,870	21,620	
Daily DAR Average	30	30	30	30	30	
Weekday Only DAR Average	40	40	40	40	40	

[1] Source: CyRide, 2007.

Ridership by Type of Fare

Depending on the time of year, approximately 75 percent to 95 percent of CyRide's monthly patrons have prepaid their fare through GSB fees and ISU parking fees, as illustrated in Figure 3-9.

Figure 3- 9
Monthly Ridership by Type of Fare



3.4 Operating Trends

Table 3-4 shows CyRide's select systemwide performance statistics between fiscal years 1997 and 2006. Figure 3-10 presents CyRide's operating expense for the same ten-year period, which has grown steadily at an average rate of 5.5 percent per year, from $3.13 million in fiscal year 1996-97 to $5.34 million in 2005-06. Operating cost per passenger has only grown 12 percent over this ten-year period, from $1.14 to $1.28. In contrast, operating cost per revenue mile has increased by 27 percent over the same time period.

Table 3-4
CyRide Systemwide Performance Statistics – FY 1997 to FY 2006

	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Passengers	2.74 million	2.76 million	2.88 million	3.02 million	3.04 million	3.42 million	4.68 million	4.79 million	4.29 million	4.17 million
Revenue Hours	76,546	75,658	81,121	84,698	87,003	88,750	101,189	104,682	97,887	99,710
Total Operating Expense	$3.13 million	$3.21 million	$3.50 million	$3.74 million	$4.04 million	$4.20 million	$4.82 million	$5.08 million	$5.14 million	$5.34 million
Passengers/ Revenue Hour	35.8	36.4	35.5	35.6	35.0	38.5	46.2	45.7	43.9	41.9
Revenue Miles	798,411	828,346	889,663	917,978	927,572	973,278	1.10 million	1.12 million	1.04 million	1.07 million
Passengers/ Revenue Mile	3.4	3.3	3.2	3.3	3.3	3.5	4.3	4.3	4.1	3.9
Cost/ Passenger	$1.14	$1.16	$1.22	$1.24	$1.33	$1.23	$1.03	$1.06	$1.20	$1.28
Cost/ Revenue Mile	$3.92	$3.87	$3.94	$4.08	$4.35	$4.32	$4.40	$4.54	$4.92	$4.98

Figure 3- 10
CyRide Annual Operating Expenses, FY 1995 – FY 2006

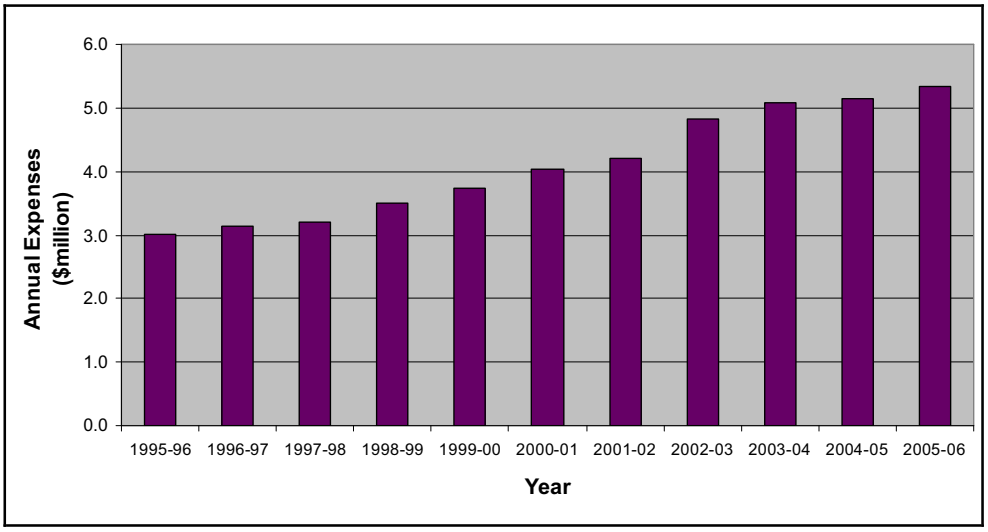


Table 3-5 on the following page presents selected operating characteristics for CyRide's fixed route, dial-a-ride and Moonlight Express services from 1995/96 to 2005/06. Over this 10-year period, ridership on fixed routes and the Moonlight Express have grown 52 percent and 237 percent, respectively. Farebox revenues for fixed routes have declined over this time by 66 percent. Expenses for the Moonlight Express have increased almost three-fold, testament to the service's popularity. On the other hand, ridership on the dial-a-ride service has declined 36 percent although the number of passengers per revenue hour and revenue mile has increased.

3.5 Revenue Sources

Figure 3-11 presents CyRide's revenue sources for fiscal year 2005-2006, which is $5.65 million. Over 40 percent of this revenue comes from ISU's Government of Student Body ($2.42 million). Another 18 percent ($1.02 million) are from tax levies, while ISU, Iowa Department of Transportation and the FTA each contribute eight to 10 percent each.

Figure 3- 11
CyRide Revenue Sources, FY 2006

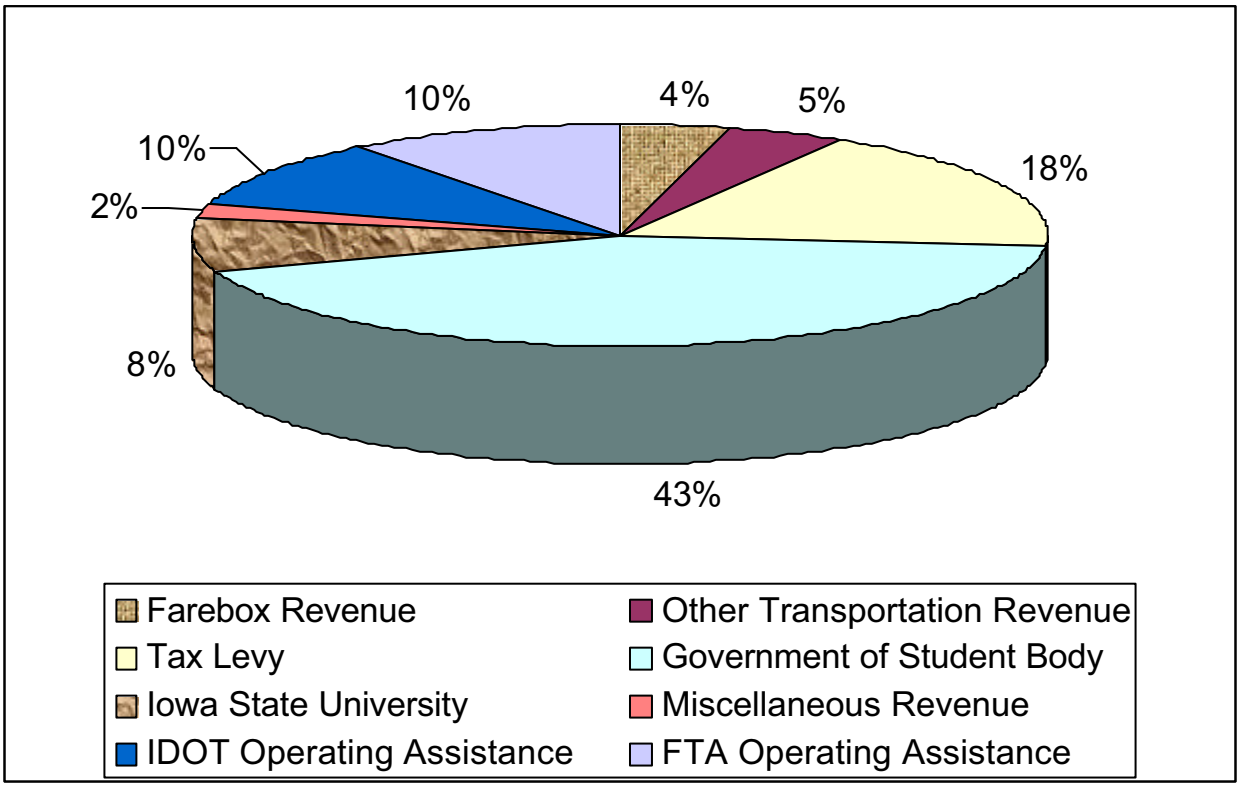


Table 3-5
CyRide Performance Statistics by Type of Service – 1997 to 2006

Fiscal Year	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03[1]	2003-04	2004-05	2005-06
FIXED ROUTE										
Passengers	2.70 million	2.72 million	2.83 million	3.00 million	3.00 million	3.36 million	4.63 million	4.73 million	4.23 million	4.11 million
Revenue Miles	719,826	748,295	804,620	832,164	845,622	886,386	1.02 million	1.04 million	988,068	1.02 million
Revenue Hours	69,014	77,541	76,181	76,244	78,328	80,597	94,150	97,420	92,534	94,758
Passengers/ Revenue Hour	39.2	35.1	37.2	39.0	38.4	41.7	49.2	48.5	45.8	43.3
Passengers/ Revenue Mile	3.8	3.6	3.5	3.6	3.6	3.8	4.6	4.6	4.3	4.0
Expenses	$2.19 million	$2.22 million	$2.43 million	$2.64 million	$2.89 million	$3.01 million	$3.52 million	$3.93 million	$3.91 million	$4.04 million
Farebox Revenue	$650,662	$648,111	$644,805	$669,975	$721,934	$662,124	$226,100	$185,118	$200,540	$220,154
Farebox Revenue/ Operating Expenses	29.7%	29.2%	26.5%	25.4%	25.0%	22.0%	6.4% (Note 1)	4.7%	5.1%	5.4%
DIAL-A-RIDE										
Passengers	16,775	17,739	16,948	14,417	14,501	13,852	13,706	13,876	9,736	10,715
Revenue Miles	68,127	66,946	68,698	70,534	66,058	68,314	56,716	55,807	31,340	29,634
Revenue Hours	6,710	6,895	7,280	7,276	7,512	6,875	5,318	5,095	3,163	2,664
Passengers/ Revenue Hour	2.5	2.6	2.3	2.0	1.9	2.0	2.6	2.7	3.1	4.0
Passengers/ Revenue Mile	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.4
Expenses	$206,405	$200,940	$227,603	$238,375	$244,436	$240,641	$195,124	$162,513	$117,387	$125,815
Farebox Revenue	$19,222	$21,484	$19,438	$16,300	$16,090	$15,352	$15,596	$13,786	$11,150	$9,926
Farebox Revenue/ Operating Expenses	9.3%	10.7%	8.5%	6.8%	6.6%	6.4%	8.0%	8.5%	9.5%	7.9%
MOONLIGHT EXPRESS										
Passengers	16,367	19,138	25,651	26,653	25,241	33,782	37,305	46,329	48,280	55,154
Revenue Miles	10,458	13,084	16,345	15,280	15,892	18,578	24,808	29,814	25,552	28,024
Revenue Hours	822	1,023	1,263	1,178	1,163	1,278	1,721	2,166	2,190	2,288
Passengers/ Revenue Hour	19.9	18.7	20.3	22.6	21.7	26.4	21.7	21.4	22.0	24.1
Passengers/ Revenue Mile	1.6	1.5	1.6	1.7	1.6	1.8	1.5	1.6	1.9	2.0
Expenses	$26,942	$30,422	$36,623	$40,407	$37,098	$41,826	$53,102	$69,752	$67,424	$78,941

[1] GSB revised student payments per semester to prepaid fare.

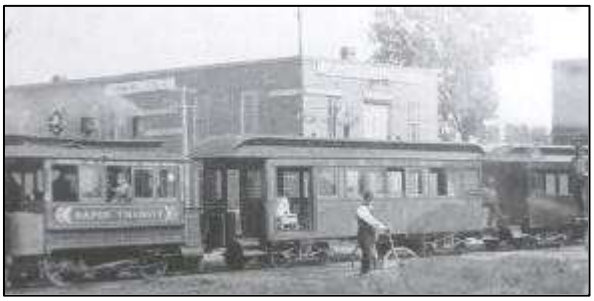
3.6 What Was the Dinkey?[1]

In 1868, when the Iowa Agricultural College was formally opened, the matter of transportation between the railway station and the institution, a distance of two miles, was a problem. The town and the college were separate and distinct populations at that time. Students and visitors arriving in Ames generally traveled by train and arrived at the downtown depot. If their final destination was the campus, their travel options were limited to walking or horse-drawn carriage.

In 1890, the Iowa Agricultural College signed an agreement with the Ames Street Railway Company to construct and operate a standard gauge railway to be operated by steam motor or other motive power as may be determined. On the Fourth of July, 1891, the Dinkey made its first run between downtown Ames and campus.

Streetcars carried passengers between downtown Ames and campus on the steam-powered Dinkey from 1891 to 1907, and on the Ft. Dodge, Des Moines & Southern Railroad's electric-trolley, interurban line from 1907 to 1929. In 1913, it was reported that the streetcar carried 133 people per hour. The fare remained constant at a nickel for 35 years until, in 1926, the fare was raised to seven cents. The streetcar was replaced by bus service in 1929.

The Dinkey:



- Made it possible for faculty to live downtown and commute to the College
- Carried school children from 4th Ward to downtown school
- Facilitated the transport of construction materials to campus during a period of great growth
- Was integral to town and campus life for 16 years, bonded the two communities, and furnished many memories of the good old days.

[1] Photo source: Ames Historical Society.

4.0 CORRIDOR AND STUDY AREA CHARACTERISTICS

This section presents a description of the five corridors and two study areas under consideration in this study. The corridors are identified on Figure 4-1 which also illustrates generalized existing land uses throughout the city.

4.1 Corridor 1 – Iowa State Center to ISU

Corridor 1 runs north-south, generally along Beach Avenue/Wallace Road between the Iowa State Center and the ISU campus (Figure 4-2).

This corridor is currently served by CyRide Orange Route bus service which links the parking at the Iowa State Center with the main ISU campus. While this service is scheduled for 10 minute headways during peak periods, buses are added (referred to as "extras") as needed to meet demand, effectively providing buses every two to three minutes during peak periods on peak days. CyRide generally provides about 171 trips from the Iowa State Center to the ISU campus per day with approximately 27 trips during the peak hour of service (8:30 to 9:30 am).

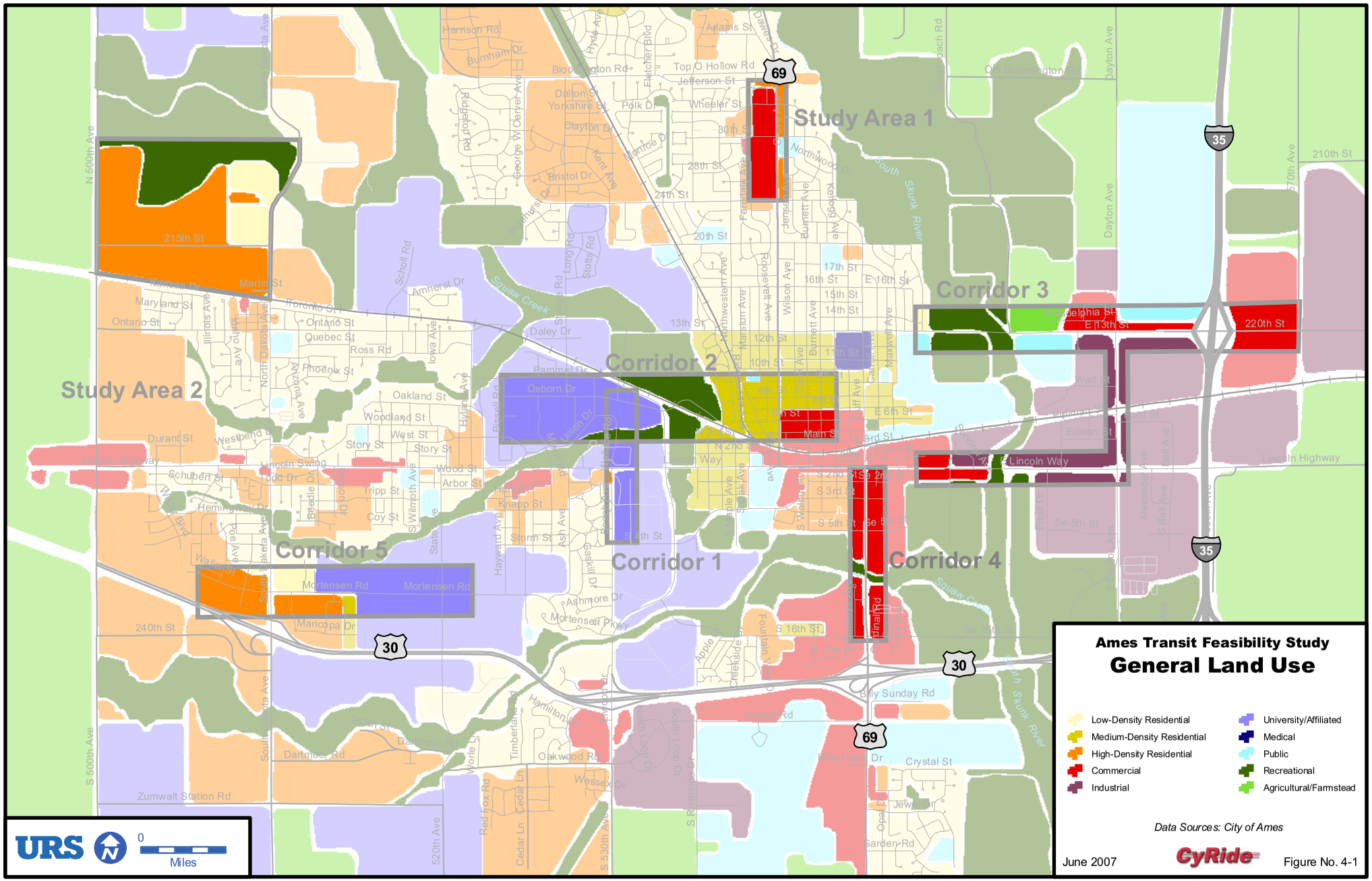
The volume of buses between the Iowa State Center and the campus results in two primary concerns. First, buses experience delays at the intersection of Beach and Lincoln Avenue. Lincoln is a major east-west route through the campus carrying approximately 19,000 vehicles per day. Second, the almost continuous flow of buses into the campus is a safety concern with the high volume of pedestrian traffic on the campus.

Approximately 2,100 vehicles park at the Iowa State Center each day with a maximum accumulation of about 1,000 cars. The parking lots in the Iowa State Center area have a capacity of approximately 4,000 spaces. Utilization of the Iowa State Center parking facilities is primarily a function of parking policy and supply decisions by ISU administration.

Currently, parking supply and demand on the ISU campus are approximately in balance. However, future campus development could displace approximately 400 spaces on the main campus. Some portion of these spaces might be replaced by construction of a new parking structure. The change in parking supply on the main campus will impact the demand for parking at the Iowa State Center.

The parking at the Iowa State Center is currently free to users and students can ride the CyRide bus at no charge by showing their student ID. A change in these pricing policies would change the demand for parking and, thus, ridership at the Iowa State Center.

The parking at the Iowa State Center is intended primarily for commuter students driving in from outside the City of Ames. However, the parking pricing and quality of transit service attracts a number of other users.


Study Area 1
Study Area 2
Corridor 1
Corridor 2
Corridor 3
Corridor 4
Corridor 5
Ames Transit Feasibility Study
General Land Use
Low-Density Residential
Medium-Density Residential
High-Density Residential
Commercial
Industrial
University/Affiliated
Medical
Public
Recreational
Agricultural/Farmstead
Data Sources: City of Ames
June 2007
CyRide
Figure No. 4-1
URS
0
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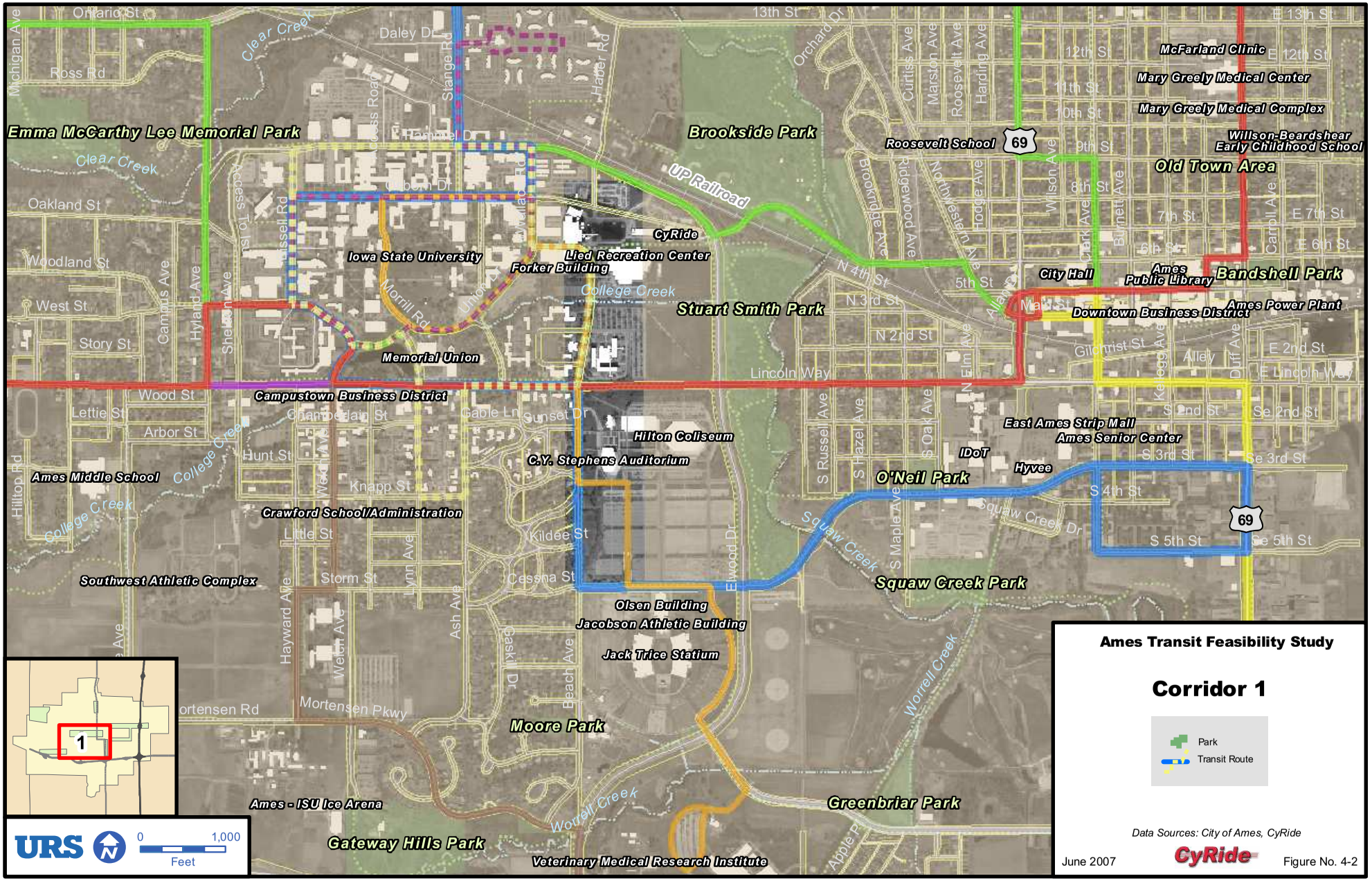

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While a comprehensive usage survey is not available, anecdotal information indicates that people who could use other CyRide routes to the campus instead drive and park at the Iowa State Center.

Providing improved transit service in this corridor would need to respond to the following corridor demands and constraints:

- The transit service would have to be able to move a large number of people quickly and efficiently. The system would need to carry a minimum of 8,000 passengers per day and approximately 1,750 persons per hour to accommodate existing demand.

- The transit service must cross Lincoln Way without introducing significant additional delays to traffic on Lincoln Way.

- The system must be compatible with the campus pedestrian environment and must not cause significant safety or operational concerns.

4.2 Corridor 2 – ISU to Downtown Ames

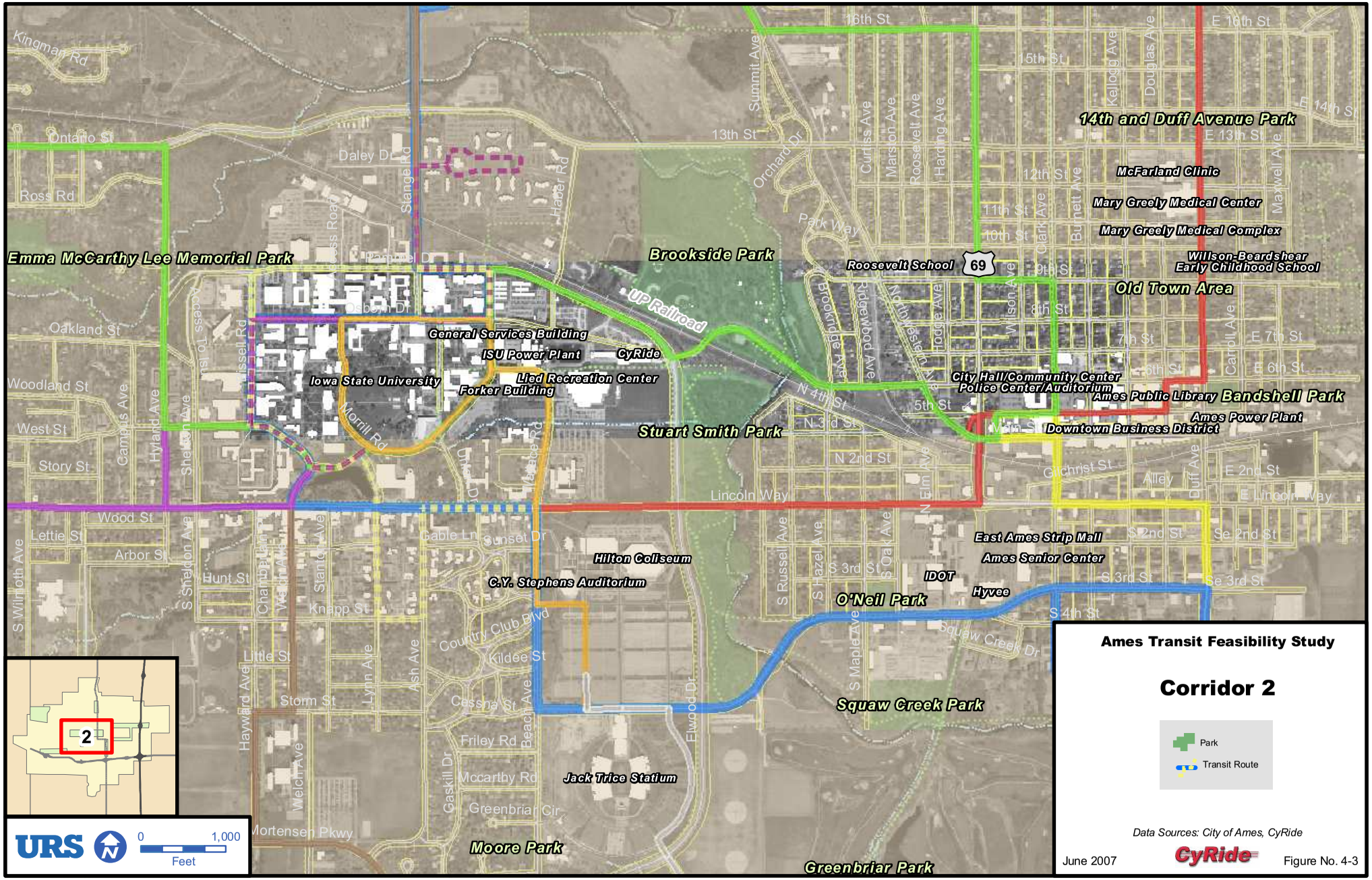
Corridor 2 runs east-west between the ISU campus and downtown Ames (Figure 4-3). The main roadways serving the area are Lincoln Way, Osborn Drive and Sixth Street. CyRide's Green, Gold, Orange, and Purple Routes currently operate within Corridor 2. The corridor is bisected by parkland and the Union Pacific Railroad. The railroad crosses the corridor at Haber Road, Sixth Street/Osborn Road, and Brookridge Avenue. The railroad crossings at Haber Road and Sixth Street/Osborn Road are grade-separated (railroad overpasses), while the Brookridge Avenue crossing is at-grade.

The east side of the corridor is residential and commercial and includes the core of downtown Ames. The middle portion of the corridor is primarily parkland and railroad, while the west side is the ISU campus, with its mixture of office, classroom and residential development.

This corridor is currently served by CyRide Red and Green bus service which link downtown Ames (City Hall) with the Main ISU campus. The Red line provides service on Lincoln Way with peak period frequencies of 10 minutes. The Green line provides service on 6th Street and Pammel Drive with peak period frequencies of 20 minutes.

The Blue route also provides service through Corridor 2 but does not connect directly to downtown Ames. The Blue route generally follows South 4th Street between South Duff Avenue and Beach Avenue then Lincoln Way into the ISU campus.

The central location of this corridor means that new development expected to occur in a number of other corridors, study areas and throughout the city will add to transit demand in this corridor. For example, if bus service is extended to a new mall on 13th Street, trips between ISU and the new mall site will pass through Corridor 2.



Ames Transit Feasibility Study

Corridor 2

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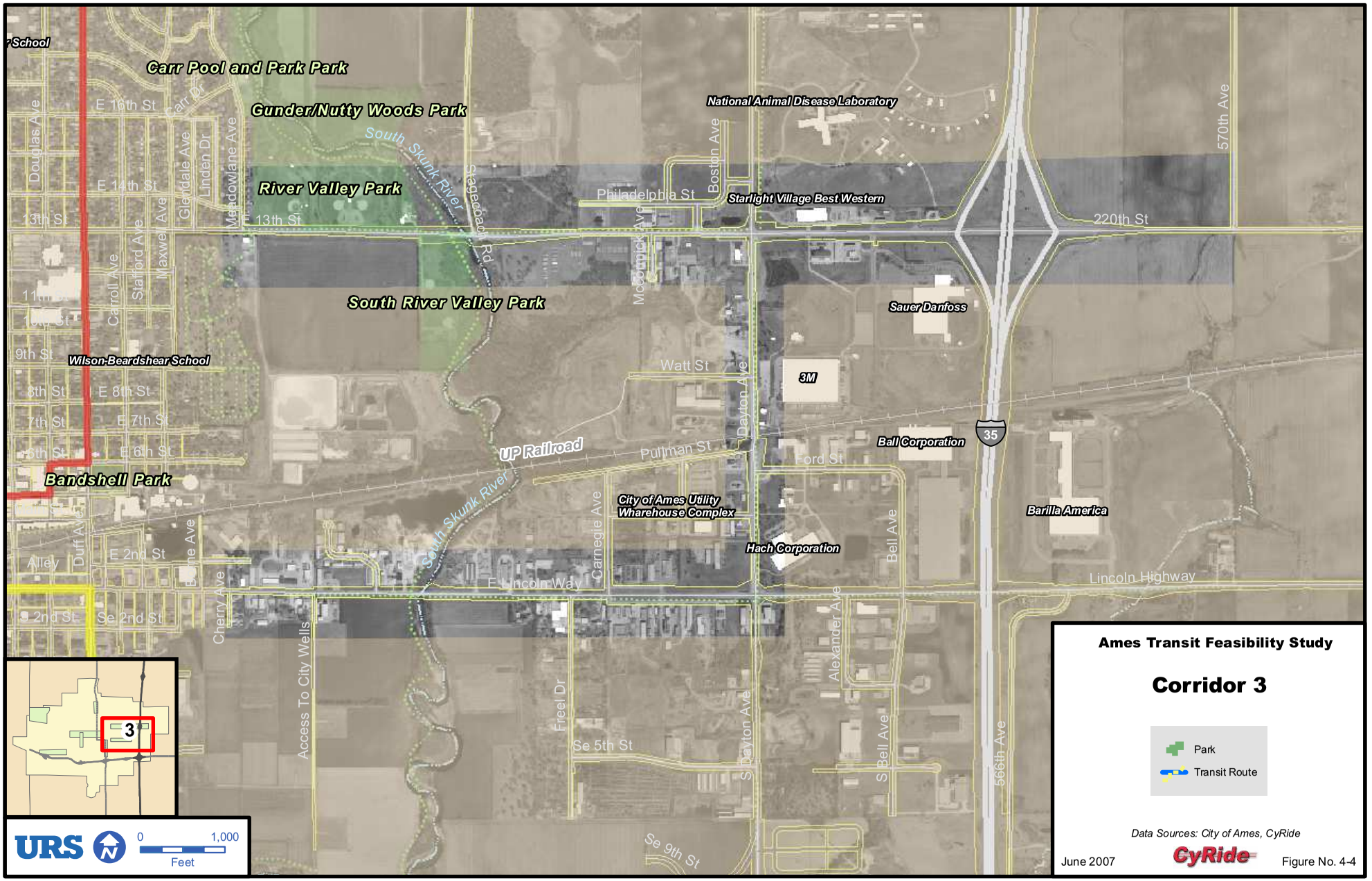
4.3 Corridor 3 – 13th Street Mall

Corridor 3 includes the area along Lincoln Way, 13th Street and Dayton Avenue from Duff Avenue east past I-35 (Figure 4-4). A new shopping mall with just over one million square feet of retail space is proposed for the property just east of I-35, north of 13th Street.

Land uses along Lincoln Way are commercial to the west and industrial to the east. Industrial uses continue along Dayton Avenue north of Lincoln Way to 13 Street. There is approximately one-half mile of undevelopable property adjacent to 13th Street that is part of the Skunk River floodplain. East of the floodplain, the property adjacent to 13th Street is industrial to the south and commercial to the north.

Developed industrial uses include a 3M facility with approximately 350 employees and Sauer Danfoss with approximately 320 employees. Both of these industrial facilities operate 24-hours a day with three work shifts. Developed commercial uses include a heart clinic and a dialysis clinic.

There is currently no fixed route bus service to this area. Heart of Iowa Regional Transit Agency (HIRTA) provides demand-response, on-call transit service to this area.



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4.4 Corridor 4 – South Duff

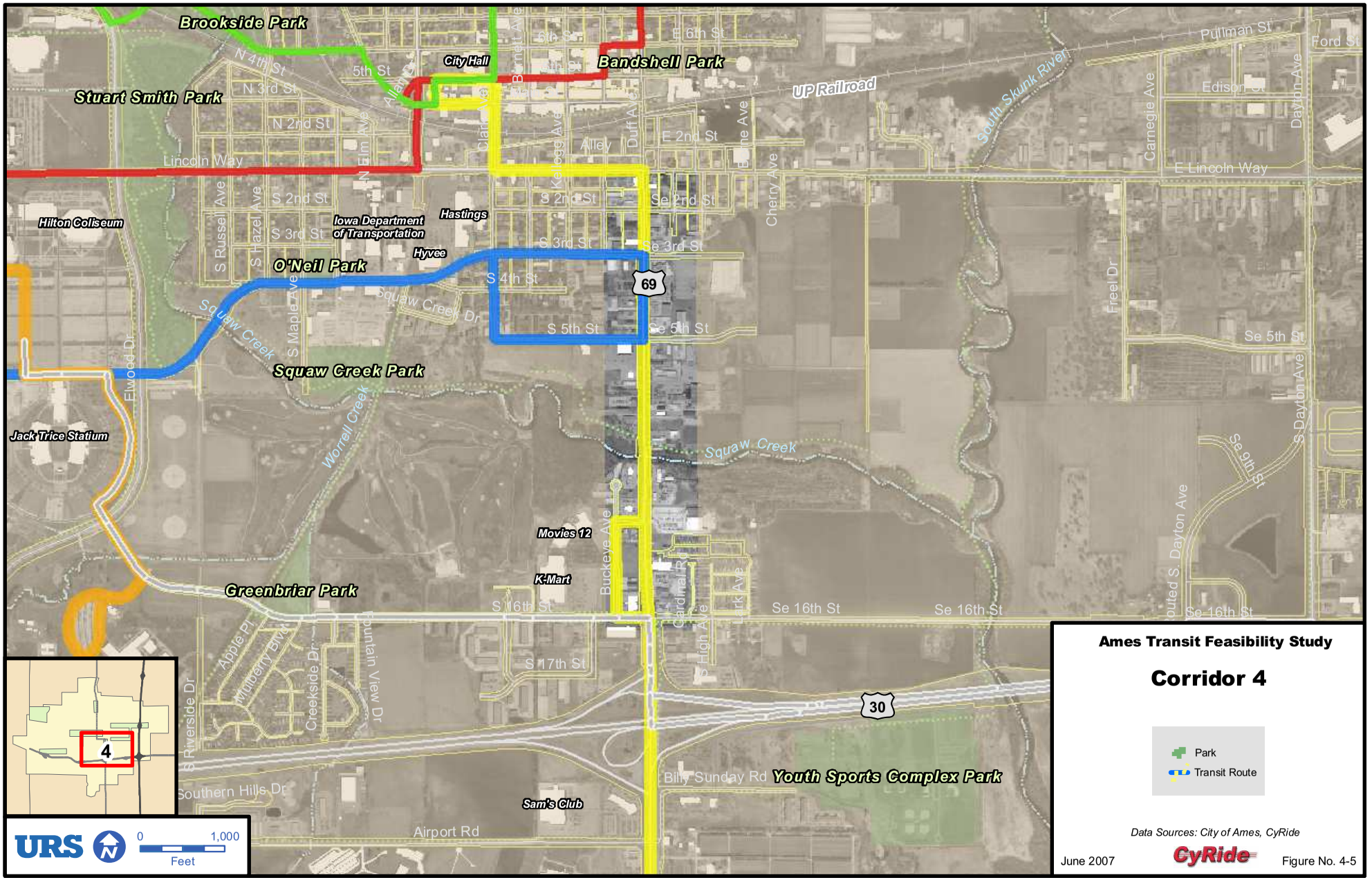
Corridor 4 spans Highway 69/Duff Avenue between Sixteenth Street and East Lincoln Way, also known as the South Duff commercial area (Figure 4-5). South Duff Avenue is a four-lane roadway and carries approximately 26,000 vehicles per day. It is one of the primary north-south roadways in Ames. Its existing right-of-way width is approximately 120 feet.

The corridor crosses Squaw Creek, so any significant physical changes to Highway 69 should consider this factor.

Duff Avenue is currently served by CyRide's Yellow and Blue Routes. The yellow route provides 30-minute, north-south service between the City Hall in Downtown Ames and a residential development south of Highway 30. The Yellow Route runs from approximately 6:30 am to 6:30 pm. The Blue Route runs east-west between Duff and Beach generally along 4th Street. Transit boardings and alightings along the corridor are among the lowest for the system. The average monthly ridership on the Yellow Route is fewer than 2,000 passengers, equivalent to fewer than 100 per day.

Land uses in the corridor are primarily 'big-box' auto oriented retail uses including K-Mart, Target and Best Buy. There are plans to construct a Super WalMart in the corridor.

All three of the Focus Groups commented that more frequent service and evening service should be provided in the South Duff corridor. Business interests felt that increased transit service would benefit the retail uses in the corridor. Residents and students wanted improved service particularly to the discount retail stores.



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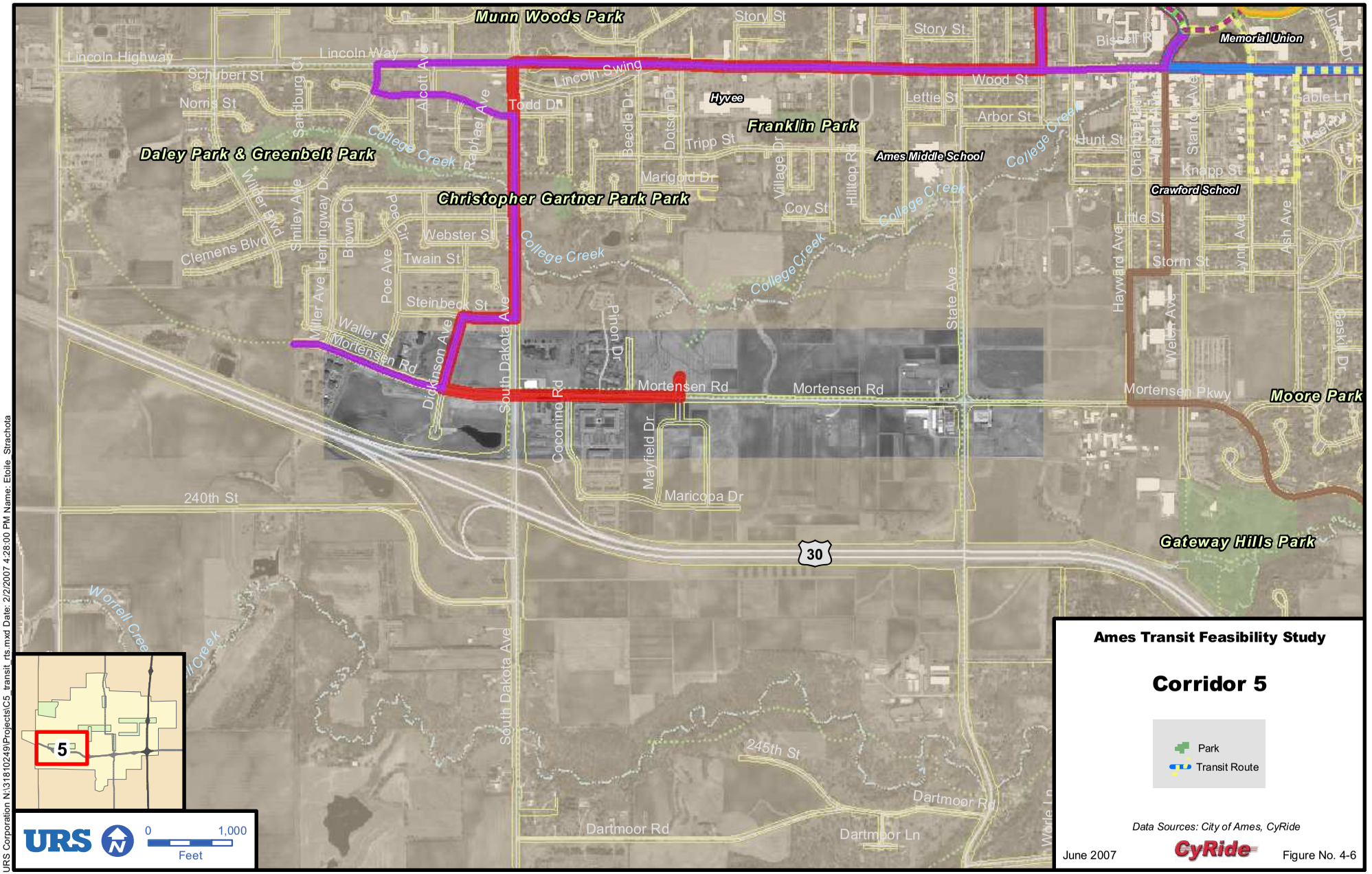
4.5 Corridor 5 – Mortensen Road

Corridor 5 would serve future development in the vicinity of Mortensen Road and South Dakota Avenue in west Ames (Figure 4-6). This area has recently experienced a significant amount of new multi-family residential development. Much of this medium and high density housing is oriented to ISU students which has added to transit demand between this corridor and the ISU campus.

The corridor is served by CyRide's Red and Purple Routes. Boardings and alightings are relatively high for the routes serving the corridor, 300 to 600 per day, depending on the segment. Particularly in the morning peak period, CyRide adds 2 to 3 extra buses to meet the demand for transit service.

The corridor is made up of high-density residential uses west of Dakota Avenue, and residential uses and the Ames Middle School to the east, East of the Middle School, the property along Mortensen Road is owned by ISU and is currently undeveloped. Based on the ISU ownership and information in the campus master plan, it is expected that the area east of Ames Middle School (Pavilion Project) would not generate a substantial increment of transit demand.



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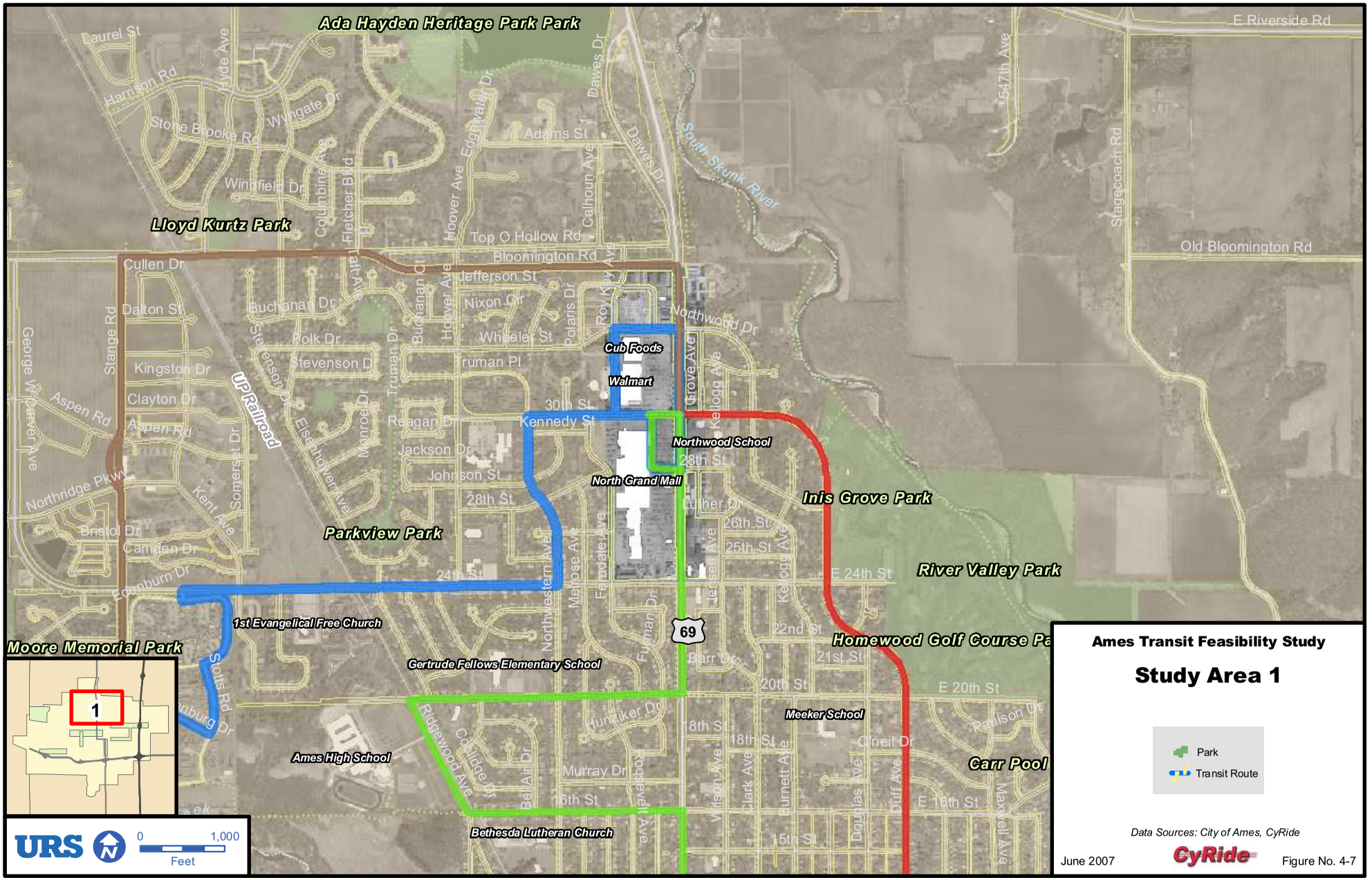
4.6 Study Area 1 – North Grand Avenue and North Grand Mall

Study Area 1 is the area defined by Grand Avenue (Highway 69) that includes the North Grand Mall (Figure 4-7). The area is developed, with a mix of retail and high density residential uses. In addition to the mall, there is a Cub Food Store and a WalMart located north of the mall.

CyRide has an existing transit center in the North Grand Mall. CyRide's Blue, Brown, Green and Red Routes serve the area, with approximately 325 boardings and 325 alightings per day in North Grand Mall. These four routes together carry approximately 50 percent of CyRide's annual ridership.

An expansion and renovation of the North Grand Mall are planned that includes replacement of some of the existing structures on the site and roadway improvements. The project will add or reconfigure a total of 150,000 square feet to the shopping center.


Ada Hayden Heritage Park Park
Lloyd Kurtz Park
Parkview Park
Inis Grove Park
River Valley Park
Moore Memorial Park
Homewood Golf Course Pa
Carr Pool
Laurel St
Harrison Rd
Hyde Ave
Stone Brooke Rd
Wyngate Dr
Windfield Dr
Columbine Ave
Fletcher Blvd
Edgewater Dr
Hoover Ave
Dawes Dr
Calhoun Ave
Adams St
South Skunk River
547th Ave
E Riverside Rd
Stagecoach Rd
Old Bloomington Rd
Top O Hollow Rd
Bloomington Rd
Cullen Dr
Dalton St
Buchanan Dr
Buchanan Ct
Jefferson St
Nixon Cir
Polaris Dr
Roy Key Ave
Northwood Dr
Cub Foods
Walmart
Wheeler St
Truman Pl
Truman Dr
Polk Dr
Stevenson Dr
Stange Rd
George Washington Carver Ave
Aspen Rd
Clayton Dr
Kingston Dr
UP Railroad
Eisenhower Ave
Monroe Dr
Somerset Dr
Kent Ave
Northridge Pkwy
Bristol Dr
Camden Dr
Edenburn Dr
Reagan Dr
Jackson Dr
Johnson St
30th St
Kennedy St
Northwood School
28th St
North Grand Mall
Luther Dr
26th St
25th St
24th St
E 24th St
Grove Ave
Kellogg Ave
Jefferson Ave
Northwestern Ave
Melrose Ave
Ferndale Ave
Fuhrman Dr
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22nd St
21st St
Barr Dr
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Meeker School
Raulson Dr
O'neil Dr
18th St
Hunziker Dr
Ridgewood Ave
Coolidge Dr
Bel Air Dr
Murray Dr
16th St
Roosevelt Ave
Wilson Ave
Clark Ave
Burnett Ave
Douglas Ave
Duff Ave
E 16th St
Maxwell Ave
15th St
1st Evangelical Free Church
Gertrude Fellows Elementary School
Ames High School
Bethesda Lutheran Church
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Ames Transit Feasibility Study
Study Area 1
Park
Transit Route
Data Sources: City of Ames, CyRide
June 2007
CyRide
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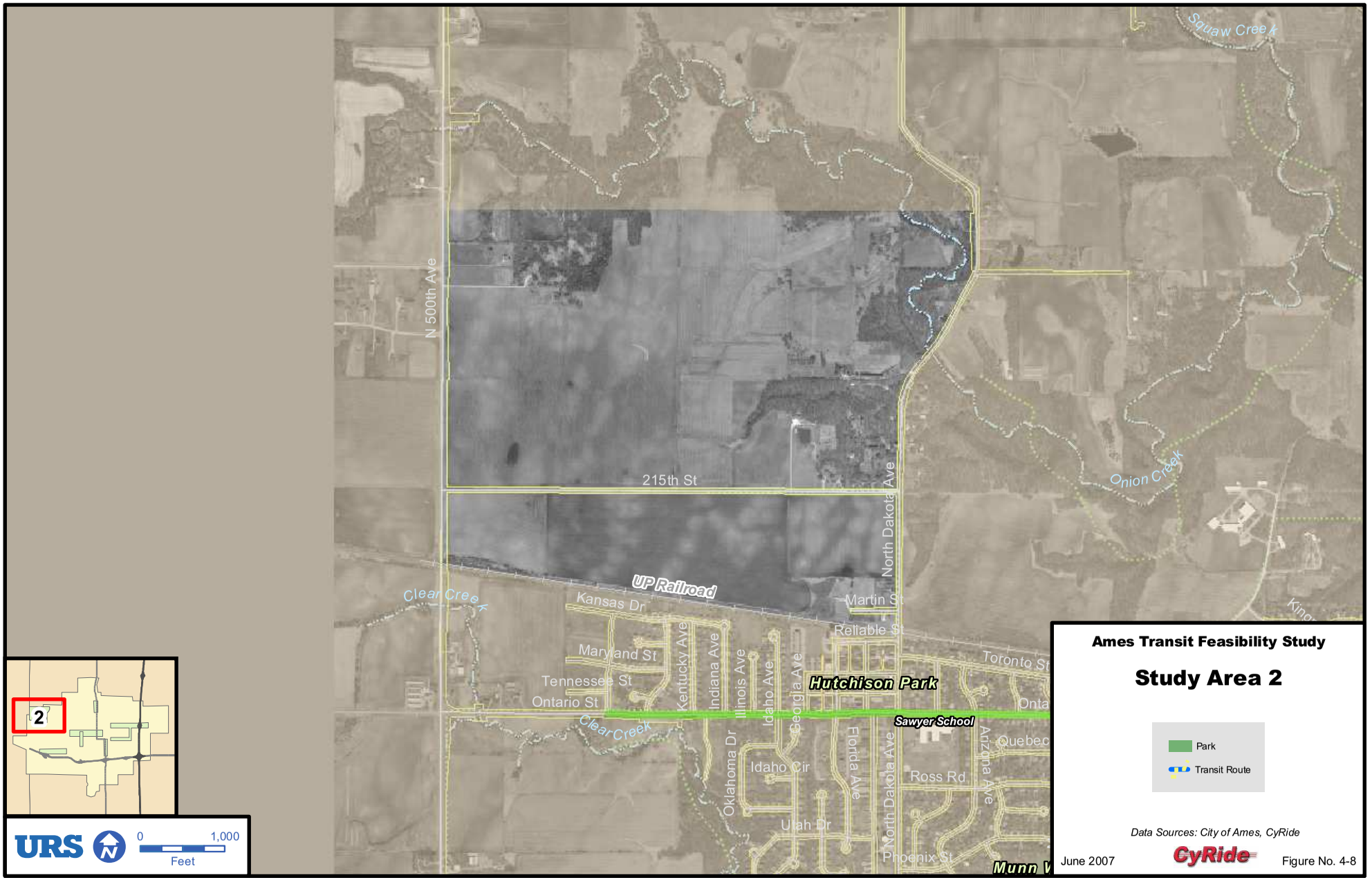
4.7 Study Area 2 – West Ames planned development (north of Lincoln Way)

Study Area 2 is currently undeveloped and is situated in west Ames (Figure 4-8). This Northwest Growth Area is located north of the UP Railroad between 500th Avenue North (County Line Road) and approximately Garfield Avenue. Primary access into this new development would be via North Dakota Avenue. Development proposed for this area would include over 1,500 single and multi-family dwelling units and approximately 150,000 square feet of retail space. New development north of the UP Railroad will require a new grade separation of North Dakota Avenue over the railroad.

CyRide's Green Route provides the nearest fixed route transit service, operating on Ontario Street to approximately one-half mile west of North Dakota Avenue. There are approximately 500 boardings and 500 alightings on this segment of the Green Route. The Green Route carries approximately 10 percent of CyRide's ridership throughout the community.



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5.0 TRAVEL DEMAND FORECASTS

The primary source of trip information incorporated into the ridership forecasting was the latest version of the Ames MPO travel demand model. All of the pertinent model input and parameter files were provided to URS staff in February 2007. The travel model was developed for the purpose of estimating daily vehicle travel and does not include a separate transit component. Thus, URS developed a process for adapting the available travel model datasets and incorporating mode split and boarding/alighting information from readily available sources to complete the transit ridership forecasts.

The forecasting process was executed through the following four steps:

- Step 1: Convert vehicle trips to person trips.
- Step 2: Estimate existing transit mode share in study areas/corridors.
- Step 3: Review forecasted person trip growth between today and 2030.
- Step 4: Forecast 2030 transit ridership for study areas/corridors.

The forecasting process is described in more detail in this memorandum.

Step 1: Convert vehicle trips to person trips

The current model structure for the Ames travel model is based on generation, distribution and assignment of *vehicle* trips. *Person* trip information is required to complete a transit ridership analysis. Therefore, a conversion process to go from the current vehicle trip format to a person trip format was developed. URS staff used estimates of average vehicle occupancy by trip purpose to convert the model vehicle trip tables to person trip tables for the transit alternatives analysis. The model includes the following trip purposes:

- Home-Based Work (HBW): Trips between home and work or work and home without an intermediate stop.
- Home-Based Non-Work (HBNW): Trips between the traveler's home and any other non-work destination. One end of the trip must be at the traveler's home. Examples include shopping trips, trips to the doctors, or trips to church.
- Non-Home-Based (NHB): Trips that do not end or begin at the traveler's (driver's) home. Examples would include a trip at lunch between work and a restaurant, the portion of an errand trip occurring between shopping areas, etc.

- Internal-to-External (I-E): Trips with one end (origin or destination) within the model coverage area and the other end outside the model coverage area. Internal-to-external trips are comprised of HBW, HBNW and NHB purposes.

- Commercial Vehicle (CV): Trips made in the system by commercial trucks associated with the direct shipment of goods.

The I-E and CV trip purposes were not included in the person trip conversion process, because these trip purposes are not candidates to use the CyRide service. The conversion of vehicle trips to person trips was done for both the model's base year (2000) and horizon year (2030).

No recent travel survey data is available in Ames, so to convert home-based work (HBW) vehicle trips to person trips, URS used 2000 census journey-to-work data to estimate average vehicle occupancy. The census-based estimate of HBW vehicle occupancy was 1.17 persons per vehicle, and was used as the vehicle-to-person conversion value for HBW trips.

Census data does not include non-work trip purposes. Thus, non-local sources for conversion values were used. Auto occupancy rates from similar sized metropolitan areas, documented in NCHRP 365, were used to convert home-based non-work (HBNW) and non home-based (NHB) vehicle trips to person trips. These national average rates from NCHRP were:

- HBW: 1.11 persons per vehicle

- HBNW: 1.67 persons per vehicle

- NHB: 1.66 persons per vehicle

The Ames auto occupancy rate of 1.17 in year 2000 was 5.4 percent higher than the averaged survey data for similar-sized metropolitan areas reported in NCHRP 365. Thus, our analysis assumed that HBNW and NHB trip purposes would similarly have a proportionally higher trip rate than the NCHRP 365-documented national averages. Thus, the following occupancy rates were used to convert vehicle trips to person trips for Ames:

- HBW: 1.17 persons per vehicle

- HBNW: 1.76 persons per vehicle

- NHB: 1.75 persons per vehicle

Summaries of the total regional model trips by trip purpose are documented in Table 5-1 (vehicle trips) and Table 5-2 (person trips).

Table 5- 1
Regional Vehicle Trip End Total by Purpose, Ames Travel Model[1]

Model Year	Trip Purpose			Summary
	HBW	HBO	NHB	
2000	48,754	120,198	80,600	249,552
2030	69,482	169,878	112,746	352,106
Vehicle Trip Growth	20,728	49,680	32,146	102,554
Percentage Growth	43%	41%	40%	41%

It should be noted that in most areas currently served by CyRide, it was assumed that current (2007) person trip levels (for all modes of travel) were the same as those reported in the base year model (2000). The majority of areas served by CyRide are in the built-out portions of the city, where little change in trip-making should have occurred over the past six to seven years. Additionally, in most cases the travel model represents the best tool for estimating trip levels at such an aggregate level. Therefore, the 2000 model was used as a tool for estimating 2007-level person trips for most study area locations. Exceptions are noted in the next section.

Table 5-2
Regional Person Trip End Total by Purpose, Estimates from Ames Travel Model[2]

Model Year	Trip Purpose			Summary
	HBW	HBO	NHB	
Estimated Persons per Vehicle	1.17	1.76	1.75	
2000	57,042	211,548	141,050	409,640
2030	81,294	298,985	197,305	577,584
Person Trip Growth	24,252	87,437	56,255	167,944
Percentage Growth	43%	41%	40%	41%

Step 2: Estimate Existing Transit Mode Share in Study Areas/Corridors

The purpose of Step 2 is to identify the relative portion of all trips that currently use the CyRide transit service. The portion of person trips served by CyRide, or its "mode share" is calculated based on a comparison of:

- *Estimates of CyRide trips in study corridors*. These estimates of CyRide ridership are displayed as daily boardings and alightings in various corridor segments in Figure 3-8.

[1] Source: Ames Regional Travel Demand Model.
[2] Source: URS Corporation.

- *Estimates of total person trips for all modes of travel*. The person trip ends were estimated through review of the Ames travel model, as documented in Step 1. Where applicable, the Ames travel model was supplemented with traffic studies completed for individual development/redevelopment projects. These development projects included:

  - North Grand Mall Redevelopment
  - New Super Wal-Mart on South Duff Avenue
  - Proposed Fieldstone Development/Northwest Growth Area

  In addition to these traffic study-based adjustments to 2007 person trip totals, URS made adjustments to the base year person trips for:

  - *Corridor 5, the West Towne area (TAZs 76 and 90)*. Very little development existed in this study corridor in 2000, but it has significant levels of mixed-use and multi-family residential development today. Based on field visits and review of aerial photography, it appears that approximately 85 percent of these TAZs are developed. Thus, 85 percent of 2030 trip levels were assumed for 2007 conditions.

  - *ISU Campus Trips*. Current ISU enrollment forecasts anticipate little change in overall enrollment over the next 10 years. Therefore, no growth in overall ISU person trips was assumed for 2030.

For the key study area corridors evaluated, CyRide "ridership analysis districts" were developed based on the Ames Travel Model traffic analysis zone (TAZ) structure and the location of key CyRide boardings/alighting segments. The TAZ structure and the CyRide boarding/alightings by corridor segment are illustrated in Figure 3-8. As shown, there are many overlaps in the geography of the TAZs and boarding/alighting segments. For the purposes of comparing the boarding/alighting data to the person trip information for all modes (summarized by TAZ), it was necessary to aggregate TAZs into analysis districts. In cases where more than one boarding/alighting segment fell into a single ridership analysis district, the ridership estimates for these multiple segments were combined. The analysis districts are illustrated in Figure 3-8 and described in Table 5-3.

A summary of current levels of person trips (all modes), CyRide ridership (in boardings and alightings) and CyRide mode share is presented by analysis district in Table 5-4.

Table 5-3
Study Area Ridership Analysis Districts[1]

Ridership Analysis District	TAZs	Description
Study Area 1	59	North Grand Mall
Blue 1	60	Wal-Mart and Cub Foods north of North Grand Mall
Green 1	70, 71	Residential area centered on Ontario Street west of North Dakota Avenue, Green Route service
Green 2	31	Mixed commercial – residential area north of downtown, Green Route service
Green 3	34, 35	Residential area between 9th Street and 13th Street centered on Grand Avenue, Green Route service
Green 4	37, 38, 39, 43, 44, 45, 46, 47, 50	Residential area between 13th Street and 24th Street centered on Green Route including Ames High
Red 1/Purple 1	76, 90	Corridor 5: Mortensen Avenue
Red 2/Purple 2	72, 75, 82, 86	Area around Dakota Avenue – Lincoln Way intersection, serviced by Red and Purple Routes
Red 3/Orange 3	3	East side of central campus; included in Corridors 1 and 2
Red 4	15, 16, 17, 18, 25	Neighborhood between central campus and downtown along Lincoln Way, included in Corridor 2
Red 5/Green 5	26, 27	Downtown Ames, included in Corridor 2.
Orange 1	14	West side of central campus, included in Corridors 1 and 2
Orange 2	7	Campus/neighborhood southwest of Lincoln Way – Beach Avenue intersection, serviced by Orange Route
Orange 4	2	Iowa State Center, included in Corridor 1.
Yellow 1	95, 97, 99, 100	Industrial, retail and residential uses along S Duff Avenue south of US 30, serviced by Yellow Route
Yellow 2	23, 103	Retail corridor along S Duff Avenue north of US 30, part of Corridor 4
Yellow 3	21, 104, 180	Retail corridor along S Duff Avenue south of Lincoln Way, part of Corridor 4
Corridor 3-1	122, 123	Proposed regional retail (Wolford Development), no current CyRide service
Corridor 3-2	109, 110, 111, 112, 115, 116, 117, 118	Corridors including East 13th Street, the Dayton Avenue, East Lincoln Way, no current CyRide service
Study Area 2	67	Future development area called Northwest Growth Area, no current CyRide service

[1] Source: URS Corporation.

Table 5-4
2007 Trips and Mode Share by Ridership Analysis District[1]

Ridership Analysis District	TAZs	2007 Person Trip Ends (All Modes)	2007 CyRide Boardings and Alightings	CyRide Mode Share
Study Area 1 (North Grand Mall)	59	23,200[2]	650	2.8%
Blue 1	60	9,400[3]	200	2.1%
Green 1	70, 71	11,000	1,000	9.1%
Green 2	31	3,100	50	1.6%
Green 3	34, 35	5,200	10	0.2%
Green 4	37, 38, 39, 43, 44, 45, 46, 47, 50	16,800	120	0.7%
Red 1/Purple 1	76, 90	15,700[4]	2,800	17.8%
Red 2/Purple 2	72, 75, 82, 86	16,300	800	4.9%
Red 3/Orange 3	3	8,900	5,150	57.9%
Red 4	15, 16, 17, 18, 25	15,500	80	0.5%
Red 5/Green 5	26, 27	7,200	240	3.3%
Orange 1	14	5,200[5]	4,680	90.0%
Orange 2	7	8,100	560	6.9%
Orange 4	2	27,400	5,720	20.9%
Yellow 1	95, 97, 99, 100	15,900	30	0.2%
Yellow 2	23, 103	15,200	10	0.1%
Yellow 3	21, 104, 180	19,300	20	0.1%

1 Source: URS Corporation; Ames Regional Travel Demand Model; and Iowa Department of Transportation.
2 Based on data from *North Grand Mall Redevelopment Traffic Impact Study*.
3 Based on data from Iowa DOT trip generation study.
4 Based on URS estimate that current (2007) development is 85 percent of build-out 2030 levels (18,400 trips).
5 Based on CyRide staff estimate that 90 percent of people traveling to Iowa State Center ride the Orange Route.

Step 3: Review Forecasted Person Trip Growth between Today and 2030

In addition to a base year (2000) scenario, the Ames model includes a land use and transportation network scenario for the year 2030. This model scenario includes a 2030 year vehicle trip table, which forecasts the number of daily vehicle trips exchanged between each TAZ (by trip purpose) in 2030. By comparing the number of trips estimated for the base year and the number of trips estimated for the future year (2030) for each TAZ and aggregating each TAZ to its appropriate ridership analysis district, it was possible to determine the relative growth in forecasted trip making for all modes by analysis district over the planning horizon.

The current number of all-mode person trips, the forecasted 2030 number of person trips and the growth in person trips by analysis district are shown in Table 5-5. As documented in Step 2, there were several analysis districts where additional information was available to supplement the information in the Ames travel model, for both existing and future 2030 conditions. This supplemental information was included in the person trip forecasts documented in Table 5-5.

Step 4: Forecast 2030 Transit Ridership for Study Areas/Corridors

Future year CyRide trips were forecasted for all seven study areas/corridors. To complete Step 4, it was necessary to first estimate a forecasted 2030 CyRide mode share, and then apply that mode share to the level of person trips estimated for 2030 for each analysis district. There were two levels of analysis required, based on whether or not CyRide service was currently offered in the corridor:

- In corridors currently served by CyRide, it was assumed that the 2030 CyRide mode share (the percentage of all person trips which were served by CyRide) would be the same as current levels.

- In corridors that are not currently served by CyRide, mode shares were forecasted based on various sources of available data. There were two study corridors CyRide does not currently service for which mode share forecasts were necessary: Corridor 3 and Study Area 2. Documentation of the process by which mode shares were estimated for each study corridor is included in this section.

Table 5-5
Existing and Future Levels of Person Trips, by Analysis District[1]

Ridership Analysis District	TAZs	2007 Person Trip Ends (All Modes)	2030 Person Trip Ends (All Modes)	Person Trip Percentage Change
Study Area 1 (North Grand Mall)	59	23,200	33,500[2]	44%
Blue 1	60	9,400	9,600[1]	2%
Green 1	70, 71	11,000	19,200	75%
Green 2	31	3,100	2,900	-6%
Green 3	34, 35	5,200	5,300	2%
Green 4	37, 38, 39, 43, 44, 45, 46, 47, 50	16,800	17,600	5%
Red 1/Purple 1	76, 90	15,700	18,400	17%
Red 2/Purple 2	72, 75, 82, 86	16,300	31,900	96%
Red 3/Orange 3	3	8,900	8,900[2]	0%
Red 4	15, 16, 17, 18, 25	15,500	15,800	2%
Red 5/Green 5	26, 27	7,200	7,400[2]	3%
Orange 1	14	5,200	5,200[2]	0%
Orange 2	7	8,100	8,100[2]	0%
Orange 4	2	27,400	27,400[2]	0%
Yellow 1	95, 97, 99, 100	15,900	19,100	20%
Yellow 2	23, 103	15,200	22,200	46%
Yellow 3	21, 104, 180	19,300	30,500[3]	58%
Corridor 3-1	122, 123	400	25,500	6275%
Corridor 3-2	109, 110, 111, 112, 115, 116, 117, 118	14,700	18,600	27%
Study Area 2 (Northwest Growth Area)	67	1,300	29,600[4]	2177%

Corridor 3 CyRide Mode Share Estimates

Corridor 3 constitutes a large portion of Ames east of the Skunk River, along the East 13th Street corridor, the Dayton Avenue corridor, the East Lincoln Way corridor and the proposed regional retail center (Wolford Development). Potential ridership for this corridor was analyzed and forecasted by breaking it into two different analysis districts:

- *Corridor 3-1 District: The proposed regional retail center east of Interstate 35*. For the regional retail center, the existing mode share for the North Grand Mall (Study Area 1) was assumed to be a good surrogate for the proposed regional retail center, due to similar

1 2007 to 2030 growth rate based on Ames Regional Travel Demand Model.
2 Assumes no overall growth in ISU person trips based on current ISU enrollment forecasts, which predicts little change over the next 10 years.
3 Includes trip data from *Super Wal-Mart Center Traffic Report*.
4 Based on data from *Fieldstone Village Traffic Impact Study*.

scale and type of retail development proposed. Thus, it was assumed that 2.8 percent of all person trips at the proposed retail center (TAZs 122 and 123) would be served by CyRide if service were offered.

- *Corridor 3-2 District: The already developed areas along East 13th St, Lincoln Way and Dayton Ave.* The remainder of Corridor 3 along East 13th Street, Dayton Avenue and East Lincoln Way (TAZs 109, 110, 111, 112, 115, 116, 117 and 118), has relatively high levels of employment, including a mix of light industrial, medical, service and small-scale retail uses. There is not a good surrogate for this portion of Corridor 3 among the studied corridors in the current CyRide service area, as none include a similar mix land use types and density.

  To develop an appropriate mode share for the Corridor 3-2 analysis district, available Census/Local Employment Dynamics database[1] was reviewed. Based on this data, URS staff estimated that approximately 27 percent of workers in this general area come from Ames, the rest from the surrounding area. This data is in line with a CyRide study from the early 1990s that found approximately 25 percent of workers in the East 13th Street/Dayton Avenue area were from Ames. Thus, if we assume that 27 percent of all trips within the corridor have access to CyRide, and the city-wide mode share for CyRide is 3.8 percent of all person trips, it is estimated that the mode share for all trips in this analysis district would be approximately 1.0 percent (3.8% x 27% = 1.0%).

- *Study Area 2 Mode Share Estimates.* Study Area 2 (northwest growth area) is a large area of northwest Ames slated for development, located north of the Union Pacific rail line on each side of North Dakota Avenue. The area is planned to be developed by Fieldstone to relatively high densities with planned condominiums, town houses, apartments and single-family residential uses, in addition to some specialty retail uses.

  To estimate an appropriate mode share for Study Area 2, two different existing ridership analysis districts were combined:

  - The first was the Green 1 analysis district, located directly south of Study Area 2 (TAZs 70 and 71), which is composed of apartments and single-family housing. The estimated CyRide mode share in Green 1 is 9.1 percent of all trips.

  - The second was the Green 4 analysis district, a relatively dense neighborhood of single-family and some multi-family housing in an established portion of north-central Ames. The estimated CyRide mode share in Green 4 is 0.7 percent of all trips.

  A mode share of 4.9 percent was established for Study Area 2 by averaging the CyRide ridership mode share for these two districts.

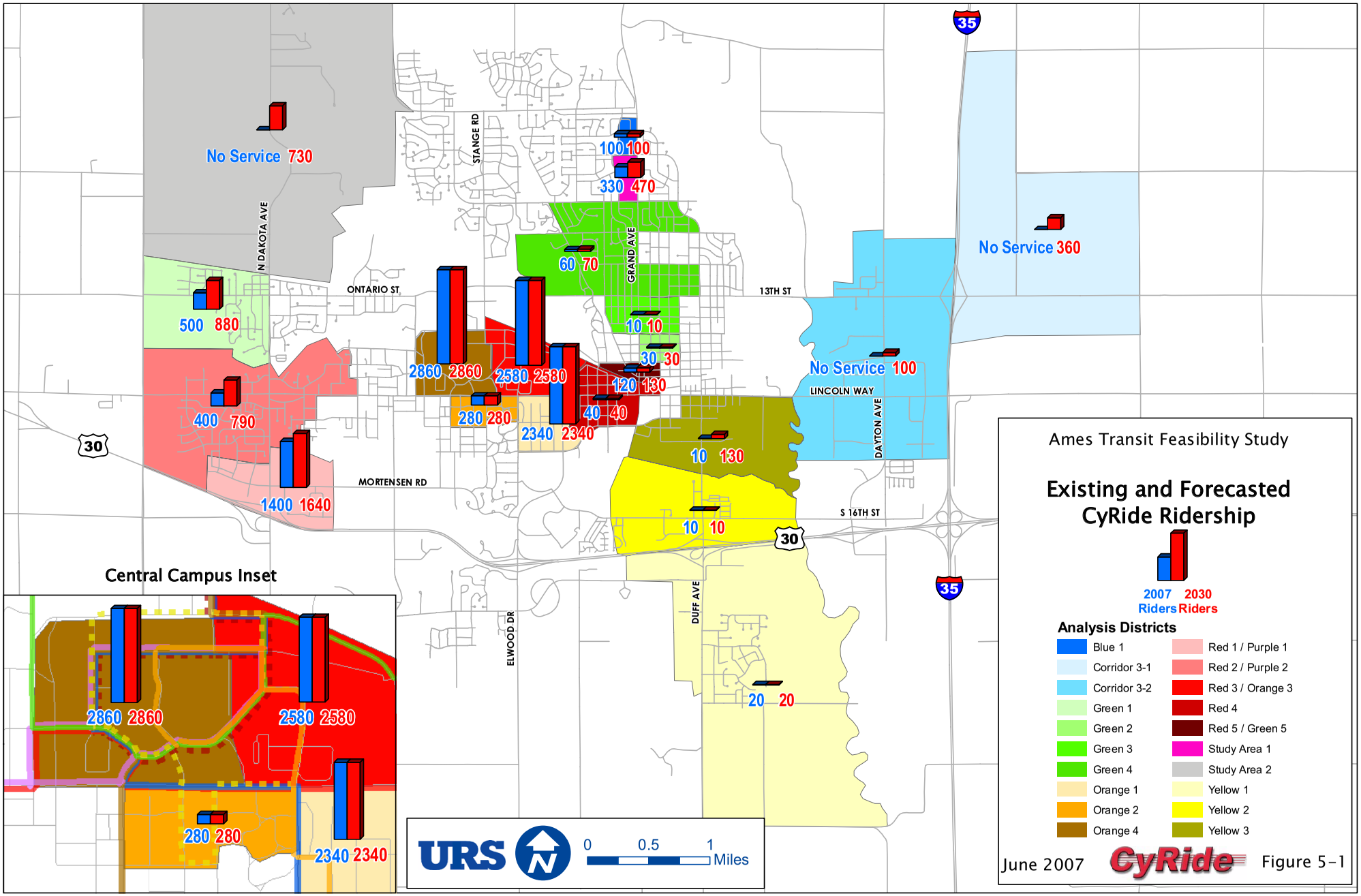
[1] Data available at: lehdmap.dsd.census.gov. 2003 survey data used.

The forecasted mode shares for each analysis district were then applied to the estimated level of person trip activity for that district to forecast a 2030 level of CyRide ridership. The 2030 CyRide ridership forecasts resulting from Step 4 are documented in Table 5-6, which reports forecasted CyRide boardings and alightings, and illustrated in Figure 5-4, which reports forecasted CyRide riders.

Table 5-6
Forecasts of CyRide Boardings and Alightings, by Analysis District[1]

Ridership Analysis District	TAZs	2030 Person Trip Ends (All Modes)	Forecasted CyRide Mode Share	Forecasted 2030 CyRide Boardings and Alightings
Study Area 1 (North Grand Mall)	59	33,500	2.8%	940
Blue 1	60	9,600	2.1%	200
Green 1	70, 71	19,200	9.1%	1,750
Green 2	31	2,900	1.7%	50
Green 3	34, 35	5,300	0.2%	10
Green 4	37, 38, 39, 43, 44, 45, 46, 47, 50	17,600	0.7%	120
Red 1/Purple 1	76, 90	18,400	17.8%	3,280
Red 2/Purple 2	72, 75, 82, 86	31,900	4.9%	1,570
Red 3/Orange 3	3	8,900	57.9%	5,150[1]
Red 4	15, 16, 17, 18, 25	15,800	0.5%	80
Red 5/Green 5	26, 27	7,400	3.3%	250
Orange 1	14	5,200	90.0%[2]	4,680[3]
Orange 2	7	8,100	6.9%	560[3]
Orange 4	2	27,400	20.9%	5,720[3]
Yellow 1	95, 97, 99, 100	19,100	0.2%	40
Yellow 2	23, 103	22,200	0.1%	20
Yellow 3	21, 104, 180	30,500	0.8%	250[2]
Corridor 3-1	122, 123	25,500	2.8%	710
Corridor 3-2	109, 110, 111, 112, 115, 116, 117, 118	18,600	1.0%	190
Study Area 2 (Northwest Growth Area)	67	29,600	4.9%	1,450

1 Source: URS Corporation.
2 Assumes no overall growth in ISU person trips based on current ISU enrollment forecasts, which predicts little change over the next 10 years.
3 Based on current Wal-Mart/Blue 1 mode share of 2.1 percent bus and current Yellow 3 mode shares of 0.1 percent.


No Service 730
500 880
400 790
1400 1640
100 100
330 470
60 70
10 10
30 30
120 130
40 40
2860 2860
2580 2580
280 280
2340 2340
No Service 360
No Service 100
10 130
10 10
20 20
N DAKOTA AVE
STANGE RD
ONTARIO ST
GRAND AVE
13TH ST
LINCOLN WAY
DAYTON AVE
MORTENSEN RD
S 16TH ST
ELWOOD DR
DUFF AVE
30
35
Central Campus Inset
URS
0 0.5 1 Miles
Ames Transit Feasibility Study
Existing and Forecasted CyRide Ridership
2007 Riders
2030 Riders
Analysis Districts
Blue 1
Corridor 3-1
Corridor 3-2
Green 1
Green 2
Green 3
Green 4
Orange 1
Orange 2
Orange 4
Red 1 / Purple 1
Red 2 / Purple 2
Red 3 / Orange 3
Red 4
Red 5 / Green 5
Study Area 1
Study Area 2
Yellow 1
Yellow 2
Yellow 3
June 2007
CyRide
Figure 5-1

6.0 TRANSIT TECHNOLOGIES

The purpose of this chapter is to define and evaluate the transit technologies to improve service in CyRide's current and future service area. These technologies include:

- Standard bus (40-foot, diesel-powered)
- Articulated bus (60-foot bus which could include a variety of features such as low-floor or level boarding and use of alternative fuel)
- BRT
- Modern streetcar
- LRT.

The following chapter, *Alternative Service Plans*, takes into account the appropriate transit technologies recommended in this chapter for further review, and defines appropriate transit service options for each of the five corridors and two study areas. Chapter 8, *Evaluation of Alternatives*, assesses the feasibility of each combination of transit technology and service option through a review of factors such as including service frequency, economic development, cost, ridership and the environment.

6.1 Standard Bus

Bus transit is the most common type of public transportation in the world today. The general category of bus transit is comprised of manually operated rubber-tired vehicles. Nearly all types of bus transit operate in mixed traffic on ordinary roadways, and all are self-propelled by an on-board engine and power source. Stops are as frequent as every one to two blocks, or every one-eighth mile. Fewer stops and higher average speeds characterize express or limited service. The national average trip length for buses is 3.7 miles[1]. The photograph on this page illustrates a typical 40-foot (standard) bus in CyRide's fleet.

Buses can use different types of propulsion systems, including diesel (most commonly used), diesel electric, electric, and compressed and liquefied natural gas (CNG and LNG, respectively), considered as "cleaner" fuels. Battery-powered buses have been implemented, and their short operating range limits them primarily to short-haul, special use operations in activity centers.

[1] Source: 2005 National Transit Database, Federal Transit Administration.

Buses also come in various sizes or passenger capacities. The typical capacity for a 40-foot bus–the largest vehicle in CyRide's current fleet–is 70 passengers, including standees. A 60-foot (articulated) bus has a capacity of approximately 120 passengers including standees.

Buses have three major advantages that account for their predominance as a transit technology. First, they are the least expensive of all technologies. Since they can use existing roadways, they do not require a large investment in construction and maintenance of new infrastructure. Second, they offer unequaled routing flexibility. Third, buses can serve a wide range of passenger demand levels by using small to large vehicles.

Buses also have a number of disadvantages that make them unsuitable for some uses. The greatest drawback of bus transit is the high labor cost per passenger carried. Labor wages and benefits for bus service can easily be double the capital cost of the vehicles on an annual basis. Second, since diesel buses dominate existing bus transit operations, their noise levels and emission of pollutants may be undesirable.

Applicability to Ames Feasibility Study

Standard (40-foot) bus transit is a proven technology used by CyRide. One of the advantages of a diesel bus system is that it has relatively low capital costs and offers considerable flexibility. Disadvantages are its limited capacity; buses cannot be coupled, unlike other technologies where a single driver can operate a transit unit, such as a train, that has much greater passenger capacity. The absence of the coupling capability directly affects the operating efficiency of the system when evaluated in terms of passengers moved per dollar spent. Other negative aspects of a diesel bus include point source noise and air pollution.

In light of the advantages and disadvantages of the conventional bus, this Study recommends conventional bus for further consideration.

6.2 Articulated Bus

Articulated buses have similar characteristics to standard buses, except for size and, therefore, passenger capacity. Articulated buses are 60 feet long and have an average total passenger capacity of 120. They could have three doors and have a wider turning radius than 40-foot buses: approximately 45 feet, vs. 30 feet. Articulated buses also come with a variety of propulsion systems including diesel and diesel-electric. The photos on the right illustrate New Flyer's 60-foot low floor buses. The bottom photo features a diesel-electric bus being used in Seattle.[1]

[1] Photo source: New Flyer.

Applicability to Ames Feasibility Study

Articulated bus is a proven technology, currently operating in numerous cities. Its higher passenger capacity relative to CyRide's current fleet of 40-foot buses translates to the potential use of two articulated buses for every three 40-foot buses in service. This could mean lower operating costs for CyRide. Another advantage of using articulated buses is that they use the existing roadway infrastructure for service. CyRide might also consider using hybrid articulated buses as it looks to the purchase of new buses.

A disadvantage of articulated buses is their larger required storage area as well as increased maintenance cost. Our understanding is that CyRide's existing maintenance facility would require modifications in order to accommodate articulated buses. The magnitude of the modifications to the maintenance facility would depend on several factors, including the number of articulated buses it decides to purchase and additional fleet and growth in administrative and operations staff in the short and long term. Nevertheless, this Study recommends conventional articulated buses for further consideration.

6.3 BRT

Bus Rapid Transit is designed to operate in environments with medium to heavy passenger volumes, on medium-distance trips. BRT has been originally conceived as a low-cost, rubber-tired alternative to light rail transit that combines the quality of rail transit with the flexibility of bus transit. The core concept in BRT is an integrated, well-defined system that provides for a significant improvement in performance.

BRT vehicles can range from a standard bus to a highly specialized, unique vehicle such as that pictured here. BRT vehicles usually have low floors, multiple boarding doors and may utilize a barrier-free fare collection system, which increases the efficiency of passenger boarding and alighting. The propulsion system may be conventional diesel engines or overhead electric catenary. Vehicles typically require 11- to 12-foot lane widths and priority treatment in mixed traffic. Complete separation from other vehicular traffic is preferred. The photo on the right features the BRT vehicle used in Las Vegas.[1]

Busways that provide a high level of service and high passenger capacities are typically grade-separated from cross streets (as in Ottawa and Pittsburgh). Low-volume busways are characterized by at-grade intersections with cross streets (as in Seattle and the University of Minnesota transitway). Stops along the busway are made only at stations, typically spaced every one-half to one mile. Buses may operate non-stop along the busway or make selected stops

[1] Photo source: Regional Transit Commission of Southern Nevada.

based on passenger demand. Buses may also exit the busway and operate along streets to provide local service. Additionally, BRT vehicles can be used on high-occupancy vehicle facilities.

BRT is a relatively new and rapidly expanding transit technology and as such, may be difficult to define at times. For example, numerous systems currently in operation have characteristics of express bus and BRT, such as the University of Minnesota Transitway. Other common characteristics of BRT include distinctive station architecture, branding, use of special vehicles, use of ITS, AVL, real-time information, and as such, there is a relatively wide range of cost, fleet size and route length. Depending on the type of vehicle used, a BRT vehicle's total passenger capacity ranges from 100 to 120 passengers including standees.

Applicability to Ames Feasibility Study

Conventional BRT is a proven technology, currently operating in numerous cities. BRT operating on an exclusive travel lane is capable of providing moderate to high capacity for lower cost than light rail transit. BRT can utilize standard buses or it can be equipped with larger vehicles because the operation is largely confined to the exclusive travel lane where they do not interact with mixed traffic. Disadvantages of busway/BRT may include costs associated with right-of-way acquisition and operating costs. Although the vehicles can be larger than standard buses and thereby offer more capacity, the coupling of vehicles to achieve higher efficiency is limited to rail transit. BRT vehicles can utilize one of several propulsion systems, each with its own environmental effects. Considering the advantages and disadvantages, this Study recommends conventional BRT for further consideration.

6.4 Modern Streetcar

Modern streetcar transit can be characterized as rail system with an overhead electrical power source that operates primarily in mixed traffic, similar to conventional buses and electric trolley buses. Typical stations or stops are generally spaced one-eighth to one-quarter mile apart. Streetcar systems are often appealing from the perspectives of aesthetics and economic development; in addition to providing mobility, they can be viewed as enhancements to the character of an area because of their distinctive design. A single-car train could carry up to 115 passengers, including standees.

Other streetcar systems are currently operating in the United States that utilize vintage vehicles, including Kenosha, Wisconsin; San Francisco; and New Orleans. Vintage streetcars typically operate as single-car trains.

Portland's streetcar system includes approximately $2.5 billion return on investment since the first line was announced in 1997. Current projects credited to the streetcar amount to $750 million. Approximately half of all development in the city's central business district is within one block of the streetcar line, while 7,000 housing units have been built within three blocks of the line.

Applicability to Ames Feasibility Study

Modern streetcars offer a similar level of service as conventional buses. Modern streetcars are well suited for low to medium ridership applications. Most of the streetcar systems (using both vintage and modern vehicles) in operation provide circulation service, typically in a downtown area, rather than the line-haul type of service. Modern streetcars require a fixed rail and an overhead catenary, limiting its flexibility and adding to its cost.

In summary, streetcars are a proven technology. Their characteristic operating speed and passenger capacity are not suitable for line-haul applications. However, they could be ideal for a circulation service especially in the downtown Ames and between the Iowa State Center and ISU central campus. Therefore, this Study recommends Modern Streetcar technology for further analysis.

6.5 Light Rail Transit

Light rail transit (LRT) operates in more than 20 urban areas in the U.S. and Canada, including Portland, Baltimore, St. Louis, Buffalo, Dallas, San Diego, Los Angeles, Minneapolis and San Jose. LRT features electric rail cars, operated singly or in short trains of up to four cars, using an overhead electric wire (catenary) as the power source. The use of an overhead electric wire eliminates the issues associated with having a live third rail at ground level. LRT train length must not exceed the minimum length of a city block so that stopped vehicles do not block intersections or crosswalks. LRT operates primarily in a semi-exclusive right-of-way with total corridor lengths generally not exceeding 15 to 20 miles, and is a medium- to high-capacity transit technology. In addition to operating at-grade, an LRT system may be grade-separated by operating in a tunnel, on an elevated structure, or alongside motor vehicles on the surface. The typical passenger capacity of one LRV is 150 passengers. The following photo illustrates the Hiawatha line in Minneapolis, MN.

A key characteristic of LRT is its flexibility. For LRT applications, the range of selected characteristics includes:

- A highly pedestrian environment to a fully grade separated right-of-way

- Top speeds from 30 mph to 55 mph
- Station spacing from one-quarter mile to 1 mile
- A semi-exclusive to exclusive right-of-way.

The application of LRT technology to a particular corridor can vary significantly. One application could include station spacing from one-quarter to three-eighths mile with a semi-exclusive right-of-way, while another application could include one-mile station spacing in an exclusive right-of-way.

Applicability to the Ames Feasibility Study

Light rail transit is a proven technology currently operating in numerous cities in the US. The primary advantage of LRT is its adaptability and flexibility. It can range from a high speed, high capacity system comparable to heavy rail, to low speed, medium capacity streetcar or shuttle service. Other advantages include the relatively easy incorporation of LRT into a downtown area with station spacing close enough to provide convenient walk access. Other advantages of LRT include lower air and noise pollution than other technologies such as buses. Disadvantages of LRT include relatively high capital and implementation costs and less route flexibility than buses.

Given the relatively short travel distances being considered this Study, high capital and operating cost, right-of-way requirements associated with providing an exclusive guideway, and higher ridership thresholds associated with LRT, this Study does not recommend LRT for further consideration.

6.6 Recommended Transit Technologies

Based on this review of transit technologies, the Ames Transit Feasibility Study recommends the following transit technologies for further consideration:

- Standard Bus
- Articulated Bus
- BRT
- Streetcar.

Table 6-1 presents a summary of the transit technologies considered for the Ames Transit Feasibility Study, including each technology's physical and operational characteristics. The transit technologies recommended for further consideration are highlighted in green.

Table 6-1
Characteristics of Transit Technologies Considered[1]

Parameter	Standard Bus	Articulated Bus	Bus Rapid Transit (BRT)	Modern Streetcar	Light Rail Transit (LRT)
					
Capital Cost per Mile ($ millions)	Note 2	Note 2	10 to 40	10 to 30	20 to 40
Typical Vehicle Capacity	70 passengers	120 passengers	120 passengers	115 passengers	150 passengers
-- Potential Number of Linked Vehicles	None	None	None	None	Three
Average Trip Length (miles)	3.7	3.7	5.6	Not available	3.1
Running Surface	Mixed traffic or separate ROW	Mixed traffic or separate ROW	Separate ROW preferred	Mixed traffic	Mixed traffic or separate ROW
Speed (maximum/average)	65mph/12mph	65mph/12mph	50mph/25mph	30mph/15mph	55mph/22mph
Power Supply	Diesel or alternative fuels	Diesel or alternative fuels	Diesel	Overhead electric wire	Overhead electric wire
Operating Environment	Urban/Suburban	Urban/Suburban	Urban/Suburban	Urban/Suburban	Urban/Suburban
-- Grade Separation Required	No	No	Note 3	Note 3	Note 3
-- Alignment Extension Cost	N/A	N/A	High	High	High
At-Grade Station Access	Yes	Yes	Yes	Yes	Yes
Typical Stop/Station Spacing	Close	Close	1/2 to 1	1/8 to 1/4	1/4 to 1
Environmental Impacts	Emissions, noise	Emissions, noise	Right-of-way, noise, emissions	Right-of-way, noise	Right-of-way, noise
Proven Technology	Yes	Yes	Yes	Yes	Yes
-- Line-haul operations	Many	Many	Few	Few	Many
Advantages	Can operate in mixed traffic or on its own guideway, adaptable to a variety of fuels, low capital costs	Can operate in mixed traffic or on its own guideway, adaptable to a variety of fuels, low capital costs	Moderate to high capacity system for less cost than LRT and other fixed guideway systems	Moderate capacity for less cost than other fixed guideway systems, operates in mixed traffic, less noise and emissions than buses, visually enhancing	Moderate to high capacity system for less cost than other fixed guideway systems, can operate in mixed traffic, less noise and emissions than buses
Disadvantages	Limited capacity, high operating costs (one driver per vehicle), subject to traffic delay	Limited capacity, high operating costs (one driver per vehicle), subject to traffic delay	High operating costs (one driver per vehicle), travel times compromised in mixed traffic, not as flexible as standard buses, requires wide guideway	Unlike electric trolley, streetcar systems require a rail running surface, high capital costs, not as flexible as buses	High capital costs, not as flexible as buses
Implementation Feasibility	Positive	Positive	Positive	Positive	Positive
Applicable to Ames?	**Yes**	**Yes**	**Yes**	**Yes**	No

[1] Reference: Kittelson & Associates, Inc., KFH Group, Inc., Parsons Brinckerhoff Quade & Douglas, Inc., and Katherine Hunter-Zaworski (2003). *Transit Capacity and Quality of Service Manual*, Second Edition. *TCRP Report 100,* Transportation Research Board, National Academy Press, Washington, DC.
[2] Bus capital cost attributable primarily to number of vehicles.
[3] Need for grade separation depends on cross-street traffic volumes. For rapid transit operating at high frequencies, grade separation is required.

7.0 ALTERNATIVES CONSIDERED

The purpose of this chapter is to define the transit improvement options considered for each of the five corridors and two study areas identified by CyRide. These improvements include continuing any existing service in an area, modifying this service, or introducing new service. Part of the option that includes new service is the reintroduction of the Dinkey, a streetcar service that started operating in the late 19th century between downtown Ames and the Iowa State Campus (then the Iowa Agricultural College), through 1929 when it was replaced by bus service.

The following chapter, *Evaluation of Alternatives,* determines the applicability of each of the transit improvement options presented through a review of several factors, including service frequency, economic development, cost, ridership and the environment.

There are numerous service options considered in this feasibility study that include modifications to existing routing as well as the introduction of new routes. Each option generally described by the corridor or study area where it may be applied. As previously stated, each of these options are evaluated for their effectiveness in the following chapter, *Evaluation of Alternatives*.

Cost estimates are provided for each alternative. These estimates include contingency and project administration, consistent with a feasibility study. (Appendix A presents the detailed cost estimates for each alternative.) Once more details are known, these costs will be refined under a separate study.

7.1 Corridor 1

Corridor 1 is generally the area between the Iowa State Center and ISU's central campus. It is currently served by the Orange Route, which carries approximately 8,100 passengers daily. ISU anticipates maintaining its current enrollment, and possibly the relocation of approximately 400 parking spaces from central campus to the Iowa State Center. This change is expected to yield an increase of 1,350 to 1,700 trips per hour. An increase in the number of transit trips also raises concerns regarding pedestrian safety on Osborn Drive, as well as maintaining traffic mobility at the intersection of Lincoln Way and Beach Road.

Potential Solutions

Maintain existing service along the Orange Route (No Action)

In this alternative the current standard bus concept on minimal peak period headways would be maintained. As the university enrollment and employment are expected to remain relatively consistent with current levels, little or no change in ridership in the corridor is anticipated. One potential change that could affect ridership would be the potential for displacement of main campus parking due to building development on campus. In cases where building development displaces existing parking spaces, one assumption is that a number of those spaces would be reassigned to the ISC, which would result in increased ridership on the Orange Route. It has been assumed that over time approximately 400 spaces would be displaced and the parking reassigned to the ISC. Reassignment of the parking would yield an additional 450 bus riders per day on the Orange Route.

Continue to add buses to accommodate increase in demand

This alternative would entail approximately 12 additional trips per day and a purchase of one new 40-foot bus. The anticipated increase in daily ridership under this alternative is 450.

Currently, at peak times, buses are already effectively operating at 2- to 3-minute headways, which would severely limit CyRide's effective ability to further increase service if in the long-term ridership grows beyond the 450 new daily riders anticipated under this scenario.

Use articulated buses to increase bus passenger capacity

Under this option, two new articulated buses would serve the route, each with an approximate capacity of 120 passengers. Similar to the previous option, 450 additional riders would result under this scenario. This option would require the purchase of three new articulated buses (includes one spare) and modifications to the existing CyRide maintenance and storage facility to accommodate these new buses, including the purchase of new equipment. The anticipated cost of a new electric hoist, specialty tools and contingencies is approximately $100,000. The cost of three new articulated buses is approximately $1.4 million if purchased in Year 2007.

According to CyRide staff, the existing maintenance and storage facility could accommodate up to two articulated buses. Any additional increase in the size of CyRide's fleet would require construction of a new maintenance and storage facility elsewhere, as CyRide has effectively outgrown its current site. The construction of a brand new maintenance facility could cost approximately $7.6 million to $9.6 million in year 2007 dollars, which includes growth in current fleet size and administrative staff for both CyRide and Heartland Senior Services. This estimate does not include the cost of land acquisition. Table MF-1 in Appendix A presents the assumptions used in developing the order-of-magnitude cost estimates for a brand new, joint maintenance facility for CyRide and Heartland Senior Services.

Increase passenger capacity using BRT

The BRT alternative proposed for Corridor 1 would likely qualify for funding under this program. The photo simulation on the right illustrates how a BRT system might operate within the existing right-of-way of Osborn Drive in ISU's central campus (facing west).

Photo simulation of BRT on Osborn Drive. Source: URS.

Under this scenario, passenger capacity would be increased by using articulated buses as discussed above and the buses would be configured to operate as a BRT system. The BRT system would operate between the Iowa State Center and the Armory as described as follows:

- Within the Iowa State Center, the BRT would operate in a designated diamond lane .
- A new exclusive guideway would be constructed along the east side of Beach Avenue between the Iowa State Center and Lincoln Way. This exclusive right-of-way would function as a queue bypass lane for buses northbound on Beach.
- On Beach Road North of Lincoln Way, BRT buses would operate in mixed flow.

- On Osborne Drive, the BRT would operate in the existing access controlled lanes as the CyRide buses do today. Area is access controlled by gates to remove most vehicular traffic.

- A bus turnaround and transit hub would be constructed in the existing surface parking lot southwest of the Armory.

- The signalized intersections at Beach/ Lincoln Way and Wallace/Osborne would be optimized and reconfigured to provide transit signal priority for the BRT vehicles.

- The BRT vehicles would have a unique color scheme to provide a special branding for the BRT service.

- Implementation of the BRT would include bus station/stop enhancements along the route.

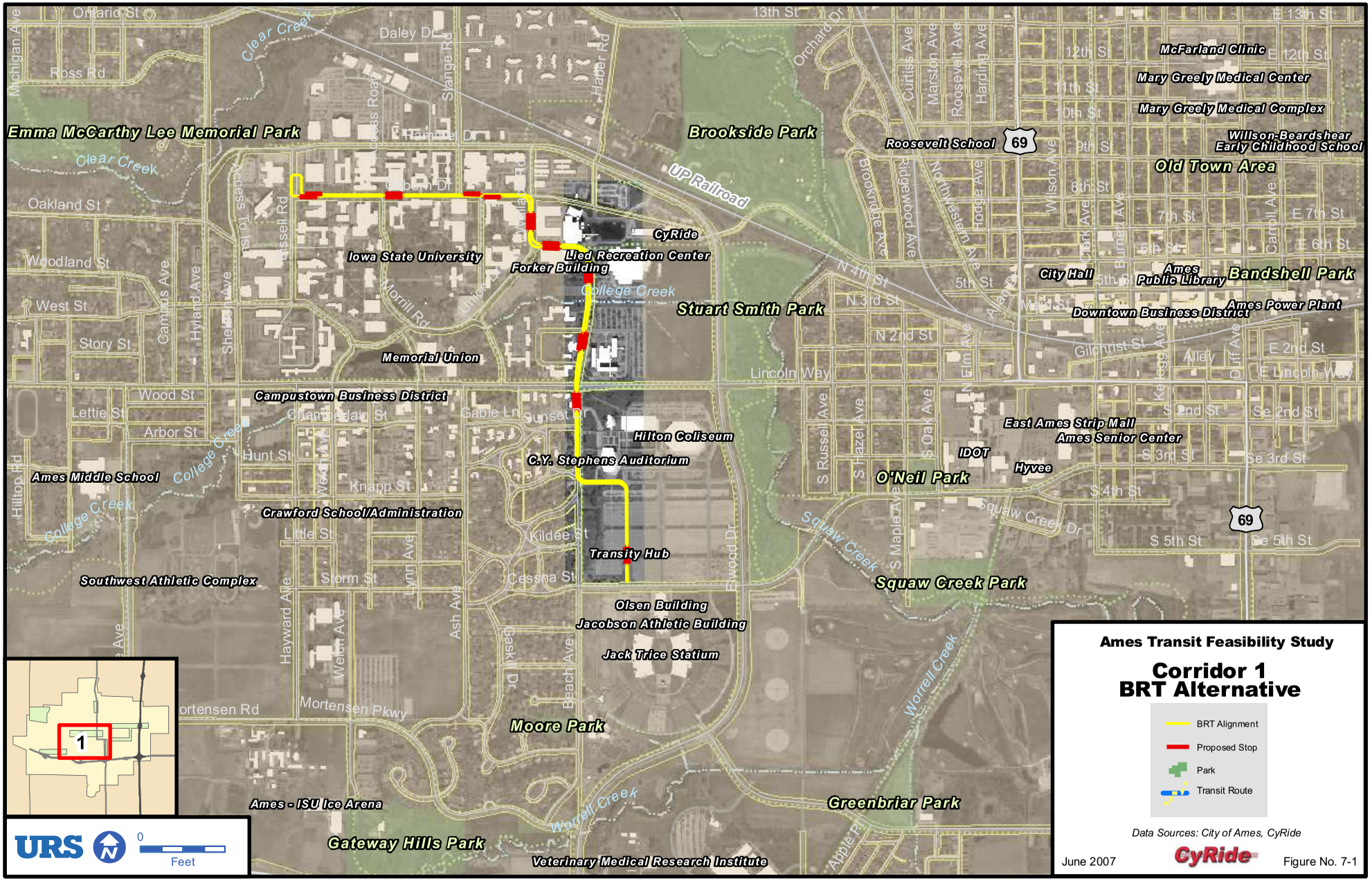
The estimated route length of this option is 1.67 miles, with 1.02 miles of exclusive bus-only lanes (61 percent). Figure 7-1 presents the general alignment of this option, with stops indicated. Generally, these stops are the same as those currently on the Orange Route.

Table 7-1 provides an estimate of the cost to construct the 1.67-mile long BRT line between the Iowa State Center and ISU's central campus, in year 2007 dollars. It includes an allowance of $320,000 to modify CyRide's existing maintenance facility to accommodate two new articulated buses[1]. It does not include the cost of purchasing additional right-of-way. Appendix A presents the assumptions used to develop these estimates for Corridor 1.

Table 7-1
Estimated Construction Cost – Corridor 1 BRT[2]
Year 2007 Dollars

Cost Category[3]	Cost ($ million)
Guideway and Sitework	$ 1.59
Stations and Maintenance Facility	0.92
Systems (Electrification and Signaling)	--
Vehicles	1.60
Professional Services	0.753
Unallocated Contingencies	0.967
Total	$ 5.83
Route Length	1.67 miles
Cost per Mile – Without Vehicles	$ 2.53
Cost per Mile – With Vehicles	$ 3.49

1 Includes Contingency and Engineering and Administration costs.
2 Source: URS Corporation.
3 Based on the Federal Transit Administration's 2007 Standard Cost Categories.



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Establish a new modern streetcar route between the Iowa State Center and ISU central campus

A streetcar line would increase passenger capacity even more than articulated buses because streetcars could be coupled (joined together) and could conceivably double passenger capacity with minimal impact on service frequency that a bus is incapable of achieving. For example, a one-car train has a total capacity of 115 passengers, while a 40-foot bus has a capacity of only 70 passengers. It would take more than three buses to provide the same passenger capacity as two articulated buses.

Figure 7-2 presents the general alignment of a potential streetcar line, with stops indicated. Generally, these stops are the same as those currently on the Orange Route. As a new type of transit vehicle is proposed under this alternative, Figure 7-2 also shows the general location and footprint of a potential maintenance and storage facility for the streetcar line. A double-track system is proposed under this alternative to provide service frequencies comparable to the current bus service provided.

Table 7-2 provides an estimate of the cost to construct the 1.7-mile long, double-tracked streetcar line between the Iowa State Center and ISU's central campus, in year 2007 dollars. Appendix A presents the assumptions used to develop the estimate.

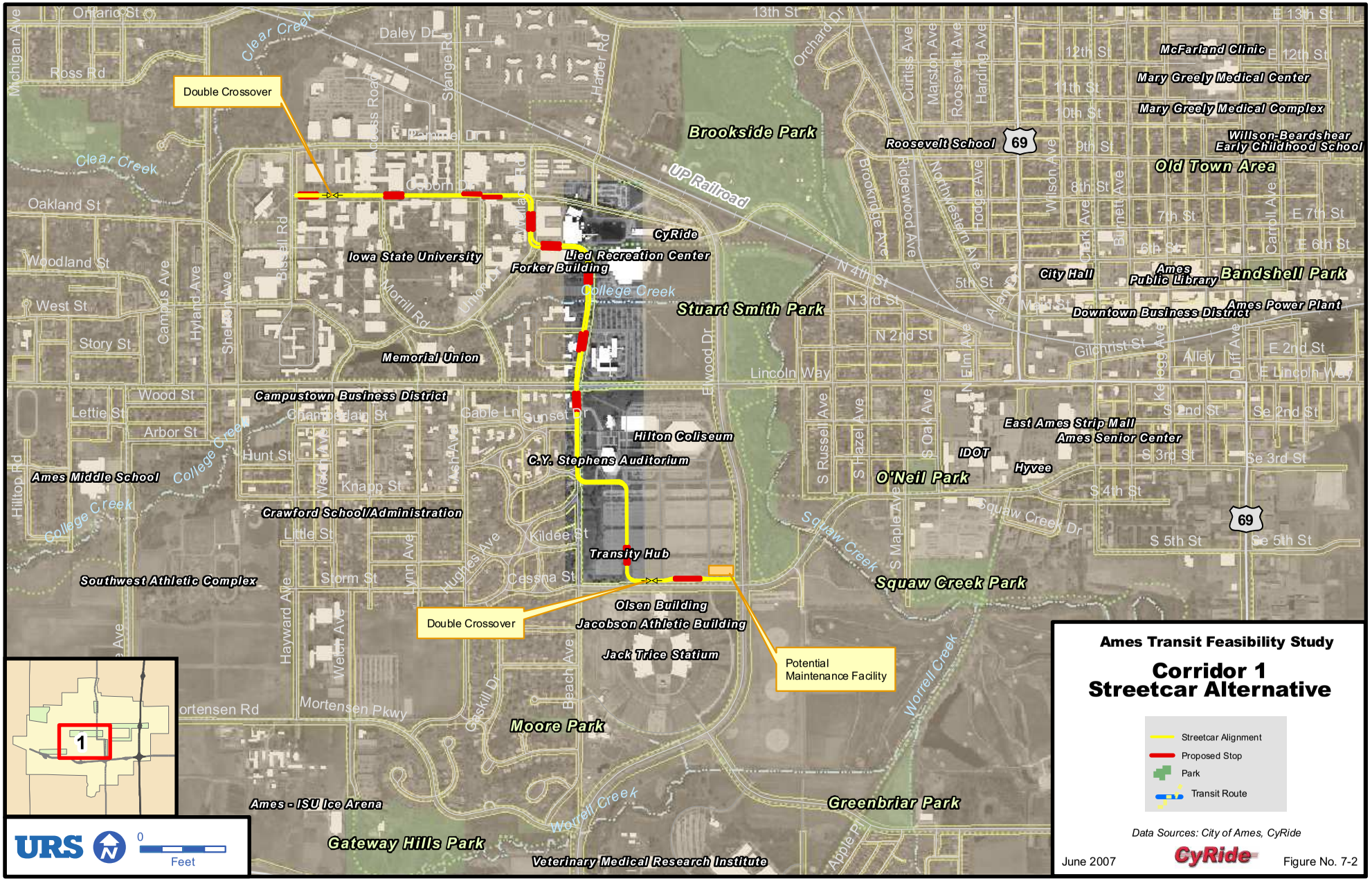
Table 7-2
Estimated Construction Cost – Corridor 1 Streetcar[1]
Year 2007 Dollars

Cost Category[2]	Cost ($ million)
Guideway and Sitework	$ 16.11
Stations and Maintenance Facility	2.62
Systems (Electrification and Signaling)	2.79
Vehicles	18.82
Professional Services	4.31
Unallocated Contingencies	7.16
Total	$ 51.81
Route Length	1.68 miles
Cost per Mile – Without Vehicles	$ 19.67
Cost per Mile – With Vehicles	$ 30.85

The cost of purchasing additional right-of-way for this alternative is not included in Table 7-2. Additionally, the cost of a new maintenance facility is identified as an allowance.

Appendix A presents the detailed cost estimates for the streetcar system proposed for Corridor 1.

1 Source: URS Corporation.
2 Based on the Federal Transit Administration's 2007 Standard Cost Categories.



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7.2 Corridor 2

Corridor 2 is the area generally between downtown Ames and ISU's central campus (see photo to the right of Osborn Drive facing west). CyRide's Red and Green Routes serve this corridor. Similar to Corridor 1, ISU anticipates maintaining its current enrollment; downtown Ames is also expected to hold its current population and employment figures at the same current level. Issues and concerns include:


Osborn Drive today. Source: URS.

- Improving the connection between these two major trip generators/destinations
- Increase downtown Ames' economic vitality
- Low existing travel demand between ISU and downtown Ames
- Crossing the existing freight railroad tracks

Potential Solutions

Maintain service provided by Red, Green and Blue Routes (No Action)

This alternative is expected to maintain existing daily ridership.

Establish streetcar service to replace Red, Green and Blue Routes between ISU central campus and downtown Ames

Figure 7-3 presents the three different alignments of a potential streetcar line between downtown Ames and the ISU central campus, along with proposed stops. Two alignments are proposed to run on Main Street, while a third one would operate on Sixth Street to minimize rail design and operational complications associated crossing the Union Pacific Railroad. Similar to the streetcar system proposed under Corridor 1, all streetcar alternatives proposed for Corridor 2 are dual-tracked to provide 10-minute headways. The alignment on Sixth Street (Option 2) is 1.9 miles long while the two alignments on Main Street (Option 1) are both 2.1 miles long.

Table 7-3 provides a summary of the estimated cost to construct each of the three alternative double-tracked streetcar lines between the downtown Ames and ISU's central campus, in year 2007 dollars.

The cost of purchasing additional right-of-way for this alternative is not included in Table 7-3. Additionally, the cost of a new maintenance facility is identified as an allowance.

Appendix A presents the detailed cost estimates for the three alternative streetcar alignments proposed for Corridor 2.

The photo simulation to the right illustrates how a streetcar system might fit within the existing context of Osborn Drive in ISU's central campus.

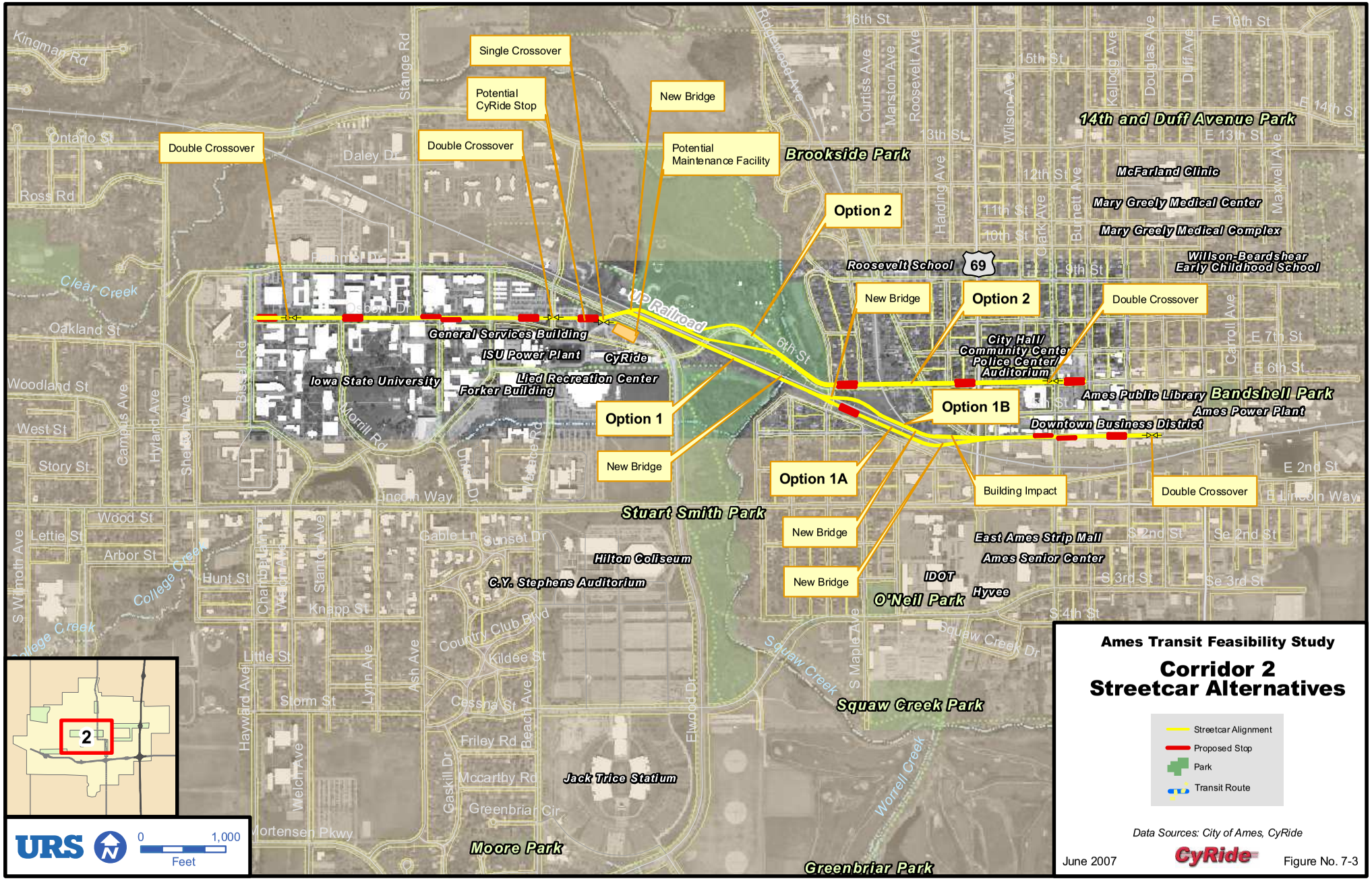
Photo simulation of streetcar on Osborn Drive.
Source: URS.

Table 7-3
Estimated Construction Cost – Corridor 2 Streetcar Alternatives[1]
Year 2007 Dollars

Cost Category[2]	Cost ($ million)		
	1A	1B	2
Guideway and Site Work	$ 41.75	$ 39.15	$ 16.81
Stations and Maintenance Facility	2.28	2.13	2.19
Systems (Electrification and Signaling)	3.48	3.48	3.17
Vehicles	9.41	9.41	9.41
Professional Services	9.50	8.95	4.43
Unallocated Contingencies	15.13	14.30	7.44
Total	$ 81.56	$ 77.42	$ 43.45
Route Length	2.09 miles	2.09 miles	1.91 miles
Cost per Mile – Without Vehicles	$ 34.45	$ 32.55	$ 17.87
Cost per Mile – With Vehicles	$ 38.95	$ 37.05	$ 22.81

The difference in cost between Alignments 1A, 1B and 2 are generally attributed to the number and length of track structures required to provide grade separation when crossing the existing UP tracks.

1 Source: URS Corporation.
2 Based on the Federal Transit Administration's 2007 Standard Cost Categories.



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7.3 Corridor 3

Corridor 3 includes the area of the proposed new shopping center on 13th Street east of I-35. CyRide's current service coverage in this area is limited to paratransit service. In addition to the proposed mall, transit could serve various uses along Lincoln Way, Dayton Avenue and 13th Street. These uses include the heart and dialysis clinic; major employers such as 3M and Sauer Danfoss. Another issue is the lack of significant transit destinations for one-half mile along Thirteenth Street because of the Skunk River floodplain. Extending fixed route service to this area is anticipated to yield approximately 900 riders per day.

Potential Solutions

The relatively low anticipated ridership along Corridor 3 would not support the study of transit technologies with higher capacity, such as articulated bus or modern streetcar.

Do not extend fixed route service (No Action).

In this alternative no changes would be made to the current route structure following development of the regional retail center.

Extend the Red Route to serve Thirteenth Street to the proposed shopping center

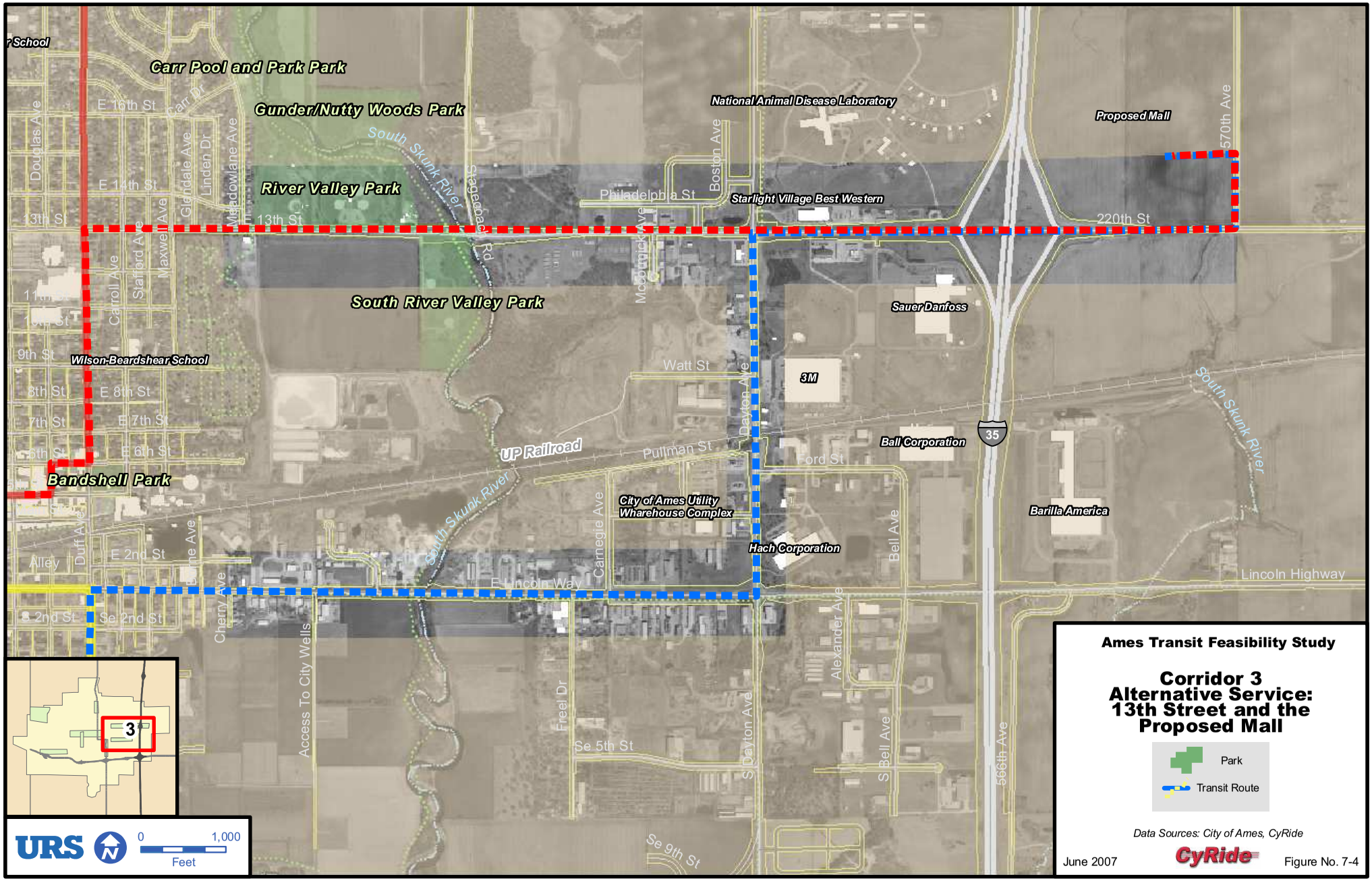
Figure 7-4 presents the alternatives that include modification to CyRide's existing Red Route in order to serve Corridor 3. Two potential concepts associated with the Red Route were reviewed:

- Remove the leg on Duff Avenue north of 13th Street and reroute the Red Route to 13th Street to the east.

- Add a new route connecting the regional retail center to the downtown (in addition to the Red Route). This option requires the purchase of two new 40-foot buses, for an estimated capital outlay of $600,000.

Extend the Blue Route to serve Lincoln Way and Dayton Avenue to Thirteenth Street

Figure 7-4 presents the proposed extension of CyRide's existing Blue Route in order to serve Corridor 3, via Lincoln Way, Dayton Avenue and 13th Street to the east. Similar to the previous option, the extension of the Blue Route requires the purchase of two new 40-foot buses, for an estimated capital outlay of $600,000. The resulting increase in operating cost for this option is also $320,000.


Carr Pool and Park Park
Gunder/Nutty Woods Park
River Valley Park
South River Valley Park
Bandshell Park
Wilson-Beardshear School
National Animal Disease Laboratory
Proposed Mall
Starlight Village Best Western
Sauer Danfoss
3M
Ball Corporation
Barilla America
Hach Corporation
City of Ames Utility Wharehouse Complex
UP Railroad
South Skunk River
Lincoln Highway
E 16th St
E 14th St
13th St
E 13th St
11th St
9th St
8th St
E 8th St
7th St
E 7th St
6th St
E 6th St
E 2nd St
Alley
E Lincoln Way
Se 2nd St
Se 5th St
Se 9th St
Watt St
Pullman St
Ford St
Philadelphia St
220th St
Douglas Ave
Carr Dr
Glendale Ave
Linden Dr
Meadowlane Ave
Maxwell Ave
Stanford Ave
Carroll Ave
Stagecoach Rd
McCormick Ave
Boston Ave
570th Ave
Dayton Ave
Duff Ave
Cherry Ave
Access To City Wells
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Ames Transit Feasibility Study
Corridor 3 Alternative Service: 13th Street and the Proposed Mall
Park
Transit Route
Data Sources: City of Ames, CyRide
June 2007
CyRide
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7.4 Corridor 4

CyRide currently serves Corridor 4 – the South Duff commercial area – via the Yellow Route. Additional retail development is expected in this corridor, including a new Super Wal-Mart. Issues and concerns related to the corridor are as follows:

- Infrequent service and short hours currently provided by the Yellow Route, given the relatively longer business hours along the corridor
- Commercial uses are auto-oriented; buildings are set back from the road at a relatively great distance for pedestrians
- Persons needing access to the area have difficulty doing so
- ISU students desire to have access to discount retail along the corridor.

Potential Solutions

Continue existing service (No Action)

Under this scenario, the current hours and frequency of service would be maintained in the study area. Anticipated development in the corridor is forecasted to result in an increase in ridership over the current 40 persons per day. The forecast ridership in year 2030 for the Yellow Route under this scenario is 185 passengers per day.

Increase service frequency and hours of service of the Yellow Route

Under this scenario, the Yellow Route would operate every 15 minutes from 10:00 AM to 6:00 PM, then every half hour from 6:00 PM to 10:00 PM. This service modification would require the purchase of two new 40-foot buses ($600,000), and would increase the projected year 2030 ridership to approximately 225 passengers per day (40 more passengers per day than the No Action).

7.5 Corridor 5

The City of Ames anticipates continued growth in residential development along Mortensen Road, an area currently being served by the Red and Purple Routes. The Red Route operates frequently in the morning and afternoon peak periods to serve the Ames Middle School and residential uses destined to the ISU central campus. Issues and concerns relate to the traffic congestion in the vicinity of the Ames Middle School during peak travel periods.

Potential Solutions

Continue existing service (No Action)

Development in the study area is anticipated to continue to occur. The type of development is expected to be relatively similar to the current types. Thus, it is anticipated that the increment of development would result in increased transit use. Ridership is expected to increase by 700 passengers per day in year 2030 under this scenario. In this operating scenario the current headways and use of "extras" is expected to be maintained.

Increase frequency of Red Route

The concept includes doubling the frequency of buses throughout the day, which would reduce the scheduled headway from 10 minutes on weekdays to five minutes. The increase in frequency would require putting an additional four 40-foot buses into service at a capital cost of approximately $1.2 million. The increase in frequency would result in an anticipated ridership of 780 passengers per day in year 2030, or an increase of 80 persons per day over the No Action. The limited increase in ridership reflects the very high level of transit service available in the corridor in the No Action. It should be noted, however, that the use of "extras" may still be required to provide adequate capacity in the peak periods. The number of "extras" should be similar to or reduced from the current conditions and especially from the No Action.

Deploy articulated buses to increase passenger capacity and maintain the current frequency

This option would entail the purchase of four new articulated buses at a cost of approximately $1.9 million. CyRide's existing bus barn could accommodate these vehicles for maintenance, but the conditions would be far from ideal. Building height conflicts will likely exist and entry door may need to be modified. In addition, the articulated vehicles are larger than the 40-foot buses currently in use. Articulated buses are used in Des Moines and each bus requires four standard bus parking stalls. As the current CyRide facility is already approaching or at capacity for storage and maintenance, inclusion of articulated buses would compound the current issues. Thus, this concept likely needs to include construction of a new maintenance facility at some point. A few articulated vehicles could be accommodated in the current facility, but only a limited number and likely fewer than could be used on the street. The estimated cost of a new maintenance facility is $7.6 million to $9.6 million. This estimate includes allowances for growth in CyRide's and Heartland Senior Services' fleet and staff for the next 10 to 15 years.

7.6 Study Area 1

Study Area 1 encompasses the North Grand Mall, which CyRide serves through its Red, Green, Brown and Blue Routes. North Grand Mall serves as a transfer point for CyRide passengers. The mall is planned for expansion that includes new and renovated space totaling up to 150,000 square feet.

Potential Solutions

Continue existing service (No Action)

With the expansion of North Grand Mall, trip activity in the retail center is expected to increase. Associates with that trip increase would be an expected ridership increase of approximately 140 passengers per day by 2030. Total ridership in the corridor (on the Red, Blue, Green and brown Routes) is forecasted to be approximately 570 passengers per day.

Increase frequency of Green Route

As the green Route provides the most direct route between the downtown area and the North Grand Mall, it was selected as the focus of an improvement. The increase in frequency assumed in the concept would be to add two more runs an hour to the service, which would result in a decrease in the headway from 20 minutes to 12 minutes.

The concept would require purchase of two new 40-foot buses at a cost of approximately $600,000. Associated with the increase in frequency would be a ridership increase of 40 passengers per day over the No action.

7.7 Study Area 2

The City of Ames anticipates significant growth in the northwest area of the community, located west of Dakota Avenue and North of Ontario Avenue. Currently, development plans include 1,500 single and multi-family dwelling units and approximately 150,000 square feet of retail space for the area north of the Union Pacific Railroad. Issues related to providing transit service in this area include crossing the UPRR tracks, which is presently an at-grade crossing. With the anticipated level of development an increase in trip activity of is expected from the present 1,600 trips per day to almost 30,000 trips per day. The resulting trip density will be similar to other parts of town that are served by transit (currently there is no service in the immediate area).

Potential Solutions

Do not extend service to Study Area 2 (No Action)

In this concept no fixed route service would be extended, even as the area develops.

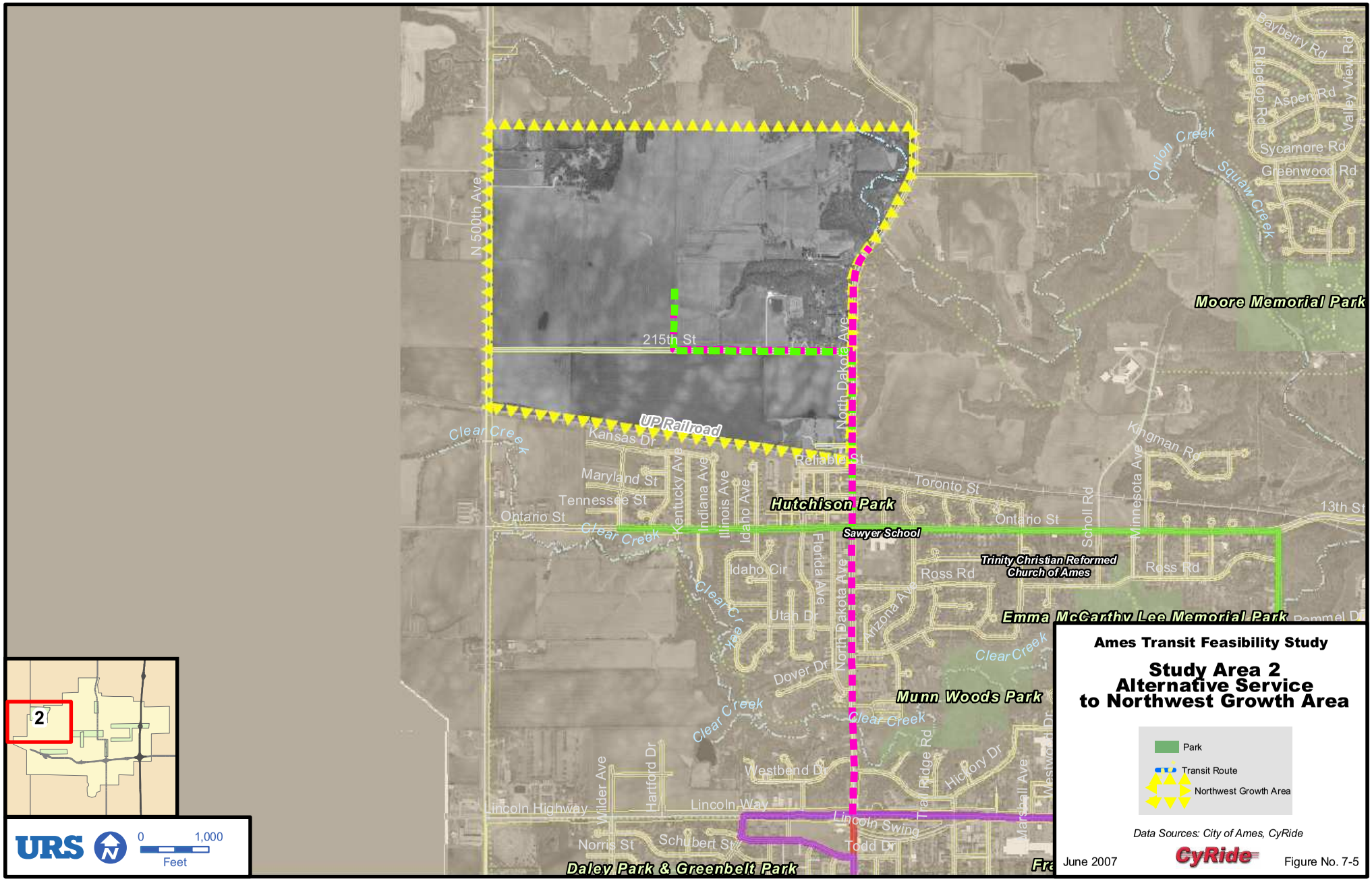
Extend the Green Route to Study Area 2 with increase in frequency

Under this scenario, headways would be reduced from 20 minutes to 12 minutes. The Green Route would have two branches:

- Route A would continue to serve the Ontario Avenue/California Avenue area.
- Route B would provide service to Study Area 2 via Dakota Avenue across the UPRR tracks. (See Figure 7-5.) This new branch of the Green Route would entail the purchase of two additional 40-foot buses at an estimated cost of $600,000. At build-out, 700 riders are estimated to use the service.

Introduce new route via Dakota Avenue north of Lincoln Way.

Under this scenario, a new route (illustrated in a pink broken line in Figure 7-5) would serve the Northwest growth area via Dakota Avenue, originating from the south at Lincoln Way. This new route would run every half-hour on weekdays. Similar to the previous option, this new "pink" route would entail the purchase of two new 40-foot buses, and is estimated to yield 800 riders per day at build-out. The additional 100 riders projected for this route is based on diverting existing riders of the Green Route.



8.0 ALTERNATIVE EVALUATION

The primary purpose of the study is to evaluate the need for and feasibility of new or modified transit services in selected corridors. Through the information provided in Chapter 3 on current service levels and demand and the forecasted growth in the region that is provided in Chapter 5, a basis for the purpose and need for action was established. In addition, the information documented in the current and future conditions analysis establishes at least a starting point for identifying the range of reasonable alternatives to be evaluated relative to satisfying the purpose and need. The range of alternatives considered, by corridor/study area, is addressed in Chapter 6. The purpose of this section is to document the process and results of the evaluation of the alternatives identified for each of the corridors.

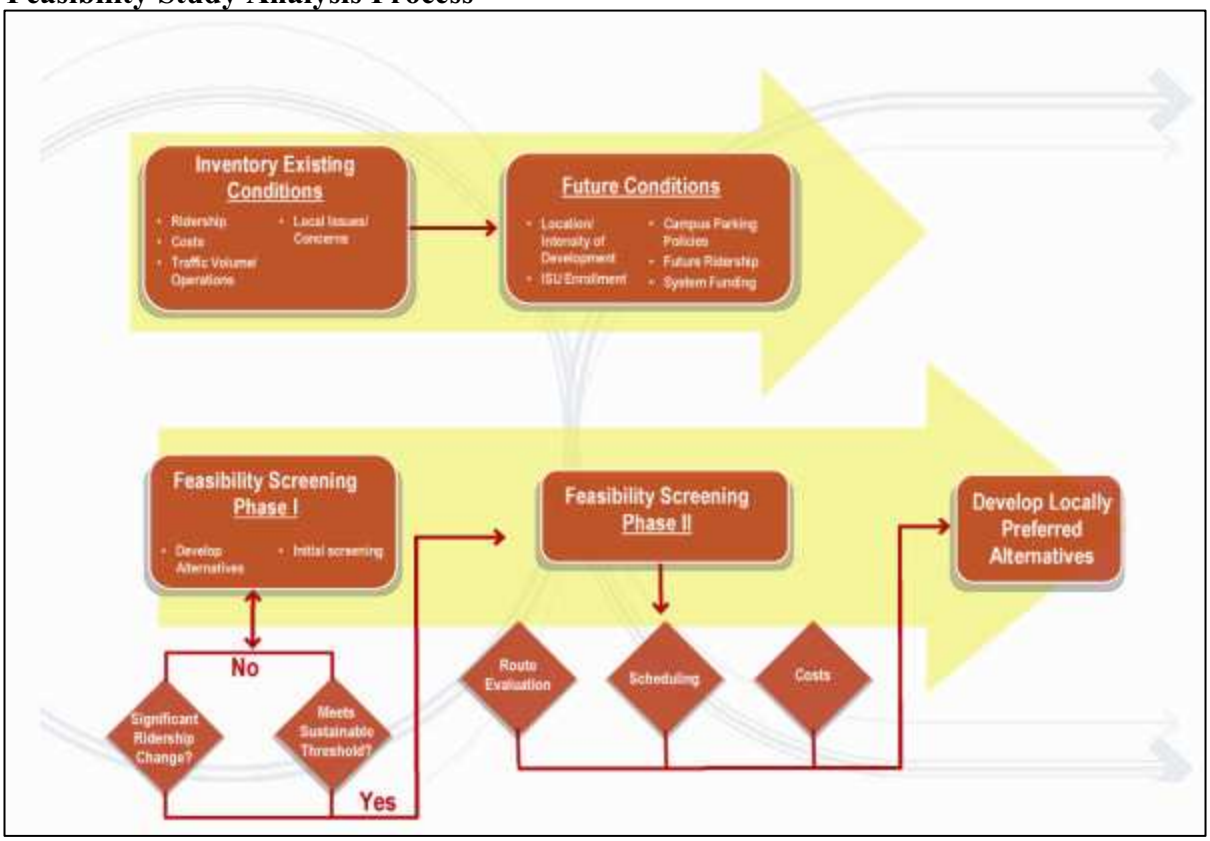
When each of the corridors is reviewed relative to the others, it is quickly concluded that the breadth of conditions, and ultimately the needs, is quite diverse. In the range of corridors included in the study areas there are corridors that currently and in the 2030 conditions reflect relatively light transit potential (for example, South Duff through the Kate Mitchell neighborhood) and there are corridors that currently and/or through the planning horizon have the potential to carry very heavy transit loads (for example, the Iowa State Center to central campus corridor). As one of the products of the feasibility study will be recommendations on priorities, and the needs will very likely far outweigh the funding available, competition among the corridors/study areas for expansion dollars will be fierce. The challenge is to develop and employ an evaluation and prioritization process that is not unduly biases by one or a few conditions at either end of the transit potential spectrum (i.e. cost for expansion, ridership potential, potential for economic development, etc.).

The evaluation process used in the feasibility study was developed expressly with breadth of the study area conditions in mind. Each of the alternatives was evaluated relative to a broad range of criteria that incorporated various perspectives (engineering feasibility, environmental impacts and social acceptance).

Figure 8-1 displays the evaluation process employed by the study team for each of the corridors/study areas. Each of the key elements, or steps, is summarized below:

- Inventory existing conditions and forecast future conditions: The primary purpose in the overall alternatives analysis process of these tasks is to provide input material for the purpose and need for action. Additionally, for the concepts evaluation the information provided for the current and future conditions is used to provide quantifiable measures for the assessment from various perspectives. For example, the service cost information and ridership are combined in the analysis to allow quantification of incremental cost associated with a service change.

Figure 8- 1
Feasibility Study Analysis Process



- Feasibility screening: Evaluation of the range of alternatives in each of the corridors/study areas employed a two phase methodology. Through the initial phase current and estimates of future ridership (2030) were reviewed relative to the current type and level of transit service, and a determination was made as to whether the current service reasonably reflects the current/future needs of the specific corridor and/or study area.

  Chapter 6 documents the characteristics of the range of potential technology concepts included in the universe of alternatives. In addition to evaluating in Phase I of the screening whether the current service levels reflect existing/future needs, an evaluation was completed to determine from the range of technology alternatives which concepts could reasonably be supported by current/future ridership. For each of the corridors/study areas, the two-step Phase I assessment produced one of the following products:

  - The conclusion that the current technology and service level reasonably address current and/or future needs in the corridor/study area.

- An increased level of transit service is needed or could be supported in a specific corridor/study area and that an identified subset from the universe of technology alternatives warrant additional analysis. In the refined analysis (Phase II), more specific details on the service level parameters would be evaluated.

In Phase II of the alternatives screening, service level parameters (frequency, routing, etc.) for those technology concepts that were identified in Phase I as reasonable were assessed relative to a consistent set of criteria. The specifics of the criteria are documented in the next section.

- Development of the Locally Preferred Alternatives. The goal of the study is to identify those improvement concepts that meet the purpose and need within each of the corridors/study areas. Weighing the results of various perspective assessment tests and input received from stakeholders (including university students/faculty/staff, business interests, city officials, the CyRide Board and the public), a set of recommendations was developed.

8.1 Evaluation Criteria

To ensure that the assessment of various technology and service alternatives is robust and is not unduly influenced by the results of a single or small number of assumption parameters, a broad range of evaluation criteria inclusive of the engineering, environmental and social impact perspectives was employed in the alternative evaluation. Each of the criteria employed are outlined below:

- Service Frequency: What are the service frequency/headway assumptions incorporated into the alternative and/or how the assumptions different than the existing conditions?

- Transfers: Does the concept negatively (by increasing the number of transfers relative to current condition) or positively (by reducing the number of transfers relative to the current) impact the need to transfer in order to complete a trip.

- Economic Development: In very general terms what is the potential for sparking additional economic development? The potential for economic development was based on experience observed in other communities that have implemented the technology/service concept being evaluated, and not on an Ames or study area corridor specific economic analysis.

- Capital Cost: Planning level cost for rolling stock (buses, trolley vehicles) and other infrastructure investment were estimated for each of the technology and/or service concepts that required a greater number of buses or employed a new technology. Selected concepts included more minor service changes that would not result in the need to make a capital investment into rolling stock or corridor amenities. Thus, no additional capital costs were estimated for these concepts. Unit costs reflect typical 2007 construction costs.

- Annual operations and maintenance costs: Costs associated with an increased or decreased number of labor hours (for operations and/or maintenance) relative to the current were quantified and included in the alternatives analysis.

- Impacts to the Built and Natural Environment: This criteria encompasses a broad range of impact categories including traffic operations, safety, physical impacts associated with right-of-way/footprint needs, existing land use, noise and vibration, wetlands, and streams and rivers. The level of assessment is cursory and intended to identify whether there are potential fatal flaws from an environmental and/or social perspective in the concept.

- Ridership Potential: Concepts that substantially increase or decrease the level of transit service currently being provided have the potential to positively (increasing frequency, hours of service, service area, etc.) or negatively (decreasing service frequency, service hours, service coverage, etc.) influence ridership in a corridor or study area. Chapter 5 documents the methods and assumptions used in developing base daily ridership levels in the corridors. To determine the potential change from the base daily ridership associated with a specific corridor service change, elasticity analyses that reflected the identified change (i.e. change in frequency, change in service hours, etc.) were applied. The increment of change to either current and/or forecasted base 2030 ridership is summarized in the table.

- Riders Associated with System Change: Summary of the ridership change, relative to the No Action, associated with the transit improvement/alternative.

- New Passengers per Revenue Hour: Result of dividing the increment of new ridership associated with implementation of the transit alternative divided by the new revenue hours of service. New passengers per revenue hour is a measure of the productivity of the proposed transit improvement/alternative. The 2005 LRTP recommends that route performance measures (cost per revenue hour, farebox recovery, cost per revenue mile, ridership level) do not fall below 60 percent of the system-wide average (Page 7-16). A primary performance measure is the cost per revenue hour. The average passengers per revenue hour for the current system is approximately 43.7 (National Transit Database, 2006). Thus the threshold for meeting the goal documented in the 2005 LRTP would be a 26.2 passengers per revenue hour of service. If this threshold cannot be made, the performance measure would not be satisfied and the reasonableness/desirability of providing the service should be scrutinized.

- Consistency of Local Plans: The recommendations associated with transit service in the region cannot be made entirely independent from other regional/city planning policies, including the Comprehensive Plan, subarea plans and the long range transportation plan. Thus, each of the improvement alternatives were evaluated relative to goals, policies and recommendations of other plans in the region. Whether or not the particular transit concept being considered was consistent or inconsistent with locally adopted plans was noted.

8.2 Summary of Results

Tables 8-1 through 8-7 document the results of the alternatives evaluation. Within the matrix format each of the alternatives maintained through the Phase I level of analysis are documented relative to each of the evaluation criteria outlined above.

Table 8-1
Evaluation of Alternatives - Corridor 1[1]

Transit Improvement Alternative	Alternative Impacts									
	Service Frequency	Transfers	Economic Development	Capital Cost	Annual Operating Cost	Build/Natural Environment	Consistency with Local Plans	Ridership Potential	Total Corridor/Route Ridership After System Change	New Passengers per Revenue Hour
Maintain existing service along Orange Route (No Action).	--	--	--	--	--	--	--	Existing 8,060 riders per day; Increase of 450 (Reflects relocating 400 central campus spaces to ISC)	8,510	145.2
Add more buses to existing Orange Route service. (Add 12 buses per day to accommodate increased demand)	Marginal (if any) reduction in peak headway of 2-3 minutes.	--	Limited private-sector investment potential in corridor. No significant land resources available for redevelopment - Vast majority of coverage area is on campus.	$300,000 for one 40-foot bus	$57,800	No significant impact; use existing street	--	Same as No Action	8,510	136.0
Add larger capacity buses to existing Orange Route schedule. (add 3 - 60 foot articulated buses - Replaces 3 - 40 foot buses)	Maintain current headway (peak period - 2-3 minutes)	--		$1.9 million for four 60-foot buses. $320,000 allowance to upgrade CyRide's existing maintenance facility	-$198,500	No significant impact; use existing street	--	Same as No Action	8,510	236.4
Establish trolley service to replace current Orange Route between ISC and central campus.	Trolley service on 4 minute headways	--		$51.8 million	$2,746,500	Potential pedestrian crossing conflicts through campus ; at-grade crossing through Lincoln Way/Beach intersection; special event traffic conflicts	Assessment of guideway service included in 2005 LRTP.	Same as No Action	8,510	152.0
Establish BRT service to replace current Orange Route between ISC and central campus.	BRT service on 2-3 minute headways	--		$5.83 million	-$198,500	Potential pedestrian crossing conflicts through campus ; at-grade crossing through Lincoln Way/Beach intersection; special event traffic conflicts	Assessment of guideway service included in 2005 LRTP.	Same as No Action	8,510	236.4

[1] Assumptions:
- Maintain current on-campus parking supply and restrictions.
- On-campus building expansion displaces approximately 400 parking spaces.
- Based on frequency elasticity coefficient of -0.22.
- No change in student fee structure.

Table 8-2
Evaluation of Alternatives - Corridor 2[1]

Transit Improvement Alternative	Alternative Impacts									
	Service Frequency	Transfers	Economic Development	Capital Cost	Annual Operating Cost	Build/Natural Environment	Consistency with Local Plans	Ridership Potential	Total Corridor/Route Ridership After System Change	New Passengers per Revenue Hour
Maintain existing Red, Green and Blue Routes east of Campus (No Action)	--	--	--	--	--	--	--	--	--	--
Establish fixed-guideway Trolley service to replace Red/Green/Blue Route between Campus and Downtown	Assume trolley service on 10-minute headways	Additional transfer for Red Route riders from east; potential transfer for Blue and Green Routes.	Strong opportunity for transit-oriented redevelopment in vicinity of downtown; Would require City action to promote and enable redevelopment.	$43.45 million to $81.56 million	$1.19 million	Potential pedestrian crossing conflicts through Campus; Crossing of Squaw Creek and floodplain; Impacts to existing streets.	--	Total hub ridership – 2,410 per day (year 2030); No increase from No Action.	2,410	141.8

[1] Assumptions:
- Maintain current on-campus parking supply and restrictions.
- On-campus building expansion displaces approximately 400 parking spaces.
- Based on frequency elasticity coefficient of -0.22.
- No change in student fee structure.

Table 8-3
Evaluation of Alternatives - Corridor 3[1]

Transit Improvement Alternative	Alternative Impacts									
	Service Frequency	Transfers	Economic Development	Capital Cost	Annual Operating Cost	Build/Natural Environment	Consistency with Local Plans	Ridership Potential	Total Corridor/Route Ridership After System Change	New Passengers per Revenue Hour
Do not extend service to Corridor 3 (No Action).	--	--	--	--	--	_	Inconsistent with long-term and short-term service extension policies established in 2005 LRTP	--	--	--
Extend Red Route	Assume 30-minute headways, 14 hours per day, 7 days per week between downtown and new mall	13th Street and Mall trips would transfer downtown	Bus service would support proposed new mall development	2 new 40-foot buses; $600,000	$581,000	No significant impact; use existing street	Consistent with long-term and short-term service extension policies established in 2005 LRTP. LRTP recommended Red and Blue Route extension. Ridership does not warrant extending both (based on passengers per revenue mile performance threshold).	Total ridership: 900/day. 710 from Regional Retail. 190 from E. Lincoln Way.	900	32.1
Extend Blue Route	Assume 30-minute headways, 14 hours per day, 7 days per week between downtown and new mall	13th Street and Mall trips would transfer downtown	Bus service would support proposed new mall development	2 new 40-foot buses; $600,000	$581,000	No significant impact; use existing street	--	Total ridership: 900/day. 710 from Regional Retail. 190 from E. Lincoln Way.	900	32.1

[1] Assumptions:
- Maintain current on-campus parking supply and restrictions.
- On-campus building expansion displaces approximately 400 parking spaces.
- Based on frequency elasticity coefficient of -0.22.
- No change in student fee structure.

Table 8-4
Evaluation of Alternatives - Corridor 4[1]

Transit Improvement Alternative	Alternative Impacts									
	Service Frequency	Transfers	Economic Development	Capital Cost	Annual Operating Cost	Build/Natural Environment	Consistency with Local Plans	Ridership Potential	Total Corridor/Route Ridership After System Change	New Passengers per Revenue Hour
Maintain existing service along Yellow Route (No Action).	--	--	--	--	_	_	Elimination of the Yellow Route was to be taken under advisement following 2005 LRTP assessment. Service north of US 30 replaced by Blue Route and Orange Route extension. Passengers per revenue mile is below desired 60% of average performance threshold.	2030 daily ridership - 185. Up from current 40/day.	185	--
Extend hours of Yellow Line service to Corridor 4.	Improved evening and weekend service. Assume 15 min. service 10:00 AM to 6:00 PM, 30 min. service 6:00 PM to 10:00 PM	Additional yellow line downtown transfers	Support existing and planned development. Provide student access to discount retail. More opportunities to attract transit-using customers and employees.	2 new 40-foot buses; $600,000	$416,300	No significant impact; use existing street		Increased frequency and hours of service forecast to increase 2030 ridership to 265/day	225	6.9

[1] Assumptions:
- Maintain current on-campus parking supply and restrictions.
- On-campus building expansion displaces approximately 400 parking spaces.
- Based on frequency elasticity coefficient of -0.22.
- No change in student fee structure.

Table 8- 5
Evaluation of Alternatives - Corridor 5[1]

Transit Improvement Alternative	Alternative Impacts									
	Service Frequency	Transfers	Economic Development	Capital Cost	Annual Operating Cost	Build/Natural Environment	Consistency with Local Plans	Ridership Potential	Total Corridor/Route Ridership After System Change	New Passengers per Revenue Hour
Maintain existing service along Red Route (No Action).	--	--	--	--	--	--	--	2030 ridership - 2500 passengers/day. Current - 1800 passengers/day.	700	--
Add more buses to existing Red Route service.	Double frequency of red route service between AMS and ISU Campus	--	Support existing and planned residential development in vicinity of Mortensen Road	4 new 40-foot buses; $1,200,000	$592,700	No significant impact; use existing street	Decreasing headway is consistent with 2005 LRTP recommendations. Resulting performance meets desired passengers per revenue mile threshold.	+80 passengers per day with 50% reduction in peak headway (to 5 Min.)	780	64.5
Add larger capacity buses to existing Red Route schedule.	Maintain scheduled frequency; no "extra" buses.	--	Support existing and planned residential development in vicinity of Mortensen Road	4 new 60-foot buses; $1,600,000; $320,000 allowance for maintenance facility upgrade	-$111,600	No significant impact; use existing street	--	No change from No Action Alt.	780	143.3

[1] Assumptions:
- Maintain current on-campus parking supply and restrictions.
- On-campus building expansion displaces approximately 400 parking spaces.
- Based on frequency elasticity coefficient of -0.22.
- No change in student fee structure.

Table 8- 6
Evaluation of Alternatives - Study Area 1[1]

Transit Improvement Alternative	Alternative Impacts									
	Service Frequency	Transfers	Economic Development	Capital Cost	Annual Operating Cost	Build/Natural Environment	Consistency with Local Plans	Ridership Potential	Total Corridor/Route Ridership After System Change	New Passengers per Revenue Hour
Maintain existing Red, Green, Brown and Blue Routes to North Grand Mall (No Action).	--	--	--	--	--	--	--	570 passengers/day (2030). Increase of 140/day from 2006.	140	--
Add more buses to existing Green Route service between Downtown and North Grand Mall.	Decrease headways from 20 minutes to 12 minutes	--	Serve planned mall expansion; More opportunities to attract transit-using customers and employees.	2 new 40-foot buses; $600,000	$355,600	No significant impact; use existing street	Passengers per revenue hour does not meet LRTP performance criteria of 60% of current.	Approx. 4.6% increase in passengers per 10% reduction in headway.	180	7.5

[1] Assumptions:
- Maintain current on-campus parking supply and restrictions.
- On-campus building expansion displaces approximately 400 parking spaces.
- Based on frequency elasticity coefficient of -0.22.
- No change in student fee structure.

Table 8- 7
Evaluation of Alternatives - Study Area 2[1]

Transit Improvement Alternative	Alternative Impacts									
	Service Frequency	Transfers	Economic Development	Capital Cost	Annual Operating Cost	Build/Natural Environment	Consistency with Local Plans	Ridership Potential	Total Corridor/Route Ridership After System Change	New Passengers per Revenue Hour
Do not extend service to Study Area 2 (No Action).	--	--	--	--	--	--	Inconsistent with long-term service extension policies established in 2005 LRTP	--	--	--
Extend Green Route to Study Area 2; increase frequency.	Decrease headways from 20 minutes to 12 minutes; maintain 2A service to Ontario/California; add 2B service north on Dakota across the UP tracks	--	Potential amenity to attract businesses/residents.	2 new 40-foot buses; $600,000	$682,200	No significant impact; use existing street	Consistent with long-term service extension policies established in 2005 LRTP. Increment of ridership does not meet passengers per revenue hour performance threshold.	700 passengers/day at build-out.	700	20.6
Serve Study Area 2 with new route (Transportation Plan identifies as "Pink Route").	Add 30-minute service between 215th Street and ISU Campus via Lincoln to Dakota, 5 days per week, 12 hours per day;	--	Potential amenity to attract businesses/residents. Would provide new service on Dakota between Lincoln and Ontario.	2 new 40-foot buses; $600,000	$682,200	No significant impact; use existing street	Consistent with long-term service extension policies established in 2005 LRTP. Increment of ridership does not meet passengers per revenue hour performance threshold.	800 passengers/day. +100 estimated based on attracting about 5% from Green.	700	23.5

[1] Assumptions:
- Maintain current on-campus parking supply and restrictions.
- On-campus building expansion displaces approximately 400 parking spaces.
- Based on frequency elasticity coefficient of -0.22.
- No change in student fee structure.

9.0 RECOMMENDATIONS

9.1 Overview

The step of developing the transit improvement recommendations requires a review of the study purpose and the study goals to become reacquainted with the vision of the study. The purpose that the study was initiated was to identify the need for and feasibility of transit improvements in the selected corridors and study areas. In addition, a key element of the study goals was to provide information to allow the prioritization of the recommendations. To stay true to the purpose and goal statements, the recommendations have been organized into two branches:

- **Prioritization of the need in each focus area based on current conditions, forecasted future conditions, and the increment of change/development anticipated.** Current conditions are principally a review of current ridership, service frequency relative to the ridership, and issues/needs identified by staff and through the focus group meeting information. Future conditions are evaluated as a function of the level of transit ridership relative to the route miles required to serve the corridor/study area. The increment of change in trip making and/or development, however growth is measured, has been included in the assessment as a barometer of the degree of change anticipated that could be interpolated to whether the need is short term or longer term. The product of this portion of the recommendations is a listing of the degree of need in the current and horizon year periods.

- **Identification of the "best fit" recommendation within each of the focus corridors and study areas**. The best fit recommendation is derived through review of the performance measures associated with implementation of the identified alternative and a very general assessment of cost versus likely available funding. The cost versus likely funding evaluation was based on a comparison of the alternative capital and operating/maintenance costs relative to current system operating costs. As this study is a very preliminary planning assessment, it is not reasonable or feasible to complete a detailed cost-benefit assessment. Rather experience and judgment were used in assessing the feasibility.

9.2 Corridor/Study Area Need Ranking

Based on the evaluation documented in Chapter 8, and the logic of establishing the recommendations documented above, the following table that summarizes the recommended priority ranking of the corridors was developed. This ranking represents the priority that would be followed for making investments in improved transit service. The ranking was based on:

- Whether there are presently unmet transit needs in a corridor or study area. Again, the need was identified through assessment of existing ridership, information gathered from CyRide staff, assessment of the route performance measures and information gathered through the public involvement process.

- Whether assessment of the 2030 development and transit ridership forecasts for a study area or corridor resulted in the conclusion that the current level of transit service provided would not adequately support future travel needs.

Each of the corridors has been ranked based on the assessment of the current and future needs. As Corridor 1 (Iowa State Center to central campus) demonstrates a high need in both the current and horizon year conditions, it has been identified as the highest priority corridor. The individual values and resulting priority ranking for each corridor and study area are described as follows, and summarized in Table 9-1.

Table 9-1
Recommended Corridor/Study Area Need Priority

Corridor/ Study Area	Existing Transportation Need	Future Transportation Need	Priority	Comments
1 Iowa State Center to the ISU campus	High	High	1	High demand for additional service
2 ISU to downtown Ames	Low	Low	5	Some potential for economic development associated with transportation investment
3 13th Street New Mall	Low	Medium	3	Service addition dependant on development of new mall
4 South Duff	Low	Low	6	Pattern of development not conducive to transit
5 Mortensen Road	Medium	High	2	High demand warrants consideration of improved service
Study Area 1 North Grand Mall	Low	Low	7	No change in service is warranted
Study Area 2 Northwest Growth Area	Low	Medium	4	Service addition dependant on new development

9.3 Corridor and Study Area Specific Recommendations

Priority 1 - Corridor 1 Transit Enhancement: Bus Rapid Transit

Corridor 1 offers a unique opportunity to potentially obtain federal New Starts funding for transit improvements. As documented in Chapter 2, a project with the following characteristics can qualify as a Very Small Start project:

1. Be a fixed guideway for at least 50% of the project length in the peak period –

AND/OR

2. Be a corridor-based bus project with the following minimum elements:

   - Substantial transit stations

- Signal priority/preemption (for Bus/LRT)
- Low-floor/level boarding vehicles
- Special branding of service
- Frequent service: 10 minutes during peak and 15 minutes during off-peak periods
- Service offered at least 14 hours per day
- Existing corridor ridership exceeding 3,000 passengers per day
- Less then $50 million total cost
- Less then $3 million per mile (excluding vehicles)

The vehicles used for this service would be low-floor boarding, articulated buses that would have a unique color scheme to provide a special branding for the BRT service.

It may be possible to include the cost of a new maintenance facility as part of the cost of implementing the BRT project. A new maintenance facility is needed to service and store the new articulated buses associated with this proposal. Even with the estimated cost of $7.6 million to $9.6 million for a new maintenance facility, the overall cost of the BRT project would be less than $16 million.

The BRT option for Corridor 1 as described in Chapter 7 would satisfy all of these conditions. Corridor 1 ridership currently exceeds 8,000 passengers per day.

Access to Osborn Drive between Wallace Road and Bissell Road is currently limited to transit and service vehicles by access gates. The project would include development of an exclusive bus lane along Beach Avenue between the Iowa State Center and Lincoln Way and a designated diamond lane within the Iowa State Center. The combination of these corridor modifications would result in meeting the 50 percent of the route as a fixed guideway criteria.

The project would be defined to include transit signal priority at the intersections of Beach/ Lincoln Way and Wallace Road/Osborne Drive. Transit signal priority would include optimization of the traffic signal timing and provide for a leading and/or lagging green for the BRT movements on Beach Avenue and Wallace Road.

The project would be defined to include a bus turnaround and transit hub in the existing surface parking lot southwest of the Armory along with bus station/stop enhancements along the route.

The next steps in the implementation of this recommendation would be as follows:

1. Meet with FTA staff to present the BRT project concept and discuss the potential for funding under the Very Small Starts program.

2. Discuss with FTA the procedural requirements needed to move the project forward. In particular, FTA guidance allows for, "… a very simple Alternatives Analysis process." Some definition of how this might differ from a standard AA would be desirable.

3. Move forward with conceptual design of the BRT concept including details of the guideway improvements, station improvements, traffic signal modifications, vehicle specifications maintenance facility and operating plans.

4. Complete the simplified AA process.

5. Identify sources of local funds. The Very Small Starts program will pay a maximum of 50 percent of the project cost. The remainder of the project cost will need to be funded from other sources. FTA will require a local financial commitment prior to approving the project.

In addition to satisfying the transportation need in this corridor, the primary advantage of the BRT option is that it likely qualifies for 50 percent federal funding. Other advantages of this option include:

- The additional guideway and transit signal priority treatments will improve bus travel times between the Iowa State Center and the campus. This should attract additional riders and make the service more efficient.

- The branding of the BRT service will allow CyRide and the university to establish a unique service corridor identity that could enhance ridership.

- Federal funding will provide for improved station/bus stop enhancements along the route. These enhancements could include shelters, benches, information kiosks, lighting and other amenities to make riding the bus more attractive. The station enhancements would serve not just the BRT project but also the other bus routes that follow these streets.

- As noted above, it is likely that some or all of the cost of a new maintenance facility could be included as part of the BRT project making it eligible for 50 percent federal funding. CyRide will need a new maintenance facility in the near future and this is an opportunity to advance that need.

- The service requirements associated with the Very Small Starts funding are easily met given the current service provided in the corridor. No significant changes in operations will be required.

Priority 2 – Corridor 5 Transit Enhancement

CyRide currently accommodates excess passenger demand in the Mortensen Road corridor by adding "extras" such that two or more buses provide service at one scheduled time. To reduce the need for these "extras" and better accommodate the passenger demand, it is recommended that CyRide acquire four articulated buses for use on this route. The articulated buses would allow CyRide to provide additional passenger capacity while reducing overall operating costs.

The primary challenge associated with this recommendation is the need to provide new or upgraded maintenance facilities to accommodate storage for the articulated buses. As noted above, the Corridor 1 BRT program could include development of a new CyRide maintenance facility that would resolve this issue.

Priority 3 – Corridor 3 Transit Service to New Mall

It is estimated that the proposed new retail mall and other new development in the vicinity of 13th Street and I-35 would generate bus ridership of approximately 900 trips per day. This level of ridership would warrant bus service to this area. The service could be provided either as a branch of the Red Route or as an extension of the Blue Route. A new route could also be developed between Ames City hall and the new mall. All options are expected to have similar cost implications.

Service in this corridor should not be initiated until the majority of the proposed mall is substantially complete and open for business, but should not be delayed beyond the mall opening, but prior to travel behavior patterns for potential transit customers are established.

Priority 4 – Study Area 2 Transit Service to Northwest Growth Area

It is estimated that the proposed development in the Northwest Growth Area will generate approximately 700 bus trips per day. This level of ridership would marginally warrant bus service to this area. This service could be provided either as a branch of the Green Route or as a new route from the University. A new route could provide service on Dakota between Lincoln Way and Ontario which currently does not have bus service.

Service in this corridor should not be initiated until the majority of the proposed development is substantially complete. If the overall density of development in this area is reduced, additional service in this corridor may not be warranted.

Priority 5 – Corridor 2 Enhanced Service between ISU and Downtown Ames

The demand for transit service between ISU and Downtown Ames is relatively low and is adequately accommodated by the existing Red and Green Route service. There is no significant change in transit ridership forecast to occur in this corridor.

This study evaluated an option of establishing streetcar service in this corridor, essentially reestablishing the historic Dinkey service. This option does not appear to be warranted based on relatively low ridership, high capital cost and high operating and maintenance cost.

The primary advantage of establishing streetcar service in this corridor would be to enhance economic development. The transit investment alone would be expected to have only minor economic development benefit. However, development potential could be enhanced through:

- City initiatives to acquire and consolidate property for redevelopment,
- Changes to zoning requirements to establish a transit overlay district. The overlay district could allow for increased densities, mixed uses and reduced parking.
- Changes to growth policies to encourage urban infill development and redevelopment and discourage geographic expansion.

Given the current levels of development and transit ridership, it is unlikely that a fixed guideway transit project in this corridor would qualify for New Starts funding.

Priority 6 – Corridor 4 Enhanced Service to South Duff

Ridership on the Yellow Route within this corridor is the lowest of all the routes in the CyRide system. New development in this corridor will generate some additional ridership but not significant enough to warrant any significant change in service.

The land uses in this corridor are generally auto oriented, big box uses, which are difficult to serve with transit. While there has been an expressed desire for transit access to these discount retail uses, utilization of the existing service would not warrant any service expansion. However, services may be warranted for the transit-dependent and access to jobs within the corridor.

Priority 7 – Study Area 1 – Enhanced Service to the North Grand Mall

The North Grand Mall is currently served by the Blue, Brown, Green and Red Routes. An expansion of the North Grand Mall is expected to increase transit ridership by approximately 140 passengers per day. Given the high level of service currently provided to the North Grand Mall, no additional service to this study area is warranted.

10.0 COMMUNITY INVOLVEMENT

10.1 Advisory Committee

Development of the study was guided and directed by a study Advisory Committee. The committee met four times during the study to review interim products and discuss transit operations, issues and concerns. Committee meeting notes are included in Appendix B. Members of the committee are identified in Table 10-1.

Table 10- 1
Members of the Advisory Committee

Representative	Agency
Seana Perkins	Planner, Planning & Housing, City of Ames
Damion Pregitzer	Traffic Engineer, Public Works and MPO Technical Committee, City of Ames
Emily Jensen	GSB President
Ian Guffy	GSB Senator
Tom Davenport	Transit Coordinator, CyRide
Sheri Kyras	Director of Transportation, CyRide,
Shari Atwood	Transit Planner, CyRide
Cathy Brown	Program Coordinator, ISU Facilities Planning and Management
Doug Houghton	Program Manager, ISU Public Safety
Dean Morton	University Architect, ISU Facilities Planning and Management

10.2 Focus Groups

As part of the review of existing conditions, three focus group meetings were held on February 20, 2007. The purpose of the meetings was to determine what the City of Ames' students, institutions, businesses, community leaders and citizens perceive to be the current and future key transportation issues.

To facilitate discussion, each focus group includes members of the Ames business was limited to 10 to 12 participants. Meeting in a small setting allows for detailed discussion of transportation concerns. Input from the focus group meetings is one element used to define the Purpose and Need for transit improvements in Ames and identify the potential solutions to these transportation problems.

The focus group meetings included an introduction to the project – its purpose and a general description of the various corridors under study. Following the introduction, each focus group considered a series of questions. Following is a list of questions to be discussed at each of the three focus group meetings.

- How do you see the City of Ames and surrounding area growing over the next 20 years?
- Where are the transportation deficiencies in Ames? How do they affect the way that your business or agency operates?
- What are some potential solutions to transportation problems in Ames?
- In your opinion, how have the development and redevelopment efforts affected transportation in Ames?
- How is CyRide received in the community?
- Where do you see deficiencies in bus transit service that need to be supplemented?
- Rank where transportation, redevelopment activities, environmental protection and preserving the character of the community fall within the hierarchy of issues affecting Ames.
- What specific attractions or activity centers in Ames should be served by transit?
- How do you personally feel about implementing a fixed guideway option in Ames?
- What do you perceive would be the benefits of having a fixed guideway system in Ames?
- What do you perceive would be the detriments of having a fixed guideway system in Ames?
- For citizens, businesses and institutions: How do you feel about increasing taxes to fund additional transit projects?
- For students: How do you feel about increasing student activity fees to fund improvements to CyRide's services?

The focus group results are summarized below. Complete meeting notes are contained in Appendix C.

University Focus Group

Perceived Growth Areas

- Somerset/Northridge Area/GW Carver towards Gilbert
- South Dakota/Mortensen Area
- South Duff Commercial Growth

Transportation/CyRide Issues

- Access to Jobs for Students
- South Duff Needs Improved CyRide Service Levels
- Improve Outreach/Wayfinding for Students to Increase Ridership
- CyRide has Good Image and is Worthwhile Investment for ISU
- Parking Limitations Significant Factor in CyRide Demand

Feasibility of Fixed Guideway System

- Not feasible.

Businesses Focus Group

Perceived Growth Areas

- Somerset/North Ames Area
- West Towne/Mortensen – South Dakota Area
- South Duff Commercial Growth

Transportation Problems Are Being Fixed

- Grand Avenue Extension
- Buses and Trails are Good

CyRide Opportunities

- South Duff Service Expansion

- East 13th Street/Dayton for Employees and Services
- Vanpools from Boone and Nevada
- Special Events: Schools and ISU games
- Focus on Outreach/Educating Community on CyRide

Feasibility of Fixed Guideway System

- Not feasible.

Residential Focus Group

Perceived Growth Areas

- South Duff Commercial Growth
- East 13th Street

Transportation/CyRide Issues

- CyRide Provides Tremendous Service
- Gaps in Service, including:
- East 13th Street Employers, Medical Services and Retirement Communities
- CIT/Jefferson Line Regional Bus Station
- Need to Educate General Public About Using Public Transit

Feasibility of Fixed Guideway System

- Consider Nevada to West Ames (Possibly Boone) Light Rail
- Ames is Too Small, Lacks Fixed-Guideway Density

10.3 Public Meetings

On March 29, 2007, two public meetings were held to solicit public comments on preliminary study results and transit alternatives.

- University Public Meeting, March 29, 2007, 1:00pm to 2:00pm, ISU Memorial Union, 11 Persons attended
- General Public Meeting, March 29, 2007, 4:30pm to 7:00pm, Ames City Hall, 12 Persons attended.

Both meetings were conducted in an open house format with CyRide and consultant staff available to answer questions and guide people through the project display. The project display consisted of fourteen display boards illustrating the study process, existing conditions and alternatives for each corridor and study area.

In addition to these public meetings, a presentation of preliminary study results was made to the Government of the Student Body (GSB) at ISU on March 28, 2007.

Transit Board Meeting

A summary of the study recommendations was presented to the CyRide Board on April 23, 2007. The CyRide Board currently has six members representing the City of Ames, ISU and the GSB, listed as follows:

- Steve Schainker – Ames City Manager
- Warren Madden – ISU Vice President of Business and Finance
- Matthew Goodman – Ames City Council (appointed by the City Council)
- Dennis Kroeger – Mayoral Appointee
- John Franklin – GSB Representative (appointed by the GSB President)
- Sheena Spurgin – GSB Senator (appointed by the GSB President).

Appendix A

Support Information for Cost Estimates

ORDER-OF-MAGNITUDE COST ESTIMATES
For
Ames Transit Feasibility Study

CORRIDOR 1 BRT

URS

Prepared: **May 29, 2007**

SUMMARY OF CORRIDOR 1 BRT
ORDER-OF-MAGNITUDE COST

5/29/2007

	AMES TRANSIT FEASIBILITY STUDY - BRT ON CORRIDOR 1		
		Sheet	**Corridor 1 BRT**
		Source	Corridor 1 BRT
		Length (mi)	1.67
		Length (ft)	8,828
1	**Guideway**	**$**	**1,285,585**
2	**Utility Relocation**	**$**	**305,375**
3	**Trackwork - Does Not Apply To BRT**	**$**	**-**
4	**Structures**	**$**	**-**
5	**Stations**	**$**	**720,000**
6	**Park-and-Ride Lots**	**$**	**-**
7	**Fare Collection**	**$**	**-**
8	**Operations Facility Allowance**	**$**	**200,000**
9	**Traction Power - Does Not Apply To BRT**	**$**	**-**
10	**Signal System - See Communications**	**$**	**-**
11	**Communications**	**$**	**-**
12	**Engineering & Administration**	**$**	**753,288**
13	**Contingencies**	**$**	**967,051**
14	**Vehicles**	$	1,600,620
15	**Right-of-Way Allowance**	**$**	**-**
	Total Cost	**$**	**5,831,919**
			$5,831,919
	Cost per Mile - with vehicles ($ million)	$	3.49
	Cost per Mile - without vehicles ($ million)	$	2.53

AMES TRANSIT FEASIBILITY STUDY
BRT - Corridor 1
Iowa State Center to ISU Armory

Order of Magnitude
Estimate Basics

Start Sta	End Sta	Length	
+00	88+28	8,828 FT	1.67 mile

Description	Quantity	Unit	Unit Cost	Extension	2006$
1 Guideway					**$ 1,285,585**
1 Site Preparation Allowance	1,745	RF	$ 8	$ 13,960	
2 Subgrade Preparation	1,745	RF	$ 28	$ 48,860	
3 Unclassified Excavation	-	CY	$ 32	$ -	
4 Common Backfill	1,745	CY	$ 11	$ 19,195	
5 Final Grading Allowance	1,745	RF	$ 10	$ 17,450	
6 Traffic Control Allowance	1,745	RF	$ 40	$ 69,800	
7 Landscaping Allowance	1,745	RF	$ 28	$ 48,860	
8 Chain Link Fencing	-	LF	$ 20	$ -	
9 Street Closure Allowance	2	EA	$ 50,000	$ 100,000	
10 Intersection Rebuild (2 Lanes)	-	EA	$ 90,000	$ -	
11 Traffic Signal (2 Lanes)	-	EA	$ 120,000	$ -	
12 Rebuild Residential Driveway	-	EA	$ 6,000	$ -	
13 Intersection Rebuild (4 Lanes)	1	EA	$ 180,000	$ 180,000	
14 Traffic Signal (4 Lanes)	1	EA	$ 200,000	$ 200,000	
15 Construct BRT Under Existing Overpass	-	EA	$ 100,000	$ -	
16 Rebuild Commercial Driveway	-	EA	$ 10,000	$ -	
17 Curb and Gutter Allowance	3,490	LF	$ 24	$ 83,760	
18 Roadway Construction	41,880	SF	$ 10	$ 418,800	
19 Sidewalk Construction	-	SF	$ 6	$ -	
20 Ped Crossings	1	EA	$ 50,000	$ 50,000	
21 Drainage Culvert - 60" RCP	-	LF	$ 300	$ -	
22 Complex Major Intersection Rebuild	-	EA	$ 400,000	$ -	
23 Impact Slab Construction	-	LF	$ 182	$ -	
24 Signing and Striping	3,490	LF	$ 10	$ 34,900	
25 Mountable Curb Construction	-	LF	$ 16	$ -	
26 Fill To Avoid Floodplain	-	CY	$ 20	$ -	
27 Minor Street At-Grade Crossing (New Gates and Devices)	-	EA	$ 150,000	$ -	
28 Major Street At-Grade Crossing (New Gates and Devices)	-	EA	$ 250,000	$ -	
2 Utility Relocation					**$ 305,375**
1 Utility Allowance - High (Urban)	-	RF	$ 670	$ -	
2 Utility Allowance - Medium (Suburban)	-	RF	$ 350	$ -	
3 Utility Allowance - Low (Rural)	1,745	RF	$ 175	$ 305,375	
3 Trackwork - Does Not Apply To BRT					**$ -**
4 Structures					**$ -**
1 Select Fill for MSE Walls	-	CY	$ 24	$ -	
2 Retaining Walls to 10' High	-	SFCA	$ 41	$ -	
3 Retaining Walls to 15' High	-	SFCA	$ 52	$ -	
4 Retaining Walls to 20' High	-	SFCA	$ 63	$ -	
5 BRT Bridge	-	SF	$ 85	$ -	
6 Aerial Freeway Structure - Reconstruction	-	LF	$ 5,100	$ -	
7 Pedestrian Bridge	-	EA	$ 360,000	$ -	
8 Box Culvert 8' x 5'	-	LF	$ 750	$ -	
5 Stations					**$ 720,000**
Station Name:	Beach/Lincoln Way, Maple-Willow-Larch, Lead, Forker, General Services, Kildee, Physics, Armory				
1 Platform Electrical Allowance	-	EA	$ 100,000	$ -	
2 Elevated Platform	-	EA	$ 2,500,000	$ -	
3 At-Grade Side Loading Platform	-	EA	$ 1,000,000	$ -	
4 Center Platform	-	EA	$ 2,500,000	$ -	
5 At-Grade Sidewalk Shared Platform	8	EA	$ 90,000	$ 720,000	
6 Kiss-and-Ride Parking Spaces	-	SPACE	$ 4,000	$ -	
7 Bus Transit Center	-	BUS BAY	$ 120,000	$ -	
6 Park-and-Ride Lots					**$ -**
1 Structure Parking	-	SPACE	$ 10,000	$ -	
2 Surface Parking	-	SPACE	$ 3,500	$ -	
7 Fare Collection					**$ -**
1 Fare Collection Vending Machine, Validator & Spares	-	EA	$ 85,000	$ -	

AMES TRANSIT FEASIBILITY STUDY
BRT - Corridor 1
Iowa State Center to ISU Armory

Order of Magnitude
Estimate Basics

Start Sta	End Sta	Length	
+00	88+28	8,828 FT	1.67 mile

Description	Quantity	Unit	Unit Cost	Extension	2006$
8 Operations Facility Allowance					**$ 200,000**
(Based on a retrofit of existing facility)					
1 Maintenance Facility	2	LS	$ 100,000	$ 200,000	
				$ -	
9 Traction Power - Does Not Apply To BRT					**$ -**
10 Signal System - See Communications					**$ -**
11 Communications					**$ -**
1 Communication Control Center	-	RF	$ 200	$ -	
			Subtotal	$ 2,510,960	**$ 2,510,960**
12 Engineering & Administration					**$ 753,288**
1 E & A on Infrastructure	30%	$2,510,960		$ 753,288	
			Subtotal	$ 3,264,248	
13 Contingencies					**$ 967,051**
1 Contingency on Infrastructure (Excluding utilities)	30%	$2,205,585		$ 661,676	
2 Contingency on Utilities	100%	$305,375		$ 305,375	
		Subtotal - Infrastructure			**$ 4,231,299**
14 Vehicles					**$ 1,600,620**
1 Low-Floor Bus with Dual Side Doors, Automatic Guidance	4	EA	$ 370,000	$ 1,480,000	
E & A	5%			$ 74,000	
Contingency	3%			$ 46,620	
15 Right-of-Way Allowance (Not Included)					**$ -**
1 Private Land Acquisition	-	AC	$ 600,000	$ -	
2 Business Relocation	-	EA	$ 300,000	$ -	
3 Residential Relocation	-	EA	$ 150,000	$ -	
4 Easement	-	AC	$ 400,000	$ -	
5 Residential Building Removal	-	EA	$ 20,000	$ -	
6 Other Building Removal	-	EA	$ 40,000	$ -	
			Total		**$ 5,831,919**
				Total Cost Per mile	**3.49 M/Mi**
				Cost Per mile (without vehicles)	**2.53 M/Mi**

ORDER-OF-MAGNITUDE COST ESTIMATES
For
Ames Transit Feasibility Study

JOINT CYRIDE AND HEARTLAND SENIOR SERVICES MAINTENANCE FACILITY

URS

Prepared: **May 31, 2007**

Table MF-1						
Order-of-Magnitude Cost Estimate for New Maintenance Facility						
CyRide and Heartland Senior Services						
Ames Transit Feasibility Study						
Assumptions						
Future growth		10 percent in staff and fleet sizes.				
Office Component			**Low**		**High**	
Administrative			Staff			
	CyRide	Current	18			
		Future	2			
	Heartland	Current	5			
		Future	1			
		Total	26			
		Per Person	300	SF		
	Space Requirement		7,800	SF	7,800	SF
Maintenance and Operations			Staff			
	CyRide	Current	115			
		Future	12			
	Heartland	Current	40			
		Future	4			
		Total	171			
		Per Person	25	SF		
	Space Requirement		4,275	SF	4,275	SF
Storage			200	SF		
Toilets			340	SF		
Lobby/Reception			300	SF		
Conference Room			400	SF		
		Subtotal	13,315	SF	13,315	SF
Circulation		25%	3,329	SF	3,329	SF
Walls		7%	932	SF	932	SF
Mechanical/Electrical		10%	1,332	SF	1,332	SF
	Total Space Requirement		18,907	SF	18,907	SF
		Cost/SF	**$ 110.00**		**$ 115.00**	
	Estimated Construction Cost		**$ 2,079,803**		**$ 2,174,340**	
Maintenance and Storage Component					**High**	
Function		Number of Bays				
Paratransit Storage		6				
CyRide Fleet		46				
Maintenance - 40'		2				
Articulated		2				
Steam Clean		1				
Body Repair		1				
Paint Booth		1				
	Total	59				
	Bay Width		12	FT	12	FT
	Bay Length		80	FT	80	FT
	Total Area, Bays		56,640	SF	56,640	Sf
Walls	5%		2,832	SF	2,832	SF
Access	6x12'x80'		5,760	SF	5,760	SF
	Total Space Requirement		65,232	SF	65,232	SF
		Cost/SF	**$ 70.00**		**$ 95.00**	
	Estimated Construction Cost		**$ 4,566,240**		**$ 6,197,040**	
Subtotal, Administrative + Maintenance			$ 6,646,043		$ 8,371,380	
Parking, Circulation, Contingency and Design			**$ 1,000,000**		**$ 1,250,000**	
		Total	**$ 7.65**	**million**	**$ 9.62**	**million**
Average Cost per SF (Excl. Parking, Circulation, Contingency, Design)			$ 78.99		$ 99.49	
	Total Average Cost per SF		$ 90.87		$ 114.35	

Source: URS.

ORDER-OF-MAGNITUDE CONSTRUCTION COST ESTIMATES
For
Ames Transit Feasibility Study

SUMMARY OF STREETCAR ALTERNATIVES

URS

Prepared: **May 29, 2007**

	SUMMARY OF ORDER-OF-MAGNITUDE COSTS					
	STREETCAR ALTERNATIVES					
	AMES TRANSIT FEASIBILITY STUDY					
		Corridor	**1**	**2**	**2**	**2**
		Alignment	1	2-1A	2-1B	2-2
		Length (FT)	88+68	110+57	110+32	100+59
		Length (mi)	1.68	2.09	2.09	1.91
1	Guideway		$ 7,754,883	$ 5,957,598	$ 4,069,960	$ 4,049,145
2	Utility Relocation		$ 1,551,813	$ 1,934,888	$ 1,930,600	$ 1,760,325
3	Trackwork		$ 6,807,534	$ 8,177,984	$ 8,163,284	$ 7,154,188
4	Structures		$ -	$ 25,682,232	$ 24,989,482	$ 3,849,982
5	Stations		$ 1,750,000	$ 1,200,000	$ 1,050,000	$ 1,200,000
6	Park-and-Ride Lots		$ -	$ -	$ -	$ -
7	Fare Collection		$ -	$ -	$ -	$ -
8	Operations Facility Allowance (All Yard Elements Included)		$ 869,015	$ 1,083,537	$ 1,081,136	$ 985,782
9	Traction Power		$ 2,793,263	$ 3,482,798	$ 3,475,080	$ 3,168,585
10	Signal System		$ -	$ -	$ -	$ -
11	Communications		$ -	$ -	$ -	$ -
12	Engineering & Administration		$ 4,305,301	$ 9,503,807	$ 8,951,908	$ 4,433,601
13	Contingencies		$ 7,156,268	$ 15,126,410	$ 14,296,633	$ 7,442,548
14	Vehicles		$ 18,818,100	$ 9,409,050	$ 9,409,050	$ 9,409,050
15	Right-of-Way		$ -	$ -	$ -	$ -
		Total Cost	**$ 51,806,175**	**$ 81,558,302**	**$ 77,417,133**	**$ 43,453,206**
			$51,806,175	$81,558,302	$ 77,417,133	$43,453,206
	Cost per Mile with Vehicles ($ million)		$ 30.85	$ 38.95	$ 37.05	$ 22.81
	Cost per Mile - without Vehicles ($ million)		$ 19.64	$ 34.45	$ 32.55	$ 17.87

Sheet Summary\Streetcar cost

Source: URS.

ORDER-OF-MAGNITUDE CONSTRUCTION COST ESTIMATES
For
Ames Transit Feasibility Study

CORRIDOR 1 STREETCAR

URS

Prepared: **May 29, 2007**

AMES TRANSIT FEASIBILITY STUDY
Corridor 1 - Streetcar Option
Jack Trice Stadium - Coover/Armory

Order of Magnitude
Estimate Basics

	Start Sta	End Sta	Length	
			8,868 FT	1.68 mile

Description	Quantity	Unit	Unit Cost	Extension	2007$
1 Guideway					**$ 7,754,883**
1 Site Preparation Allowance	8,868	RF	$ 8	$ 70,940	
2 Subgrade Preparation Including Sub-Ballast	8,868	RF	$ 28	$ 248,290	
3 Unclassified Excavation	-	CY	$ 32	$ -	
4 Common Backfill	-	CY	$ 11	$ -	
5 Final Grading Allowance	8,868	RF	$ 10	$ 88,675	
6 Traffic Control Allowance	8,868	RF	$ 40	$ 354,700	
7 Landscaping Allowance	8,868	RF	$ 28	$ 248,290	
8 Chain Link Fencing	-	LF	$ 20	$ -	
9 Street Closure Allowance	-	EA	$ 50,000	$ -	
10 Intersection Rebuild (2 Lanes)	9	EA	$ 90,000	$ 810,000	
11 Traffic Signal (2 Lanes) / Signal Modifications	10	EA	$ 120,000	$ 1,200,000	
12 Rebuild Residential Driveway	-	EA	$ 6,000	$ -	
13 Intersection Rebuild (4 Lanes)	4	EA	$ 180,000	$ 720,000	
14 Traffic Signal (4 Lanes)	3	EA	$ 200,000	$ 600,000	
15 Construct LRT Under Existing Overpass	-	EA	$ 80,000	$ -	
16 Rebuild Commercial Driveway	-	EA	$ 10,000	$ -	
17 Curb and Gutter Allowance	8,868	LF	$ 24	$ 212,820	
18 Roadway Construction	283,760	SF	$ 10	$ 2,837,600	
19 Sidewalk Construction	-	SF	$ 6	$ -	
20 Ped Crossings	-	EA	$ 50,000	$ -	
21 Drainage Culvert - 60" RCP	-	LF	$ 300	$ -	
22 TPS Building, Foundation and Ground Mat	8,868	RF	$ 25	$ 221,688	
23 OCS Pole Foundations	8,868	RF	$ 16	$ 141,880	
24 Signal and Communications Building	-	RF	$ 18	$ -	
25 Systemwide Ductbank	-	RF	$ 100	$ -	
26 Corrosion Mitigation	-	RF	$ 12	$ -	
27 Minor Street At-Grade Crossing (New Gates and Devices)	-	EA	$ 150,000	$ -	
28 Major Street At-Grade Crossing (New Gates and Devices)	-	EA	$ 250,000	$ -	
29 Fill To Avoid Floodplain	-	CY	$ 20	$ -	
30 Remove Track	-	TF	$ 15	$ -	
31 Shift Track	-	TF	$ 20	$ -	
2 Utility Relocation					**$ 1,551,813**
1 Utility Allowance - High (Urban)	-	RF	$ 670	$ -	
2 Utility Allowance - Medium (Suburban)	-	RF	$ 350	$ -	
3 Utility Allowance - Low (Rural)	8,868	RF	$ 175	$ 1,551,813	
3 Trackwork					**$ 6,807,534**
1 Ballasted Track	-	TF	$ 181	$ -	
2 Ballasted Track w/Ballast Curbs	-	TF	$ 250	$ -	
3 Embedded Track (115 RE)	17,735	TF	$ 350	$ 6,207,250	
4 Direct Fixation Track	-	TF	$ 300	$ -	
5 Ballasted Freight Track	-	TF	$ 136	$ -	
6 Impact Attenuators	2	EA	$ 142	$ 284	
7 Double Crossover	2	EA	$ 300,000	$ 600,000	
8 Single Crossover	-	EA	$ 175,000	$ -	
9 Turnout	-	EA	$ 125,000	$ -	
4 Structures					**$ -**
1 Select Fill for MSE Walls	-	CY	$ 24	$ -	
2 Retaining Walls to 10' High	-	SFCA	$ 41	$ -	
3 Retaining Walls to 15' High	-	SFCA	$ 52	$ -	
4 Retaining Walls to 20' High	-	SFCA	$ 63	$ -	
5 Aerial LRT Structure - DF	-	LF	$ 4,250	$ -	
6 Aerial LRT Structure - Ballast	-	LF	$ 4,250	$ -	
7 Aerial Freeway Structure - Reconstruction	-	LF	$ 5,100	$ -	
8 Pedestrian Bridge	-	EA	$ 360,000	$ -	
10 Box Culvert 8' x 5'	-	LF	$ 750	$ -	
5 Stations					**$ 1,750,000**
Station Name:	TOTAL OF 10				
1 Platform Electrical Allowance	10	EA	$ 100,000	$ 1,000,000	
2 Elevated Platform	-	EA	$ 2,500,000	$ -	
3 At-Grade Side Loading Platform	-	EA	$ 1,000,000	$ -	
4 Center Platform	1	EA	$ 300,000	$ 300,000	
5 At-Grade Sidewalk Shared Platform	9	EA	$ 50,000	$ 450,000	
6 Kiss-and-Ride Parking Spaces	-	SPACE	$ 4,000	$ -	
7 Bus Transit Center	-	BUS BAY	$ 120,000	$ -	
6 Park-and-Ride Lots					**$ -**
1 Structure Parking	-	SPACE	$ 10,000	$ -	
2 Surface Parking	-	SPACE	$ 3,500	$ -	

AMES TRANSIT FEASIBILITY STUDY
Corridor 1 - Streetcar Option
Jack Trice Stadium - Coover/Armory

Order of Magnitude
Estimate Basics

	Start Sta	End Sta	Length	
			8,868 FT	1.68 mile

Description	Quantity	Unit	Unit Cost	Extension	2007$
7 Fare Collection					**$ -**
1 Fare Collection	-	EA	$ 85,000	$ -	
8 Operations Facility Allowance (All Yard Elements Included)				$ -	**$ 869,015**
1 Building and Yard Site Preparation	8,868	RF	$ 44	$ 390,170	
2 Operations Facility Building	8,868	RF	$ 54	$ 478,845	
3 Yard Maintenance Equipment	-	RF	$ 40	$ -	
4 Maintenance of Way Vehicles	-	RF	$ 40	$ -	
5 Communications Control Center	-	RF	$ 200	$ -	
				$ -	
9 Traction Power					**$ 2,793,263**
1 OCS Simple Catenary	8,868	RF	$ 200	$ 1,773,500	
2 TPS Substation	8,868	RF	$ 115	$ 1,019,763	
3 Spare Parts		RF	$ 55	$ -	
4 Lighting	-	RF	$ 18	$ -	
10 Signal System					**$ -**
1 Train Control - LRT	-	RF	$ 300	$ -	
2 Train Control - Single Track Freight	-	RF	$ 100	$ -	
11 Communications					**$ -**
1 Communications	-	RF	$ 140	$ -	
			Subtotal	$ 21,526,507	**$ 21,526,507**
12 Engineering & Administration					**$ 4,305,301**
1 E & A on Infrastructure	20%	$ 21,526,507		$ 4,305,301	
			Subtotal	$ 25,831,808	
13 Contingencies					**$ 7,156,268**
1 Contingency on Infrastructure (Excluding utilities)	30%	$ 19,974,694		$ 5,992,408	
2 Contingency on Utilities	75%	$ 1,551,813		$ 1,163,859	
		Subtotal - Infrastructure			**$ 32,988,075**
14 Vehicles					**$ 18,818,100**
1 Low Floor LRV	-	EA	$ 4,000,000	$ -	
2 Modern Streetcar	6	EA	$ 2,900,000	$ 17,400,000	
E & A	5%			$ 870,000	
Contingency	3%			$ 548,100	
15 Right-of-Way					**$ -**
1 Private Land Acquisition	-	AC	$ 600,000	$ -	
2 Business Relocation	-	EA	$ 300,000	$ -	
3 Residential Relocation	-	EA	$ 150,000	$ -	
4 Easement	-	AC	$ 400,000	$ -	
5 Residential Building Removal	-	EA	$ 20,000	$ -	
6 Other Building Removal	-	EA	$ 40,000	$ -	
			Total		**$ 51,806,175**
			Total Cost Per mile		**30.85 M/Mi**
			Cost per Mile (Without Vehicles)		**19.64 M/Mi**

ORDER-OF-MAGNITUDE CONSTRUCTION COST ESTIMATES
For
Ames Transit Feasibility Study

CORRIDOR 2 STREETCAR

URS

Prepared: **May 29, 2007**

Ames Transit Feasibility Study
Streetcar - Corridor 2 - Option 1A
Coover/Armory to Downtown Ames
Via South Side of RR and Main St

Order of Magnitude
Estimate Basics

	Start Sta	End Sta	Length	
	+00	+00	11,057 FT	2.1 mile

Description	Quantity	Unit	Unit Cost	Extension	2006$
1 Guideway					**$ 5,957,598**
1 Site Preparation Allowance	11,057	RF	$ 8	$ 88,452	
2 Subgrade Preparation Including Sub-Ballast	11,057	RF	$ 28	$ 309,582	
3 Unclassified Excavation	-	CY	$ 32	$ -	
4 Common Backfill	-	CY	$ 11	$ -	
5 Final Grading Allowance	11,057	RF	$ 10	$ 110,565	
6 Traffic Control Allowance	11,057	RF	$ 40	$ 442,260	
7 Landscaping Allowance	11,057	RF	$ 28	$ 309,582	
8 Chain Link Fencing	-	LF	$ 20	$ -	
9 Street Closure Allowance	-	EA	$ 50,000	$ -	
10 Intersection Rebuild (2 Lanes)	8	EA	$ 90,000	$ 720,000	
11 Traffic Signal (2 Lanes) / Signal Modifications	9	EA	$ 120,000	$ 1,080,000	
12 Rebuild Residential Driveway	-	EA	$ 6,000	$ -	
13 Intersection Rebuild (4 Lanes)	2	EA	$ 180,000	$ 360,000	
14 Traffic Signal (4 Lanes)	1	EA	$ 200,000	$ 200,000	
15 Construct LRT Under Existing Overpass	-	EA	$ 80,000	$ -	
16 Rebuild Commercial Driveway	-	EA	$ 10,000	$ -	
17 Curb and Gutter Allowance	-	LF	$ 24	$ -	
18 Roadway Construction	188,384	SF	$ 10	$ 1,883,840	
19 Sidewalk Construction	-	SF	$ 6	$ -	
20 Ped Crossings	-	EA	$ 50,000	$ -	
21 Drainage Culvert - 60" RCP	-	LF	$ 300	$ -	
22 TPS Building, Foundation and Ground Mat	11,057	RF	$ 25	$ 276,413	
23 OCS Pole Foundations	11,057	RF	$ 16	$ 176,904	
24 Signal and Communications Building	-	RF	$ 18	$ -	
25 Systemwide Ductbank	-	RF	$ 100	$ -	
26 Corrosion Mitigation	-	RF	$ 12	$ -	
27 Minor Street At-Grade Crossing (New Gates and Devices)	-	EA	$ 150,000	$ -	
28 Major Street At-Grade Crossing (New Gates and Devices)	-	EA	$ 250,000	$ -	
29 Fill To Avoid Floodplain	-	CY	$ 20	$ -	
30 Remove Track	-	TF	$ 15	$ -	
31 Shift Track	-	TF	$ 20	$ -	
2 Utility Relocation					**$ 1,934,888**
1 Utility Allowance - High (Urban)	-	RF	$ 670	$ -	
2 Utility Allowance - Medium (Suburban)	-	RF	$ 350	$ -	
3 Utility Allowance - Low (Rural)	11,057	RF	$ 175	$ 1,934,888	
3 Trackwork					**$ 8,177,984**
1 Ballasted Track	-	TF	$ 181	$ -	
2 Ballasted Track w/Ballast Curbs	-	TF	$ 250	$ -	
3 Embedded Track (115 RE)	10,376	TF	$ 350	$ 3,631,600	
4 Direct Fixation Track	11,737	TF	$ 300	$ 3,521,100	
5 Ballasted Freight Track	-	TF	$ 136	$ -	
6 Impact Attenuators	2	EA	$ 142	$ 284	
7 Double Crossover	3	EA	$ 300,000	$ 900,000	
8 Single Crossover	-	EA	$ 175,000	$ -	
9 Turnout	1	EA	$ 125,000	$ 125,000	
4 Structures					**$ 25,682,232**
1 Select Fill for MSE Walls	-	CY	$ 24	$ -	
2 Retaining Walls to 10' High	1,670	SFCA	$ 41	$ 68,470	
3 Retaining Walls to 15' High	1,245	SFCA	$ 52	$ 64,740	
4 Retaining Walls to 20' High	306	SFCA	$ 63	$ 19,272	
5 Aerial LRT Structure - DF	6,007	LF	$ 4,250	$ 25,529,750	
6 Aerial LRT Structure - Ballast	-	LF	$ 4,250	$ -	
7 Aerial Freeway Structure - Reconstruction	-	LF	$ 5,100	$ -	
8 Pedestrian Bridge	-	EA	$ 360,000	$ -	
10 Box Culvert 8' x 5'	-	LF	$ 750	$ -	
5 Stations					**$ 1,200,000**
Station Name:	8				
1 Platform Electrical Allowance	8	EA	$ 100,000	$ 800,000	
2 Elevated Platform	-	EA	$ 2,500,000	$ -	
3 At-Grade Side Loading Platform	-	EA	$ 1,000,000	$ -	
4 Center Platform	-	EA	$ 300,000	$ -	
5 At-Grade Sidewalk Shared Platform	8	EA	$ 50,000	$ 400,000	
6 Kiss-and-Ride Parking Spaces	-	SPACE	$ 4,000	$ -	
7 Bus Transit Center	-	BUS BAY	$ 120,000	$ -	
6 Park-and-Ride Lots					**$ -**
1 Structure Parking	-	SPACE	$ 10,000	$ -	
2 Surface Parking	-	SPACE	$ 3,500	$ -	

Ames Transit Feasibility Study
Streetcar - Corridor 2 - Option 1A
Coover/Armory to Downtown Ames
Via South Side of RR and Main St

Order of Magnitude
Estimate Basics

	Start Sta	End Sta	Length	
	+00	+00	11,057 FT	2.1 mile

Description	Quantity	Unit	Unit Cost	Extension	2006$
7 Fare Collection					**$ -**
1 Fare Collection	-	EA	$ 85,000	$ -	
8 Operations Facility Allowance (All Yard Elements Included)				$ -	**$ 1,083,537**
1 Building and Yard Site Preparation	11,057	RF	$ 44	$ 486,486	
2 Operations Facility Building	11,057	RF	$ 54	$ 597,051	
3 Yard Maintenance Equipment	-	RF	$ 40	$ -	
4 Maintenance of Way Vehicles	-	RF	$ 40	$ -	
5 Communications Control Center	-	RF	$ 200	$ -	
				$ -	
9 Traction Power					**$ 3,482,798**
1 OCS Simple Catenary	11,057	RF	$ 200	$ 2,211,300	
2 TPS Substation	11,057	RF	$ 115	$ 1,271,498	
3 Spare Parts	-	RF	$ 55	$ -	
4 Lighting	-	RF	$ 18	$ -	
10 Signal System					**$ -**
1 Train Control - LRT	-	RF	$ 300	$ -	
2 Train Control - Single Track Freight	-	RF	$ 100	$ -	
11 Communications					**$ -**
1 Communications	-	RF	$ 140	$ -	
			Subtotal	$ 47,519,035	**$ 47,519,035**
12 Engineering & Administration					**$ 9,503,807**
1 E & A on Infrastructure	20%	$ 47,519,035		$ 9,503,807	
			Subtotal	$ 57,022,842	
13 Contingencies					**$ 15,126,410**
1 Contingency on Infrastructure (Excluding utilities)	30%	$ 45,584,148		$ 13,675,244	
2 Contingency on Utilities	75%	$ 1,934,888		$ 1,451,166	
		Subtotal - Infrastructure			**$ 72,149,252**
14 Vehicles					**$ 9,409,050**
1 Low Floor LRV	-	EA	$ 4,000,000	$ -	
2 Modern Streetcar	3	EA	$ 2,900,000	$ 8,700,000	
E & A	5%			$ 435,000	
Contingency	3%			$ 274,050	
15 Right-of-Way					**$ -**
1 Private Land Acquisition	-	AC	$ 600,000	$ -	
2 Business Relocation	-	EA	$ 300,000	$ -	
3 Residential Relocation	-	EA	$ 150,000	$ -	
4 Easement	-	AC	$ 400,000	$ -	
5 Residential Building Removal	-	EA	$ 20,000	$ -	
6 Other Building Removal	-	EA	$ 40,000	$ -	
			Total		**$ 81,558,302**
			Total Cost per Mile		**38.9 M/Mi**
			Cost per Mile (Without Vehicles)		**34.5 M/Mi**

Ames Transit Feasibility Study
Streetcar - Corridor 2 - Option 1B
Coover/Armory to Downtown Ames
Via North Side of RR and Main St

Order of Magnitude
Estimate Basics

Start Sta	End Sta	Length	
+00	+00	11,032 FT	2.1 mile

Description	Quantity	Unit	Unit Cost	Extension	2006$
1 Guideway					**$ 4,069,960**
1 Site Preparation Allowance	11,032	RF	$ 8	$ 88,256	
2 Subgrade Preparation Including Sub-Ballast	11,032	RF	$ 28	$ 308,896	
3 Unclassified Excavation	-	CY	$ 32	$ -	
4 Common Backfill	-	CY	$ 11	$ -	
5 Final Grading Allowance	11,032	RF	$ 10	$ 110,320	
6 Traffic Control Allowance	11,032	RF	$ 40	$ 441,280	
7 Landscaping Allowance	11,032	RF	$ 28	$ 308,896	
8 Chain Link Fencing	-	LF	$ 20	$ -	
9 Street Closure Allowance	-	EA	$ 50,000	$ -	
10 Intersection Rebuild (2 Lanes)	8	EA	$ 90,000	$ 720,000	
11 Traffic Signal (2 Lanes) / Signal Modifications	9	EA	$ 120,000	$ 1,080,000	
12 Rebuild Residential Driveway	-	EA	$ 6,000	$ -	
13 Intersection Rebuild (4 Lanes)	2	EA	$ 180,000	$ 360,000	
14 Traffic Signal (4 Lanes)	1	EA	$ 200,000	$ 200,000	
15 Construct LRT Under Existing Overpass	-	EA	$ 80,000	$ -	
16 Rebuild Commercial Driveway	-	EA	$ 10,000	$ -	
17 Curb and Gutter Allowance	-	LF	$ 24	$ -	
18 Roadway Construction	-	SF	$ 10	$ -	
19 Sidewalk Construction	-	SF	$ 6	$ -	
20 Ped Crossings	-	EA	$ 50,000	$ -	
21 Drainage Culvert - 60" RCP	-	LF	$ 300	$ -	
22 TPS Building, Foundation and Ground Mat	11,032	RF	$ 25	$ 275,800	
23 OCS Pole Foundations	11,032	RF	$ 16	$ 176,512	
24 Signal and Communications Building	-	RF	$ 18	$ -	
25 Systemwide Ductbank	-	RF	$ 100	$ -	
26 Corrosion Mitigation	-	RF	$ 12	$ -	
27 Minor Street At-Grade Crossing (New Gates and Devices)	-	EA	$ 150,000	$ -	
28 Major Street At-Grade Crossing (New Gates and Devices)	-	EA	$ 250,000	$ -	
29 Fill To Avoid Floodplain	-	CY	$ 20	$ -	
30 Remove Track	-	TF	$ 15	$ -	
31 Shift Track	-	TF	$ 20	$ -	
2 Utility Relocation					**$ 1,930,600**
1 Utility Allowance - High (Urban)	-	RF	$ 670	$ -	
2 Utility Allowance - Medium (Suburban)	-	RF	$ 350	$ -	
3 Utility Allowance - Low (Rural)	11,032	RF	$ 175	$ 1,930,600	
3 Trackwork					**$ 8,163,284**
1 Ballasted Track	-	TF	$ 181	$ -	
2 Ballasted Track w/Ballast Curbs	-	TF	$ 250	$ -	
3 Embedded Track (115 RE)	10,376	TF	$ 350	$ 3,631,600	
4 Direct Fixation Track	11,688	TF	$ 300	$ 3,506,400	
5 Ballasted Freight Track	-	TF	$ 136	$ -	
6 Impact Attenuators	2	EA	$ 142	$ 284	
7 Double Crossover	3	EA	$ 300,000	$ 900,000	
8 Single Crossover	-	EA	$ 175,000	$ -	
9 Turnout	1	EA	$ 125,000	$ 125,000	
4 Structures					**$ 24,989,482**
1 Select Fill for MSE Walls	-	CY	$ 24	$ -	
2 Retaining Walls to 10' High	1,670	SFCA	$ 41	$ 68,470	
3 Retaining Walls to 15' High	1,245	SFCA	$ 52	$ 64,740	
4 Retaining Walls to 20' High	306	SFCA	$ 63	$ 19,272	
5 Aerial LRT Structure - DF	5,844	LF	$ 4,250	$ 24,837,000	
6 Aerial LRT Structure - Ballast	-	LF	$ 4,250	$ -	
7 Aerial Freeway Structure - Reconstruction	-	LF	$ 5,100	$ -	
8 Pedestrian Bridge	-	EA	$ 360,000	$ -	
10 Box Culvert 8' x 5'	-	LF	$ 750	$ -	
5 Stations					**$ 1,050,000**
Station Name:					
1 Platform Electrical Allowance	7	EA	$ 100,000	$ 700,000	
2 Elevated Platform	-	EA	$ 2,500,000	$ -	
3 At-Grade Side Loading Platform	-	EA	$ 1,000,000	$ -	
4 Center Platform	-	EA	$ 300,000	$ -	
5 At-Grade Sidewalk Shared Platform	7	EA	$ 50,000	$ 350,000	
6 Kiss-and-Ride Parking Spaces	-	SPACE	$ 4,000	$ -	
7 Bus Transit Center	-	BUS BAY	$ 120,000	$ -	

Ames Transit Feasibility Study
Streetcar - Corridor 2 - Option 1B
Coover/Armory to Downtown Ames
Via North Side of RR and Main St

Order of Magnitude
Estimate Basics

Start Sta	End Sta	Length	
+00	+00	11,032 FT	2.1 mile

Description	Quantity	Unit	Unit Cost	Extension	2006$
6 Park-and-Ride Lots					**$ -**
1 Structure Parking	-	SPACE	$ 10,000	$ -	
2 Surface Parking	-	SPACE	$ 3,500	$ -	
7 Fare Collection					**$ -**
1 Fare Collection	-	EA	$ 85,000	$ -	
8 Operations Facility Allowance (All Yard Elements Included)				$ -	**$ 1,081,136**
1 Building and Yard Site Preparation	11,032	RF	$ 44	$ 485,408	
2 Operations Facility Building	11,032	RF	$ 54	$ 595,728	
3 Yard Maintenance Equipment	-	RF	$ 40	$ -	
4 Maintenance of Way Vehicles	-	RF	$ 40	$ -	
5 Communications Control Center	-	RF	$ 200	$ -	
				$ -	
9 Traction Power					**$ 3,475,080**
1 OCS Simple Catenary	11,032	RF	$ 200	$ 2,206,400	
2 TPS Substation	11,032	RF	$ 115	$ 1,268,680	
3 Spare Parts	-	RF	$ 55	$ -	
4 Lighting	-	RF	$ 18	$ -	
10 Signal System					**$ -**
1 Train Control - LRT	-	RF	$ 300	$ -	
2 Train Control - Single Track Freight	-	RF	$ 100	$ -	
11 Communications					**$ -**
1 Communications	-	RF	$ 140	$ -	
			Subtotal	$ 44,759,542	**$ 44,759,542**
12 Engineering & Administration					**$ 8,951,908**
1 E & A on Infrastructure	20%	$ 44,759,542		$ 8,951,908	
			Subtotal	$ 53,711,450	
13 Contingencies					**$ 14,296,633**
1 Contingency on Infrastructure (Excluding utilities)	30%	$ 42,828,942		$ 12,848,683	
2 Contingency on Utilities	75%	$ 1,930,600		$ 1,447,950	
		Subtotal - Infrastructure			**$ 68,008,083**
14 Vehicles					**$ 9,409,050**
1 Low Floor LRV	-	EA	$ 4,000,000	$ -	
2 Modern Streetcar	3	EA	$ 2,900,000	$ 8,700,000	
E & A	5%			$ 435,000	
Contingency	3%			$ 274,050	
15 Right-of-Way					**$ -**
1 Private Land Acquisition	-	AC	$ 600,000	$ -	
2 Business Relocation	-	EA	$ 300,000	$ -	
3 Residential Relocation	-	EA	$ 150,000	$ -	
4 Easement	-	AC	$ 400,000	$ -	
5 Residential Building Removal	-	EA	$ 20,000	$ -	
6 Other Building Removal	-	EA	$ 40,000	$ -	
			Total		**$ 77,417,133**
			Total Cost per Mile		**37.05 M/Mi**
			Cost per Mile (Without Vehicles)		**32.55 M/Mi**

EAST-WEST CORRIDOR
Streetcar - Corridor 2 - Option 2
Coover/Armory to Downtown Ames
Via Sixth St

Order of Magnitude
Estimate Basics

	Start Sta	End Sta	Length	
	+00	+00	10,059 FT	1.9 mile

Description	Quantity	Unit	Unit Cost	Extension	2006$
1 Guideway					**$ 4,049,145**
1 Site Preparation Allowance	10,059	RF	$ 8	$ 80,472	
2 Subgrade Preparation Including Sub-Ballast	10,059	RF	$ 28	$ 281,652	
3 Unclassified Excavation	-	CY	$ 32	$ -	
4 Common Backfill	-	CY	$ 11	$ -	
5 Final Grading Allowance	10,059	RF	$ 10	$ 100,590	
6 Traffic Control Allowance	10,059	RF	$ 40	$ 402,360	
7 Landscaping Allowance	10,059	RF	$ 28	$ 281,652	
8 Chain Link Fencing	-	LF	$ 20	$ -	
9 Street Closure Allowance	-	EA	$ 50,000	$ -	
10 Intersection Rebuild (2 Lanes)	5	EA	$ 90,000	$ 450,000	
11 Traffic Signal (2 Lanes) / Signal Modifications	6	EA	$ 120,000	$ 720,000	
12 Rebuild Residential Driveway	-	EA	$ 6,000	$ -	
13 Intersection Rebuild (4 Lanes)	4	EA	$ 180,000	$ 720,000	
14 Traffic Signal (4 Lanes)	3	EA	$ 200,000	$ 600,000	
15 Construct LRT Under Existing Overpass	-	EA	$ 80,000	$ -	
16 Rebuild Commercial Driveway	-	EA	$ 10,000	$ -	
17 Curb and Gutter Allowance	-	LF	$ 24	$ -	
18 Roadway Construction	-	SF	$ 10	$ -	
19 Sidewalk Construction	-	SF	$ 6	$ -	
20 Ped Crossings	-	EA	$ 50,000	$ -	
21 Drainage Culvert - 60" RCP	-	LF	$ 300	$ -	
22 TPS Building, Foundation and Ground Mat	10,059	RF	$ 25	$ 251,475	
23 OCS Pole Foundations	10,059	RF	$ 16	$ 160,944	
24 Signal and Communications Building	-	RF	$ 18	$ -	
25 Systemwide Ductbank	-	RF	$ 100	$ -	
26 Corrosion Mitigation	-	RF	$ 12	$ -	
27 Minor Street At-Grade Crossing (New Gates and Devices)	-	EA	$ 150,000	$ -	
28 Major Street At-Grade Crossing (New Gates and Devices)	-	EA	$ 250,000	$ -	
29 Fill To Avoid Floodplain	-	CY	$ 20	$ -	
30 Remove Track	-	TF	$ 15	$ -	
31 Shift Track	-	TF	$ 20	$ -	
2 Utility Relocation					**$ 1,760,325**
1 Utility Allowance - High (Urban)	-	RF	$ 670	$ -	
2 Utility Allowance - Medium (Suburban)	-	RF	$ 350	$ -	
3 Utility Allowance - Low (Rural)	10,059	RF	$ 175	$ 1,760,325	
3 Trackwork					**$ 7,154,188**
1 Ballasted Track	4,884	TF	$ 181	$ 884,004	
2 Ballasted Track w/Ballast Curbs	-	TF	$ 250	$ -	
3 Embedded Track (115 RE)	13,494	TF	$ 350	$ 4,722,900	
4 Direct Fixation Track	1,740	TF	$ 300	$ 522,000	
5 Ballasted Freight Track	-	TF	$ 136	$ -	
6 Impact Attenuators	2	EA	$ 142	$ 284	
7 Double Crossover	3	EA	$ 300,000	$ 900,000	
8 Single Crossover	-	EA	$ 175,000	$ -	
9 Turnout	1	EA	$ 125,000	$ 125,000	
4 Structures					**$ 3,849,982**
1 Select Fill for MSE Walls	-	CY	$ 24	$ -	
2 Retaining Walls to 10' High	1,670	SFCA	$ 41	$ 68,470	
3 Retaining Walls to 15' High	1,245	SFCA	$ 52	$ 64,740	
4 Retaining Walls to 20' High	306	SFCA	$ 63	$ 19,272	
5 Aerial LRT Structure - DF	870	LF	$ 4,250	$ 3,697,500	
6 Aerial LRT Structure - Ballast	-	LF	$ 4,250	$ -	
7 Aerial Freeway Structure - Reconstruction	-	LF	$ 5,100	$ -	
8 Pedestrian Bridge	-	EA	$ 360,000	$ -	
10 Box Culvert 8' x 5'	-	LF	$ 750	$ -	
5 Stations					**$ 1,200,000**
Station Name:					
1 Platform Electrical Allowance	8	EA	$ 100,000	$ 800,000	
2 Elevated Platform	-	EA	$ 2,500,000	$ -	
3 At-Grade Side Loading Platform	-	EA	$ 1,000,000	$ -	
4 Center Platform	-	EA	$ 300,000	$ -	
5 At-Grade Sidewalk Shared Platform	8	EA	$ 50,000	$ 400,000	
6 Kiss-and-Ride Parking Spaces	-	SPACE	$ 4,000	$ -	
7 Bus Transit Center	-	BUS BAY	$ 120,000	$ -	

EAST-WEST CORRIDOR
Streetcar - Corridor 2 - Option 2
Coover/Armory to Downtown Ames
Via Sixth St

Order of Magnitude
Estimate Basics

Start Sta	End Sta	Length	
+00	+00	10,059 FT	1.9 mile

Description	Quantity	Unit	Unit Cost	Extension	2006$
6 Park-and-Ride Lots					**$ -**
1 Structure Parking	-	SPACE	$ 10,000	$ -	
2 Surface Parking	-	SPACE	$ 3,500	$ -	
7 Fare Collection					**$ -**
1 Fare Collection	-	EA	$ 85,000	$ -	
8 Operations Facility Allowance (All Yard Elements Included)				$ -	**$ 985,782**
1 Building and Yard Site Preparation	10,059	RF	$ 44	$ 442,596	
2 Operations Facility Building	10,059	RF	$ 54	$ 543,186	
3 Yard Maintenance Equipment	-	RF	$ 40	$ -	
4 Maintenance of Way Vehicles	-	RF	$ 40	$ -	
5 Communications Control Center	-	RF	$ 200	$ -	
				$ -	
9 Traction Power					**$ 3,168,585**
1 OCS Simple Catenary	10,059	RF	$ 200	$ 2,011,800	
2 TPS Substation	10,059	RF	$ 115	$ 1,156,785	
3 Spare Parts	-	RF	$ 55	$ -	
4 Lighting	-	RF	$ 18	$ -	
10 Signal System					**$ -**
1 Train Control - LRT	-	RF	$ 300	$ -	
2 Train Control - Single Track Freight	-	RF	$ 100	$ -	
11 Communications					**$ -**
1 Communications	-	RF	$ 140	$ -	
			Subtotal	$ 22,168,007	**$ 22,168,007**
12 Engineering & Administration					**$ 4,433,601**
1 E & A on Infrastructure	20%	$ 22,168,007		$ 4,433,601	
			Subtotal	$ 26,601,608	
13 Contingencies					**$ 7,442,548**
1 Contingency on Infrastructure (Excluding utilities)	30%	$ 20,407,682		$ 6,122,305	
2 Contingency on Utilities	75%	$ 1,760,325		$ 1,320,244	
		Subtotal - Infrastructure			**$ 34,044,156**
14 Vehicles					**$ 9,409,050**
1 Low Floor LRV	-	EA	$ 4,000,000	$ -	
2 Modern Streetcar	3	EA	$ 2,900,000	$ 8,700,000	
E & A	5%			$ 435,000	
Contingency	3%			$ 274,050	
15 Right-of-Way					**$ -**
1 Private Land Acquisition	-	AC	$ 600,000	$ -	
2 Business Relocation	-	EA	$ 300,000	$ -	
3 Residential Relocation	-	EA	$ 150,000	$ -	
4 Easement	-	AC	$ 400,000	$ -	
5 Residential Building Removal	-	EA	$ 20,000	$ -	
6 Other Building Removal	-	EA	$ 40,000	$ -	
			Total		**$ 43,453,206**
				Total Cost per Mile	**22.81 M/Mi**
				Cost per Mile (Without Vehicles)	**17.87 M/Mi**

OPERATING COST ESTIMATES
For
Ames Transit Feasibility Study

BUS, BRT AND STREETCAR ALTERNATIVES

URS

Prepared: **May 29, 2007**

DRAFT
5/29/2007

Table OC-1			
2006 Comparative Operating and Maintenance Costs - All Bus			
Source: 2006 National Transit Database			
Ames Transit Feasibility Study			
Operating Cost Element	**CyRide Ames, IA**		
Total Operating Expenses ($ million)	$	5.42	
Salary, Wages and Benefits ($ million)	$	3.79	
Labor Cost as Percent of Total Operating Cost		70.0%	
Annual Operating Expense - Bus	$	5,295,844	
Annual Vehicle Revenue Hours - Bus		95,258	
Operating Expense per Bus Revenue Hour	**$**	**55.59**	
Annual Bus Revenue Miles		**1,022,237**	
Operating Expense per Bus Revenue Mile	**$**	**5.18**	
Estimated 2007 Operating Expenses			
Total Operating Expense in Year 2007 Dollars	$	5.64	million
rate		**4%**	
projected 2007 cost/rev hour	**$**	**57.82**	
2006-2007 multiplier:		1.04	

Source: URS.

Table OC-2

2007 Estimated Operating Cost - Orange and Green Routes

Ames Transit Feasibility Study

Route	Days of Operation	Hours of Operation[1]	Hours of Operation per Day	Days Operating per Year[6]	Estimated Annual Revenue Hours[2]	Estimated Buses per Day	Operating Cost per Revenue Hour[3]	Estimated Operating Cost
Orange	Weekdays	6:30 AM - 10:30 PM	16	256	15,000	4	$ 57.82	$ 867,000
Green[4]	Weekdays	6:30 AM - 11:30 PM	17	256				
	Saturdays	7:30 AM - 10:30 PM[5]	15	52				
	Sundays	8:30 AM - 11:30 PM[5]	15	52				
Total, Green Route[4]			16	360	3,200	1	$ 57.82	$ 185,000
Red	Weekdays	6:30 AM - 12:30 AM	18	256	1,793			
	Saturdays	7:30 AM - 10:30 PM[5]	15	52	208			
	Sundays	8:45 AM - 11:45 PM[5]	15	52	127			
Total, Red Route[7]			16	360	2,128	1	$ 57.82	$ 123,000

[1] Source: www.cyride.com

[2] Telephone conversation with Tom Davenport on 26 March 2007.

[3] Source: 2006 National Transit Database.

[4] Segment between Downtown Ames and ISU Campus. Approximately 20 percent of Green Route covered by segment between Dowtown Ames and ISU Campus.

[5] Round down to nearest half hour.

[6] Excludes holidays when CyRide is not in operation (Thanksgiving Day, Christmas Day and New Year's Day). 256 as provided by CyRide.

[7] Segment between Downtown Ames and ISU Campus. Approximately 10 percent of Red Route covered by segment between Dowtown Ames and ISU Campus.

Source: URS.

DRAFT

5/29/2007

Table OC-3

2005 Comparative Light Rail and Streetcar Operating Costs

Source: 2005 National Transit Database

Peer City (Agency)	2005 Operating Cost per Revenue Hour	
	LRT	Modern Streetcar
Pittsburgh (Port Authority of Allegheny County)	$ 286.60	
Minneapolis (Metro Transit)	$ 165.22	
Dallas (Dallas Area Rapid Transit)	$ 285.87	
St. Louis (Bi-State METRO)	$ 244.72	
Denver (Regional Transportation District)	$ 125.17	
Boston (Massachusetts Bay Transportantion Authority)	$ 242.57	
Portland (Tri-MET)	$ 266.06	$ 292.21
Tacoma (Sound Transit)		$ 173.41
Peer City Average	$ 230.89	**$ 232.81**
National Average	$ 214.30	N/A

Assumed rate of inflation, 2005 to 2007:	4.0%	
2005 to 2007 multiplier:	1.08	
Estimate 2007 Operating Cost per Revenue Hour:		
LRT	$ 231.79	Based on National Average.
Streetcar	$ 251.81	Based on Peer City Average

Source: URS.

Table OC-4
2007 Estimated Rail Transit Operating Cost
Ames Transit Feasibility Study

Corridor and Technology	Day of Week	Time of Day	Headways (minutes)	Daily Operating Hours[2,3]	Number of Consists[1]	Vehicles per Consist	Number of Vehicles[1]	Daily Revenue Hours	Days Per Year	Annual Vehicle Revenue Hours	Cost Per Revenue Hour[4]	Annual Operating Cost
Corridor 1 - Jack Trice Stadium to ISU Campus												
Streetcar	Weekday	Peak	4	10	5	1	5	50	256	12,800	$ 251.81	$ 3,223,200
	Weekday	Off Peak	20	6	1	1	1	6	256	1,550	$ 251.81	$ 390,300
								Total, Streetcar		**14,350**		**$ 3,613,500**

Corridor and Technology	Day of Week	Time of Day	Headways (minutes)	Daily Operating Hours[2,3]	Number of Consists[1]	Vehicles per Consist	Number of Vehicles[1]	Daily Revenue Hours	Days Per Year	Annual Vehicle Revenue Hours	Cost Per Revenue Hour	Annual Operating Cost
Corridor 2 - Downtown Ames to ISU Campus												
Streetcar	Weekday	Peak	10	6	1	1	1	6	256	1,550	$ 251.81	$ 390,300
	Weekday	Off Peak	20	11	1	1	1	11	256	2,800	$ 251.81	$ 705,100
	Saturday		20	15	1	1	1	15	52	800	$ 251.81	$ 201,400
	Sunday		20	15	1	1	1	15	52	800	$ 251.81	$ 201,400
								Total, Streetcar		**5,950**		**$ 1,498,200**

Notes:
[1] Excludes spare vehicles (1 for LRT and 1 for Streetcar).
[2] Based on average of 10 hours of peak service (approximately 7:30 AM to 5:30 PM) and approximately 4 hours of off-peak service.
[3] Green Route service hours: Weekdays - 6:30 AM to 11:30 PM. Saturday - 7:30 AM to 10:30 PM. Sunday - 8:30 AM to 11:30 PM. Six hours of peak service are assumed.
[4] Source: 2005 National Transit Database. Year 2007 costs obtained by applying 4 percent annual compounded increase to year 2005 costs.

Source: URS.

Table OC-5												
2007 Estimated BRT Operating Cost												
Ames Transit Feasibility Study												
Corridor and Technology	**Day of Week**	**Time of Day**	**Headways (minutes)**	**Daily Operating Hours[2]**	**Number of Consists[1]**	**Vehicles per Consist**	**Number of Vehicles[1]**	**Daily Revenue Hours**	**Days Per Year**	**Annual Vehicle Revenue Hours**	**Cost Per Revenue Hour[3]**	**Annual Operating Cost**
Corridor 1 - Jack Trice Stadium to ISU Campus												
Bus Rapid Transit (BRT)	Weekday	Peak	3	10	2	1	3	30	256	7,700	$ 72.28	$ 556,500
	Weekday	Off Peak	10	6	1	1	1	6	256	1,550	$ 72.28	$ 112,000
									Total, BRT	**9,250**		**$ 668,500**
Notes:												
[1] Excludes spare vehicles (1 BRT for a total of 3).												
[2] Based on average of 10 hours of peak service (approximately 7:30 AM to 5:30 PM) and approximately 4 hours of off-peak service.												
[4] Source: 2005 National Transit Database. Year 2007 costs obtained by applying 4 percent annual compounded increase to year 2005 costs. Includes 25 percent premium for BRT service.												

Source: URS.

Table OC-6

2007 Incremental Change in Operating Cost - Rail Transit Options

Ames Transit Feasibility Study

Route	Annual Operating Cost		
	Bus	Streetcar	Incremental Change (vs. Bus)
Orange (Corridor 1)	$ 867,000	$ 3,613,500	$ 2,746,500
Green[1] (Corridor 2)	$ 185,000	$ 1,498,200	$ 1,190,200
Red[1] (Corridor 2)	$ 123,000	N/A	

[1] Green and Red Routes - Applies to segment between Downtown Ames and ISU Campus.

Table G

2007 Incremental Change in Operating Cost - BRT Option

Ames Transit Feasibility Study

Route	Annual Operating Cost		
	Bus	BRT	Incremental Change (vs. Bus)
Orange (Corridor 1)	$ 867,000	$ 668,500	$ (198,500)

Source: URS.

Table OC-7

2007 Estimated Gross Operating Cost of Alternative Transit Improvements

Ames Transit Feasibility Study

Service Option	Day of Week	Time of Day	Headways (minutes)	Daily Operating Hours	Number of Consists[1]	Vehicles per Consist	Number of Vehicles[1]	Daily Revenue Hours	Days Per Year	Annual Vehicle Revenue Hours	Cost Per Revenue Hour[4]	Annual Operating Cost
Corridor 1												
ii. Add 12 trips to Orange Route	Weekday	All Day	20	4	1	1	1	4	256	1,000	$ 57.82	$ 57,800
iii. Use articulated buses (Orange Route)	Weekday	Peak	3	10	1	1	3	30	256	7,700	$ 72.28	$ 556,500
	Weekday	Off-Peak	10	6	1	1	1	6	256	1,550	$ 72.28	$ 112,000
									Total	9,250		$ 668,500
iv. BRT (see separate worksheet)												$ 668,500
v. Streetcar (see separate worksheet)												$ 3,613,500
Corridor 2												
ii. Streetcar (see separate worksheet)												$ 1,498,200
Corridor 3												
ii. Extend Red Route	Weekday	All Day	30	14	1	1	2	28	256	7,150	$ 57.82	$ 413,400
	Saturday	All Day	30	14	1	1	2	28	52	1,450	$ 57.82	$ 83,800
	Sunday	All Day	30	14	1	1	2	28	52	1,450	$ 57.82	$ 83,800
									Total	10,050		$ 581,000
ii. Extend Blue Route	Weekday	All Day	30	14	1	1	2	28	256	7,150	$ 57.82	$ 413,400
	Saturday	All Day	30	14	1	1	2	28	52	1,450	$ 57.82	$ 83,800
	Sunday	All Day	30	14	1	1	2	28	52	1,450	$ 57.82	$ 83,800
									Total	10,050		$ 581,000
Corridor 4												
ii. Increase frequency of Yellow Route	Weekday	All Day	30	12	1	1	2	24	256	6,150	$ 57.82	$ 355,600
	Saturday	All Day	30	10	1	1	2	20	52	1,050	$ 57.82	$ 60,700
									Total	7,200		$ 416,300
Corridor 5												
ii. Increase frequency of Red Route	Weekday	All Day	10	10	1	1	4	40	256	10,250	$ 57.82	$ 592,700
	Saturday	All Day	30	-	1	1	1	-	52	-	$ 57.82	$ -
	Sunday	All Day	30	-	1	1	1	-	52	-	$ 57.82	$ -
									Total	10,250		$ 592,700
iii. Use articulated buses (Red Route)	Weekday	Peak	30	6	1	1	3	18	256	4,600	$ 72.28	$ 332,500
	Weekday	Peak	30	12	1	1	-	-	52	-	$ 72.28	$ -
	Sunday	All Day	30	-	1	1	2	-	52	-	$ 72.28	$ -
									Total	4,600		$ 332,500
Study Area 1												
ii. Increase frequency of Green Route	Weekday	All Day	30	12	1	1	2	24	256	6,150	$ 57.82	$ 355,600
	Saturday	All Day	30	-	1	1	1	-	52	-	$ 57.82	$ -
	Sunday	All Day	30	-	1	1	1	-	52	-	$ 57.82	$ -
									Total	6,150		$ 355,600
Study Area 2												
ii. Extend Green Route with increased frequency	Weekday	All Day	30	17	1	1	2	34	256	8,700	$ 57.82	$ 503,000
	Saturday	All Day	30	15	1	1	2	30	52	1,550	$ 57.82	$ 89,600
	Sunday	All Day	30	15	1	1	2	30	52	1,550	$ 57.82	$ 89,600
									Total	11,800		$ 682,200
iii. New "Pink" Route	Weekday	All Day	30	17	1	1	2	34	256	8,700	$ 57.82	$ 503,000
	Saturday	All Day	30	15	1	1	2	30	52	1,550	$ 57.82	$ 89,600
	Sunday	All Day	30	15	1	1	2	30	52	1,550	$ 57.82	$ 89,600
									Total	11,800		$ 682,200

Source: URS.

Table OC-8				
Weekday Passengers per Revenue Hour				
Ames Transit Feasibility Study				
Threshold (60 percent of 43.70):	**26.22**			
Alternative	Weekday Ridership	Weekday Revenue Hours	Passengers/ Revenue Hour	Within Threshold?
	Corridor 1			
i. No action	8,510	59	145.23	
ii. Add 12 trips	8,510	63	135.95	
iii. Use articulated buses	8,510	36	236.39	
iv. New BRT service	8,510	36	236.39	
v. New Streetcar service	8,510	56	151.96	
Corridor 2				
i. No action	2,410	35	68.86	
ii. Streetcar	2,410	17	141.76	
	Corridor 3			
i. No action	0	-	--	
ii. Extend Red Route	900	28	32.14	
iii. Extend Blue Route	900	28	32.14	
	Corridor 4			
i. No action	185	8	21.84	No
ii. Increase frequency of Yellow Route	225	32	6.93	No
	Corridor 5			
i. No action	2500	-	--	
ii. Increase frequency of Red Route	2580	40	64.50	
iii. Use articulated buses (Red Route)	2580	18	143.33	
	Study Area 1			
i. No action	140	-	--	
ii. Increase frequency of Green Route	180	24	7.50	No
	Study Area 2			
i. No action	0	-	--	
ii. Extend Green Route with increased frequency	700	34	20.59	No
iii. New "Pink" Route	800	34	23.53	No

Cost of Service Changes AGM.T:\31810249\working\AMANL\Cost of Service Changes AGM
Source: URS.

Table OC-9

2007 Net Change in Annual Operating Cost of Alternative Transit Improvements

Ames Transit Feasibility Study

Service Option	Vehicle Revenue Hours of Option	Gross Operating Cost	Service Being Replaced	Vehicle Revenue Hours of Service Being Replaced	Cost of Existing Service Being Replaced	Net Change in Operating Cost	Net Change in Vehicle Revenue Hours
Corridor 1							
i. No action	-	$ -	None	-	$ -	$ -	-
ii. Add 12 trips	1,000	$ 57,800	None	-	$ -	$ 57,800	1,000
iii. Use articulated buses	9,250	$ 668,500	Existing Orange Route	15,000	$ 867,000	$ (198,500)	(5,750)
iv. New BRT service	9,250	$ 668,500	Existing Orange Route	15,000	$ 867,000	$ (198,500)	(5,750)
v. New Streetcar service	14,350	$ 3,613,500	Existing Orange Route	15,000	$ 867,000	$ 2,746,500	(650)
Corridor 2							
i. No action	-	$ -	None	-	$ -	$ -	-
ii. Streetcar	5,950	$ 1,498,200	Portions of Green and Red Routes	5,328	$ 308,000	$ 1,190,200	622
Corridor 3							
i. No action	-	$ -	None	-	$ -	$ -	-
ii. Extend Red Route	10,050	$ 581,000	None	-	$ -	$ 581,000	10,050
iii. Extend Blue Route	10,050	$ 581,000	None	-	$ -	$ 581,000	10,050
Corridor 4							
i. No action	-	$ -	None	-	$ -	$ -	-
ii. Increase frequency of Yellow Route	7,200	$ 416,300	None	-	$ -	$ 416,300	7,200
Corridor 5							
i. No action	-	$ -	None	-	$ -	$ -	-
ii. Increase frequency of Red Route	10,250	$ 592,700	None	-	$ -	$ 592,700	10,250
iii. Use articulated buses (Red Route)	4,600	$ 332,500	Red Route	7,680	$ 444,058	$ (111,558)	(3,080)
Study Area 1							
i. No action	-	$ -	None	-	$ -	$ -	-
ii. Increase frequency of Green Route	6,150	$ 355,600	None	-	$ -	$ 355,600	6,150
Study Area 2							
i. No action	-	$ -	None	-	$ -	$ -	-
ii. Extend Green Route with increased frequency	11,800	$ 682,200	None	-	$ -	$ 682,200	11,800
iii. New "Pink" Route	11,800	$ 682,200	None	-	$ -	$ 682,200	11,800

Source: URS.

Appendix B

Public Involvement Documentation

Introductions – The following were present at the meeting:

- Sheri Kyras – CyRide
- Shari Atwood – CyRide
- Emily Jensen – GSB
- Damion Pregitzer – City of Ames Traffic Engineer
- Cathy Brown – ISU Planning
- Seana Perkins – City of Ames Planning
- Tom Davenport – CyRide
- Dean Morton – ISU
- Rick Nau – URS
- Bill Troe – URS

Study Overview - Rick Nau presented an overview of the feasibility study through a Powerpoint slide presentation. Key discussion items included in the overview:

- It should be made clear that "selected transit markets" are not segments of the population, but rather are transportation corridors in the community.
- Corridors selected represent origins-destinations reflective of the Dinkey trolley of the early 1900s and anticipated growth/development corridors.
- The city (planning) has recently completed an assessment of growth opportunities/priorities in the northwest and southwest areas of town. The findings of the study are to be presented to the City Council this evening (January 9). Preliminary findings – Northwest area growth is preferred. The study report is available on the city's website. In order to meet the control totals for households and employment included for 2030 in the transportation plan, land encompassing both the northwest and southwest areas would be needed.
- A 50K S.F. addition is planned for the North Grand Mall. A traffic study was completed which city staff will provide to URS.
- SE 16th Street is to be paved this construction season (2007). Following it being paved, the Gray line will be moved from US 30 to SE 16th Street.
- As part of the ridership forecasting process, the development concept in the regional model needs to be examined to identify whether more recent development concepts have been incorporated.
- Rick Nau distributed a questionnaire to committee members and requested that they provide responses to the questions regarding the current transportation system. Members were asked to respond to Shari Atwood within a week.
- Bill Troe provided an overview of the ridership forecasting process to be used in the study. As this element is more focused in scope, it was suggested that a subcommittee of the Advisory Committee be formed to address ridership forecasting issues. Summaries of the action items would be provided to the entire committee at appropriate times. The subcommittee would include Damion Pregitzer and Seana Perkins. Tom Davenport would also be a source of information on more detailed on-off information. Through the discussion it was asked if the forecasting will be taking into account the secondary development impacts associated with transit improvement (assuming they are a recommendation) in a specific corridor. Not likely. A single development concept is anticipated for the analysis.
- Schedule of Meetings:
  - February 21: Advisory Committee (1:30 PM)
  - March 28: Advisory Committee (1:30 PM); GSB (7:00 PM).
  - March 29: Special Board Meeting (8:00 AM); a general student meeting in the late morning/afternoon; Public information meeting (4:30 PM).

- April 11: Advisory Committee (1:30 PM) - Presentation of the findings.

Focus Group Participation – Three focus groups were discussed:

- University: Including students, staff, faculty and administrators.
- Businesses: Retail, industrial, developers and human service providers.
- Residents (Not students)

Committee members should provide to Shari Atwood names of individuals that could be focus group members.

Potential schedule for Focus Group meetings in February:

- February 20: 10:30 AM to Noon – Business Group
- February 20: 3:00 PM to 4:30 PM – University Group
- February 20: 5:30 PM to 7:00 PM – Residents/Riders Group

Existing CyRide Operations – Discussion/presentation resulted in the following:

- Correction to maps/tables - Orange: No longer number 4, now it is 23.
- Annual ridership – the slight decline is most likely associated with enrollment declines observed in the last few years. It is anticipated that the decline will level off, because the current Freshman class is larger than in the last few years and incoming classes are expected to be larger. Current enrollment is approximately 23-24,000 and the target is 26,000. Cathy Brown will provide information on goals for enrollment and growth at the university.

Alternatives – Rick Nau presented ideas of the range of potential technology alternatives from current service enhancements to bus rapid transit (BRT) to trolleys to light rail (LRT) to commuter rail. Commuter rail will not likely be a reasonable application in Ames.

The meeting was ended with the remaining items (FTA New Starts Program) to be covered in February.

TASK LIST FROM 1/9/07 MEETING

1) Complete transportation survey & return to Shari Atwood at CyRide ASAP.
2) City – forward traffic study of North Grand Mall to Shari Atwood to send to URS.
3) Committee members – follow up on Focus Group contacts and provide to Shari Atwood.
4) Cathy Brown – Forward goals for enrollment & growth at ISU to Shari Atwood to provide to URS.

Steering Committee Meeting, 1:30 PM, February 21, 2006

Agenda:

1) FTA New Starts Program
2) Preliminary Focus Group Report
3) Corridor Characteristics
4) Stage 1 Ridership Forecasts
5) Other

1) Rick Nau gave summary of FTA New Starts Program.

2) Rick presented a brief summary of the Focus Group meetings held the previous day.

3) Rick presented a summary of the corridor characteristics from each of the seven corridors / study areas that were being evaluated as a part of the study. Questions and comments that arose during this discussion included:
    - A question was asked about some newer developments (University Plains Apartments specifically) that offer some demand-responsive service to residents via minibus, which might impact some of CyRide's service demand. It pointed out that this was a relatively limited service and might be ended by the apartment complex.
    - Questions / Issues in Corridor 1 (Orange Route – Iowa State Center to Central Campus):
        - What is the utilization of Iowa State Center parking during the average weekday? Estimated to be 1,000 to 1,400 cars. This was counted a few years back, but Campus Parking will need to recount.
        - IF a fixed-route transit alternative were chosen to connect the Iowa State Center to Central Campus and the line were give signal priority at Lincoln Way, there were concerns about vehicle progression / signal timing implications along Lincoln Way.
        - The single most important issue that drives demand in this corridor is parking availability / policy on campus. To effectively forecast ridership demand in this corridor, the study team will need to know the direction of parking availability and policy on campus.
            - Campus Master Plan from a few years ago would eliminate some parking lots for new buildings.
            - Overall, loss on central campus may be in the 200 to 600 stall range. Campus Parking folks to inform study group of "net" planned loss.
            - Intent is to keep parking on campus relatively static.
            - Balance has been achieved over last 15 years between parking availability / CyRide service and campus walkability – overall well-received balance.
            - Parking structures will be contemplated to replace any lost staff/faculty lots.

- Orange route near capacity with current service type – next step would be articulated buses or fixed-guideway system.
- Fee / paid permit system at Iowa State Center is likely to make up parking funding deficit; evaluate GSB funding implications if pay / permiting required. Also consider potential to shift parking to somewhere else if permit fees are too high.

- Questions / Issues in Corridor 2 (downtown to campus):
  - Rick presented a concept that would act as a two-hub system:
    - Fixed-guideway system would connect the two hubs
    - Existing routes would be tweaked to feed each hub
  - There was a concern that riders would not want to transfer. The response is that the system would be set up to have synchronized arrival of "feeder" routes and departure of fixed-guideway connector, so that transfer time was minimal.
  - The ridership potential for this route will be fed by trip growth on the periphery, not by the demand between the two hubs. Ridership forecasts will be refined for this alternative.
- Questions / Issues in Corridor 3 (East 13th / Dayton / Lincoln Way): Is this a viable CyRide route?
  - Tom Davenport said that CyRide studied this several years ago, and estimated that only ¼ of the traffic traveling out to the East 13th Street / Dayton corridor came from Ames, the rest from surrounding region.
  - After the meeting, URS staff reviewed an available Census / Local Employment Dynamics database, with commuting data for 2003. Based on this information, it is estimated that 25-30% of workers in this general area (E 13th Street, Dayton Ave, E Lincoln Way area) come from Ames, the rest from the surrounding area, essentially reinforcing the findings of the earlier CyRide study.
  - Ridership forecasts for this corridor would include forecasts for proposed regional retail center east of I-35 on 13th Street.
- Questions / Issues in Corridor 4 (Yellow Route / South Duff)
  - CyRide looked at front-door service along Yellow Route, but it added too much time to routes to offer at current levels.
  - Consider looking at shared costs among retailers for expanded yellow route service.
  - Parking lots/drives in front of Target, K-Mart not constructed to withstand bus service.
  - Currently low ridership along route.
  - Rick noted that a more transit-friendly development pattern would help increase ridership.
- Questions / Issues in Corridor 5 (Red Route, Purple Route / Mortensen)
  - Future use of large, vacant area owned by ISU in area of Mortensen / State Avenue would impact ridership / service area for Red Route. Currently planned as future Ag Pavillion, 200 students, classrooms and large animal shows in 2,000 seat pavilion mostly frequented by out-of-towners.

- Future extension of Dotson to Mortensen could be incorporated into a Red Route Loop. Dotson might serve as future Collector Street and relieve some Middle School traffic.

- Questions / Issues in Study Area 1 (North Grand Mall)
  - Redevelopment traffic study incorporated into URS ridership forecasts.
- Questions / Issues in Study Area 2 (Northwest Growth Area)
  - Damion to get URS traffic study for development in this area.
  - General assumption is that this would be relatively high-density residential growth (approximately 5 units / acre).

4) Jason presented the ridership forecasts, noting the general approach that was followed included:
   - Developing a person-trip table from the Ames travel model's vehicle trip table, based on estimates of auto occupancy by trip purpose.
   - Incorporating projected trip growth from the Ames travel model.
   - Incorporating CyRide ridership estimates (ons/offs) in each corridor.
   - Where appropriate, applying available studies / ISU development information to adjust model-based trip growth.

   - Tom noted that new Wal-Mart did not appear to be reflected in Yellow 3 district's 2030 trip growth totals. URS to get information on this from Damian and check in with Iowa DOT on model assumptions here.

The next meeting will be held Wednesday, March 28, 2007 at 1:30.

Business Focus Group, 10:30 AM, February 20, 2006

Attendees:

Angela Moore, Downtown Cultural District
Chuck Winkleblack, Hunziker and Associates
Matt Randall, Randall Corporation
Tina Colburn, GeAngelo's Restaurant
Steve Siegel, Cold Stone Creamery
Bob Anders, Ames Chamber/US Bank Campustown

1. **How do you see the city of Ames and surrounding area growing over the next 20 years?**
    - Somerset Area: Mixed-use, student apartments and single-family. Continued growth to north.
    - Mortensen / South Dakota (West Towne) mixed-use growth
    - Continued commercial growth on S. Duff, including upcoming Super Wal-Mart.
    - SE 16th Street area due to Grand Ave extension – hotel cluster.
    - General trends: residential growth on north and west sides, commercial growth on south and east sides.
    - Actual trends do not always fit with City's planning direction / desire.

2. **Where are the transportation deficiencies in Ames? How do they affect the way that your business or agency operates?**
    - Current issues are being addressed, particularly with the extension of Grand Ave.
    - The bus system and trails are good. CyRide is always on time and accommodating to riders.
    - Middle school on Mortensen has morning traffic congestion.
    - Some difficulties with access to / from S. Duff businesses during peak periods.

3. **What are some potential solutions to transportation problems in Ames?**
    - Large employers on East 13th Street (3M, Sauer, etc.) have a large portion of shift-workers from outlying communities. Consider vanpools from neighboring cities such as Nevada and Boone.
    - Evaluate satellite parking shuttles for large events (football & basketball games). Consider K-Mart and North Grand Mall lots.

4. **In your opinion, how have the development and redevelopment efforts affected transportation in Ames?**
    New / redeveloped properties offer plenty of parking and travel times are short, so driving a car is easy in Ames.

5. **How is CyRide received in the community?**
    Positive image mostly, but not used by most group members as not perceived as convenient as auto usage.

6. **Where do you see deficiencies in bus transit service that need to be supplemented?**
    - Tourists are not aware of and are not using CyRide to get around the City, particularly visitors to special events at ISU (Special Olympics, theater workshop, games). Potential to inform tourists of bus offerings by teaming with Visitors Bureau.
    - South Duff service (yellow route) is not frequent enough/stops too early to effectively get customers and workers to / from retail and service businesses in corridor.
    - Re-evaluate the system, as many trips not served by a single route, requiring transfer(s).

7. **Rank where transportation, redevelopment activities, environmental protection and preserving the character of the community fall within the hierarchy of issues affecting Ames.**
   Transportation issues not perceived as most important to business community. Everywhere in town is accessible within 10-15 minutes by automobile. Redevelopment activities are important.

8. **What specific attractions or activity centers in Ames should be served by transit?**
   Schools, shopping districts, downtown, campus or large employment areas.

9. **How do you personally feel about implementing a fixed guideway option in Ames?**
10. **What do you perceive would be the benefits of having a fixed guideway system in Ames?**
11. **What do you perceive would be the detriments of having a fixed guideway system in Ames?**
    - Need to have flexible transit system – fixed guideway is not flexible.
    - CyRide has successfully adapted its system to meet Ames' transit needs.
    - Economically impractical.
    - Consider alternate buses, whether "cute" trolley buses or more fuel-efficient alternatives.

12. **For citizens, businesses and institutions: How do you feel about increasing taxes to fund additional transit projects?**
    Group had issues with tax increases for CyRide, particularly since 90% of riders are students / faculty that are living in tax-exempt housing. If additional services were to benefit wider community, perhaps it would have a chance.

University Focus Group, 3:00 PM, February 20, 2006

Attendees:

Joe Campos, Residence Halls (RCA Area)
Susan Lammers, Residence Halls (Schilletter)
Danny Johnson, Faculty and Transit Committee
Dorothy Pimlott, Staff and Orange Route rider
Vern Hawkins, Faculty
Sue DeBlieck, Council for Sustainability
Frank Feeman, Student (Schilletter)
Steve Lavrenz, Student (Martin Hall)
Erin Hughes, Student (Friley)

1. **How do you see the city of Ames and surrounding area growing over the next 20 years**?
   Identified primary growth areas as:
   - Historically to the west
   - Multi-family housing on South Dakota, single-family housing on North Dakota.
   - Mixed used development to north (Somerset, Northridge, GW Carver towards Gilbert)

2. **Where are the transportation deficiencies in Ames? How do they affect the way that your business or agency operates?**
   - Some congestion around central campus – mostly CyRide issues identified (see #6).
   - Union Pacific RR considering adding a third track through Ames. This would increase delays in crossing tracks.
   - Beach Ave cross-walk one block south of Lincoln Way is dangerous.

3. **What are some potential solutions to transportation problems in Ames?**
   - Educate / inform students about service they are paying for. Make it part of student orientation? Sue DeBlieck worked on this as a student project and has already put some material together – coordinate with Vern Hawkins on this.
   - Improve bus route maps for better way finding (e.g., Buchannan not shown on map.)
   - Improve frequency for some routes to outlying housing areas.
   - Offer individual maps / schedules for each route, but maintain a system-wide map / schedule.
   - Informational kiosks at more transfer areas like City Hall.
   - Consider bike racks on buses and bus shelters.
   - Allow flexible boarding / alighting locations along routes.
   - Recent increase in parking fines reduced illegal parking.

4. **In your opinion, how have the development and redevelopment efforts affected transportation in Ames?**
   - New housing in west Ames, CyRide has adapted and served it effectively.

5. **How is CyRide received in the community?**
    - Positive image; clean and safe buses; moonlight express is good service.
    - Confusing for some students
    - Faculty see some lack of lack of service flexibility to make linked trips beyond home-to-work.

6. **Where do you see deficiencies in bus transit service that need to be supplemented?**
    - Limited service frequency / duration to service / retail developments makes access to part-time jobs difficult for some students.
    - Yellow route service gaps affect shopping / job access.
    - Ada Haden Park has no service.
    - Students ride red route from RCA to dining center, delays trip to west Ames for others. Orange route could serve this instead.
    - Cultural / informational barrier to some students using the bus.
    - No access to Jefferson Lines intercity regional bus service.

7. **Rank where transportation, redevelopment activities, environmental protection and preserving the character of the community fall within the hierarchy of issues affecting Ames.**
    - Ames is relatively small, easy to get around. Transportation is not the most pressing issue in Ames.
    - Parking supply viewed as significant issue by students.

8. **What specific attractions or activity centers in Ames should be served by transit?**
   Jobs and shopping on S. Duff.

9. **How do you personally feel about implementing a fixed guideway option in Ames?**
10. **What do you perceive would be the benefits of having a fixed guideway system in Ames?**
11. **What do you perceive would be the detriments of having a fixed guideway system in Ames?**
    - Flashy economic development tool with limited transportation benefit
    - Campus – downtown connection not perceived as primary travel demand corridor.
    - Limited road widths limit ability to have at-grade light-rail system with transit cars traveling with traffic.
    - Fixed guideway corridors would be within currently developed/University locales and would have limited redevelopment / economic development potential.
    - One benefit of fixed-guideway system would help prepare Ames for assumed future gas price increases – offer alternative transportation source.

13. **For students: How do you feel about increasing student activity fees to fund improvements to CyRide's services?**
    - Some were receptive to increased fees. However, there is a perception that there is already a student fee for everything and that they keep growing every year.
    - Parking fees may be instituted at Iowa State Center to make up for funding gap.

Resident Focus Group, 5:30 PM, February 20, 2006

Attendees:

Mary Kay Steele, Northcrest Retirement Community
Mike Wagner, Marry Greely Dialysis Unit
Heather Babka, Yellow Route Rider
Erv Klass, Ames Smart Growth
Robb Chapman, Blue Route Rider
Karen Anglin, Red Route Rider
Allen Gildehause, Brown Route Rider
Eric Armbrecht, Mainstream Living and Heartland Services
Jean Marie Marsden, Green and Red Route Rider
Karen Shimp, Ames School District

1. **How do you see the city of Ames and surrounding area growing over the next 20 years**?
    - Commercial growth on S. Duff, including upcoming Super Wal-Mart.
    - SE 16th Street
    - Wolford Development / Proposed Retail

2. **Where are the transportation deficiencies in Ames? How do they affect the way that your business or agency operates?**
    - Peak access to / from Ames Middle school difficult with Mortensen traffic.
    - Transit service issues (see #6)

3. **What are some potential solutions to transportation problems in Ames?**
    - Vapools for trips to DesMoines, other parts of Story County.
    - Extend service hours on Yellow Route, extend service to East 13th / Dayton area and eventually to new retail center at 13th / I-35.
    - Identify transit-dependent neighborhoods and offer more service.
    - Market / educate community about CyRide and its benefits.
    - Iowa Medicaid funding for access to medical services on E 13th Street.

4. **In your opinion, how have the development and redevelopment efforts affected transportation in Ames?**
    - Recent developments have made auto travel more appealing / essential.
    - Erv was a proponent of "smart growth" development and provided a Smart Growth info sheet from www.smartgrowth.org/library/printerfriendly.asp?art=2568.

5. **How is CyRide received in the community?**
    - Great, dependable service and friendly drivers
    - Most of wider community not aware of service or its benefits

6. **Where do you see deficiencies in bus transit service that need to be supplemented?**
    - Service not provided at night for school events
    - East 13th Street jobs / medical services not accessible via CyRide
    - CIT/Jefferson Lines station not accessible

7. **Rank where transportation, redevelopment activities, environmental protection and preserving the character of the community fall within the hierarchy of issues affecting Ames.**
    - Traffic issues are minimal in Ames, so transportation community-wide is a low priority.
    - In long-term, as oil prices increase transportation will become larger issue.

8. **What specific attractions or activity centers in Ames should be served by transit?**
    - E 13th Street / Dayton area
    - Increased frequency on S Duff Avenue and SE 16th Street.
    - Connections to outlying communities, specifically Nevada the county seat.

9. **How do you personally feel about implementing a fixed guideway option in Ames?**
10. **What do you perceive would be the benefits of having a fixed guideway system in Ames?**
11. **What do you perceive would be the detriments of having a fixed guideway system in Ames?**
    - Some support for light-rail between Nevada and West Ames, potentially Boone. Provides impetus for development along Lincoln Way corridor, and access to affordable housing in outlying communities.
    - Would support higher-density development, walkable community in-line with "Smart Growth" vision.
    - Others thought buses could serve same role more economically.
    - Ames does not lend itself to a fixed-guideway system, with its small scale and lack of focused pockets of trip attractions.

12. **For citizens, businesses and institutions: How do you feel about increasing taxes to fund additional transit projects?**
    No response.

Recommendations Presentation - Rick Nau presented the recommendations through a Powerpoint slide presentation. Key recommendation elements discussed included:

- Corridor 1 (Iowa State Center to the Main Campus): Recommendation was implementation of the BRT technology concept in the Beach Avenue/Wallace Road/Osborn Drive corridor using articulated buses. The concept would include development of a new maintenance/storage facility.

  Key discussion items associated with the recommended concept were:

  - How will/could the existing maintenance/storage facility be used? This is concern as the Board has voted to invest $2.4 million into building improvements and would not want this investment to be (or perceived as) a "throw away". Supplemental use of the building by the university has been assumed/discussed.
  - Will providing "better" service in the BRT route result in more persons that live on a transit that does not provide the BRT level of service drive to the ISC lot to use the BRT service to get to campus. Thus, resulting in additional vehicle traffic in the ISC area? If there is, it is likely that the traffic operational issues would be minor.
  - A proposal for a bio-renewable fuels building on campus includes a 600-800 stall structure. How might this concept impact the Corridor 1 recommendations? Likely limited, but would require more detail on the structure size and type of user.
  - Would there still be transit service to the Union. Yes, but there would need to be adjustments to the present route structure.

- Corridor 2: The recommendation was to retain the current Red and Green Route service.

  Key discussion items associated with the recommended concept were:

  - Was an analysis of what would need to happen in order to get more people to go downtown on transit completed? No.
  - Was the economic development potential of the areas between downtown and the campus addressed/incorporated in the analysis? Yes, at a cursory level.

- Corridor 3: The recommendation was to provide service to the proposed regional retail center through either a new route along 13th Street or a new route/route extension along east Lincoln Way/Dayton/13th Street. Limited discussion

- Corridor 4: The recommendation was to retain the current service. This recommendation was based on the technical assessment of current, future No Action and future with expanded hours and/or increased service frequency on the route. Expansion of service would not meet the productivity thresholds established as part of the Long Range Transportation Plan process. Input through the focus group suggested the desire for additional hours of service and frequency. CyRide will consider the feasibility of accommodating additional service hours/frequency if revenue hours/miles can be identified.

- Corridor 5: The recommendation was to replace some of the standard bus service with articulated (higher capacity) buses. The service plan would not change relative to today. Use of the higher capacity buses would allow for a reduction in the number of extra (unscheduled) buses put on the route.

- Study Area 1: The recommendation was to retain the current services. Limited discussion took place.

- Study Area 2: The recommendation was following substantial implementation of the current NW Growth Area plan to provide service on either a branch of the present Green Route or provide a new route to/from the NW Growth Area and campus via N. Dakota and Lincoln Way.

Recommendations Presentation - The intent of the meeting presentation is to focus on the study recommendations. Copies of the study report (including the appendices) were distributed to members of the Steering Committee. Rick Nau presented the recommendations through a Powerpoint slide presentation. The presentation was organized to address each of the study corridors and study areas. Key recommendation elements discussed included:

- Corridor 1 (Iowa State Center to the Main Campus): Recommendation was implementation of the BRT technology concept in the Beach Avenue/Wallace Road/Osborn Drive corridor using articulated buses. The concept would include development of a new maintenance/storage facility.

  Key discussion items associated with the recommended concept were:

  - Look at the modifying the BRT route to provide a Union Drive loop that would give access to the south Central Campus buildings (Beardshear Hall, Carver Hall, and the Union). This concept could assessed in an Alternatives Analysis. The focus of this study is whether the BRT concept has merit or not. More specific information regarding elements such as schedules, route alternatives, vehicle specifications, station specifications, etc. would be evaluated if the decision was to move a head with the BRT concept.
  - Is there additional wear and tear on the streets with articulated buses. No.
  - Are the roadway improvements identified in the BRT concept included in the cost estimates? Yes.
  - How many buses/trips would be removed with the BRT concept. It is estimated that about 12 trip would be removed, but the proposed route is out and back on Osborn Drive. Thus, there is two-way Orange Route traffic on Osborn. Presently, the Orange Route travels in one direction on Osborn. Thus, the number of buses passing any one point on Osborn will be about the same (unless the route concept is modified from the one proposed).
  - Can a number of examples of station alternatives be incorporated into the report. Purpose would be to get an idea of what can be provided at a range of costs.
  - Are there adjustments in the regional model application that are needed to conduct an alternatives analysis of the BRT concept in Corridor 1. Not likely, but it should be reviewed.

- Corridor 2: The recommendation was to retain the current Red and Green Route service.

  Key discussion items associated with the recommended concept were:

  - There would need to be a substantial level of redevelopment in the downtown area and adjacent to the downtown and campus in order to support a fixed guideway investment. Presently, there are no plans and there have been no discussions regarding redevelopment.
  - What are generally the limits of the redevelopment extent adjacent to a transit line/guideway? Generally, look at station areas for most intense activity. Are within ¼ mile is direct impact area. The areas within about ½ mile includes the indirect impact area.

- There are likely a number of under utilized parcels in the corridor that "could" be redeveloped at a high density/more intense use. But, the question that would need to be answered is whether there is the need (sustainability) for more development intensity?
- Downtown development - No off-street parking requirements.

- Corridor 3: The recommendation was to provide service to the proposed regional retail center through either a new route along 13th Street or a new route/route extension along east Lincoln Way/Dayton/13th Street. The cost estimates were based on providing service for 14 hours per day, seven days per week. The purpose of providing more hours of service than hours that the mall is open is to allow employees to use transit to get to work before the mall opens and back home after the mall closes.

  Key discussion items associated with the recommended concept were:

  - May not need to provide 14 hours of service on Sunday.
  - If transit is provided in the area, would existing employees in the area benefit and would it open employment opportunities for students. Some, much of the employment in the area includes shift work that would have one end of the trip outside the current hours of CyRide service. The complicates providing sustainable transit.
  - At what stage in the project completion/opening should transit be provided? When the regional center first opens, transit should be in place. If not, many travel preferences would be established without transit in place and getting people to switch to transit may be difficult.
  - Approval of permits for the regional retail center will take about 6 months. Construction would require one to two years.
  - Would removal of the Red Route from Duff north of 13th Street be wise? It would remove service from a fairly dense single-family residential area. Ridership is not real strong compared to other routes, but redirecting the route to the east on 13th Street would create a service gap in north Ames. The cost estimates assume a new route.

- Corridor 4: The recommendation was to retain the current service. This recommendation was based on the technical assessment of current, future No Action and future with expanded hours and/or increased service frequency on the route. Expansion of service would not meet the productivity thresholds established as part of the Long Range Transportation Plan process. Input through the focus group suggested the desire for additional hours of service and frequency. CyRide will consider the feasibility of accommodating additional service hours/frequency if revenue hours/miles can be identified.

  Key discussion items associated with the recommended concept were:

  - Yellow does not currently run on Saturday or Sunday. These are the "free" days in student's schedules and their opportunity to shop, including in the Duff Avenue corridor. Having transit service would be beneficial.
  - Need to figure out where the dollars for providing expanded service will come from.

- Corridor 5: The recommendation was to replace some of the standard bus service with articulated (higher capacity) buses. The service plan would not change relative to today. Use of the higher capacity buses would allow for a reduction in the number of extra (unscheduled) buses put on the route.

Key discussion items associated with the recommended concept were:

- Why not BRT? Ridership does not meet the typical sustainability threshold. Identifying a dedicated guideway would be difficult (no partial dedicated guideway - no federal funding).
- Maintenance facility discussion: Is the current CyRide site "really" landlocked? There is parking on the north side that could be displaced for expansion. This concept was acknowledged, but not positive/negative reaction was provided.

- Study Area 1: The recommendation was to retain the current services. Limited discussion took place.
- Study Area 2: The recommendation was following substantial implementation of the current NW Growth Area plan to provide service on either a branch of the present Green Route or provide a new route to/from the NW Growth Area and campus via N. Dakota and Lincoln Way.
- Maintenance and Storage Facility:
  - The Corridor 5 recommendations included approximately $200,000 for retrofitting the existing maintenance to accommodate articulated buses for service. There is room to store two articulated buses.
  - The current capital improvements plan includes replacement of three 40-foot buses in each of the next four to five years. Can some of these be placed with articulated buses (which could ease the space issue somewhat - would not eliminate the storage space issue). In recent past, "replacement" did not mean one-for-one. Last replacement was to include four buses - only eliminated one.
  - Does it make sense to move forward to acquire articulated buses? Yes. They can benefit both the current Orange and Red Routes. Should purchase two to four, but need to address the storage issues.
  - Heartland Senior Services is in the planning stages for a new transit facility. Brief discussions with CyRide on needs have occurred. Sheri Kyras will be coordinating with Heartland to see if there is an opportunity to share storage/maintenance.
- It was suggested that a chronological listing of the recommendations be prepared and included in the report.
- Include a discussion of two possible implementation strategies for articulated buses:
  - Purchase two articulated buses in near term and retrofit the maintenance facility. Others to follow after decide maintenance/storage needs.
  - Hold off on purchasing articulated buses until the maintenance facility needs and opportunities are clarified. Then purchase articulated buses in coordination with a maintenance facility.

  The pros and cons of these alternatives should be addressed in the report.
- Next steps:
  - Prepare presentations for council and students.

URS

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Description ISU | Computed by | Sheet ____ of ____
1 PM - 2 PM | Checked by | Date 3/29/2007 | Date ____

NAME	ADDRESS	EMAIL	Reference
Dan Hinz	4429 Friley Lincoln	djhinz@iastate.edu	
Tina Salazar	3475 Friley O'Bryan	salazart@	
Barbara Gwiasda	3420 Eisenhower	bgwiasd@iastate.edu	
Bob Anders	1315 Big Bluestem Ct.	bdeanders@fbx.com robert.anders@usbank.com	
Doug Houghton	940 MESA VERDE	dad@iastate.edu.	
Tracy Warner	515 Clark Ave.	twarner@city.ames.ia.us	
John Joiner	"	jjoiner@ "	
Damion Pregitzer	"	dpregitzer@ "	
Shari Atwood		sdatwood@cyride.com	
Dean Morton	200 Gen. Svcs Bldg	admorton@iastate.edu	
Ian Guffy	247 Sheldon #14	ianguffy@iastate.edu	

Comment Sheet

Ames Transit Feasibility Study
March 29, 2007 Public Meeting – Preliminary Recommendations

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Please provide your name and address in the space provided below.

Lawrence Curry 131 N Hyland Ames 50014 292-5303

Name | Address | City, State | Zip | Phone No.

Comments, Ideas, & Concerns

(1) Extend Blue Line to Target front door

(2) Yellow run on Sunday and later in day 7 days a week

(3) Brown route run 7 days/eves to Somerset.

> Continue on the back or attach additional sheets

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Tina Salazar 3475 O Brien Ames, IA 50012 —

Name | Address | City, State | Zip | Phone No.

Comments, Ideas, & Concerns

Wondering if Marching Band Students in Uniform really needs should on game days.

> *Continue on the back or attach additional sheets*

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Name	Address	City, State	Zip	Phone No.
Dan Hinz	4429 Friley Lincoln	Ames, IA	50012	712-621-0139

Comments, Ideas, & Concerns

From a Cyclone Marching Band member point of view, I feel it is obvious that we are students when in our band uniforms. If it could be passed on to employees that we don't need to show our ID's when in our uniforms, I would greatly appreciate it.

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Please provide your name and address in the space provided below.

Barbara Gwiasda 3420 Eisenhower Ames 50010 232-7582

Name Address City, State Zip Phone No.

Comments, Ideas, & Concerns

(1) Brown Route – ~~any~~ any expanded service appreciated

(2) Transportation to the "new" Mall should be a priority. Most international students depend on public transportation. These same students frequent No. Grand Mall and would certainly shop the "new" mall if bus service is provided.

(3) Does Cy Ride do an orientation for Middle School students on the workings / "how to use" Cy Ride?

(4) Offer some free days for riders to try out Cy Ride.

Cy Ride is a wonderful bus system: efficient on time, great customer service, friendly, informed drivers, clean buses. I am retired but when I worked I rode Cy Ride or walked to work. Now I am eligible for reduced (65 & over) rates and I'm trying to use the bus more.

Thank you – keep up the good work.

> Continue on the back or attach additional sheets

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Please provide your name and address in the space provided below.

Bob Anders

Name | Address | City, State | Zip | Phone No.

Comments, Ideas, & Concerns

Ideas for Solutions look Good,
I feel a Strong E⇔W. route extending
to Dayton x 13th should be considered

Also, we should look @ making the
campus a more visible Hub w/ user
friendly Stops/rests, etc.

> *Continue on the back or attach additional sheets*

CyRide Transit Alternatives Feasibility Study

Ames City Hall - 4:30 PM - 7 PM

March 29, 2007

SIGN-IN FORM

NAME	ADDRESS / PHONE NUMBER
Crystal Weltha	604 7th St. Ames, IA 50010 (515) 451-5694
Sarah Linahon	2605 Worle Ln. Ames, IA 50010 (815) 460-0283
Georgie Tsushima	1003 Wilson Ave Ames, IA 50010 (515) 451-6802
Dustin Mull	2515 Woodview Drive Ames, IA (515) 460-6855
Christopher R. Parsons	2804 Arbor Street, Ames, Ia 50014 (515)-292-5431
James Wellhausen	827 Kellogg (515) 232-5329
Eric Foley	512 20th Street (515) 233-5688
Bob Bowne	724 Broadway 233-2232
Martha McIrvin	1203 N 2nd St 451-5870
Holly VArnum	1128 Ash Ave. 515 292-9138
CRAIG WEAS	233 SheldonAve Apt B2 AmesIA50014 515 268-3037
AMBER MARLEY	807 ONYX Ctr AMES 50010 Ph-Day 515-233-1325 ext-1213

Comment Sheet

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Please provide your name and address in the space provided below.

CRAIG WEAS 233 Sheldon AVE APT B2 Ames IA 50014 (515) 268 3037

Name Address City, State Zip Phone No.

Comments, Ideas, & Concerns

(1) Bike racks on bus racks can hold 2 bikes at A time.
There Are A lot of bike riders that would love this.
(2) All day pass or transfer for $2.00. Some people like All day use
(3) Monthly pass is fine but also have A 7 day pass for people who dont take the bus A lot but would like A pass charge $9.00 A week.
(4) Schedule yellow route for Sunday Right now no service on Sunday. I like to shop at K-Mart but have to walk or take a cab.
(5) Bus project had some great ideas. I dont like trolley Servie keep buses and expand service Raise fares if you have too.
(6) Expand service to Central Transit (Greyhound bus Station) There is no Service now and People have to take a cab or get a ride.
(7) Later on Change paper transfers to Card transfers easier to use and no waste. Fare boxes would have to be installed but cost effective.
(8) Schedules printed for public are good but I think you can print smaller for pocket or purse.
(9) Advertise more let the City people know about this bus Service.
(10) Yellow Stop at S. Duff and Airport Road North bound is too close to traffic. Could it be moved to A Safer area?

Continue on the back or attach additional sheets

(over)

(1) Buses Are clean and Drivers are friendly. You offer A great Service keep it up.

(2) Ask more businesses to Sell Your bus pass. Sometimes expand in locations helps finding Your bus pass.

(3) on Your Paper Schedules list places where You can buy passes. It's on Your website but Some people do not have Computers.

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Please provide your name and address in the space provided below.

Holly

Name | Address | City, State | Zip | Phone No.

Comments, Ideas, & Concerns

- #22 – Run service until 7 or 8pm + Weekends + Summer time
- Friendlier drivers – patience, nicer (everyone)
- Watch for problems outside the bus – someone has fallen

> Continue on the back or attach additional sheets

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Please provide your name and address in the space provided below.

James Wetthee	827 Kellogg	Ames IA	50010	232-5329
Name	Address	City, State	Zip	Phone No.

Comments, Ideas, & Concerns

turning radious on the articulated busses is longer than that of the regular busses, That already have some troubles making some of the corners in the inner city.

With the trolly system what would be the setup of how they blend that with the road systems already in place

> *Continue on the back or attach additional sheets*

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Please provide your name and address in the space provided below.

Christopher R. Parsons 2804 Arbor Street, Ames 50014 (515)292-5431

Name | Address | City, State | Zip | Phone No.

Comments, Ideas, & Concerns

I enjoy the idea of the reintruduction of of the dinkey.

DMACC could use a Highschool route & vise virsa,

> Continue on the back or attach additional sheets

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Please provide your name and address in the space provided below.

Name	Address	City, State	Zip	Phone No.
Martha McIrvin	1203 W 2nd St	Ames, IA	50010	451-5870

Comments, Ideas, & Concerns

Corridor 3

It seems to me that it would be more efficient to add a shuttle route from the new mall to downtown, or N Duff, where ~~riders~~ riders can then transfer to Blue, Red, Yellow, or Green. You could add this new route into the current schedule, whereas to take Red or Blue out to the New mall would require a total revamp of all times for all schedules.

> Continue on the back or attach additional sheets

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Please provide your name and address in the space provided below.

AMBER MARKEY, 807 ONYX CIR AMES IA 50010

Name Address City, State Zip Phone No. (Day) 515-233-1325 ext. 1213

Comments, Ideas, & Concerns

Yellow Route ideas:

Corridor 4

1.) Extend hours of service and add Sunday - at least one bus each hour with later service in the evenings.

2.) FIX problem with late transfers to yellow in the afternoon. 2-3 x/wk, +.

priority 1

3.) post schedule changes in the yellow mini-buses Schedule the week before an ISU holiday! Riders have to plan for Alternate transportation when the buses don't reach downtown on yellow route for the first time till 9:00 Am!

4.) Add extra time to yellow route for buckeye loop stops = is tough for bus to turn left back on to S. 16th → Duff.

5.) Would you consider a monthly pass for green disability card riders? I have to buy a monthly pass, & I buy the full fare pass. Something to think about....

priority 2

Corridor 3 — 13th St to proposed mall = Great! Opportunity to expand ridership, businesses will move to this area, drawing more ridership.

Corridor 5 = Yes! would be great as no service at this time

Study area 1 = yes! I use this route a lot, with increased mall stores, more riders.

> Continue on the back or attach additional sheets