

**Texas City
Independent School District**

TRANSPORTATION REVIEW

**Conducted by
Management Partnership Services, Inc.
for the
Legislative Budget Board**

MARCH 2009



LEGISLATIVE BUDGET BOARD

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March 27, 2009

Dr. Bob Brundrett
Superintendent
Texas City Independent School District

Dear Dr. Brundrett:

The attached report reviews the management and performance of the Texas City Independent School District's (TCISD) transportation operations.

The report's recommendations will help TCISD improve its overall performance as it provides transportation services to district students. The report also highlights model practices and programs being provided by TCISD's transportation program.

The Legislative Budget Board engaged Management Partnership Services, Inc. to conduct and produce this review, with LBB staff working in a contract oversight role.

The report is available on the LBB website at <http://www.lbb.state.tx.us>.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "John O'Brien", written over the typed name.

John O'Brien
Director
Legislative Budget Board

cc: David Moss
JoAnn Hackbarth
Melba Anderson
Manuel Guajardo, Jr.
Ginger Bond
Phil Roberts
Hal Biery

EXECUTIVE SUMMARY

OVERALL ASSESSMENT

Transportation services in the Texas City Independent School District (TCISD) are provided in a cost-effective manner by a qualified staff of professionals committed to providing safe and effective services. These services are provided to 1,714 students, or 29 percent of the enrolled population using 31 active route buses at an overall annual cost of \$853,949 or \$498 per transported student. The provision of transportation services is adversely impacted, however, by the existing bell time schedule. This schedule limits the ability of the department to effectively use existing seating capacity on all buses, and dampens service quality by forcing the early arrival of buses at school and late departures in the afternoon due to logistical constraints on the time allowed for completing individual bus runs. Adjustments to basic structural elements of the transportation program, coupled with the skills and expertise of the transportation staff would allow for additional reductions in transportation costs.

The department is organized into two main divisions. The first, "Transportation Operations," is responsible for the day-to-day delivery of transportation services to the student population, and includes the majority of department staff. The second, "Fleet Management," is responsible for the upkeep and maintenance of the bus fleet plus all other vehicles and motorized equipment owned by the district. Each of these two divisions is headed by a supervisory/management position that reports to the director of physical services and transportation. This report is organized based on these two divisions.

ACCOMPLISHMENTS

- **TCISD's pool of relief drivers is an innovative approach to driver management that has helped with driver retention and overtime management.** TCISD has established a pool of relief drivers who serve a multitude of roles including basic administration, substitute driver or aide, and driver for special trips such as extracurricular trips and field trips. This has allowed the district to minimize overtime costs and retain drivers who are an asset to the transportation department. This approach is innovative and is designed to address historical issues associated with driver retention.

- **The transportation and fleet maintenance staffing balance is appropriate for an organization the size and scope of TCISD.** The staff are knowledgeable and professional, and supervisors have appropriate spans of control. These characteristics have contributed to the overall cost-effectiveness and efficiency of the operation.

MAJOR FINDINGS

- **The district's school bell time structure adversely impacts service quality, and prevents additional reductions in transportation costs.** Current schedules allow for 20 to 30 minutes between bus runs. This does not allow for effective use of available seating capacity, and results in early arrivals and late departures from second and third tier schools.
- **The district retains a significant number of spare vehicles which exceeds the typical percentage maintained in the industry.** The continued retention of multiple spare wheelchair buses that provide limited operational flexibility should be reconsidered. Opportunities for shared or regional service delivery to address increased demand may be more cost effective than maintaining an artificially high number of spare assets.

MAJOR RECOMMENDATIONS

- **Establish an annual route review process inclusive of a bell time analysis that evaluates the use of available seating capacity.** The goal of the route review should be to determine what changes to the bell time structure would be necessary to increase the use of available capacity, to reduce the number of early arrivals and late departures, and to reduce the number of buses required by the system.
- **Conduct an analysis of the size of the fleet to determine the validity of maintaining the current ratio of spare to active vehicles.** Given that many of the spare buses are used for athletic events, some increase over the industry standard of 10 to 20 percent spare ratio would be expected. However, the current 65 percent spare ratio is high.

TRANSPORTATION OPERATIONS

ORGANIZATION AND STAFFING

The Texas City Independent School District (TCISD) provides home-to-school transportation to approximately 1,714 of the district's 5,899 enrolled students. It provides these services using a district-owned and operated bus fleet comprised of 31 active route buses, plus 23 spare and activity buses.

The director of physical services and transportation oversees all TCISD maintenance operations, including grounds, facilities maintenance, and utilities and transportation services. The transportation coordinator, who reports directly to the director, manages daily operations with the assistance of a dispatcher and payroll clerk. There are 21 regular route drivers, 7 special education drivers, 7 bus aides, 7 relief drivers, 1 relief aide, and 6 headstart drivers. The shop foreman oversees school bus repair and maintenance with the assistance of one mechanic and one mechanic helper. **Figure 1** describes the overall organization of the department.

The director of physical services and transportation, transportation coordinator, and shop foreman bring experience and expertise to the district's transportation department. Effective management skills and student

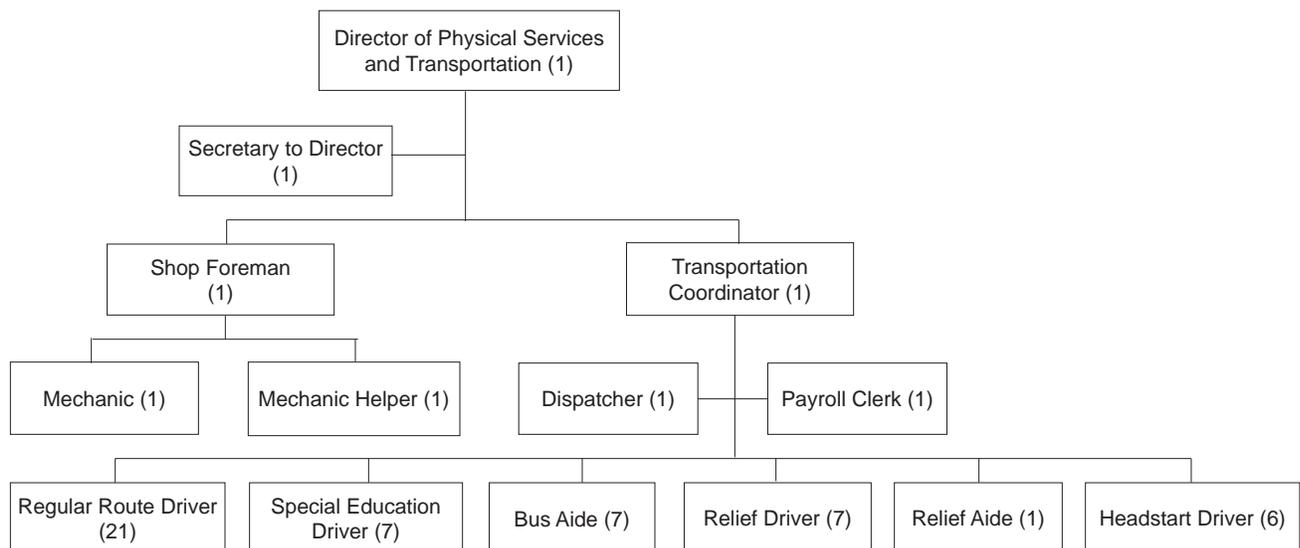
transportation expertise promote a positive work environment and efficient student transportation operation.

ADMINISTRATIVE STAFFING AND WORK DISTRIBUTION

The management and administrative functioning of the department is organized with knowledgeable and professional staff. The ratio of administrative personnel to route buses provides sufficient staffing at a reasonable cost. A description and assessment of each administrative position in this division follows:

Director of Physical Services and Transportation – This position is responsible for personnel issues, parent complaints, and meets daily with the transportation coordinator to address any concerns. The director also serves in a leadership role during monthly safety meetings by setting training goals and conducting actual training. The director, who is also responsible for obtaining bids on and making purchases of new school buses, sets the transportation budget. The director successfully manages transportation safety issues and budgetary items and is working to improve his knowledge through training classes and state conferences. It is important for the director to understand all aspects of the transportation department should there be a change in administration.

FIGURE 1
DEPARTMENT ORGANIZATION, SCHOOL YEAR 2007–08



SOURCE: TCISD physical services and transportation department.

Transportation Coordinator – This position is responsible for interviewing and hiring drivers, managing daily transportation operations, and completing state reports. The transportation coordinator also processes bus write-ups, collects write-up slips from drivers, and submits the write-ups to the school vice principals after recording them. Furthermore, the coordinator is responsible for reviewing bus routes and making updates as necessary. The transportation coordinator brings experience and expertise to the position and meets with the director to set the budget and policies for the department. The transportation coordinator is also responsible for reviewing and revising bus routes on an as-needed basis.

Dispatcher and Payroll Clerk – The duties of the dispatcher and the payroll clerk are shared by two staff. These positions are responsible for answering calls from parents and schools and filling empty routes if a regular route driver is absent. Relief drivers are available to fill empty routes, but if all relief drivers are assigned to a route or special trip, the dispatcher may drive. In addition to driving when regular route drivers are absent, the dispatcher tallies driver hours and submits payroll requests to the business office for processing. These positions also process paperwork for hiring employees and assist with benefit issues for the drivers. The dispatcher and the payroll clerk are knowledgeable about all aspects of the day-to-day student transportation program. These positions play an integral role in the administration of the transportation department and provide support to bus personnel.

ASSESSMENT OF DRIVERS AND OTHER BUS PERSONNEL

TCISD has experienced high turnover rates in recent years due to the recruitment of drivers by a local oil refinery. The loss was primarily attributed to considerable difference in wage rates between the refinery and the district. The district offers benefits, such as medical and life insurance, and has increased wages to compete with the oil refinery, but continues to experience high turnover rates. A considerable amount of time and energy is expended by administration recruiting, interviewing, and training new drivers. Furthermore, additional costs are incurred as the district pays for Commercial Drivers License (CDLs) and tuberculosis (TB) tests for new drivers. High turnover rates have minimally impacted the fiscal efficiency and administrative effectiveness of the operation, as the experience and expertise of management has allowed the department to deal with this issue in a resourceful manner. Continued efforts to attract and retain high-quality drivers are a priority for the department.

TCISD has implemented a unique seniority based system that employs the most senior drivers as relief drivers or relief aides. These employees are guaranteed six hours per day and are used in the following capacities: first line substitute driver, field trips driver, extracurricular trips and athletic events driver, lounge maintenance, and other tasks as requested by the transportation administrative staff. Relief drivers and relief aides are trained in all aspects of student management, including the needs of special education students. This practice, while unique in its approach, ensures that the most senior personnel are both knowledgeable and available to perform any needed service in the department. This has allowed the district to minimize overtime costs as relief drivers are available for empty routes and special trips. Furthermore, by guaranteeing these employees six hours per day, the district is able to retain drivers who are an asset to the department.

Individuals interested in becoming a school bus driver are recruited through the newspaper and local cable advertisements, a banner placed on the fence of the football stadium, and referrals. It was reported that the most effective means of recruiting drivers is through the banner given that it is highly visible and centrally located. Interested individuals must submit an application in order to begin the hiring process. The process begins with a local and national criminal history check. If applicants pass the criminal history checks, they are interviewed; if the transportation administrative staff desire to proceed, they require applicants to pass a TB test and pass all written CDL tests (six total). This shows a level of commitment to becoming a school bus driver for TCISD and helps with retention rates among new drivers. In an effort to ensure that the pre-employment costs associated with the testing do not deter applicants, the district pays for the following: fingerprints, new hire physical/drug screen, district training towards CDL, and the 20-hour certification course.

After being hired by TCISD, drivers must complete a 20-hour certification course developed and required by the Texas Education Agency (TEA). This training is provided by a staff member who has participated in the “Train the Trainer” course. Trainees ride route buses in the morning and afternoon during the training process for student management skills and practice driving skills midday and in the evening.

Drivers are assigned to a route after completion of all training requirements. Field trips, extracurricular trips, and athletic trips are assigned based on a predetermined rotation.

Drivers are asked to fill out an index card with their contact information and their preference for midday, evening, and/or weekend trips. Drivers may submit their trip preference only once per school year. When a special trip is approved and must be assigned to a driver, the transportation coordinator consults the alphabetical rotation and contacts the first driver whose preference matches the type of trip required. For example, if the trip is a field trip during the day and the driver next in the rotation has indicated midday as one of his or her trip preferences, he or she will be assigned that trip. If the driver has not indicated a preference for midday trips, the trip will be assigned to the next driver in the rotation who has indicated availability for that type of trip. Drivers are discouraged from rejecting a trip, as it is believed that by indicating trip preference one is generally available during that time.

ADMINISTRATIVE OFFICES AND FACILITIES

The driver facilities are housed in a trailer adjacent to the bus garage and maintenance facilities. The trailer includes a large driver lounge capable of accommodating all bus personnel and central office and a small office for the transportation coordinator. Drivers generally have access to the transportation coordinator who often sits with the dispatcher and the payroll clerk in the central office. Drivers are encouraged to bring questions or concerns to the transportation coordinator, and that individual's accessibility allows for an open relationship between herself and drivers, further promoting effective operations.

POLICIES AND PROCEDURES

TCISD has established a comprehensive set of policy documents which have been approved by the TCISD Board of Trustees. The documents address a wide array of transportation issues including: fiscal management goals and objectives, employment requirements, employment practices, employee standards of conduct, student welfare, student discipline, transportation management, and purchasing and acquisition. TCISD has done an effective job of documenting its policies and operational procedures, particularly for an organization of relatively small size. Safety management and operational procedures have clearly been emphasized in both the documentation and in implementation. While there are areas where increased documentation is necessary, the overall package is excellent, and major revisions to the existing structure are not required. The following is an assessment of notable issues regarding policy and procedure statements:

- **Transportation eligibility** – A key policy area where documentation was incomplete relates to transportation eligibility. The general policy and actual routing practices are consistent with state funding provisions that provide for students that live two or more miles from their school. However, this approach has been modified to address certain constraints present in the TCISD service area. These modifications include the establishment of “eligible” and “ineligible” transportation zones and hazard areas. Policy documents dictate that only students residing inside the eligible transportation zone will be transported to and from school. While no detailed documentation exists on how the ineligible zone was established, information from onsite interviews suggests that a detailed review of the routing network identified areas that were not being serviced. It was assumed that areas not serviced by a route bus were areas where students were not eligible for student transportation. These areas were then identified as the ineligible zone. This approach is not consistent with TEA's eligibility criteria and definition of hazardous walk zones. The district should consider a complete review of its service area and create policies that define and establish hazardous walk zones.

Hazardous areas, such as busy highways, occur near many of the district's schools. The designation of a hazard area allows students within a two-mile radius of the school they attend to ride the bus. Such areas are consistent with those defined in Texas Education Code, Section 42.155(d), but documentation on the establishment of TCISD hazardous areas was not available at the time of this review.

- **Ride times** – TCISD has not established policies or procedures that dictate the maximum length of bus rides for students. The district is just 19 square miles with a regular street grid, which facilitates relatively short bus routes. Students are rarely on the bus longer than 25 minutes, which is an acceptable level of service. A policy regarding maximum ride times may not be necessary in this environment, except as it relates to students transported to out-of-district programs. The district has a policy that allows students to be transported to any area school, within a reasonable distance, for programs that will enhance their learning experience. This policy relates primarily to special education students and to regular education

students who take courses at career and technology centers or local colleges and universities. Although district policy does not define a reasonable distance, interviews indicated students are transported to learning centers throughout Galveston County. This practice suggests that establishing a ride time policy will be beneficial to the district.

- **Student discipline** – When students register for school, they must also complete a bus rider contract if they wish to be transported to and from school. The Student Code of Conduct outlines the behavior policy, and the bus rider contract explicitly defines restrictions for violation of school bus regulations and rules. The first offense results in a student conference with the assistant principal and a written parental notice. The second offense results in a student conference with the assistant principal, parental notification by phone, and bus probation. The third and fourth offenses result in bus suspension for three and ten days respectively, and the fifth offense results in bus suspension for the remainder of the year. Most schools adhere to this policy, though there was some variability in the nature of the enforcement. Such variability may be confusing to students and may result in parental complaints as one student is disciplined for behavior that another student is not. In order for a student discipline policy to be successful, all personnel, including bus drivers and assistant principals, must adhere to the established policy.
- **Customer service** – In the event of a parental concern or complaint, the district has established specific procedures to resolve these issues. The transportation coordinator is the initial and primary point of contact for most issues. The coordinator documents the concern or complaint and reviews established policies and procedures prior to providing the parent with a decision. Efforts are made to resolve every issue within a reasonable timeframe. Most complaints received relate to lack of transportation in the “ineligible” walk zones or to student discipline issues, and the coordinator is experienced enough to resolve these concerns. In the event that a parent is not satisfied with the response from the transportation coordinator, their complaint may be elevated to the director of physical services and transportation. While the procedure for an appeal is established, it is reported that elevation of the issue to the director is rare. This policy is excellent, as a

review of established policies and procedures relating to the concern or complaint provide the district with justification for the disciplinary action. Furthermore, documentation supports the position of the district should a pattern of complaints emerge.

- **Accident management and safety** – TCISD has established formal accident management policies and procedures. The district provides the Texas Department of Public Safety (DPS) written notification of any accident directly or indirectly involving a school bus. Notice must be received within five days of the accident that includes the name and address of the owner of the bus, the name and drivers license number of the operator of the bus, the date and location of the accident, and the police report. These procedures are in accordance with policies established by TEA.

In addition to accidents, the department has also established incident management protocols in an effort to identify and address the causes of specific mishaps. These protocols include incidents that are common in many bus yards, such as mirror strikes or back up incidents into parking poles or building corners. These are identified on an established form. The goal of the tracking program is to establish training routines or configuration changes that will increase driver skill and reduce maintenance costs by minimizing these incidents. These policies are well documented and allow the district to maintain a professional working relationship with local law enforcement. Furthermore, the documentation of accidents and incidents helps transportation management create training programs to equip drivers with the skills necessary to avoid similar events in the future.

- **Community use of buses** – Policies and procedures have also been established for the use of school assets by third party groups. The district allows external groups, such as senior citizen groups, to charter school buses. These groups are charged the same amount per mile as district schools are for special trips. TCISD school buses are also used by the Governor’s Office of Homeland Security for evacuations during catastrophic events such as hurricanes. There is no charge to this office or the federal government for use of the district’s fleet in these situations. The policy regarding the use of school buses by external groups allows the district to recoup all expenses

related to operating a bus. The fee paid to TCISD by such groups is enough to pay for a driver, fuel, and administrative costs incurred in planning and completing a trip. The district builds goodwill in the community without affecting the financial efficiency of the operation. Unfortunately, the district has little choice in the use of school buses by the government for emergency evacuations. The district absorbs the administrative and operational costs of fleet usage, though the infrequency of qualifying events rarely affects the efficiency or effectiveness of the district's transportation department.

BUS ROUTING AND SCHEDULING

SERVICE DESCRIPTION

TCISD's student transportation system provides service to eight district school buildings and five other locations serviced by four buses around Galveston County while transporting 29 percent of the enrolled student population. The basic system architecture for the in-district schools is built around a three-tier bell time structure, with the seven schools staggered over three distinct start times. In this structure, a typical route bus performs three individual morning and afternoon bus runs. The first tier includes dedicated middle school and high school runs. The second tier includes dedicated elementary school runs. The third tier includes dedicated intermediate school runs.

The district's bus routes were established prior to the arrival of the current transportation coordinator, and the routes have not been changed for a number of years. Stops may be added or removed if population density changes, but the direction and number of routes have not changed. All stops are placed at street corners, and students walk no more than two blocks to a stop. There are a few individual house stops in addition to those for special needs students. Due to the compact geographical area and relatively stable student population of the district, this route structure is perpetuated.

ROUTING PROCESSES

The annual route development process begins with the registration of new students. After registering at a student's school, the parent or guardian is directed to the transportation department where they may complete a request for transportation. The registration period lasts for two weeks prior to the start of school. If a student's transportation needs change during the school year, their parent or guardian may

request a change of transportation through the student's school.

Once all requests for transportation have been collected, transportation staff assigns students to established stops throughout the district. TCISD does not use route planning software, but enters all students into a database where their information is maintained by transportation staff. Student information is organized by assigned route; this practice aids route drivers in identifying students eligible for transportation. TCISD adheres to its eligible rider policy and will not transport students who are not assigned to a route. Route maps are drawn manually, then scanned and saved as a *Microsoft Word* file. Route maps are accompanied by route directions and organized by route number. This information, along with student information, is disseminated to regular route drivers and assists substitute drivers when regular drivers are absent. In the absence of route planning software, TCISD has done a good job of electronically filing route data and making it accessible to transportation staff and drivers.

The major problem that arises in this approach is in the lack of readily available data and analytical tools. This problem causes a systemic reluctance to change the status quo, as any major route reengineering effort must encompass a massive investment of time and attention to develop the data necessary to properly evaluate alternatives. This effect tends to perpetuate existing route structures, with changes only as required to adapt an existing route or set of routes to changing circumstances. The lack of ongoing performance measurement and monitoring, coupled with the inherent difficulty of analyzing potential changes, results in a less effective and efficient route network. The performance assessment described in this report provides evidence of this assessment.

The data used to perform the system assessment was made available as a result of a useful procedure for counting riders called the "First Wednesday Report." A form is given to each driver the first Wednesday of each month, starting in October. Drivers count eligible riders in the afternoon, and those totals are averaged at the end of the school year to determine average daily ridership. While this is a commendable process to validate projections for use in the route development process, there is a concern that the district may be inaccurately calculating the average daily riders by only recording the number of riders in the afternoon. Many students may not ride the bus in the afternoon due to extracurricular activities and athletics. Verification of any variance in morning and

afternoon counts can occur if counts are taken when buses are both inbound to school and outbound from school.

The route development process at TCISD represents a combination of efficient and inefficient practices. The extensive use of corner stops is an effective mechanism to promote efficiency because it minimizes the number of times the bus must stop to collect students. In addition, the weekly counting process provides an excellent data set to evaluate both annual and seasonal ridership changes that can be used to improve routing efficiency. However, these efficiencies are mitigated by the limited review of runs that occur annually. The manual recordkeeping system, while effective as a method of administration, does not allow for the evaluation of alternative routing schemes that may better optimize resource use.

SYSTEM PERFORMANCE ASSESSMENT

TCISD provides reasonable levels of service quality at a low cost. Both the annual cost to own and operate a route bus and the annual cost per transported student are low relative to national averages. The key elements influencing these results include the compact geographical area of the district and the three-tier route structure that allows for short bus run lengths and multiple runs over the course of the service day for each active bus. While there may be opportunities to improve on these results, there are no major concerns regarding the cost or service quality of the existing system.

The dual and sometimes conflicting goals of any student transportation operation should be to fill each bus as closely as possible to capacity and to reuse that bus as many times as possible over the course of the day. These goals conflict in that to fill a bus the length of the run must be extended, and by extending the run the district reduces the time available to reuse the bus. It is also true that service constraints and geography can work against both of these goals. A key constraint is school bell times and how well they support or detract from these efficiency goals. Another key constraint that is only partially controllable by transportation or district administrators is the relative density of students and their location relative to their schools of attendance. In both cases, TCISD benefits from its compact geographical area and resulting high levels of student density.

SERVICE QUALITY

The service quality assessment is reasonable, based primarily on considerations of ride times coupled with the timeliness of deliveries to and departures from the schools. The routing

network has been designed to provide students with comparatively short ride times and safe service using professional staff. However, the existing bell schedule has created a need to use early drop-offs and late pickups from schools in order to achieve the current level of cost-effectiveness.

The existing bell time structure is the primary cause of the concerns regarding service quality. Within the regular home-to-school route network, services are provided to students at eight schools. Texas City High School houses 9th through 12th grades, however the 9th grade classes begin five minutes after the upper grade classes. Blocker Middle School houses 7th and 8th grades, and Levi Fry Intermediate houses 5th and 6th grades. The elementary schools house kindergarten through 4th grade and Heights Elementary School also houses pre-kindergarten. **Figure 2** shows the school bell times for school year 2007–08.

FIGURE 2
SCHOOL BELL TIMES, SCHOOL YEAR 2007–08

SCHOOL	AM	PM
Texas City High School	7:40	2:55
Texas City Ninth Grade Center	7:45	2:55
Blocker Middle School	7:35	2:45
Levi Fry Intermediate School	8:20	3:45
Heights Elementary School	7:55	3:15
Kohfeldt Elementary School	7:55	3:15
Northside Elementary School	7:55	3:15
Roosevelt-Wilson ES	7:55	3:15
Woodrow Wilson Alternative Education	7:00	2:00

SOURCES: TCISD physical services and transportation department; Management Partnership Services, Inc. analysis, 2008.

Examination of these bell times and tier assignments reveals limited time windows between each time tier. Thus, limited time is available to complete a run, even in a compact geographic area such as Texas City. However, this has not limited TCISD’s ability to reuse each bus frequently. Analysis of the count of runs by bus indicates that 73 percent of routes service three schools and perform three runs; 19 percent of buses service two schools by servicing the middle school or the high school and an elementary school, and two route buses serve only one school. The early arrivals or late departures create, in essence, a false tier that allows the buses to be reused multiple times but requires the schools to supervise students prior to the initial school bell or after the dismissal bell. Observations of arrivals and departures at school sites indicated that this was occurring in TCISD.

COST-EFFECTIVENESS

The key measures of cost-effectiveness for a student transportation system include the annual cost per transported student and the annual cost per active route bus. A useful comparison is also to convert the annual cost to a daily cost, which is a typical industry standard for pricing of contracted transportation services. A subset of cost metrics that help to explain overall costs include the number of buses required to transport 100 students, and the percentage of available bus seats being filled on each bus run (capacity utilization). All of the inputs that define the service characteristics of a transportation system reveal themselves in these key measures of cost-effectiveness, which are summarized in **Figure 3**.

FIGURE 3
KEY MEASURES OF COST-EFFECTIVENESS

Annual Cost per Student	\$498
Annual Cost per Bus	\$27,547
Daily Cost per Bus	\$153
Buses per 100 Students	.55

SOURCES: TCISD physical services and transportation department; Management Partnership Services, Inc. analysis, 2008.

These favorable cost numbers are generally attributed to the limited nature of the service being provided, the relatively compact operating environment, and implementation of an approach to service provision that attempts to reuse buses as many times as possible throughout the day. The annual cost per bus and student are below current national averages. For comparison, the current national average cost per student is between \$685 and \$735.

TCISD has the opportunity to improve cost-effectiveness and service quality given the relatively low level of capacity utilization on buses. Constrained bell times typically have two common impacts: early or late arrivals to school and low use of available seating capacity. The time constraints of the bell schedule will generally not allow for the loading and unloading of large groups of students in a timely manner, thus more buses are required to complete the mission. Analysis of the data indicates that overall capacity utilization is approximately 42 percent of available seating capacity. Thus, approximately 6 of every 10 available seats are not being used, and compares unfavorably with industry guidelines of 70 to 80 percent utilization of available capacity based on planned seating loads. **Figure 4** shows that the number of empty seats is significant, as indicated by the top portion of the bars.

Further analysis of capacity utilization by school demonstrates that 50 percent of the available seating is being used at only one school, as illustrated in **Figure 5**.

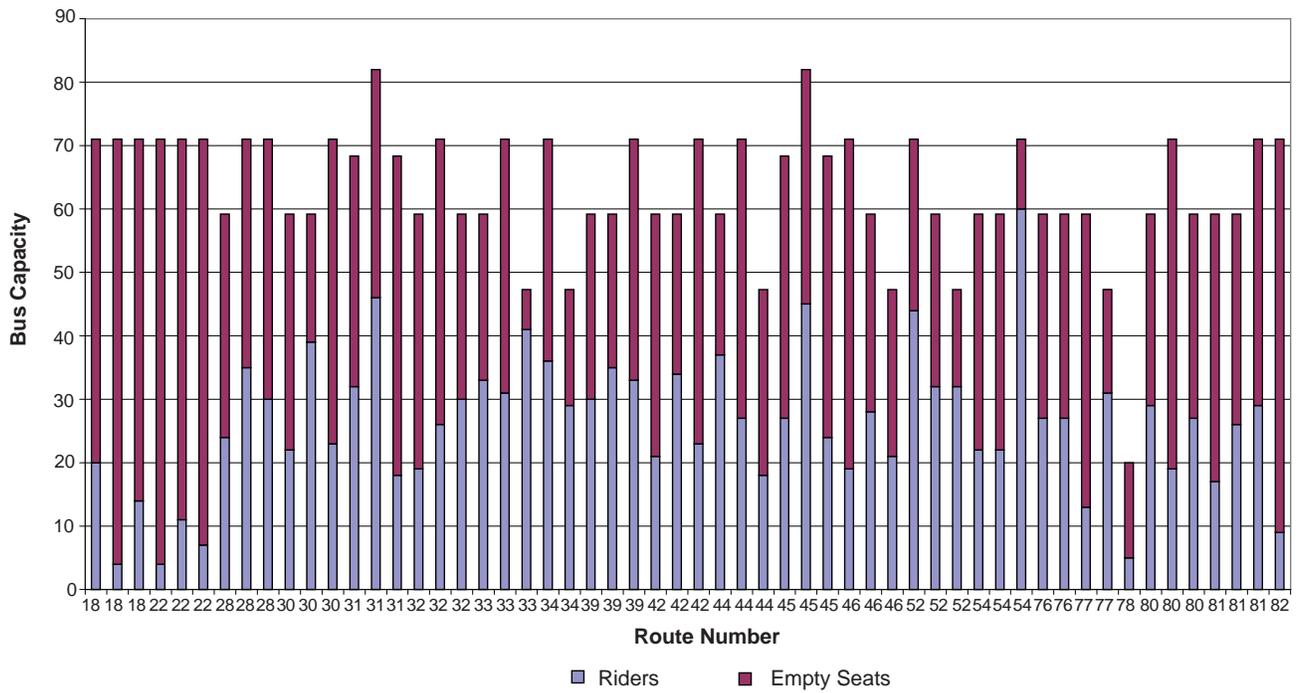
Late buses and low capacity use indicates that there are opportunities to further improve both cost-effectiveness and service quality. These efforts would generally focus on reevaluating existing bell schedules to allow for more students to be assigned to each bus, while maintaining or enhancing the existing deployment of the buses throughout the day.

RECOMMENDATIONS

- **Recommendation 1: Review all available documentation and establish formal transportation eligibility criteria.** TCISD has established an “eligible” and “ineligible” transportation zone, but the logic and rationale that dictated the specific areas being designated is not generally accessible or clearly understood. The department should develop criteria that clearly and concisely establish who is eligible for transportation service and under what circumstances. Part of this effort should seek to clarify the definition of and rationale for existing hazard areas. As part of establishing eligibility criteria, the department should also revisit the existing hazard areas in order to define the rationale for the designation and to establish criteria to evaluate any future areas that may come into question. This document should be submitted to the Board of Trustees for review, public comment, and adoption. The department can then use these criteria in future route development plans.

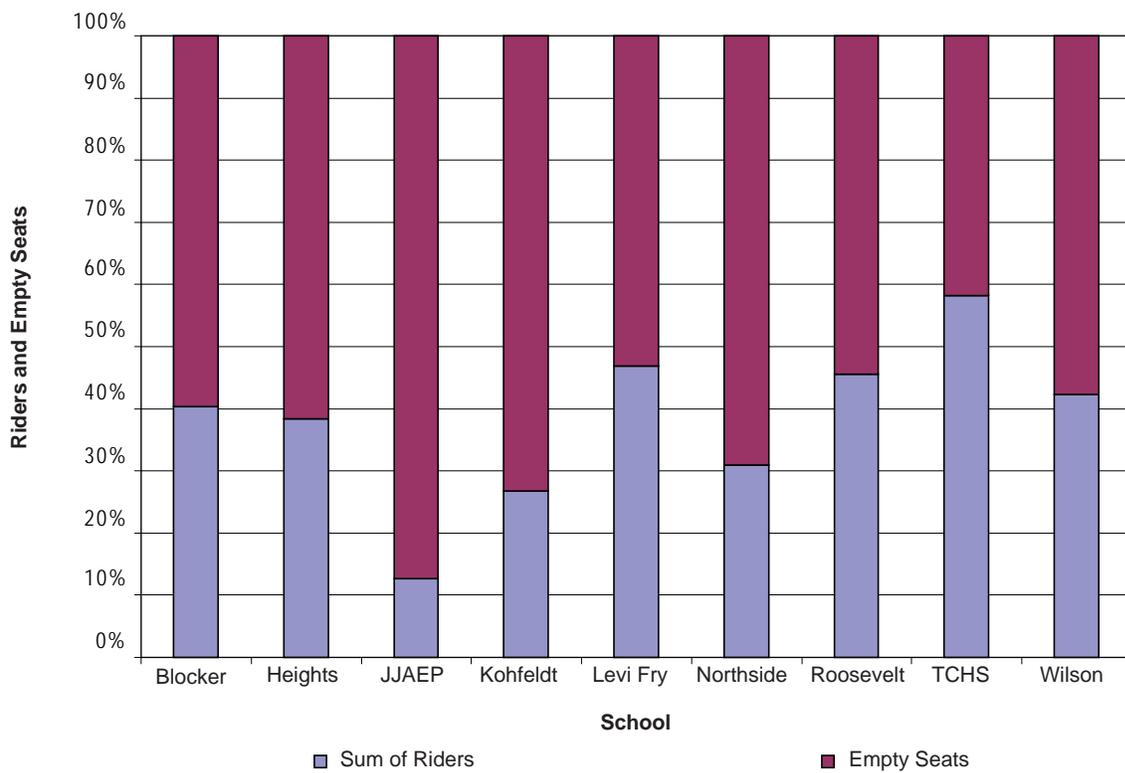
There is a limited cost associated with implementation of this recommendation. The primary costs would be staff time associated with researching previous decisions and collecting, collating, and revising the documentation as necessary. While no immediate cost impact is likely, implementation of this recommendation will clarify for both the department and the public the specific parameters associated with service provision. The cost associated with the recommendation will also be primarily related to the staff time necessary to fully research and document existing practices. No additional outside resources should be required to implement this recommendation.

FIGURE 4
CAPACITY USE BY RUN, SCHOOL YEAR 2007–08



SOURCES: TCISD physical services and transportation department; Management Partnership Services, Inc. analysis, 2008.

FIGURE 5
CAPACITY UTILIZATION BY SCHOOL, SCHOOL YEAR 2007–08



SOURCES: TCISD physical services and transportation department; Management Partnership Services, Inc. analysis, 2008.

- **Recommendation 2: Establish an annual route review process inclusive of a bell time analysis that evaluates the use of available seating capacity.** The district should conduct a comprehensive analysis of the route network, to include an assessment of alternative bell time scenarios and their impact on the number of buses required. This analysis should factor in the impact of increasing the capacity usage of each bus run. Implementing this recommendation will be a complex undertaking, particularly given the manual route management system currently in place. It is unlikely that this analysis could be completed prior to the start of school year 2009–10 using the existing approach. However, implementation of an alternative route schedule that increases overall capacity utilization to even 50 percent would result in a reduction of approximately three buses. A three bus reduction would equate to an overall cost reduction of approximately \$82,641 annually, based on the current average annual cost per bus at \$27,547.

FLEET MANAGEMENT

ORGANIZATION AND STAFFING

The fleet maintenance operation at TCISD is responsible for providing services to all of the departments across the district with the primary customers being transportation and physical services. The operation maintains a wide variety of equipment including school buses, pickup trucks, administrative vehicles, lawn care equipment, and a limited array of construction equipment. The diversity of this equipment presents a work scheduling and assignment challenge given the limited scope of the organization, but the overall assessment of the fleet management operation is that of a marginally cost-effective but generally well-managed organization.

The fleet maintenance operation at TCISD includes three staff who are all responsible for performing maintenance activities. **Figure 6** details the overall structure of the district's fleet maintenance operation.

WORK DISTRIBUTION AND SHOP OPERATIONS

The shop foreman is responsible for prioritizing and distributing job assignments. In addition, the foreman serves as the primary individual responsible for quality assurance on all repairs. The mechanic assists the shop foreman with all major repair work and is assigned individual repair jobs. The mechanic is also primarily responsible for the repair and maintenance of grounds equipment such as turf mowers, weed whips, and other small engine repairs. The mechanic helper assists both the shop foreman and mechanic in all of their activities and is responsible for performing many of the preventive maintenance (PM) services for the school buses.

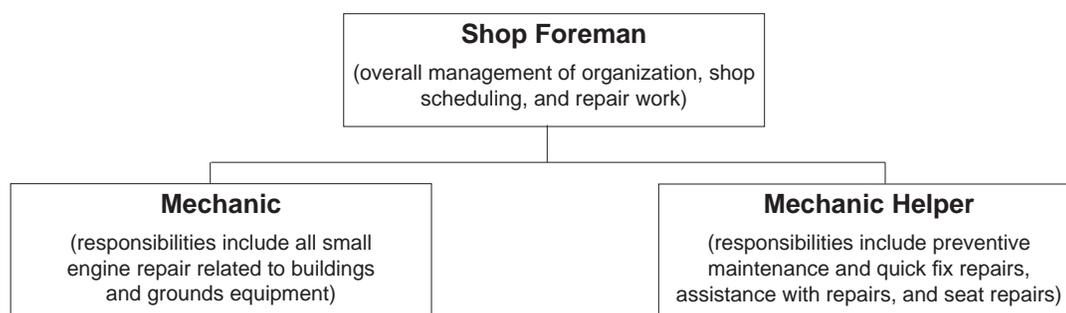
The mechanic helper also assists with quick turnaround repairs in the morning in an effort to promote fleet availability.

Work is generally distributed based on the daily collection of work requests from both the transportation and physical services divisions. The limited scope of the organization allows the shop foreman to be familiar with the overwhelming majority of active and pending work requests and to schedule work in an informal, yet effective manner that ensures work is completed timely and accurately. PM services are scheduled using two primary tactics. The first tactic is the use of a "window sticker" that is intended to notify drivers of maintenance services due based on odometer readings. The second tactic is a scheduled check of the buses that has been instituted by the shop foreman. This check procedure is designed to identify potential maintenance issues before they become significant repairs.

The existing shop scheduling provides for an appropriate staggered arrival beginning at 6:00 AM, 7:00 AM, and 8:00 AM and concluding at 2:30 PM, 3:30 PM, and 4:30 PM for the three shop personnel. This scheduling arrangement provides for coverage by mechanical staff during most daily operations, including after-school activities and athletics. In addition, a schedule is established to provide for emergency coverage in the event of an incident or accident after established working hours.

Technician training programs are limited and generally associated with vendor-provided training on new equipment. No financial benefits are provided to staff for obtaining

FIGURE 6
FLEET MANAGEMENT ORGANIZATION, SCHOOL YEAR 2007–08



SOURCE: TCISD physical services and transportation department, 2008.

additional training, such as the Automotive Service Excellence (ASE) certifications. All staff attempt to leverage specific expertise and provide informal training services on specific pieces of equipment. This informal training program is not uncommon in smaller organizations but can limit the growth of individual staff members as training is only available on a limited array of equipment and in a limited number of skill areas.

The maintenance operation uses a manual system to maintain vehicle records. The system includes a copy of the repair request record completed by the vehicle operator and the work order documenting repairs performed by the assigned technician. In addition, repairs performed by outside vendors (e.g., body repairs, glass repairs, and emissions inspections) are filed by date within each vehicle folder. A review of sampled vehicle folders indicates that only limited information is recorded on the work orders, but the repair date and the assigned technician are clearly indicated. While this approach provides for a generally complete record of vehicle repairs, it only allows for the most basic analysis of repair trends. Using data from the vehicle folders to measure existing performance or to establish a system of performance measurement would be difficult without significant administrative efforts to transfer the manual records to an electronic tracking system.

PREVENTIVE MAINTENANCE AND VEHICLE REPAIR PROGRAMS

TCISD has established a limited multi-echelon PM program based on odometer readings. Four service levels have been established that focus primarily on fluid and brake management. The following is a breakdown of the services included in each service grouping:

- *Level 1 Brake Check:* This service includes measurement of brake lining depth, tire tread depth, and tire air pressure. Air pressure is particularly important given its impact on overall fuel efficiency. All fluids are checked and filled where necessary. The results of the service are recorded on an established form that includes the date, odometer reading, and signature of the technician providing the service.
- *Level 2 PM:* This service is provided every 4,000 miles traveled and consists primarily of a safety inspection and oil and filter change. This service is recorded on the standard work order form used for most services. Given the average annual mileage of the buses in the

fleet, this service is performed approximately two times per bus per year.

- *Level 3 PM:* This service includes all services performed in the Level 1 and 2 service in addition to a transmission and fuel system service. This service is performed every two years or 24,000 miles and is recorded on the standard work order form. Given the average annual miles traveled of 7,472 miles and desired replacement criteria of approximately 10 to 12 years, it is likely that a vehicle would receive approximately seven of these services in its useful life.
- *Level 4 PM:* This service is a comprehensive summer service that includes a full inspection of the interior and exterior of the bus and performance of all services that are due or expected to be due within approximately the first month of school. Performance of the services in this manner is intended to promote maximum vehicle availability at the opening of school.

While this program is robust in its effort to address safety and availability concerns, the service list is somewhat generic and lacks a connection to manufacturer recommended service intervals. Shop personnel are able to address the lack of formality in the program in a limited way through their technical experience, but this does not fully mitigate the potential that required services may not be performed in a timely manner.

PM scheduling and compliance is managed through two mechanisms: the use of a window sticker that drivers are supposed to verify as part of their daily pre-trip inspection; and a weekly “hood check” performed by the mechanic helper. A non-scientific sampling of vehicle maintenance records indicated that over 90 percent of the services were performed within the recommended service interval.

Morning start and quick fix services are provided for a limited number of services that are intended to promote vehicle availability without adversely impacting safety. Particular items that are considered in the scope of quick fix items include:

- bulb replacement;
- battery charging and jump starts; and
- minor seat repairs.

These services are provided by the shop foreman or mechanic helper whose shift schedule has been established to ensure

that staff are available to perform these repairs. The array of repairs and the staff schedule are appropriate for an operation of the size and scope of TCISD.

MAINTENANCE FACILITIES

The shop facility includes two small work bays. The space is marginally adequate for the existing activities of the maintenance program. A primary concern is that the existing school buses are now nearly too long to fit into the maintenance bays. In addition, there are concerns about circulation around the buses in the event they are up on the bus lifts. The bay used for small vehicle and ground equipment maintenance is adequate in size. The shop area lacks many modern health and safety items such as eye wash areas, downspout showers, and blow out fans. However, one large circulating fan is present in the shop that assists with circulation. In addition, the overhead lighting is adequate but not ideal.

MAINTENANCE PERFORMANCE ASSESSMENT

The nature of a diverse fleet such as that operated by TCISD requires the establishment of some baseline comparative measure that can be applied to all vehicles in a fleet in order to properly evaluate performance. The process used is one that is common in the maintenance management industry and is known as a vehicle equivalent unit (VEU) analysis. A VEU provides a standard comparison basis for dissimilar vehicle types by converting resource requirements to the equivalent of one standard sedan. Thus, a typical Class C school bus consumes 3.5 times the resources of a sedan in both labor and parts, and receives a VEU of 3.5.

Key measures of cost-effectiveness for a fleet maintenance and repair operation include total cost per VEU, parts costs per VEU, mechanic staffing ratios, age of the fleet, spare bus ratios, and mechanic productivity. Given the manual recordkeeping system, only a limited number of these measures could be calculated. **Figure 7** shows the key measures of fleet cost-effectiveness. Of these, only mechanic productivity could not be calculated as part of this analysis due to limitations on the availability of data.

Data and observations indicate that the fleet maintenance operation is staffed appropriately and is comparatively cost-effective. While costs per VEU are outside the high end of the industry guideline between \$1,200 and \$1,600 per VEU, this can be attributed in part to the significant number of spare vehicles retained in the fleet.

FIGURE 7

KEY MEASURES OF FLEET COST-EFFECTIVENESS

M&R Cost per VEU	\$1,659
Hourly labor rate	--
Available hours per trades worker	--
Productive technician hours	--
VEU per trades worker	81
Hours charged per vehicle equivalent	--
Scheduled service rate	--
Preventive Maintenance compliance	90%*
Work bay to FTE technician ratio	1:1
Fleet availability percentage	90%*

-- Data not readily available.

*Estimated based on a non-scientific sample of vehicle repair history.

SOURCES: TCISD physical services and transportation department; Management Partnership Services, Inc. analysis, 2008.

FUEL MANAGEMENT

TCISD owns and manages one gasoline and one diesel fuel tank. The system is connected to a tank monitoring system that provides for the necessary leak monitoring and evaluation of fuel inventories to ensure environmental compliance. Fuel consumption is managed at the fuel head through a key and personal identification number (PIN) system. The key identifies the vehicle and the PIN identifies the individual. Fuel consumption is automatically recorded based on the gallons of fuel pumped.

Prior to being authorized to receive fuel, operators are required to enter the vehicle meter reading. The purpose of recording this value is to provide data for the PM schedule and to analyze fuel economy. The current system setup has few error checking features that would otherwise promote accurate data entry. The negative impact on the PM program of not fully utilizing the error checking functionality of the software have, however, been effectively eliminated by the process used to check vehicle mileage as previously discussed. However, analysis of fuel economy is adversely impacted by existing data management practices.

The significant increase in the cost of fuel has had a limited impact on TCISD to date. No significant changes to the routing scheme or any reduction in co-curricular and athletic trips have occurred that can be attributed to fuel cost increases. However, it was reported that continued increases of the magnitude that were experienced during school year 2007–08 would put increasing pressure on transportation services that would require management to address this issue.

FLEET REPLACEMENT PLANNING

The director of physical services and transportation is responsible for collecting bids and purchasing buses. There is no formal policy regarding bus replacement schedules, though the district tries to replace two to three buses per year. There has been enough funding recently to adhere to this informal schedule in a manner that keeps the fleet within expected age ranges. Additionally, the district has not given any consideration to the seat belt requirements set to be in place in 2010. Staff interviews suggest that the district will monitor the status of the provision of funding for implementation of these requirements and will react accordingly.

An analysis of fleet-related statistics indicates that the median mileage of the active fleet is approximately 35,000 and the average mileage is approximately 45,000. These values are unremarkable in a compact, urban/suburban mix district like TCISD. However, special education buses would appear to have accumulated significant life-to-date miles that will present an increasing concern in the near future. **Figure 8** shows the life to date miles of each bus by service characteristic.

Analysis of fleet age indicates that the median age is approximately six years and the average age is six and one-half years. This would indicate that the district is using approximately a 12-year average replacement cycle. While

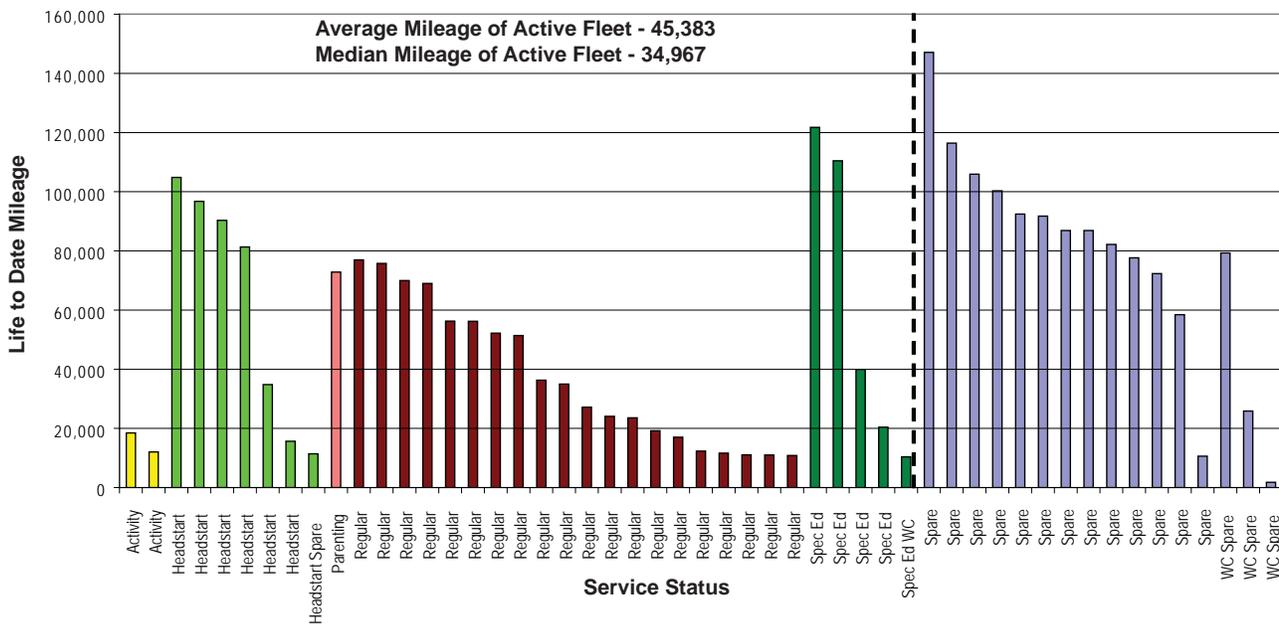
this replacement cycle is consistent with industry averages and rationale when considered in light of total miles traveled, there are several issues that emerge through a detailed analysis.

Figure 9 shows the distribution of model years by service type. The first item of note is the large spike of 1998 model year buses. Of the 10 buses in that model year, 4 are used as spares, and 3 are assigned to special education routes. Of particular concern is that 75 percent of all special education vehicles (3 of 4) are in this model year. Consequently, managing a large spike in replacement requirements may be difficult in the near term as all these vehicles age simultaneously.

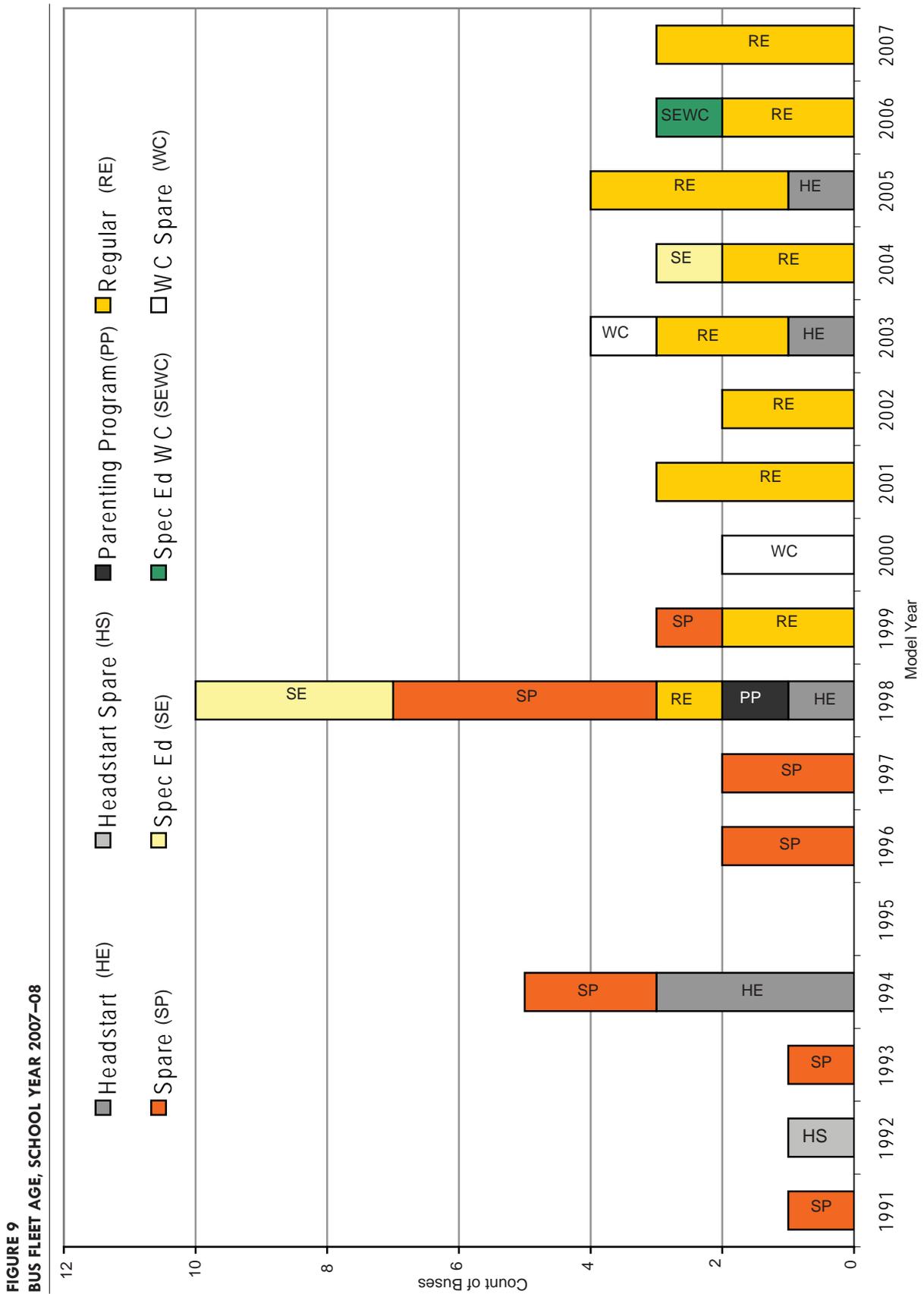
When viewed from the perspective of service status, as in **Figure 10**, it becomes clear that a significant number of spare buses are being retained in the fleet.

The rationale for retaining such a large percentage of spare buses primarily relates to the use of these vehicles for athletic and extracurricular trips. As a result, the number of actual route bus spares does not appear to be excessive. An issue for longer term consideration is the retention of three spare wheel chair buses when only one is used in the active fleet. While this is a precautionary measure against future demand, there are limited alternative uses for these units. Consideration should be given to the possibility of increased collaboration

**FIGURE 8
BUS FLEET MILEAGE, SCHOOL YEAR 2007–08**

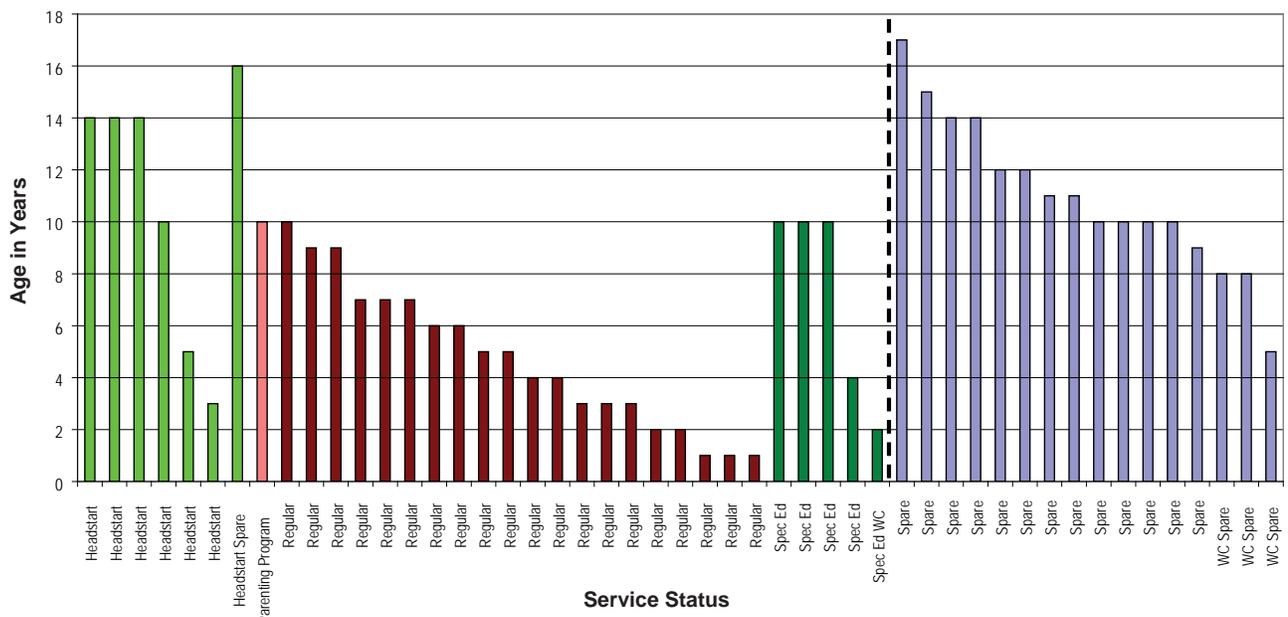


SOURCES: TCISD physical services and transportation department; Management Partnership Services, Inc. analysis, 2008.



SOURCES: TCISD physical services and transportation department; Management Partnership Services, Inc. analysis, 2008.

**FIGURE 10
BUS AGE BY SERVICE STATUS, SCHOOL YEAR 2007–08**



SOURCES: TCISD physical services and transportation department; Management Partnership Services, Inc. analysis, 2008.

with neighboring districts or regional agencies in an effort to reduce the number of units retained in the fleet.

RECOMMENDATIONS

- Recommendation 3: Establish a formal fleet maintenance training program that details the managerial, technical, and administrative requirements of each position.** The shop foreman should be provided training on non-maintenance activities such as budget analysis and related management topics where required. The mechanic and mechanic helper should be provided the opportunity to receive technical training on both specific vehicle types and systems. The district should encourage the attainment of certifications. The Society of Automotive Service Engineers would serve as a useful starting point for attaining certifications. The district could provide an incentive that may include reimbursement for expenses, salary adjustments, or one-time bonus payments to achieve the certifications. Since the time of review, the district reports that the mechanical staff are receiving training through state and local certification classes.

The cost of this recommendation will vary depending on the method chosen to encourage training. Salary adjustments are clearly the most valuable and

expensive approach because of the adjustment to all future compensation and retirement costs. Payment of bonuses or reimbursement for costs incurred can be a more cost-effective mechanism to reward employees for increasing skill levels. Implementation of this recommendation is likely to require some review by TCISD human resources staff for compliance with all applicable guidelines and will require approval from the Board of Trustees. Therefore, it is unlikely that this program could be implemented prior to the start of school year 2009–10. Without knowing how the district will implement this recommendation, to account for cost associated with training and a staff incentive, it is estimated to cost the district \$8,000 annually.

- Recommendation 4: Develop a more formal preventive maintenance service program that specifically incorporates manufacturer recommended service items at designated intervals.** The department should identify the services required by the vehicle manufacturer and formally incorporate them into the existing PM program. Formal inclusion and documentation of these services will ensure compliance with warranty requirements and better synchronize the service intervals with the specific needs of each vehicle.

Implementation of this recommendation will be administratively more burdensome in the short term than the existing program because it will require the development of customized PM service sheets for each unit. However, once the master sheets are developed, the revised program should prove no more difficult to implement or administer than the existing program. It is assumed that the department could implement this recommendation with existing resources.

- **Recommendation 5: Consider re-implementing the fuel management system to take greater advantage of available data and system functionality.** A significant volume of valuable data can be collected through the fueling system that allows for detailed analysis of maintenance performance and vehicle efficiency. However, if operators are not required to input accurate data through the use of routine error checking functionality the value of the data is diminished. Establishing appropriate floor (i.e., a value not less than that entered at the last fueling) and ceiling values (i.e., a value no greater than 500 miles more than the previous meter reading) and eliminating nuisance values (e.g., 00000 or 99999) will greatly enhance the usefulness of fuel data as part of the maintenance process.

In addition to improving the use of the fueling software, fuel key management process changes should also be considered. Establishment of a periodic audit process that ensures all outstanding keys are accounted for and that the keys are attached to the designated vehicles is a reasonable and appropriate internal control.

Implementation of this recommendation could occur prior to school year 2009–10, provided that the existing system has the capabilities described. There is likely to be a small direct cost associated with making any necessary software changes. Staff time will be required to review and verify the assignment of keys and PIN numbers, but this time should be limited. Staff time of approximately two hours should be required for analysis of the transaction data. The total one-time cost to implement this recommendation should not exceed \$4,000.

- **Recommendation 6: Conduct an analysis of the size of the fleet to determine the validity of maintaining the current ratio of spare to active vehicles.** The district should begin a data collection effort to quantify the use of the spare vehicles in an effort to justify their continued retention. Given that many of the spare buses are used for athletic events, some differences over the industry average of 10 to 20 percent spare ratio would be expected. However, the current 65 percent spare ratio is high relative to expected values. Analyzing alternative service opportunities and evaluating the continued retention of spare buses should require approximately 20 hours of staff time and no direct out-of-pocket costs.

FISCAL IMPACT

RECOMMENDATIONS	2009-10	2010-11	2011-12	2012-13	2013-14	5-YEAR (COSTS) OR SAVINGS	ONE-TIME (COSTS) OR SAVINGS
1. Review all available documentation and establish formal transportation eligibility criteria.	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2. Establish an annual route review process inclusive of a bell time analysis that evaluates the use of available seating capacity.	\$0	\$82,641	\$82,641	\$82,641	\$82,641	\$330,564	\$0
3. Establish a formal fleet maintenance training program that details the managerial, technical, and administrative requirements of each position.	\$0	(\$8,000)	(\$8,000)	(\$8,000)	(\$8,000)	(\$32,000)	\$0
4. Develop a more formal preventive maintenance service program that specifically incorporates manufacturer recommended service items at designated intervals.	\$0	\$0	\$0	\$0	\$0	\$0	\$0
5. Consider re-implementing the fuel management system to take greater advantage of available data and system functionality.	\$0	\$0	\$0	\$0	\$0	\$0	(\$4,000)
6. Conduct an analysis of the size of the fleet to determine the validity of maintaining the current ratio of spare to active vehicles.	\$0	\$0	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$74,641	\$74,641	\$74,641	\$74,641	\$298,564	(\$4,000)