

Short-Range Transit Plan

DRAFT ALTERNATIVE ANALYSIS REPORT

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Submitted to:



Merced County Association of Governments

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Introduction

A thorough examination of the Merced County Transit (MCT) system was undertaken. Several alternatives were developed to the existing service design. These alternatives, which hold promise for improving service, will be described below.

Goals and Planning Principles

The service alternatives discussed in this report are designed to achieve the following goals:

- Increase ridership
- Improve productivity
- Improve reliability

In designing alternatives that achieve these goals the following planning principles were followed:

1. Optimize frequency
2. Maximize two way service
3. Maximize directness to key transfer points/destinations
4. Coordinate transfers – pulse where possible or utilize high frequency (15 minutes or less) where market warrants
5. Minimize competition between routes for same customer (1/2 mile spacing)
6. Minimize turns – maximize use of major streets
7. Provide reasonable runtimes to allow for reliability
8. Efficient use of equipment (deadhead and layover kept to the minimum necessary for reliability and movement to/from yard)
9. Simplify routes

Each of these principles will be discussed in greater detail below. However, designing transit service is as much an art as it is a science. Sometimes the principles outlined above are in conflict. Other times factors, often beyond the immediate control of the transit provider, put limitations on what can be done and require choices, sometimes difficult ones, to be made.

1. Optimize Frequency

Typically frequency (how often a bus runs along its route) is the number one improvement requested by transit customers. This was the result in the on board survey conducted in 2000. In 2004 another survey was conducted for the Short Range Transit Plan (SRTP). More riders were surveyed for this survey and it was found that there were more requests for Sunday and evening service than for higher frequency. (Improved frequency on two routes since 2000 may have impacted the results.) Higher frequency, however, was still requested by 35% of the respondents. The importance of frequency is self evident. The more often a bus runs, the more flexibility the customer has. The more frequently a bus runs the shorter time a customer has to wait if they miss a bus. For trips in which the customer has little control over time, such as work shift schedules, daycare pick-up, class schedules or medical appointments; frequency can minimize the amount of time the customer must arrive early or has to wait around afterwards to catch a bus. Trip chaining (where individuals make multiple trips, such as shopping, day care or doing



errands on the way to or from work) is becoming more common and the more frequent the bus service is, the more feasible trip chaining on the transit is possible.

However, there are two constraints on the level of frequency provided. The biggest is money. The more frequent a bus route runs, the higher the operating cost. There are other planning principles (such as directness of service, minimizing competitiveness among bus routes) that can assist in maximizing frequency with limited resources. However, frequency is often Baseline beyond what the market can sustain due to dollars.

The second constraint is the potential market for transit. There are many external factors that influence the potential market. At the core is population density, the number of people residing within the catchment area of the bus route. The more people, the higher frequency that can be justified.

Absent from the planning principles is service span – the hours bus service is provided and the days of the week it is offered. This goes hand and hand with frequency in determining the attractiveness of transit. The longer transit service operates each day the more trips that can be made on transit. With college classes in the evening and many jobs that do not follow traditional 9 AM to 5 PM shifts, a greater service span can increase service utility. Indeed, in the current survey, evening service and Sunday service garnered the highest response for improvements desired. The reason that it was omitted as a planning principle is that it has no bearing on how routes are designed. Any alternative can operate longer (or shorter) hours if resources are available (or reduced).

2. Maximize Two Way Service

Most trips customers make are in both directions. If a rider trip chains they will eventually end the trip where they began it earlier (usually at home). Service should be designed to be as direct in both directions as possible. Currently some routes operate in giant one way loops. As a result, the customer may have a direct trip in one direction but it may take two to three times longer in the other way. For example, a customer who is riding from Station Ave. and Green Sands in Atwater to the Bloss Clinic has a ten minute ride in one direction and a 50 minute ride in the other. A customer traveling from Alexander and Parsons to Merced College can make the trip in 11 minutes in one direction and 49 to 64 minutes in the other. Maximizing two way service eliminates these disparities and improves MCT's attractiveness.

3. Maximize Directness

This goes hand in hand with providing two way service. Since it is impossible to provide a one seat ride to all destinations, service should be direct to the key destinations along a natural path of a route. Major destinations should provide direct links to transfer points so that customers who must transfer can still make the trip in a relatively short time.

4. Coordinate Transfer

In order to minimize the total trip time for a customer, the time a customer must wait between buses when transferring needs to be minimized. When service is provided every 30 or 60 minutes, timed transfers or pulses (where buses arrive at the same time, layover for a few minutes to allow customers to transfer, then leave at strategic locations) are necessary. When buses run every 15 minutes or more often, random meets will usually result in short waits between buses.



5. Minimize Competitiveness between Bus Routes

It has been found that transit customers are normally willing to walk up to ¼ mile to catch a bus. Therefore the ideal spacing between bus routes is ½ mile. In this case, bus routes are not competing for the same customer, which reduces service productivity and sometimes creates confusion. If routes do operate on the same street for a distance of a mile or longer, headways should be staggered so as to improve the service level. For example, if two bus routes that operate every 60 minutes share a route, their headway is staggered so that service is provided every 30 minutes along the common portion of the route. Also, on the approach to transit centers, routes will operate closer together. This should not amount to more than a ¼ mile to ½ mile in length in most cases.

6. Minimize Turns

The more turns a bus makes the slower it operates, the more unpleasant the ride is and the more confusing the route is to comprehend. Direct routes on major streets provide the fastest possible service.

7. Reasonable Runtimes

Bus operations in mixed traffic will never take the exact same amount of time to operate on any given day. There are so many variables that can impact runtimes including construction, rail crossings, accidents, boarding wheel chairs, etc. To maintain reliability, runtimes must be reasonable and based on actual traffic conditions but not excessive resulting in the risk of running early (resulting in customers missing the bus) or running excessively slow to keep from running early (annoying the customers already on the bus). Recovery time to allow for these disparities needs to be built in the schedule.

8. Efficient Use of Equipment

The key to optimizing productivity (making the best use of resources) is equipment utilization. Except for reasonable recovery time (10% to 10% plus five minutes is the desired amount of recovery time per round trip), and the time it takes to get to and from the garage at the beginning and end of the day; each bus should be in continuous service. Any extra layover or deadhead should be avoided. If a bus is not in revenue service carrying customers, it is not being used wisely.

9. Simplify Routes

The more complicated a bus route network is, the more likely customers will not understand how it can serve them. Admittedly some street patterns require making compromises on how routes are designed. However to the extent that that routes are direct, don't compete with each other and each route provides two way service, the route network should be understandable to the public.

The following table summarizes the goals that each planning principle accomplishes.



Table 1 - Planning Principles and Goals Matrix

Planning Principle	Increase Ridership	Improve Productivity	Improve Reliability
Optimize frequency	X		
Maximize two way service	X		
Maximize directness	X	X	X
Coordinate transfers	X	X	
Minimize competitiveness between bus routes		X	
Minimize turns		X	X
Reasonable runtimes			X
Efficient use of equipment		X	
Keep it simple	X	X	X

Route Alternatives - General

Route alternatives are classified as follows. In some instances, such as Merced City and intercity (rural) routes, there are multiple alternatives with variations following in some or all of the following classifications.

Baseline assumes the current number of peak buses and total vehicle hours plus additional buses and hours included in the FY 2004-05 proposed budget or buses and hours needed to meet “unmet transit needs that are reasonable to meet” as determined through the annual Unmet Transit Needs process. The Baseline plan assumes six additional peak buses and 58 additional revenue vehicle hours on weekdays over current levels. These additions are as follows:

- Route 10/10A increased service and extension to Gustine – 2 buses and 21 hours (FY 2004/05 budget)
- Route 17 (Juvenile Center) - 1 bus and 7 hours (Unmet Need)
- Route 7, 8, and 16 Improvements – 3 buses and 30 hours (Unmet Need - anticipated start up in FY 2005-06)

Recommended assumes a modest increase in service over the Baseline alternative. This version includes operating all local routes every 30 minutes in Merced City, extending the operating day by 30 minutes on all Merced City and rural routes and includes some additional linkages in specific Merced City Alternatives. Implementation is dependent on budgetary constraints which will be addressed in greater detail in the SRTP.

UC Merced applies to route extension or new routes designed to serve the campus when it opens. If funding can be obtained from the University or students (to be discussed in greater detail in the SRTP) these extensions can be implemented as soon as the campus opens. UC service expansion is compatible with all alternatives and all classifications of each alternative.

Growth applies to route extensions or new routes serving areas currently undeveloped. Depending on funding (to be discussed in the SRTP) service can be implemented as



soon as streets are open to the public. Some routes or route extensions may be implemented incrementally as roadway segments open. Growth service is compatible with all alternatives and classifications of alternatives.

Issues - Merced City

The alternatives for Merced City are designed to address the following issues which depress ridership, productivity or reliability.

- Several areas of the city are served by routes operating on a one way loop (generally most areas east of G Street). As a result, trips that may take 10 to 15 minutes in one direction will take 45 to 50 minutes in the other.
- Most routes make jogs which increase travel time for most customers using those buses.
- Although most routes serve Merced College, Merced Mall and Wal-Mart (the top three destinations on MCT), the path taken to these destinations is often indirect (due to the two factors mentioned immediately above) resulting in an unattractive service.
- Several routes overlap particularly on G and M Streets. In some cases two routes will serve the same areas at about the same time. For example, two routes serve the East 26th street area on a 60 minute headway, but both buses pass through this neighborhood at about the same time negating any benefit of being served by two routes. Because frequencies are not staggered these overlaps of service can result in competing for the same customer.
- Due to all of the above mentioned factors, the route network can be confusing, which further discourages transit use.
- Although four of the six local routes operate on a semi-30 minute headway, the current route network includes breaks and lunch periods that result in longer gaps in service during certain time periods. On the two routes that operate once an hour (which are also the two routes operating on giant one-way loops), gaps in service exceeding one hour occurs several times during the day, further depressing ridership.
- Some routes utilize narrow streets not suitable for big bus service.
- A large number of turns on many routes increases travel time and can impact reliability.

Route Alternatives – Merced City

To address the issues described above, three alternatives were developed. The Baseline version of each alternative addresses most of these issues throughout the city. The recommended version allows for a modest increase in service which may be affordable (to be addressed in the financial plan of the SRTP) and that further increases ridership and improves productivity. The Recommended version of each addresses all issues and optimizes ridership and productivity. All versions of all iterations provide coverage i.e. a bus route within walking distance of all areas with sufficient population density (at least six dwelling units per acre) to support transit. The alternatives are illustrated on the maps 1 through 12. Key elements of the alternatives are as follows:



- All alternatives include a high frequency (service every 15 minutes) shuttle (designated Route 12) connecting all of the many destinations along the Olive Street corridor between Highway 59 (Wal-Mart) and G street. By providing a high frequency service transit can be more attractive for trip chaining (where an individual will make stops at several different businesses not within walking distance in a commercial corridor), reduce demand for Dial-A-Ride (DAR) service (which includes several of those trip chains), and allow for restructuring other bus routes to operate in a more direct fashion. This will provide direct service to several different destinations instead of overlapping routes.
- An alignment operating through the parking lots of several shopping centers was explored and rejected. To do so would require three buses to operate on a 15 minute headway. The proposed alignment only requires two buses.
- Service on Olivewood, where several medical offices are located, was also explored. Barriers on R and M Street will prevent the crossing of these streets or making left turns which would be necessary. Bus stops established on Olive are in some cases the equivalent of ½ block to Olivewood providing a suitable alternative to operating buses on Olivewood. Also this shuttle would serve senior housing at Alexander and Park replacing existing route 4 and providing service twice as often.
- In all three alternatives, service is provided between Merced College and Merced Transpo via G Street (Route 2), M Street (Route 3) and R Street (Route 4). Each of these routes operates over these streets every 30 minutes and makes no jogs. These north-south corridors are each located ½ mile apart making for perfect spacing between routes. Relying on a single route in each corridor should improve productivity and simplify the route network for easier understanding. Service to various destinations along the Olive corridor will be made by transfer to the Olive Shuttle (Route 12) which will operate every 15 minutes.
- Service will be provided along G, M and R Street south of Transpo as well as every 30 minutes. However, the exact alignment is different in each alternative.
- Service is provided between Merced Transpo and Wal-Mart every 60 minutes via Highway 59 (Route 1). This represents a reduction in service from the current 30 minute service. By staggering headways with Route 7, 30 minute service will be retained along all the corridor except to the Wal-Mart stop. Service to Wal-Mart can be provided by connections to the Olive Shuttle which will operate every 15 minutes.
- The area east of G Street and north of Highway 99 is very difficult to serve due to the lack of any continuous north-south streets. Each alternative takes a different approach to serving this area. In all cases, service is provided in a two way manner (as opposed to the one way service today) and 26th street receives service every 30 minutes.
- Amtrak is served by only one route every 30 minutes. A direct route is provided in both directions to Merced Transpo.
- Likewise, Merced Community Hospital and the adjacent health offices will be served by one local route. However through a combination of route 9 and another local route service will be provided via the most direct route to the Merced Transpo every 30 minutes. In alternative 2, a slightly longer route will provide 30 minute service and Route 9 a 60 minute service.
- The County Department of Human Service will be connected to Merced Transpo by the most direct route possible every 30 minutes instead of the current roundabout routings. Other routes will also serve this office.



- Loughborough between Wal-Mart and Merced Mall will be served by Route 8 every 60 minutes. In alternative 2, Route 1 will complement Route 8 in this corridor, providing service every 30 minutes.
- Wherever service is removed from a street, it is done to reduce turns or jogs in a route or to stop serving narrow streets not suitable for big buses. Many of these jogs were apparently designed to serve specific apartment complexes or neighborhoods. In all cases the walking distance from these concentrations of residents to a bus will be ¼ mile or less (reasonable walking distance).

Alternative 1 – Simplify Routes

Route 1: Connects Wal-Mart with Transpo via Highway 59 and 16th Ave., continuing south to the Dept of Human services via McSwain, Lopes and Sydney. Service will be provided every 60 minutes in the constrained version and every 30 minutes in the recommended version. The recommended version of this alternative extends Route 1 to Merced College via Loughborough, and M street.

Route 2: Connects Merced College with South Merced via R Street. Serving the length of R Street between Yosemite Avenue and Childs Street deviating only to serve Transpo. Service is provided every 30 minutes in all versions.

Route 3: Connects Merced College with South Merced via M Street between the Merced College Campus and Gerard looping back via N Street to the Golden Valley Clinic. The only deviating off of M street is to serve Transpo.

Route 4: Connects Merced College with South Merced via G Street between Yosemite Ave and Gerard. Service along G Street deviates to serve Transpo and via 11th, D Street and Childs to serve a residential area south of G without good pedestrian access to G. Service is provided every 30 minutes in all versions.

Route 5: Connects the Department of Human Services with a direct route to Transpo via Wardrobe, V and 16th Street. It continues serving the area east of G Street operating via both 21st Street and 27th/Glen/26th Street back to M Street where it continues to Merced College. This route will serve Amtrak in both directions. Service is provided every 30 minutes in all versions. Service along M Street in conjunctions with route 3 will be provided every 15 minutes between 26th and Merced College.

Route 11: Connects southeastern Merced (a loop consisting of Childs, Coffee, Gerard and parsons with Transpo via Yosemite Parkway, and 13th Street serving Merced Community Hospital and adjacent medical facilities. This route continues via a short loop R Street, 23rd Street V Street and Main Street. Service is provided every 60 minutes in the baseline alternative, however in conjunction with route 9, service is provided every 30 minutes between Transpo and Yosemite Parkway and Parson via Merced Community Hospital. In the Recommended version serve is every 30 minutes.

Route 12: Connects Wal-Mart with G Street serving the shopping centers, medical offices and other destinations along the Olive corridor. Service is provided every 15 minutes in all versions.

Route 13: serve the northeast sections of Merced City connecting other routes at Merced College and G Street and Alexander. Service is provided in both directions via



Yosemite Avenue, Parsons, El Portal, Cherokee Avenue, Brookdale Drive, Parsons and Alexander. Service is provided every 60 minutes as part of the baseline alternative and every 30 minutes as part of the recommended alternative.

Alternative 2 – Optimum Productivity

Route 1: Service between Wal-Mart and Transpo same as alternative 1. Service is extended from Wal-Mart to Merced College via Loughborough and M Street. Service to McSwain, Sydney and Lopes is provided by route 5. Service is provided every 60 minutes in the baseline alternative and every 30 minutes in the recommended alternative.

Route 2: Service between Merced College and South Merced via R Street is the same as in Alternative 1. Instead of looping at R Street and Childs the route will be extended via Childs to Merced Community Hospital looping via B Street, 13th Street and D Street providing cross town service in South Merced. Service is every 30 minutes in all versions.

Route 3: Service between Merced College and South Merced via M street is that same as in Alternative 1. Service south of Childs will be provided by Route 11. Route 3 will extend to the Department of Human Services via Childs, West and Wardrobe. This alternative provides the most direct route between Transpo and the Golden Valley Clinic. Service is provided every 30 minutes in all versions.

Route 4: Between Merced college and Transpo via G street same as Alternative 1. This route will provide the direct link between Transpo and Department of Human Services via 16th, V and Wardrobe. Service is provided every 30 minutes in all versions.

Route 5: This route connects the Department of Human Services offices to Transpo via Lopes, Sydney and McSwain, continues to Amtrak via Martin Luther King Way, serves 26th/glen/27th to McKee. Operates via McKee Alexander to Parsons where the route splits with alternating trips operating via Parsons and Yosemite Avenue to Merced College and alternating trips operating via Alexander, G Street, Brookdale Drive, Cherokee Avenue, El Portal Drive, Joerg Avenue, Donna Drive and M Street to Merced College. Service is provided every 30 minutes in all versions, except in Northeast Merced where service is provided every 60 minutes on each branch of the route.

Route 6: An extension of Route 2 in the recommended version from Merced community "College back to Transpo and continues to loop via R Street, 23rd street, V Street and Main Street.

Route 11: This route connects the Department of Human Services with South Merced and via Grogan Avenue, West Avenue, Childs Avenue, M Street, Gerard, R Street, and 16th to Transpo. It continues to the east via O Street, 20th Street, M Street, 21st Street, Yosemite Parkway and Parson making a loop via Childs, Coffee, Gerard and Parsons. Service is provided every 30 minutes in south Merced in all versions. Service in East Merced is provided every 60 minutes in the baseline version and 30 minutes in the constrained version.

Route 12: Same as Alternative 1.



Alternative 3 –Maximize Ridership

Route 1: Same as Alternative 1. Service on Grogan provided by route 5.

Route 2: Same as Alternative 1. Turn around loop in south Merced slightly different.

Route 3: Same as Alternative 1.

Route 4: Same as Alternative 1.

Route 5: Same as Alternative 1. Route 5 also serves Grogan.

Route 6: In the recommended version only this route provides cross-town service in South Merced beginning at the Department of Human Services continuing via Wardrobe, V street, 8^h Street, Martin Luther King Way, Childs Avenue, D street, 13th Street, C Street, 15th Street to Transpo.

Route 11: Combines route 11 as in alternative 1 with route 13 as in alternative 1 via a link along R Street, Rambler and Alexander.

Route 12: Same as Alternative 1.



Map #1 - Merced Alternative 1: Baseline Routes



Map #2 - Merced Alternative 1: Baseline Frequency



Map #3 - Merced Alternative 1: Recommended Routes



Map #4 - Merced Alternative 1: Recommended Frequency



Map #5 - Merced Alternative 2: Baseline Routes



Map #6 - Merced Alternative 2: Baseline Frequency



Map #7 - Merced Alternative 2: Recommended Routes



Map #8 - Merced Alternative 2: Recommended Frequency



Map #9 - Merced Alternative 3: Baseline Routes



Map #10 - Merced Alternative 3: Baseline Frequency



Map #11 - Merced Alternative 3: Recommended Routes



Map #12 Merced Alternative 3: Recommended Frequency



Table 2 - Summary of Merced City Alternatives

The table below summarizes the frequency of service for the Baseline version of each alternative. It also compares other differences between the three alternatives.

	Alternative 1	Alternative 2	Alternative 3
Frequency Hwy 59	60 ¹	60 ¹	60 ¹
Frequency R St.	30	30	30
Frequency M St.	30	30	30
Frequency G St.	30	30	30
Frequency 21st	30	60 ²	30
Frequency 26th	30	30	30
Frequency Loughborough	60	30 ³	60
Frequency NE Merced	60	60	60
Frequency Parsons/Coffee Loop	60	60 ²	60
Frequency Olive Corridor	15	15	15
Frequency Sydney/Lopes	60	30	60
Frequency direct between Transpo and Human Services	30	30	30
Frequency direct between Transpo and Community Hospital	30 ⁴	60 ⁵	30 ⁴
Cross-town service south Merced	No	Yes	Recommended Version only
Service on V St. north of Main	Yes	Recommended Version only	Yes
Direct service from NE Merced to Transpo	No	Yes	Yes

The recommended version of all three alternatives assumes 30 minute service on all routes will be provided until the end of service each day and that the service day is extended by 30 minutes.

Route Alternatives – UC Merced and Future North End Growth

Conceptual plans have been developed for serving UC Merced, Merced City as it grows northward, and the Lennar development adjacent to UC Merced (maps 13 through 14)

These concepts are designed to be compatible with all of the alternatives described in this report including both Baseline and Recommended versions. It is recommended

¹ Frequency between Transpo and Hwy 59/Cooper is every 30 minutes by staggering Route 1 and 7 headways.

² In the recommended version service is provided every 30 minutes.

³ Thirty minute service is provided by staggering headways of route 1 and 8.

⁴ Thirty minute service is provided by staggering headways of route 9 and 11.

⁵ The most direct route is served only by route 9 on a 60 minute headway. However Route 2 also serves the hospital every 30 minutes by using a slightly longer route.



that service to UC Merced begin as soon as the college opens and funded through student fees or other financial support from the University. Other growth routes will ideally be initiated as roadway segments open. Methods of funding will be discussed in the financial section of the SRTP.

UC Merced routes could use Yosemite Avenue and Lake Road instead of the routes showed on the map on an interim basis until all street segments needed for the extension are built.

Route Alternatives – Merced County

The intercity or rural routes are well used. After a through evaluation of each route (except for route 10/10A) only minor recommendations are needed. Maps 15 through 18 show the three rural route alternatives (note that only route 10 changes in each alternative) the changes to each route are described below.

Route 7:

This route will be combined with existing Route 6 to provide a single route between Merced and Turlock. Utilizing the additional bus identified in the Unmet Needs Hearings, will be provide service once every hour between Merced and Winton (a doubling of service) and once every two hours between Winton and Turlock (approximately the same level of service).

Recommended changes to Route 7 include streamlining the route in Winton to operate via Santa Fe, Central and Walnut to provide a faster trip for through riders. Increased service on Route 8 will compensate for the service not provided on Myrtle and Jones.

In Livingston the route will operate in both directions via Main, I, Prusso, B and Winton Parkway to maximize coverage, minimize overlap between the old Route 6 and 7 and provide for the most direct routing without giving up coverage.

In Hilmar it is recommended that service be removed from Falke and instated on Bloss. Although this removes the stop at the park and community center it will only be a one block walk to the bus stop on Bloss. At the time of field reconnaissance there was considerable delay at the unsignalized intersection of Falke and Highway 165 which would not occur at the signalized intersection at Bloss.

Combining Route 7 and 8 into a single route operating every 30 minutes was explored and not recommended for the following reasons. If all buses were routed to Transpo direct service to Wal Mart, Merced Mall and Merced College would lost. The transfer would involve out of direction travel. Conversely, routing all buses to the above three destinations would eliminate connections to greyhound and other rural route in Merced and increase travel time for anyone going to south Merced. Between Highway 59 and Franklin utilizing Santa Fe as Route 8 does would provide a speedy intercity service but deprive major employment areas and several residential areas of all service. Utilizing Route 7 alignment which serves these areas would considerably slow down route 8. Standardizing the routing in Atwater and Winton to operate every 30 minutes is a possibility, utilizing the Route 7 alignment in Atwater is illustrated in alternative 2 of Atwater local service.



Map #13 - UC Merced and Growth Routes Merced County



Map #14 - Lennar and UC Merced Routes Merced County



Map #15 - Rural Intercity Routes Operating within Merced



Map 16 - Rural Intercity Routes Alternative1



Map 17 - Rural Intercity Routes Alternative 2



Map 18 - Rural Intercity Routes Alternative 3



Route 8:

Utilizing the additional bus identified in the Unmet Needs process, service will be improved to every 60 minutes. The loop serving Winton will be expanded to replace Route 16 (see Atwater local service for details).

Route 9:

The following modifications are proposed for this route.

In Merced, service will be provided to Merced Community Hospital in both directions via 13th Street so that customers do not have to travel through Transpo. This will also serve as a direct local link between the two points.

In Planada the area south of the railroad track will be served by a different alignment that provides an end to one way service and provides a faster route that also better penetrates the neighborhoods.

In Le Grand the route is also modified to provide two way service and better penetration without increasing travel time.

Through interlining buses with either Route 7 or 10 at the Merced Transpo service, service can be provided every 60 minutes instead of 90 to 120 minutes without increasing the number of vehicles needed to provide service. This route serves areas with high residential density and low income households therefore improving the frequency is warranted.

Route 10:

Utilizing two additional buses and additional hours included in the proposed FY 2004-05 budget, service will be increased from two round trips per day on each route to all day service operating every 60 minutes. It is recommended that the route be simplified in Dos Palos to serve the most heavily populated areas and rely on DAR to feed this route from areas not served by the revised route. The revised route reduces the travel time between Merced and Los Banos.

In Los Banos the route will be modified to provide local service connecting the key destinations including Merced College (Los Banos campus), K-Mart, downtown, Memorial Hospital and Wal-Mart.

Three alternatives are presented for extending this route to Santa Nella and Gustine – both currently without fixed route bus service.

Alternative #1 extends the route to Santa Nella and Gustine continuing on to Hilmar and Turlock. Service on this extension will be every two hours.

Alternative #2 extends the service to Santa Nella and Gustine continuing on back to Merced. Service on this extension will be every two hours.

Alternative #3 extends the route to Santa Nella and Gustine terminating in Gustine. Service is provided every 60 minutes.

Each alternatives has its benefits. Alternative 3 provides more frequent service to Gustine while the other two alternatives provide direct regional linkages.



Route 17:

Utilizing an additional bus resulting from a previous year's Unmet Needs Finding, this new route connects Merced Transpo with the new juvenile court complex.

Route Alternatives – Los Banos

Local service in Los Banos is the least productive of all MCT fixed routes. Service operates via a one way loop requiring an hour to complete. Therefore most roundtrips are one hour while these round trips can be done in 10 to 20 minutes or less via auto.

Two local routes providing two way service are proposed.

Route 14 would duplicate the proposed alignment of Route 10, providing combined service every 30 minutes in both directions between Merced College and Wal-Mart. The combined service will also serve the older parts of town and all other major traffic generators. Sufficient time exists in the schedule for this bus to loop back to Wal-Mart to serve the southern part of the city, either the area currently served by the existing Route 14 (also the least productive portion of route 14) or when other roads in south Los Banos are built via a totally new alignment serving new development.

Route 15 will serve the northwest area of Los Banos which is heavily populated via a 12 minute loop that will connect with route 10 and 14 in Downtown for access to Wal-Mart and the Hospital and a faster route to Merced College. The route would extend to the east along San Luis Road then loop back to Kmart and Merced College. Service initially would be every 60 minutes but service would be more direct and provided in both directions.

Ultimately another route could serve the northeastern area of the city which is undergoing tremendous growth via a yet to be determined alignment.

Maps 19 and 20 illustrate these proposals.

Route Alternatives – Atwater/Winton

As with Los Banos, the local route in Atwater is a giant one way loop that is a 60 minute round trip when riding the bus, while the same trip would take only 1/3 of that time or less by car. Utilizing the extra bus resulting from the Unmet Need Findings, Route 16 would operate as a two way loop. It would no longer serve Winton, replaced by more frequent service on both Routes 7 and 8. The buses could also make a shorter loop, (Route 18) providing service every 30 minutes on the portion of the loop serving the central core of Atwater and adding service to Shafer Road.

A second alternative has Routes 7 and 8 following a uniform route through Atwater providing service every 30 minutes with a modified short loop to compensate for the change in route 8. Maps 21 through 24 illustrate these proposals.



Map 19 - Los Banos Proposed Routes



Map 20 - Los Banos Proposed Frequency



Map 21 - Alternative 1: Atwater Proposed Routes



Map 22 - Alternative 1: Atwater Proposed Frequency



Map 23 - Alternative 2: Atwater Proposed Routes



Map 24 - Alternative 2: Atwater Proposed Frequency



Capital, Financial and Ridership Implications

The following table summarizes the additional buses and annual hours needed to implement each version of each alternate. Service in effect at the beginning of March 2004 is used as the base for both peak buses and annual hours. Assumptions are described below the table.

Table 3 - Summary of Increased Peak Vehicle Requirements, Increased Operating Hours, Ridership and Productivity

	Baseline				Recommended			
	Peak buses	Annual Hours	Estimated Weekday Ridership	Estimated Productivity (Boardings per Vehicle Hour)	Peak buses	Annual Hours	Estimated Annual Ridership	Estimated Productivity (Boardings per Vehicle Hour)
Existing Merced City Routes	NC	NC	1,500	13	2	9,300	1,750	11.5
Merced City Alternative 1 Simplified Route	NC	NC	1,800	15.7	3	15,400	2,400	13.6
Merced City Alternative 2 Maximize Productivity	NC	NC	1,700	14.8	2	12,600	2,500	15.1
Merced City Alternative 3 Maximize Ridership	NC	NC	1,900	16.5	3	15,400	2,600	14.8
Rural Alternative 1 Gustine - Turlock	5	12,600	1,400	14.3	NC	2,520	1,550	14.4
Rural Alternative 2 Gustine - Merced	5	12,600	1,350	13.8	NC	2,520	1,500	13.9
Rural Alternative 3 Gustine Hourly	5	12,600	1,250	12.8	NC	2,520	1,400	13
Los Banos Local Service	NC	NC	200	10	3	10,320	800	13.1



Atwater Local Service Alternative 1	1	3,024	250	11.4	NC	NC	250	11.4
Atwater Local Service Alternative 2	1	3,024	250	11.4	NC	NC	250	11.4

NC: No change

The Baseline column assumes the current number of peak buses and total vehicle hours plus additional buses and hours included in the FY 2004-05 proposed budget or buses and hours needed to meet “unmet transit needs that are reasonable to meet” as determined through the annual Unmet Transit Needs process. The Baseline plan assumes six additional peak buses and 58 additional revenue vehicle hours on weekdays over current levels. These additions are as follows:

- Route 10/10A increased service and extension to Gustine – 2 buses and 21 hours (FY 2004/05 budget)
- Route 17 (Juvenile Center) - 1 bus and 7 hours (Unmet Need)
- Route 7, 8, and 16 Improvements – 3 buses and 30 hours (Unmet Need - anticipated start up in FY 2005-06)

The Recommended column assumes a modest increase in service over the Baseline alternative. This version includes operating all local routes every 30 minutes in Merced City, extending the operating day by 30 minutes on all Merced City and rural routes and includes some additional linkages in specific Merced City Alternatives. Implementation is dependent on budgetary constraints which will be addressed in greater detail in the SRTP.

Table 4 - UC and North End Growth

UC Merced		Growth	
Peak buses	Annual Hours	Peak buses	Annual Hours
5	27,300	7	24,808
5	27,300	7	24,808
5	27,300	7	24,808

UC Merced assumes a longer service day (16 hours per weekday and 12 hours per Saturday) and also 12 hours on Sunday.

Growth assumes the recommended service day of the new routes or route extensions.



If maintenance practices change by adding a second and possibly third shift allowing the spare ratio to be reduced to the industry standard of 20%, the additional buses needed for the Baseline and recommended plans can be fulfilled with existing equipment.

Merced College Transit Center

Currently Merced College is located at the north end of development in the City of Merced. Although it is the number one destination on the MCT and most local routes serve it directly in both the existing network and in the alternatives described above, a location at the periphery of a service area does not make for an attractive transfer location, since most customers will have to make out of direction travel.

However as the city grows northward, Merced College will ultimately be located in the geographic center of the city. As a result Merced College will become the ideal location for the prime transit hub. In addition to being a top destination in itself, Merced College also has sufficient space that can be developed into a transit hub. It appears the landscaped barrier along M street can be designed to provide a large enough transit center without removing parking.

Scheduling Implications

Currently schedules have gaps in service every two hours to account for driver breaks and meal breaks. The routes in all alternatives are designed to have a short break at the end of each trip to allow for recovery in case of unscheduled delays and provide the driver an opportunity to use the rest room or stretch. Service would be provided on a consistent 30 60 or 120 minute frequency throughout the day. Meal breaks can be accommodated through cascading run assignments that do not require shutting a bus down.

Ideally all buses would pulse (arrive at the same time, layover to accommodate transfers, then leave) at Transpo. Due to space limitations this is impossible. Under these alternatives a rolling pulse is used where southbound buses pulse at the same time followed closely by northbound buses. Timed connections are also scheduled in Atwater and Los Banos. Where routes overlap, schedules are designed to provide double the frequency – in other words if two bus routes are operating every 60 minutes, the service on the combined section is every 30 minutes.

Fare Policy Implications

All of the alternatives assume that rural (intercity) routes will also accommodate local trips within the cities they serve. The current fare structure as described in MCT materials is inconsistent on the fare charged. For example local rides within Winton and Atwater or within Merced on routes 7 or 8 are \$2. Local rides within a given city on routes 9 and 10 are \$1, the same fare as local routes. The latter policy should apply to all routes at all time. The unincorporated area west of Franklin on route 7 should be treated as a local fare for trips into Merced as these trips are a comparable distance to most local trips within the city limits.

Suggestions on where to draw fare zone boundaries, better explain fare policy to the customer and enforce fare policy on routes with multiple fares will be discussed in greater detail in the SRTP.



Dial-A-Ride Implications

The national average productivity for Dial-A-Ride (DAR) operations is 2.8 passengers per revenue vehicle hour. However different characteristics among paratransit systems can cause great variation. For example rural or intercity systems with long average trip lengths can never achieve that level of productivity unless there are a significant number of riders traveling between two general areas at the same time filling up the vehicle. On the other hand local systems operating in a compact area with short average trip lengths can exceed the national average number with efficient scheduling.

MCT's contract with MV Transportation includes scheduling and dispatching DAR. MV has been operating DAR systems for several decades and can provide management support to improve DAR productivity in the City of Merced where productivity should exceed the national average due to the compact nature of the city and short average trip lengths. With improved productivity two vehicles can be diverted from DAR service to fixed route service to initiate a frequent service connecting commercial areas along the Olive corridor (new route 12 in all alternatives).

There are two other changes in DAR service structure that will allow for redesigning bus routes to increase ridership and improve productivity.

In Dos Palos the fixed bus route (10) has been streamlined to serve the largest concentrations of population and to speed up the overall route. With increased frequency and all day service, DAR in Dos Palos should be reoriented to serve those areas of Dos Palos and South Dos Palos no longer served by fixed route service and providing a connection to route 10 buses for trips to Los Banos or Merced.

In Los Banos, DAR service should be open to the general public to provide service in neighborhoods losing fixed route service as well as new neighborhoods until fixed route service can be justified. With improvements in scheduling and dispatching opening up DAR to the general public should not result in the need for additional vehicles or service hours.

Employer Based Transportation Implications

MCT has embarked on a bold Employer Based Transportation (EBT) Program that entails designing custom routes to serve major employers. A trial program is underway at Merced College. It is too early to determine how successful this program will be in terms of employers participating and employees joining the program. It does have the potential to attract individuals to transit to use it for commuting to and from work that currently do not.

The Merced College program is operating in addition to existing transit services. As the EBT program grows it is envisioned to replace existing fixed routes service between 7 AM and 9 AM and 4 PM and 6 PM. This presents a dilemma. If demand for the EBT program exists it will likely serve new transit customers and open up employment opportunities for individuals who may not be able to access the served worksites. Both are desirable goals. However by eliminating existing fixed routes service many existing customers will lose service and be forced to stop using MCT services.



The On-board survey conducted as part of this SRTP illustrated that transit customers using MCT to access work are employed at numerous different businesses throughout the City including many small businesses that would not likely be part of the EBT either because they have too few employees or shifts are staggered throughout the day. Limiting service to 9 to 4 PM would preclude most of these customers from using MCT because either their shift would start or end outside of this time frame.

The lower ridership during traditional peak travel times could be the result of service design issues, particularly in the afternoon that this plan seeks to address. The long one way travel times on some bus routes and the infrequency after 3:30 PM (when bus routes that operate every 30 minutes begin operating every 60 minutes) could be discouraging transit use. The top request for additional service on the on-board survey was later service and interviews with riders (the interviews were random and don't constitute a scientific sampling) also indicated that service ended too early for them to use transit to access work. For those individuals without a car they would need to get a ride with someone else to get to or from work.

In the long term, as UC Merced grows, night service will become imperative (and possibly funded through UC Merced student fees). In the short term maintaining 30 minute headways until the end of the service day and extending service just 30 to 60 minutes later may result in significant increasing ridership during the traditional peak periods. In designing changes to the route system that will shorten overall trips it will make conventional fixed route transit service more attractive.

Where this leaves the EBT program is a matter of debate. As stated above it has the potential to serve completely different customer base than could be attracted by the existing fixed route systems even with the improvements recommended.