

BILL PURCELL
MAYOR



OFFICE OF INTERNAL AUDIT

METROPOLITAN
GOVERNMENT OF NASHVILLE
AND DAVIDSON COUNTY

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July 30, 2007

Mr. John W. Lynch, Acting Director
Department of Public Works
Metropolitan Government of Nashville
And Davidson County
750 South 5th. Street
Nashville, TN 37206

Dear Mr. Lynch:

We have recently completed a performance audit of the Waste Management Division of Public Works. According to the *Government Auditing Standards* issued by the Comptroller of the United States, "a performance audit is an objective and systematic examination of evidence for the purpose of providing an independent assessment of the performance of a government organization, program, activity, or function in order to provide information to improve public accountability and facilitate decision making by parties with responsibility to oversee or initiate corrective action." A performance audit is different than a financial statement audit, which is limited to auditing financial statements and controls, without reviewing operations and performance. In performing this audit, we retained Maximus to work under our direction. Their final report dated July 20, 2007, *Performance Audit of the Solid Waste Division of Public Works*, accompanies this letter and is hereby submitted to you.

Management's response to the audit recommendations is attached to this report.

We appreciate the cooperation and help provided by all Public Works staff.

This report is intended for the information of the management of the Metropolitan Government of Nashville and Davidson County. This restriction is not intended to limit the distribution of this report, which is a matter of public record.

Internal Audit



Don Dodson
Audit Director

Copy: Bill Purcell, Mayor
David L. Manning, Director of Finance
Sue Cain, Interim Director of Law
Metropolitan Government Audit Committee
Richard V. Norment, Assistant to the Controller
KPMG, Independent Public Accountant

Metro Nashville
PUBLIC WORKS

Monday, July 30, 2007

Mr. Don Dodson
Internal Audits
222 3rd Avenue North
Suite 401
Nashville, Tn 37201

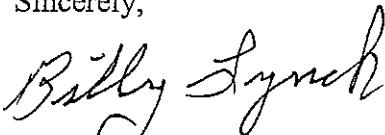
Dear Mr. Dodson:

We are pleased that the audit is complete. The Public Works Department is also pleased that the auditors' findings supported the changes our department made in order to efficiently and effectively manage waste services during and after the transition to the new management team.

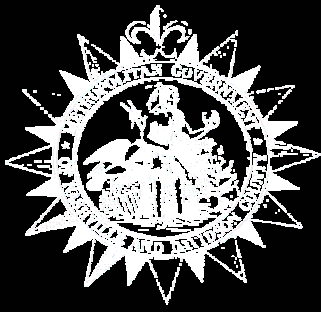
The Public Works Department agrees with many of the recommendations contained in the audit and will initiate a review process to begin implementation. Several of the recommendations of the audit report are already well-under way to implementation or as in the case of our new pilot recycling program for residents in the Downtown District – are already operational. We acknowledge that the audit found no significant changes needed and appreciate that the audit stated that recommendations were for "fine-tuning an already well managed set of functions." In this light, as we strive to increase the efficiency and excellence of waste management services, each recommendation will be fully reviewed and working implementation plans and proposals will be developed by the management team.

We appreciate the efforts of Maximus and want to thank and recognize all of the Waste Management Staff who spent many hours in interviews, collecting data for the audit team, and in reviewing drafts.

Sincerely,


Billy Lynch

Public Works Director



Metropolitan Government of Nashville and Davidson County, Tennessee

Performance Audit of the Solid Waste Division of Public Works

July 20, 2007



MAXIMUS
HELPING GOVERNMENT SERVE THE PEOPLE

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EXECUTIVE SUMMARY

MAXIMUS is pleased to present this report to the Metropolitan Government of Nashville and Davidson County (Metro) Finance Department, of our management review of the Public Works Division of Solid Waste (DSW). In this report, we review the organization, operations, staffing, and resource management of the Division, present various issues that relate to its performance and capability, and provide recommendations that will result in an improved service delivery capability for the Division.

We are impressed with the overall performance of the Division, particularly in view of its recent managerial and operational changes. All of the staff with which the project team interacted displayed a desire to provide the highest possible levels of service to their customers. We believe that the Division generally provides high levels of service to Metro customers, and that the recommendations made in this report reflect, not radical changes to current operations, but rather mechanisms for “fine tuning” an already well-managed set of functions.

In the following sections, we summarize our observations and principal recommendations. This starts with a listing of strengths and improvement opportunities found in the Solid Waste Division.

1. Strengths of the Division of Solid Waste

- The procedure for receiving customer calls and dispatching crews to handle the issues raised in the calls is exemplary and has resulted in almost all calls being resolved within 24 hours of receipt.
- Metro crews and contractors have maintained customer complaints at fewer than 10 per 1,000 households per year.
- The Division has made a transition to a brush collection program which results in each area of Metro receiving service at least five times annually.
- The Public Works Department, in conjunction with staff in the Division of Solid Waste, is in the process of implementing an automated routing system which will enable it to continually monitor the efficiency of its routes, an important development as Metro experiences growth in the Urban Service District.
- The Recycling Program has enhanced its educational initiative, targeting third graders, and others, through a variety of methods, which include outreach to businesses, and a home composting initiative, among others.

2. Improvement Opportunities for the Division of Solid Waste

- The DSW needs to calculate the value of all resources dedicated to the monitoring of private contractors used in the collection of solid waste and brush in order to measure its efforts against the Best Management Practices.
- At the time of this study, the collection of overspill (trash left outside a container by the customer) by private contractors was costing DSW an estimated \$921,000 annually and required 4 semi-automated vehicles and 8 personnel daily. A revision to the contracts of existing contractors could save DSW as much as \$500,000. The use of 4 vehicles and 8 staff would allow the 4 emergency vehicles from Metro Solid Waste Collection to be eliminated and the availability of 8 additional personnel would eliminate the need for temporary employees and allow

redeployment of several DSW personnel to other areas of need within the Public Works Department.

- There is a need to charge for the acquisition of the second and third solid waste containers often requested by customers. The total estimated cost per container is \$45.32 which includes \$38.00 for each container, an average delivery cost of \$2.32 per container and a \$5.00 administrative fee per container.
- Acquisition of 3 automated collection units for Curby to provide recycling collection in the annexed area (Council District 32) will provide an efficient method for accomplishing this task, but the additional collection vehicles will create a situation in which there are 8 Daily Use collection units supported by 2 Spares. It is estimated that the frequency of use of temporary labor and collection vehicles from Metropolitan Solid Waste will increase since downtime to the Curby Daily Use automated (sidearm loading) collection units will increase. Maintenance and repair costs are also estimated to increase.
- Drop-off sites within the USD have experienced a reduction in volumes for the five year period 2001 through 2005. This reduction in volume may be offset by the introduction of drop-off sites to the General Service District (GSD) where each could be collocated with a fire station. Harpeth Valley has been noted as a potential site. The downward trend was reversed in 2006 when an 8% increase accrued to the drop-sites. The reversal is attributed to the opening of the new site at Dupont - Hadley Middle School and increased educational efforts at select drop-off sites,
- The Nashville website should provide the location of each drop-off site on a map with the address and reference to dates and times of operation.
- A permit fee should be charged to those individuals who receive a waiver for their solid waste collection in an amount equal to 25% of the actual cost of collection.
- DSW must establish a means of identifying and returning its vehicles that have had repairs or services completed by the Heavy Equipment Shop the day the repairs are completed.
- Average downtime for a DSW vehicle repaired or serviced by the warranty vendor averaged 19.1 days during a six month period. Future equipment bids should consider a requirement that the warranty vendor must supply DSW a replacement vehicle after the first week of downtime.
- The coverage statistic noted in this report should be used to estimate spare vehicle demand based upon actual downtime demonstrated in Fleet's Daily Reports.
- DSW needs to track utilization of vehicles on a daily basis. Presently, 18 of the 61 DSW vehicles (29%) were estimated to have utilization rates of less than 49%. This utilization statistic should also be a consideration in the planning for spare vehicles and general fleet replacement.

SECTION I: BACKGROUND, SCOPE & OBJECTIVES

Metro engaged MAXIMUS to undertake a thorough review of the operations of the Division of Solid Waste of Public Works. This analysis included an evaluation of each of the Division's business processes and procedures, including:

- Workloads and staffing
- Organizational structure
- Management systems
- Policies and procedures
- Use of technology
- Fleet and equipment utilization, maintenance and replacement
- Comparisons of operations to other similar organizations
- Outsourcing policies

We are pleased to present our report on this engagement, in which we detail our findings, observations and recommendations for the improvement of service delivery to the residents of Nashville. In this report, we review the organization, operations, staffing and resource management practices of the Division, and present various issues that relate to its performance and capability, and provide recommendations to drive enhanced delivery of solid waste and recycling services to the residents of Nashville while optimizing the application and management of public resources.

Approach & Methodology

In conducting the analysis, the MAXIMUS team applied a structured methodology proven successful in other, similar projects and yet tailored to the specific requirements, circumstances and operating environment of the Nashville Division of Solid Waste.

Our **SURE**[®] (Survey-Understand-Recommend-Execute) methodology provided the overarching framework for our analysis. This proprietary methodology is derived from four principal sources. The analytical techniques come from the General Accounting Office's *Government Accounting Standards* (commonly referred to as the "Yellow Book"), the guidelines of the Governmental Accounting Standards Board, and the recommendations of the Institute of Internal Auditors. There are four stages of work in our methodology:

- Initially, we **SURVEY** the organization to identify the principal policy, management and operational issues and components so that we comprehend at the outset of the project the work climate and culture of the Division of Solid Waste, as well as the broader Department of Public Works, and develop specific project activities to address those elements. In this stage we finalize the project work plan and schedule and conduct preliminary interviews to gain an entry overview of the organization under review.
- Our next objective is to **UNDERSTAND** the Division of Solid Waste, its work environment, and business processes. It is in this phase that we conducted principal data gathering, interviews

and field observations and completed an initial diagnostic assessment to focus our team's attention on the high value opportunities or areas in need of further examination. Here we documented the current organizational practices, staffing, workload, equipment, management practices and the like.

- Next we analyzed the data and information gathered to date and then **RECOMMEND** improvements to meet the specific objectives of the project. We developed a series of recommendations for each issue observed in the earlier stages. For each recommendation, we identified the issues to be addressed, the recommended course of action, and a business case that supports either the financial and/or operational benefits that will result from adoption of the recommendation.
- Finally, we provide an implementation plan for the Division staff's use as they **EXECUTE** the recommendations.

The following pages present our findings, recommendations and implementation planning. Following this discussion, we present, in Section III, our analysis and recommendations relating to pertinent sections of the Municipal Code as they relate to solid waste and recycling functions. Finally, in Section IV we present a summary of the results of the survey administered to various cities in the country regarding their solid waste and recycling efforts.

SECTION II ISSUES AND RECOMMENDATIONS

Issue 1: Downtown Residential Solid Waste Collection

DESCRIPTION:

The Downtown District is experiencing the introduction of high density buildings that have both residential and a commercial/residential mix of units. In addition, the Downtown District continues to be a place where individual and multi-family residential units are being remodeled or torn down and replaced with newer units. It is the situation with single and multi-family redevelopment that will challenge the Division of Solid Waste's (DSW) ability to maintain the present level of efficiency in the solid waste collection process within the Downtown District.

ANALYSIS AND FINDINGS:

- The Introduction within Paragraph 10.20.120 of the Metropolitan Code addresses the issue of the location of containers. The Introduction states: "The Department of Public Works shall only pick up and dispose of garbage and rubbish in the Urban Services District which has been placed in an alley, on an adjacent curb or on the side of a public road or street..."
- During the last year, the DSW gained access to the Metro planning process and obtained the ability to provide input concerning waste disposal for new construction in the Downtown District. The DSW has advance access to building plans in the Downtown District that involve all major residential remodels or new construction within the Downtown District. The Engineering Division reviews these plans after they have been submitted to the Public Works Department for review.
- The Department of Public Works has a Downtown Business Area Trash Collection and Container Policy in place concerning small business, single and multi-family residential units. The present policy allows a small business to receive two containers free of charge. There is a proposed policy modification that will allow the small business to purchase a third container. There is a three container limit for small businesses. If additional waste capacity is necessary, the small business will be required to obtain a dumpster or compactor and contract with a private hauler for disposal services.
- Single residential units within the Downtown area are issued one container. There is a policy modification proposed that would allow the single family resident to purchase two additional containers, the maximum allowed under the policy.
- Multi-family residential customers with four or fewer units will be issued one container by the Department, and it will be proposed that these customers will be allowed to purchase two additional containers. Multi-family residential buildings with five or more units are required to use a dumpster or compactor.
- The Department maintains standards for the location and situation of dumpsters, compactors and roll-offs in the Downtown District and elsewhere. These standards include requirements for the pad upon which the unit is placed, ingress and egress standards and the area immediately adjacent to the collection medium.
- Downtown trash collection is accomplished twice daily, seven days per week. This collection is done by two person crews using semi-automated vehicles. Carts are placed in alleys in accordance with

city administration goals to maintain the aesthetic quality of the Downtown and to keep the public right-of-way clear for safety purposes.

- The Downtown District has about 576 stops: 276 containers and 300 street baskets. These stops are collected by two Downtown District crews using semi-automated vehicles. Almost all of the containers are located in 40 alleys.

RECOMMENDATION:

It is recommended that the proposal of the Public Works Director to charge for additional containers for single and multi-family residential customers and small businesses within the Downtown area and throughout the USD be reviewed by Department of Law to determine if this recommendation requires approval of the legislative body or changes in law. The charge should be a total of \$45.32 per delivered container which includes the cost of the container (\$38), a delivery charge based upon operational cost per mile for the vehicle and driver’s time (\$2.32) and indirect costs associated with administrative activities that serve this function (\$5.00).

IMPLEMENTATION PLANNING AND ISSUES:

Responsibility	Priority	Precedent Steps	Estimated Cost/(Savings)	Time Frame for Implementation
Department of Law and Public Works Director	High	Contingent upon the findings of the Law Department, the Public Works Department and DSW staff need to follow the steps necessary to institute the Public Works Director’s proposal to charge for additional containers for single and multi-family customers and small businesses within the Downtown area and throughout the USD.	This approval will be cost and revenue neutral for the Public Works Department if a price of \$45.32 per delivered container is adopted. The cost to the research and preparation of Legal Department is an additional, but unknown cost	To become effective January 1, 2008.

Issue 2: Contractor Monitoring

DESCRIPTION:

Currently, two Supervisors report that they have oversight responsibilities for private contractors providing solid waste and brush collection services for the Division of Solid Waste (DSW) within the Urban Services District. One Supervisor oversees Brush and the other oversees solid waste. However, only one Supervisor is assigned this task as a primary duty that takes the majority of the Supervisor's time. The services monitored include brush collection (performed by SRS, Inc.), automated solid waste collection (Red River) and semi-automated collection (by Red River, Hudgens and Waste Industries). Presently, contractor monitoring is response-driven for semi-automated and automated solid waste collection routes because there is an insufficient time commitment made for routine monitoring of these routes.

ANALYSIS AND FINDINGS:

- It has been the experience of the project team that contract administration and field monitoring should typically be the equivalent of 4% to 8% of the contract price. For the fiscal years FY 05/06 and FY 06/07, the DSW had contracted brush and trash collection services valued at \$7,459,400, or an average of \$3,729,700 for each fiscal year. This would suggest that the equivalent of \$149,188 to \$298,376 would be spent on the administration and monitoring of contracted collection services. It is estimated that the two DSW Supervisors who are charged with contract oversight as part of their duties expend about 46 hours per week or about 2,932 hours annually in the field monitoring contractors providing collection services. The value of these hours is estimated to be approximately \$64,600 or approximately 1.7% of the average contracted collection value for the fiscal years FY 05/06 and FY 06/07. (The project team recognizes that both financial and administrative contract monitoring efforts are also made by personnel located elsewhere in the Division; however, the amount of time and its value are unknown.)
- The oversight of the contractors by DSW Supervisor is response-driven. Although the complaints are typically addressed in a prompt manner, there is no written documentation of these events unless they are reported through the Call Center or Public Works Administration. Incidents reported to the Call Center by the public have a written description of the nature of the DSW field issue and the resolution of the issue recorded by the Call Center on a daily basis. Should a citizen require a follow-up call, the call is made by a member of the DSW staff before the Call Center closes the incident.
- DSW has indicated that after the completion of the project team's on-site visits, the issue of overspill is being managed with the contractor. Assuming this is the case, the Brush Supervisor and Supervisor for Contracted Trash Collection are able to handle daily oversight of the brush and solid waste collections by private firms as a matter of routine.
- Three other Supervisors may provide oversight of the DSW solid waste collections during the four, ten hour days each works. These Supervisors have the experience and training necessary to support either the Brush or Contracted Trash Collection Supervisors in an emergency or when either of the primary private sector oversight Supervisors is on leave. As noted immediately below, the Curby and Metro Solid Waste Collection Supervisors are available an estimated 28 hours weekly to support or replace on a short term basis the primary oversight Supervisors.

- The Curby Supervisor spends about an hour each day preparing and outlining work for the Curby recycling crew including maps, directions and special service orders, and provides routes for the “back-door” recycling collection unit that includes “misses”. The Supervisor also spends time in the field overseeing automated recycling collection operations and dealing with complaint issues. The Curby Supervisor has a Supervisor that assists in these efforts. As a result, the Curby Supervisor has approximately four (4) hours per day, or sixteen (16) hours weekly for contract monitoring.
- The Metro Solid Waste Collection Supervisor is in charge of semi-automated trash collection. In this role, the Supervisor has responsibility for eight, two person crews that service 32 routes per week. This Supervisor has no assistant, and is frequently required to redeploy the Unit’s personnel to other tasks such as clean-up of overfills or collection of bulk goods or other non-refuse loads. The Supervisor spends time in the field with crews, responds to complaints and also assists with oversight of the private contractors who are collecting refuse. The Supervisor’s contract oversight duties focus on Red River which provides the majority of the semi-automated collection by private contractors. The estimated time available for contractor oversight by this Supervisor is approximately three (3) hours per day, or twelve (12) hours weekly.
- The responsibility for the oversight of contracted solid waste collection is that of a single Supervisor. This Supervisor also oversees the distribution of recycling and solid waste containers for new homes and commercial sites as well as additional containers to existing collection sites. This work can require the delivery of 40 to 60 containers weekly, or two to three truckloads. This Supervisor’s main responsibility is coordination with three supervisors from Red River who are in charge of two (2) semi-automated collection routes and twenty (20) automated routes daily. The estimated time available for contract oversight by this Supervisor is approximately thirty (30) hours per week.
- The DSW Brush Supervisor is responsible for the oversight of the brush removal contractor. The DSW Brush contractor, SRS, Inc., performs brush removal on 9 routes, 5 times annually. Like the DSW Brush Unit, the contractor operates Tuesday through Friday. The Brush Unit Supervisor is responsible for two units – in-house brush removal and a five person front end loader team. The Brush Unit Supervisor has a Supervisor who oversees the daily operations of the 12 person, DSW in-house brush collection and removal effort. The Brush Supervisor oversees the five person front end loader operation that hauls multi-family and commercial solid waste dumpsters (Tuesday through Friday) and recycling dumpsters (Wednesday and Thursday). It is estimated that the Supervisor has approximately 18.4 hours available for contract oversight. Due to the nature of the work of brush removal, the DSW Supervisor charged with overseeing the work of the contractor can likely accomplish this without assistance from outside the unit.
- The two Supervisors now providing oversight to the private contractors that provide solid waste and brush collection for DSW have approximately forty-six (46) hours weekly to provide contract monitoring services. This is 30 hours weekly for the Supervisor who oversees private solid waste collections and 16 hours for the Brush Supervisor.
- When either or both of these two assigned, oversight Supervisors is absent, there can be a reduction in available oversight time. The reduction in available contract monitoring hours is a function of the number of hours available for this task by the Metro Solid Waste Collection and Curby Supervisors. The hours available vary from 12 hours to 16 hours available depending on which of the two Supervisors is available. The table below displays the time available for contract monitoring by these two Supervisors when either or both assigned Contract Oversight Supervisors require additional support or when either or both require replacement due to absences.
- Private contractors provide collection services to 112 routes weekly. This work is accomplished through the collection of 32 semi-automated routes and 80 automated routes. Eight semi-automated routes are collected by Red River, Hudgens and Waste Industries four times per week. Red River

collects twenty routes four times per week using automated collection vehicles. Like the DSW, the private contractors use a four day work week (Tuesday through Friday) and a ten hour work day.

<p align="center">Contract Monitoring Work Elements Solid Waste Collection</p>	<p align="center">Monitoring Time per Route Solid Waste and Brush Collection</p>
<p>A. Routes per Week to be Monitored</p>	<p>(8 semi-automated routes/day) (4 days/week) = 32 routes/ week (20 automated routes/day) (4 days/week) = 80 routes/week 112 Routes / Week (9 Brush Routes) (5 Clean-Ups /Route) = 45 Clean-Ups (208 operating days /year) / (45 Clean-Ups) = 4.6 days / Route Clean-Up (4 days / week) (4.6 days / route) = .87 routes / week</p>
<p>B. Estimated Available Contract Monitoring Hours for Contract Oversight and Brush Supervisors</p>	<p>Contractor Oversight Supervisor (7.5 hours/day)(4 days) = 30 Brush Supervisor (4.0 hours/day)(4 days) = 16</p>
<p>C. Available Contractor Monitoring Time per Week / Route Contract (Solid Waste and Brush Oversight Supervisors) = C / B</p>	<p>(30 hours) / (112 routes/week)= .27 hours = 16 Minutes / Solid Waste Route (16 hours) / .87 Routes = 18.4 Hours /Brush Route</p>
<p>D. Available Contract Monitoring Support or Replacement Time per Week</p>	<p>Metro Solid Waste Supervisor = (3 hours /day) (4 days) = 12 hours / week CURBY Supervisor = (4 hours / day) (4 days) = 16 hours / week</p>
<p>E. Solid Waste Support or Replacement = D / C</p> <p>Note: The calculation at right represent the total hours available for contract monitoring by the Metro Solid Waste and Curby Supervisors when either the Solid Waste or Brush Supervisors require Support or Replacement.</p>	<p align="center">SUPPORT</p> <p>(12 to 28 Hours + 30 Hours) / (112 routes / week) = (42 to 58 Hours) / 112 routes /week) = 22 to 31 Minutes/ Solid Waste Route (12 to 28 + 16 Hours} / .87 Routes = 32.2 to 50.5 Hours / Route</p> <p align="center">REPLACEMENT</p> <p>(12 to 28 hours) / (112 routes/week) = .11 to .25 hours = 7 to 15 Minutes / Solid Waste Route (12 to 28 Hours) / (.87 routes/week) = 13.8 to 32.2 Hours / Brush Route</p>

The table above suggests that there is sufficient time for the Solid Waste and Brush Contract Oversight Supervisors to provide routine oversight to their respective private contractor. If either of the Contract Oversight Supervisors needs Support in their duties, the number of hours of oversight can be increased 93% per week for solid waste and 152% per contracted brush routes. If both Contract Oversight Supervisors require Support at the same time and assuming one-half of the available Support hours are allocated to each Contract Oversight Supervisor, the available rate of Support is reduced. For solid waste, the Support Supervisors would provide a 47% increase in the hours per week provided by the Solid Waste Contract Oversight Supervisor, while brush oversight would increase 76% of the amount of hours per route provided by the Brush Contractor Oversight Supervisor.

If either of the Contractor Oversight Supervisors required replacement, the Metro Solid Waste and Curby Supervisors could provide 93% of the weekly hours of solid waste oversight currently provided and 152% of the hours per brush route currently provided. If both the Solid Waste and Brush Contractor Oversight Supervisors required replacement simultaneously and assuming one-half the total hours were allocated to each, the replacement Supervisors would provide 47% of the current hours per week provided by the Solid Waste Contract Supervisor and 76% of the hours per brush route currently provided by the Brush Supervisor.

RECOMMENDATIONS:

- Whenever possible, DSW management should avoid allowing the simultaneous absences of both of the Supervisors assigned to provide oversight to solid waste or brush contract collectors.
- Because the simultaneous absences of the two assigned Contract Oversight Supervisors cannot always be avoided, the other four Supervisors in the in the Division of Solid Waste including the assistant Supervisors in the Brush and Curby Units and the Metro Solid Waste Collection Supervisors should maintain their cross-training in the basics of the contract oversight supervisory positions through the existing practice of moving Supervisors between the contract areas of responsibility periodically as time and circumstances permit.

IMPLEMENTATION PLANNING AND ISSUES:

Responsibility	Priority	Precedent Steps	Estimated Cost/(Savings)	Time Frame for Implementation
DSW Operations Manager and Public Works Staff	High	Maintain cross-training the four DSW Supervisors who are not regularly involved in contract oversight of the contract collection Supervisors.	Four Supervisors @ eight (8) hours. Estimated cost of \$925 in staff time and materials. Materials to include electronic copies of Metro Code on Solid Waste Brush and Recycling and contracts with private providers.	September, 2007
DSW Operations Manager and Public Works Staff	High	Create standardized form for use by Supervisors providing oversight to	Part of cross-training exercise that follows class room hours. Staff time 16 hours = \$500.	August, 2007

Responsibility	Priority	Precedent Steps	Estimated Cost/(Savings)	Time Frame for Implementation
		contractors.		
DSW Operations Manager and Supervisors	High	Create a schedule for field cross training and days and hours of contractor oversight.	Staff time 16 hours = \$500	July, 2007

Issue 3: Eligibility for Waivers

DESCRIPTION:

Under Section 10.20.130 of the Metro Code the Public Works Director has been designated "...to promulgate and provide for the conditions which shall warrant a waiver for the elderly and handicapped, disabled or other persons from being required to comply with the provisions of 10.20.120 (of the Code)." In practice, the elderly are those persons who can demonstrate that they are 65 years of age or older, and the disabled are those individuals who can have a doctor vouch that their patient has an illness(es) that prevents the patient from complying with the requirements of Section 10.20.120 of the Metro Code. Section 10.20.120 of the Code requires that persons within the Urban Services District receiving once per week trash collection using a standardized container provided by the Metro Public Works Department must comply with the size and weight restrictions the Public Works Director may place on the container service. Individuals who are handicapped, disabled or elderly and residing in a single or duplex setting pay for solid waste collection, but receive a waiver from the requirement to place their collection container in an alley or curbside.

To date, the waiver eligibility criterion has created an unanticipated inequity. With the exception of those disabled persons who are 65 or older and receive the waiver, there is an unstated assumption that 65 years of age is the point in life when people are unable physically or mentally to set out their trash weekly. These individuals receive specialized collection that requires that DSW staff expend the time necessary to collect the collection container from a location that is removed from the curb or alley way, move the container to the collection vehicle and return it to its original location.

ANALYSIS AND FINDINGS:

- In 2005, the waiver program had 4,632 elderly and 387 disabled persons or a total of 5,019 individuals. According to the 2005 Annual Report to the Metro Council, the population receiving waivers was 3.96% (5,019 waiver customers/126,683 total customers served) of the estimated customer base for 2005.
- Presently, the American population is living longer than ever before through unprecedented medical advances, which have rendered the definition of "elderly" at age 65 years or older as arbitrary. However, the price of this longevity is a multiplicity of illnesses that older persons can survive, but which diminish their physical and/or mental ability to deal with such tasks as setting out trash and/or recycling containers at the appointed date and time. Similarly, despite improved medical procedures and technologies, a disabled person may not be able to perform the tasks of setting out trash and recycling regardless of their age, physical abilities or willingness or desire to do so.
- According the 2002 US Census data for Tennessee, the state's population was 5,214,985 and the non-institutionalized portion of the population with a self care disability (physical, mental or both) was 1.61% for the population with an age of 16 to 64 years of age and 1.55% for that part of the population 65 years of age and greater. It is estimated that the Urban Services District had a disabled population ages 16 to 64 of about 4,900 in 2002 and about 4,800 of the population over 65 had this status.
- Although the waiver represents an attempt to assist two classes of individuals that are perceived as deserving of this assistance, it does represent an inequity because it may miss the targeted beneficiaries. Certainly there are persons within the Urban Services District who are over 65 years of

age, or those who are disabled and continue to set out their own trash and recycling containers, or receive assistance from friends or family in doing so. At the same time, there are persons, regardless of age, who cannot perform these tasks and do not have the support network necessary to assist them in performing these tasks.

RECOMMENDATIONS:

- It is recommended that the waiver option for those 65 or more years of age be eliminated within twelve months of the adoption of a resolution by the Metro Council to take this action.
- It is recommended that the Public Works Director adopt a universal definition of disability that is age neutral, but takes into account an individual’s ability to perform the tasks associated with trash or recycling disposal. The Director should arrange for a form to be placed on-line that allows physicians to register a patient for a waiver. The form would require a physician to define a patient’s limitations within the parameters established by federal law. All of those under the present waiver system would also be required to re-apply. The new waiver policy would be advertised during the roll-out phase.
- Those who are approved for this waiver would pay an annual permit fee in lieu of an equal share equivalent to the cost of 13 weeks of service, based upon the Annual Report to the Metro Council of the previous year. (Example – For 2006, the permit fee for qualified participants would be \$24.10 ((13 weeks / 52 weeks) x (\$96.38 cost for 2005) = \$24.10)
- It is recommended that the Metropolitan Government, through the Department of Law, determine if a recommendation to change the information on the property tax bill would require approval of the legislative body or a change in law. The change in the tax bills of each taxpayer within the Urban Services District would list the costs of all services for which they pay taxes to include police, fire, road and bridge maintenance, trash collection and disposal, elementary and secondary education and the like. The information would also be made available with detail on the Nashville.gov website and through press coverage of the approved budget.

IMPLEMENTATION PLANNING AND ISSUES:

Responsibility	Priority	Precedent Steps	Estimated Cost/(Savings)	Time Frame for Implementation
Public Works Director and Department of Law	High	Contingent upon the findings of the Department of Law, the appropriate appointed or elected body would eliminate present waiver program and introduce a universal definition of disabled.	Cost Neutral	January, 2009 (Phase out waiver within 12 months of passage of resolution.)
Public Works Director and Department of Law	High	Contingent upon the findings of the Department of Law, the appropriate appointed or elected body would	Estimated revenue of approximately (\$120,000 to \$130,000)	July, 2009 (Effective 6 months after passage of the resolution)

Responsibility	Priority	Precedent Steps	Estimated Cost/(Savings)	Time Frame for Implementation
		take the action necessary to require an annual permit fee for those who receive a waiver. This would be equal to 25% of the cost of trash collection and disposal as calculated in the previous year's Annual Report to the Metro Council or such other document that serves the same purpose as the Annual Metro Report to the Council.		ending the waiver program.)
Department of Law and Tax Assessor	High	Based on the findings of the Department of Law, the appropriate appointed official or elected body would take the action necessary to modify the property tax bill format so that the cost to each property owner within each tax district that comprises the USD will receive the cost of the services provided by Metro Government on their individual tax bill.	Cost unknown. Data are already compiled. May require re-formatting tax bill and will require programming to place these costs on the tax bill.	January, 2010 (Next tax bill year after the passage of the waiver elimination resolution.)

Issue 4: Enforcement of Container Set Out Regulations

DESCRIPTION:

The Metropolitan Code governing the enforcement of solid waste container set-outs lacks the necessary substance to allow effective enforcement. The process that is in place involves at least two, and sometimes three, different departments of the Metropolitan government, is time consuming and does not promote effective trash collection.

ANALYSIS AND FINDINGS:

- Presently, the Division of Solid Waste (DSW) enforcement focus for solid waste disposal is limited to residential containers left out past the time (7 PM) the containers are to be taken off the street (Ordinance 89-826), and noise resulting from emptying a dumpster between 11 PM and 6 AM within three hundred feet of a residence (Metro Code 10.20.300. E.).
- There is only one (1) DSW Supervisor who actively enforces container set out regulations.
- As outlined below, the prosecution of an “after hours” violation is labor intensive and time consuming. Upon observation of an initial “after hours” violation, the following procedure is followed:
 - The DSW Supervisor photographs the violation and notes the address, date and time of the observation on the photo. The Supervisor then issues a cordially-written corrective action letter of warning.
 - If there is a second case within thirty (30) days, the Supervisor again documents the situation through photography before producing and issuing a registered letter to the property owner.
 - For a case in which a third violation occurs within the thirty day period, the violation is again documented photographically by the Supervisor.
 - The Supervisor meets with the Metro Code Department liaison for DSW in order to review the evidence collected, the documentation of the violations and written contacts with the violator. The Code Department liaison then decides if the evidence and documentation are sufficient to present to Environmental Court. This decision can involve discussion with the District Attorney.
 - The DSW Supervisor must present the case in Environmental Court. In a first violation, these types of cases do not typically warrant a conviction.
- The DSW has six (6) other Supervisors who could be trained to perform the container set out enforcement task. All are experienced Public Works employees, and most have spent the majority of their careers in the DSW. In this monitoring role, each of these Supervisors can observe such violations as residential units that have chronic overspill and “after hours” set out violations.

RECOMMENDATIONS:

- It is recommended that the Public Works Director request that the Law Department determine what steps would need to be taken to authorize Supervisors of the Division of Solid Waste (Public Works

Department) to issue citations for Metro Code violations concerning solid waste and recycling collection.

- Contingent upon the response from the Department of Law, it is recommended that the Public Works Department (PWD) have the six (6) Supervisors who are not presently involved in container set out regulation enforcement trained by the Metro Code Department in case preparation (documentation, notice to the violator, etc.), case presentation (legal terminology, use of maps, diagrams, photographs, etc.) and court decorum. This would make the enforcement of set out regulations a supervisory responsibility rather than the responsibility of a single supervisor.
- It is recommended that the DSW continue its information efforts to alert customers that using non-standard solid waste collection carts causes inefficiencies in the collection operations of the contractor.
- It is recommended that a group be formed to review Public Works contracts with the goal of making specific recommendations on how the Public Works contracts can be improved.

IMPLEMENTATION PLANNING AND ISSUES:

Responsibility	Priority	Precedent Steps	Estimated Cost/(Savings)	Time Frame for Implementation
Department of Law	High	Determine what steps must be taken to have the DSW Supervisors be able to write citations and present their cases in Environmental Court.	Cost of time to research what, if any, steps are needed to implement this recommendation. Cost unknown.	October, 2007
Directors of Public Works and Metro Codes	High	PWD arranges for Metro Codes to train six (6) Supervisors presently involved in solid waste collection in residential areas.	Cost of training includes an estimated 20 hours of staff time at approximately \$550.	Training to commence in February, 2008
Public Works and Metro Codes Directors	High	Supervisors-in-training assist the in-house Supervisor in preparation of an "after hours" case and attend Court with Metro and/or in-house Supervisor.	Cost of training is an estimated 12 hours at \$328.	March, 2008
Appropriate certifying authority	High	Six newly trained and the experienced Supervisors are certified to present cases in Environmental Court.	Cost neutral.	May, 2008

Issue 5: Enforcement of Container Overspill

DESCRIPTION:

Overspill is any trash, bagged or loose, placed outside an approved trash container. Section 10.20.120 of the Metropolitan Code provides clear direction concerning how overspill is to be handled within the Urban Services District (USD). Overspill is an unresolved problem within the USD caused by a small number of service recipients that results in additional time and cost expenditures in the daily operations of the DSW. Ultimately, this additional cost is borne by all taxpayers within the USD whose overwhelming majority comply with the directives of the Metropolitan Code.

ANALYSIS AND FINDINGS:

- The Metropolitan Code (Paragraph 10.20.120, Sections A. through D.) provides language that addresses the overspill issue for single, duplex and other multi-family units as well as commercial and industrial sites in the Downtown core and throughout the USD.
- For each trash generation location, the Metro Code states: “If the Department of Public Works or other department furnishes a waste container for use at the (type of trash generating location), the occupants of such (trash generating location) shall use the container for weekly collection contemplated by this section. Further, such (occupants) shall comply with waste container capacity and weight limitations established by the Director of the Department of Public Works. **Any excess garbage or rubbish shall be disposed of at the expense of the owner or the person in charge of the premises.”**
- The DSW implements the Public Works Department policy of supplying each customer with the minimum number of containers necessary to service the site. This is done at no cost to the recipient. In residential settings, the norm is a single 96 gallon container. An additional container is provided at no cost when requested by the occupant or when a DSW Supervisor notes that the unit regularly requires an additional container.
- Despite this policy of free container provision within the USD, some customers continue to stack excess trash outside the provided container(s). The result is that the overspill team within DSW is called upon daily to spend part of its day collecting this excess waste before it becomes a nuisance in an area.
- Though the Code of Ordinances allows the Public Works Director to require the use of a standardized cart for solid waste collection by an unknown number of customers, the DSW continues to have problems with solid waste customers who do not use the carts made available to them by DSW. The use of non-standard carts undermines the efficiency of the contractor’s automated solid waste collection vehicles which are used for 80 of the 144 DSW routes collected monthly within Metro.
- DSW staff has identified a handful of primarily residential areas that create the majority of the overspill problem. For these areas, overspill is a chronic and ongoing issue.
- The cost of this DSW activity can be estimated based upon a proposed plan to have a private sector vendor collect all overspill. The estimate was \$36,000 per month or \$432,000 annually.

- If the work of overspill clean-up continues to be performed by DSW personnel and equipment, the cost is estimated to be approximately \$921,024 annually. (The cost includes the use of 4 semi-automated trucks with 2 person crews Tuesday through Friday for 10 hours per day, 4 days per week, 52 weeks per year.) The cost calculations are summarized in the table below.
- This estimated cost is actually greater than \$921,024 per year because not only are the DSW personnel and equipment committed to a task that should not exist, but DSW resources are taken from tasks that are required. Several of these required tasks are referenced below.
- Overspill clean-up as presently practiced has been in place for about one year. The current practice requires four Equipment Operators III and four Sanitation Leaders to collect overspill. The remaining seven DSW Equipment Operators and five temporary laborers comprise six teams to do the (8) routes that the Metro Solid Waste Unit must collect daily. The eight routes require about seven hours of the ten hour day; therefore, six trucks with two person crews are able to accomplish this daily task. Although expensive, this process can work most days except when there are one or more equipment failures among the automated vehicles of the recycling fleet which requires semi-automated trucks with two crewpersons to respond. Similarly, leaf collection, alley clean up and other duties assigned this effort can be accomplished, but not without temporary assistance.
- The elimination or a significant reduction in this task would greatly reduce wear and tear on the semi-automated fleet. Under present practice, the semi-automated packer units comprise almost one-half (47.5%) of the DSW fleet. This is the one vehicle type that can accomplish most of the tasks required of the DSW. Running these vehicles 220 miles and 10 engine hours consumes a significant and unnecessary amount of money and equipment. Continuing this practice will cause premature replacement or inordinately high maintenance and repair costs. To illustrate, 4 semi-automated trucks operating 10 hours per day for 208 days per year is 8,320 engine hours and as many as 183,040 miles per year [(220 miles/day) (208 days)]. The criteria in the Metro Vehicle Capital Replacement Plan suggest replacement at 90,000.miles. Also, instead of eight trucks operating daily, there may be ten or eleven trucks required due to overspill. Therefore, each year that this Unit continues to collect overspill, its trucks are accumulating mileage sufficient to create the need to replace more than the equivalent of 2 semi-automated trucks. Further, the DSW keeps more of these units on hand than is necessary due to the maintenance practices that are not meeting demand and the fact that redundancy has been the recommended remedy. The maintenance problem may be exacerbated by the mileage accumulation. Redundant fleet vehicles cost money even if not in use.
- The practice of using four full time DSW Equipment Operators III and four Sanitation Leaders 10 hours per day, 4 days per week, 52 weeks per year to clean up overspill uses 16,640 hours ((8 DSW crew members) (10 hours / day) (4 days / week) (52 weeks)). However, allowing four weeks per year per employee for absences such as leave, requires an additional 32 weeks of effort by other full time DSW staff. Therefore, the equivalent of 8.61 FTEs is used for overspill collection. Although the Metro Solid Waste Collection unit staff are the only flexibility available for DSW management, there is a question as to whether the number allocated to this unit would be necessary if appropriate overspill regulations were in place and timely maintenance and repair were available to this unit.

Overspill Collection Work Elements	Number
A. Average Cost / Mile / Semi-Automated Truck	(\$2.50 / Mile)
B. Number of Semi-Automated Trucks / Day	4
C. Routes per Semi-Automated Truck / Day	5.5

Overspill Collection Work Elements	Number
D. Miles per Route per Day	40
E. Number of Days / Week / Semi-Automated Truck	4
F. Annual Operating Costs for Semi-Automated Trucks = 52 Weeks (A x B x C x D x E)	\$457,600
G. Crewpersons / Day	8
H. Hours / Crewperson / Day	10
I. Days / Week	4
J. Average Hourly Rate + Benefits @ 30%	\$20.95
K. Annual Cost of Labor = 52 Weeks (G x H x I x J)	\$348,608
L. Number of Temporary Hires Used to Work Metro Solid Waste Unit's Regularly Scheduled Routes (8)	4
M. Hours Worked per Day by Temporary Labor	10
N. Number of Days per Week Worked by Temporary Labor	4
O. Estimated Hourly Wage for Temporary Labor	\$13.80
P. Cost of Four Temporary Laborers to Work Metro Solid Waste Unit's 8 Daily Routes = 52 (L x M x N x O)	\$114,816
Q Total Annual DSW Labor, Temporary Labor and Truck Operating Costs = F + K + P	\$921,024

RECOMMENDATION:

- It is recommended that the Public Works Department enforce the Codes or practices that are in place including:
 - The lids on containers should be flush with the body of the container so that excess refuse is not holding the container lid in a partially open position.
 - Provide those residential units that continually generate overspill with an additional container.
 - In accordance with the existing Metro Code, Public Works should provide the first container at no cost to the property owner, and charge the property owner the cost of subsequent containers at the rate of an estimated \$45.32 (\$38 container cost, \$2.32 delivery and a \$5 administrative fee).
 - The Public Works Director proposed a modification to Ordinance 10.20.120 A. through D, that sets a limit of three containers per residence. The property owner should have the option of taking additional solid waste to a convenience center or acquiring a dumpster that can be approved by the Public Works Director to remove waste weekly at a fee.
- Citations should be written for those properties that continue to generate overspill after receipt of the second container. The recommended fine should reflect the cost of the personnel and equipment necessary to accomplish the collection of the overspill.

- For the residential areas that are chronic generators of overspill, the Public Works Department should deliver a clear message that the overspill problem will not be allowed to continue. To do this, the following are required:
 - Leaders of these neighborhoods and property owners should be invited to a meeting with DSW staff in which the staff presents documented evidence (photography, a summary of field notes and specific costs associated with the collection of overspill) of the problem. If possible, there should be a tour of the area to note specific problem locations. The meeting should be held in a public building in or near the neighborhood.
 - The leaders should be informed of what the DSW can do to assist the neighborhood in the resolution of the problem including the role recycling can play in reducing refuse collection and the possibility of introducing a neighborhood drop-off center for recyclables in lieu of individual recycling containers.
 - It must be stressed that DSW crews will no longer provide overspill clean-up service, and citations will be issued to the property owner for clean-up at the actual cost of the service plus the indirect administrative cost (as detailed in the annual indirect cost calculation) for billing and collection. A continued overspill problem can lead to other issues up to and including the property being declared a public nuisance.
 - If necessary, the neighborhood leaders and property owners should be offered a drop-off site for their neighborhood if there are community members who can be responsible for it. This option should be used if the staff can identify public land and neighborhood sponsors prior to the meeting with neighborhood leaders, or if local private property held by a church or other neighborhood institution can provide the land and sponsor the drop-off site for a share of the proceeds from the sale of the recyclables .
 - These neighborhoods should be monitored to determine if progress toward the desired result is being met.
 - There should be monthly follow up meetings that focus on the progress made and needed improvements.
 - Should the effort to remediate the situation provide less than a seventy-five percent (75%) decline in a neighborhood's incidents of overspill within one month of the meeting, citations should be issued to the property owner(s). If it is necessary to file liens against the property, the liens should reflect the actual cost and indirect costs associated with the removal of overspill.
 - The collection of overspill in those neighborhoods that have undergone remediation, but fail to demonstrate a reduction of at least 75% in the incidence of overspill within one month of the remediation meeting, should be performed by the private sector. The private firm shall provide an itemized bill for these services. Billing shall be developed in cooperation with the DSW staff.
- The private vendor's collection of overspill in these neighborhoods will provide exact costs in time and equipment necessary to collect the overspill.
- The availability of DSW personnel and equipment will allow the DSW management to evaluate the number of employees and vehicles DSW needs to complete its daily mission and determine if the Division has appropriate staffing and equipment allocations.
- It is recommended that the DSW continue its information efforts to alert customers that using non-standard solid waste collection carts causes inefficiencies in the collection operations of the contractor.

- It is recommended that a group be formed to review Public Works contracts with the goal of making recommendations on how the Public Works contracts can be improved. Specifically, the committee would examine the contracts governing the operations of the Division of Solid Waste to determine what elements could be modified, added or deleted in order to improve operational efficiency and effectiveness in such areas as overflow collection, availability of collection vehicles under repair by a private vendor removes the vehicles from operations for two to three weeks and other operational issues.

IMPLEMENTATION PLANNING AND ISSUES:

Responsibility	Priority	Precedent Steps	Estimated Cost/(Savings)	Time Frame for Implementation
Public Works Director, Metro Code Department Staff Liaison to DSW	High	Begin enforcement of Metro Code 10.20.120 A. through D, with regard to overspill. (Assumes that the actions recommended in Issue 4 are implemented.)	Cost of staff training to document, prepare and present cases to Environmental Court until such time as certification of DSW Supervisors to issue citations occurs. Cost in staff time 20 Hours or approximately \$550. (Includes 4 Supervisors and DSW Liaison from Metro Code.)	January, 2008, and a grace period from January through February, 2008
Department of Law and, Public Works Director	High	Based on the findings of the Department of Law, take the steps necessary to modify the Metro Code to allow the PWD Director to charge for second and third solid waste collection containers and set a ceiling of three solid waste containers per single family residence.	Cost of time Public Works Director, DSW Operations Manager and Metro legal staff. Estimated 15 Hours valued at \$750.	Passage January, 2008 and implementation February, 2008
Department of Law, Public Works and Metro Code Department Directors	High	Contingent upon the findings of the Department of Law, take the steps necessary to provide training necessary to allow DSW Supervisors to issue citations necessary to enforce Metro Code ordinances on overspill, use of non-standard collection carts and other	Cost of satisfying requirements of District Attorney so that District Attorney will grant certifications to DSW Supervisors to issue citations. Cost unknown.	January, 2008 to determine what steps must be followed to allow Public Works Director to have citations issued for violation of the overspill ordinance effective March, 2008

Responsibility	Priority	Precedent Steps	Estimated Cost/(Savings)	Time Frame for Implementation
		customer actions that raise the service cost		
Public Works Director	High	Implementation of the above three tasks will reduce the need for the present practice of overspill collection.	Reduction in overspill collection could reduce cost of Temporary Labor by 90% or (\$103,300). Maintenance costs would be reduced.	Expected savings by March, 2008
Purchasing and Public Works Director	High	Create RFP and bid the collection of overspill to the private sector.	Elimination of overspill collection by the private sector may save as much as \$489,024 annually. The amount will be greater than this depending upon the degree to which the first three recommendations above are implemented and pursued.	January, 2008
Public Works Director, DSW Operations Manager and DSW Supervisors	High	Work with those 3 to 4 neighborhoods in which the overspill problem is chronic.	Approximately \$1,250 per neighborhood or \$5,000 for outreach, materials and staff time needed to meet with neighborhood leaders and residents, define an alternative acceptable to a consensus of the parties, implement and enforce the agreed upon alternative.	October, 2007
Public Works Director and DSW Operations Manager	High	Select and award a bid to a contractor to perform all overspill clean-up within the USD, and include within the agreement the form of billing and collection of payment from violators of the overspill ordinance	Cost of PWD Staff time and Legal Staff time. Estimated 40 staff hours valued at \$2,000.	Selection and award by March, 2008
Public Works Director and DSW Operations Manager	Medium	Public Works continues its information campaign to alert contractor's customers of issues that result from use of non-standard collection carts and overspill.	Cost of PWD Staff time at an estimated \$400 per month through March, 2008 for a total of \$3,600	August, 2007 through March, 2008

Responsibility	Priority	Precedent Steps	Estimated Cost/(Savings)	Time Frame for Implementation
Public Works Director and DSW Operations Manager	Medium	PWD Director requests that the Metro Council allow the appointment of a citizen's committee to review PWD contracts with an emphasis on improving DSW operational efficiency and effectiveness for solid waste and recycling collection.	Cost of staff time to provide information and otherwise support the committee at an estimated cost of \$400 per month.	Appointments by Council in January, 2008

Issue 6: Expansion of Recycling Service to the Downtown Business District

DESCRIPTION:

The Downtown core does not presently receive recycling services from the DSW. Metro needs to increase the volume of recyclables collected and diverted from the landfill in order to meet goals for recycling set by the state of Tennessee, or 25% of the waste stream. The combined public and private recycling rate for calendar year 2005 was twenty-two percent (22%).

ANALYSIS AND FINDINGS:

- The expansion of recycling into the Downtown District could provide access to volumes of recyclables that could assist Metro in meeting its state recycling goals. The market for recycling in the Downtown District is unknown, however, it was believed to be significant even prior to the advent of high density residential and mixed use construction within the District.
- The DSW outreach to businesses includes use of the Nashville.gov website that has specific information for business recycling such as a list of local recyclers of various types of materials. The number of local businesses within the Downtown District that make use of this information is unknown.
- Large companies sometimes require recycling as a matter of policy. To the extent the Downtown District has such companies, the DSW service would not be necessary.
- Collection of recyclables by semi-automated technology would be a labor intensive exercise for the DSW and impractical for large volumes since it would either require the addition of personnel and trucks or the transfer of these resources from other uses. Use of automated collection technology would be a more efficient and effective method for collecting recyclables in volume within the Downtown District.
- There are no convenience centers or drop-off sites within the Downtown District. The introduction of such a facility could facilitate the recycling effort by providing a convenient alternative to relatively small generators of recyclables within the Downtown District.

RECOMMENDATIONS:

- The DSW should initially focus its research effort on the recycling needs of businesses and high density residential or mixed use enterprises within the Downtown District that have sufficient volume to warrant recycling collection by automated technology.
- Since the market for recycling among the businesses within the Downtown District is unknown, it is recommended that a DSW outreach occur that uses the Nashville.gov website, public service announcements, handouts including a questionnaire at businesses and direct mail to businesses in the Downtown District to determine if there is interest in recycling.
- The questionnaire should be brief and should include the name and address of the business, a contact person with telephone number and e-mail address, a question concerning whether the business

currently recycles, and the type and volume of materials, if known. Lastly, a question should be posed to the contact person to determine if they would like further information on recycling options.

- The purpose of the questionnaire would be to target possible large volume recycling generators for follow-up by DSW staff and to provide information to small businesses that express an interest in recycling, but whose volume may better lend itself to a method other than automated collection technologies.
- The Supervisor who presently oversees Downtown District solid waste collection should be designated as the point of contact and follow-up for interested businesses that have recycling volumes which may warrant an automated collection method.
- Public Works support staff should create a database summarizing the business data feedback, and support staff, the DSW Operations Manager and Supervisors analyze data to define recommendations concerning what strategy and tactics may be used to efficiently penetrate the Downtown District market.
- If there is sufficient interest from smaller generators, the possibility of a drop-off site on the fringe of the Downtown District would be a cost-effective alternative.

IMPLEMENTATION PLANNING AND ISSUES:

Responsibility	Priority	Precedent Steps	Estimated Cost/(Savings)	Time Frame for Implementation
Supervisor that oversees solid waste collection in the Downtown District, and Education personnel	High	Operations Manager and Supervisor works with Education staff to launch outreach effort.	Staff time estimated to be 24 Hours at approximately \$650.	May, 2008
Education staff and Operations Manager	High	Create and distribute a questionnaire for Downtown businesses. Obtain addresses for direct mail from business license database.	Staff time estimated to be 6 Hours, or approximately \$160. Materials are estimated at \$1,000.	February, 2008
Public Works staff, DSW Operations Manager and Downtown Supervisor	High	Create a database from questionnaire findings and analyze database to determine means to serve the portion of the business market that expressed an interest in recycling.	Estimated cost to create database 6 Hours staff time is \$120. Estimated cost to analyze database is approximately 24 Hours at \$850	March, 2008

Issue 7: Low Set Out Rate Recycling Routes

DESCRIPTION:

There is a wide variation in set out rates (a measure of recycling participation) experienced by the DSW Curby Program. Thirty-two recycling routes or 22% of the Curby Program’s routes, have levels of participation of fewer than 1 in 5 households. At the other end of the spectrum, there are 32 routes that have levels of participation ranging from 2.5 to 3.5 of every 5 households. The set out rate for Metro is 40% which is slightly below three of the surveyed cities that have an average participation rate of 43.67%. The present set-out rate contributes to the shortfall of the state goal of diverting 25% of the waste stream, and the participation rate also builds inefficiency into the Curby recycling effort. Low participation routes can be alley collection routes. The collection units for recycling in alleys are 18 cubic yard packer trucks that are relatively new (2004). These semi-automated trucks use two-person crews and require about the same engine hours to collect the low participation routes as those routes with higher recycling volumes.

ANALYSIS AND FINDINGS:

- The Curby curbside recycling collection program has a forty percent (40%) average set-out rate. As demonstrated in the table below, seventy-four routes have a range of rates between forty percent (40%) and seventy-five percent (75%). Seventy (70) routes have rates of less than forty percent (40%). These routes range from 11.96 % to 39.99% household participation.
- The table below demonstrates the range of set-out rates by the number of routes in the Curby Program in calendar year 2005. Note that there are thirty-two (32) routes with rates below thirty percent (30%). These are routes that are completed by collection units quickly since there are fewer sites on each route which contribute recyclables.

Ranges of Set Out Percentages	Number of Routes
10 to 19.99	13
20 to 29.99	19
30 to 39.99	38
40 to 49.99	42
50 to 59.99	19
60 to 69.99	11
> 70	2
Total	144

- There is one benchmark that should be considered when the set out rate for recycling in the Metro area is discussed.
 - The benchmark is the 43.67% average set out rate experienced by the three (3) peer cities with which Metro was comparable for the purposes of this study, and which reported such

applicable figures. In order for Metro to meet the set out rate of its peers, approximately 3,800 additional households (assuming 2.3 persons per household) would be necessary. This would only require an increase of approximately 6.9 % more households than the current estimated participation (21,114 households) in the curbside recycling collection program (Curby).

- The Metro recycling programs and private sector recycling efforts diverted approximately 22% of the total waste stream in 2005. The recycling expectations established for Metro by the state of Tennessee require a diversion rate of 25% of the waste stream. To reach this diversion rate would require that Metro and the private sector divert by recycling, or other means, approximately 270,580 tons, or 32,280 tons more than was recycled by the public and private sectors combined in calendar year 2005. These 32,280 tons represent saved landfill space equal to a football field (including both end zones) covered by recyclables to a depth of about 17.3 feet.
- In order to meet the state goal of a 25% diversion rate, the benchmark for recyclables noted above and the actual municipal solid waste (839,779 tons) and recycling (238,111 tons) figures from 2005 are used. For 2005, the municipal waste and private sector recycling volumes would have to yield 32,280 tons so that the volume placed in the landfill would be reduced from 839,779 tons to 807,499 tons. If the Metro recycling effort (Curby) added approximately 1,450 households, it would meet the 42.75% set-out rate. This incremental increase would yield 912 tons of recyclables. However, Metro drop-off and convenience centers and the private sector would have to add 31,558 tons of recyclables to reach the 25% diversion rate.

RECOMMENDATIONS:

- It is recommended that the thirty-two (32) routes in the ranges of 10% to 29.99% be submitted to analysis using the Public Works Department ROUTE SMART program. The goal would be to create one set of sixteen (16) routes. In order to do this, there would be a need to:
 - Minimize the travel distance between the participating households within the existing thirty-two (32) routes;
 - Create 16 routes that begin at the DSW offices and end at the recycling center. Each of the 16 newly created routes should have an average set out rate in the range of 20% to 24%.
 - Determine, as another alternative, if it is possible to create eight routes with an average set out rate in the range of 40% using the same criteria as noted in the first two bullets above.

IMPLEMENTATION PLANNING AND ISSUES:

Responsibility	Priority	Precedent Steps	Estimated Cost/(Savings)	Time Frame for Implementation
DSW Operations Manager, Curby Supervisor and GIS Analyst.	High	DSW Operations Manager and Curby Supervisor meet with GIS Analyst to determine how low participation recycling routes can be	Estimated cost in staff time of 18 hours is estimated at \$500.	August, 2007

Responsibility	Priority	Precedent Steps	Estimated Cost/(Savings)	Time Frame for Implementation
		combined in order to maximize the benefit to the Division and Department.		
GIS Analyst	High	Do analysis with several iterations as noted under the Recommendations.	Estimated Staff time cost of 24 to 40 Hours valued at approximately \$1,250 to \$1,900.	August, 2007
DSW Operating Manager, Curby Supervisor and GIS Analyst	High	Choose routing that minimizes disruption to customers, is consistent with normal Curby workloads, maximizes the use of automated collection units and maximizes collection time reductions.	Estimated staff time of 30 Hours valued at \$1,000.	August, 2007 through September, 2007
Public Works Director and DSW Operations Manager.	High	Implement route consolidation.	Cost Unknown. (There will be a savings of time for at least one, two person crew. Estimated minimum savings of staff time of 40 hours, or \$1,000 per week, and an unknown savings in operating and maintenance costs savings associated with one packer truck.)	Target April, 2008

Issue 8: Expansion of Recycling Drop-Off Sites in the USD and GSD

DESCRIPTION:

Drop-Off sites have been a valuable resource and efficient means in the Division of Solid Waste's attempt to increase recycling volumes and to assist in keeping areas clean within the Urban Service District. While the data do not support an expansion of this effort within the USD at this time, the potential of this approach to capture recycling volumes in the General Service District should be examined.

ANALYSIS AND FINDINGS:

- Between 2001 and 2005, the tonnage of recyclables collected at the drop-off sites within the USD declined from 9,115.22 tons to 5,742.88 tons. For this five year period, this reflects a reduction of 3,372.3 tons or 37% of the tonnage. The volume of recyclables collected in 2001 represented the peak for the drop-off program for the five year period. The date and volume are significant because the Curby Program (curbside recycling) did not begin until 2002. The reduction in drop-off site volumes and number of sites suggests that the Curby Program may have had an immediate and significant impact on the use of drop-off sites.
- The DSW reduced the number of drop-off sites by 40% from fifteen (15) to nine (9) during the 2001 to 2005 timeframe.
- The reduction in the number of sites and reduced tonnages resulted in average tonnage per site ranging from a high of 651.1 tons in 2001 when there were 15 sites to a low of 473.0 tons in 2004 with 13 sites. In 2005, with 9 drop-off sites operational, the average tonnage per site rebounded to 574.3 tons per site.
- In 2006, the drop-off sites experienced an 8% increase in volume, from a total tonnage of 5,405 to 5,825. This has been attributed to the opening of a tenth drop-off site at Dupont - Hadley Middle School and targeted educational and promotional materials at select drop-off sites throughout the system. A new drop-off site, the eleventh, will be operational in the summer of 2007 at the Wal-Mart located at Old Hickory Boulevard and Edmonson Pike.
- There is a need to continue to provide the public information on the drop-off sites within the USD to determine if the pre-Curby Program recycling volumes can be reached or surpassed. Part of this informational effort can be designed to encourage the members of the small business community to use these sites for the disposal of recyclables.
- Curbside recycling collection (Curby Program) was fully operational in 2002. By 2004, the "Curby" curbside program collected an annual volume of 12,360 tons of recyclables. This amount increased to 13,213 in 2005, or by almost 7%.
- It is suggested that there is an inverse relationship between the growth in the recyclable tonnage collected through the Curby Program and the reduction in tonnage collected at drop-off sites within the USD. Simply put, the more recycled materials collected by the Curby Program, the less recycled materials that are collected at drop-off centers.
- The convenience of curbside collection and availability of multiple containers for recycling at no cost could be factors that limit, if not eliminate, trips to drop-off centers by those who use the Curby service for recycling.

- The reduction in drop-off sites from 15 in 2001 to 9 in 2005 may reflect an adjustment in the number of sites that more appropriately fits customer demands. The average tonnage collected per drop-off site was 574.3 tons in 2005. This is 88.2% of the average amount of tonnage per site collected in 2001. However, the opening of a tenth drop-off site in 2006 helped to increase the total volume of the drop-off system by 8% in 2006. The average volume per site also increased slightly to about 583 tons.
- It is notable that the Public Works and DSW staffs have made improvements to the drop-off site concept. These improvements are the results of discussions between DSW staff and site sponsors regarding site specific concerns and needs. Improvements included the assignment of a position to inspect and clean each drop-off site daily, signage installed at several sites to improve visibility, enhanced signage at all sites to assist site users in the proper use of the site and reduce contamination and illegal dumping.
- In October of 2005, the Metropolitan Government passed Ordinance BL-2005-768 which annexed a significant portion of Council District 32 into the Urban Services District. In accordance with Article 1, Section 104 of the Metropolitan Charter a range of services will either be enhanced or introduced to this newly annexed area due to its urban characteristics. Among the services that are to be introduced will be the collection of recyclables. DSW estimates that collection will begin in early February, 2008 and that the area has 3,000 to 4,000 residential units that will be served by the Curby Program.
- In anticipation of the annexation, DSW requested the acquisition of three (3) sidearm loading collection units with an 18 cubic yard capacity.
- Effects of the Curby Program providing services to 3,000 to 4,000 residential units are demonstrated in the table below. The addition of three side-arm loading collection units (18 cubic yard capacity) should be sufficient at 3,000 units based upon the calculations shown in items A. through K. of the table. At 3,000 residential units, each of the 3 collection units would generally require disposal once per day. On an estimated 4 occasions per year (.02 x 208 Collection Days) each of the 3 vehicles assigned to the annexed area could require a second disposal trip. At 4,000 residential units, there could be an estimated 75 occasions in which each of the 3 units would require a second disposal. The routing of the Curby Daily Use sidearm and rear –end loading fleet, and availability of Curby equipment and personnel will be key factors in determining the degree to which the second disposal trip becomes problematic.
- The analysis found in items L. through T. of the table estimates the situation with vehicle availability when Curby has 8 Daily Use Vehicles and 2 Spares to perform its collections. The Spares will be able to assist the Curby daily collections and/or replace Daily Use Curby sidearm units when as many as two Daily Use vehicles are not available. It is estimated that the two Spares will be available 126 days or 60.7% of the 208 of Curby operating days (.607 x 208 Days) annually. [Note-The three new sidearm collection units come with new federally mandated exhaust systems that could cause the time in maintenance or repair of these units to be greater than the older, pre-2007 sidearm units.] However, there are situations in which two or more Daily Use vehicles and/or one or both Spares are not available. In these cases, one or more of the two drivers from the four rear-end loading Curby collection units are replaced by temporary labor and the driver(s) operate the available Curby sidearm units or a driver and a temporary laborer operate one of the Metro Solid Waste Collection Unit's Spare rear end loading collection unit. The cost of a temporary laborer is an estimated \$130.80 per day (10 hours x (\$12/hour wage + \$1.80 Temp Agency burden). If at least one temporary laborer per day is needed, the annual cost is an estimated \$27,206 (\$130.80 x 208 Days).
- Availability of DSW labor is also part of the operational situation. During a period spanning at least twelve months in 2005 and 2006, the DSW had 5 rear-end loading collection units and 8 staff assigned to collect overspill for the private vendors contracted to collect solid waste within the USD.

Subsequent to the Project Team’s on-site work, communications with Public Works staff indicated that this overspill situation was being managed. To the extent that this effort frees the equipment and employees assigned to overspill collection, neither labor nor equipment will be an issue for the Curby program going forward.

Estimated Volumes and Vehicle Availability for the Curby Program to Serve the Annexed Area, 2008	Number
A. Number of Households	3,000 to 4,000
B. Average Household Size	2.4
C. Pounds per Week per Person	45
D. Estimated Set-Out Rate	40%
E. Estimated Tonnage = (A x B x C x D) / 2,000 Pounds / Ton / Week	64.8 to 86.4
F. Estimated Cubic Yards per Ton	3.4
G. Estimated Cubic Yards per Week	220 to 294
H. Cubic Yards Capacity of Side arm Loader Collection Unit	18
I. Estimated Number of Side-Arm Loaded Trucks Available for Collection of Annexation	3
J. Number of Collection Days per Week per Sidearm Unit	4
K. Estimated Number of Disposal Trips per Collection Week (4 Days) per Collection Unit = H x I x J / G	1.02 to 1.36
L. Number of Days per Year Recyclables Collected	208
M Estimated Days of Downtime per Sidearm Collection per Year	70
N. Estimated Number of Sidearm Collection Units Needed for Daily Use with Annexation	8
O. Estimated Downtime per Year for 8 Sidearm Units = M x n	560
P. Estimated Days of Downtime per Spare Sidearm Unit per Year	34
Q. Estimated Number of Spare Sidearm Units Spares	2
R. Estimated Number of Downtime for Spare Units per Year = P. x Q.	68
S. Estimated Days Spares Available to Replace Daily Use Units Collecting Recyclables = (J. x Q.) – (S.)	340
T. Estimated Percentage of Days Spare Sidearm Units Available to Replace Daily Use Units per Year = S./ O.	60.7

- The General Services District has 46,194 residential units (37,628 single family, 1,867 multi-family and 6,699 condominiums). A limited experiment involving the introduction of a drop-off site at an area fire station or school within the GSD could be valuable for what can be learned about the attitude of persons toward recycling. The Harpeth Valley area within the GSD has been suggested as an area that may support a drop-off site.

RECOMMENDATIONS:

- The improvements made to the existing sites based on the lessons learned from the experiences of the DSW staff and site sponsors should be implemented at any new sites that may be introduced. For example, sufficient directional signage to the site, informational signage at the sites that assist the user in the proper use of the site and the assignment of DSW staff to provide daily clean-up at the sites have all proved to be successful improvements.
- The expansion of the drop-off site program within the USD should be approached cautiously. Although the drop-off sites are more efficient than the Curby Program (\$39.30/ ton versus \$61.19 for Curby), the present number and geographic distribution of drop-off sites are serving present demand while tonnage per drop-off site remains below the pre-Curby Program collection level of 651.1 tons per site. Further, the present capacity of drop-off sites can be expanded through the addition of roll-off containers and/or more frequent removal of the existing containers.
- Since the availability of 3 additional automated (sidearm loading) collection units is necessary, but not sufficient to eliminate use of temporary labor or the use of vehicles from outside the Curby operation in the collection of recyclables, it is recommended that the overspill issue be eliminated through the contracting of this service to the private vendors providing solid waste collection in the USD. This would allow the replacement of at least 4 and as many as many as 7 older model rear end loaders in the Metropolitan Solid Waste Collection Unit’s fleet and the availability of the eight employees would allow meaningful cross-training to resume so that all staff could qualify as drivers. Adding drivers through training of the seven non-drivers in DSW will extend the flexibility of DSW to deal with equipment or personnel shortfalls, reduce the reliance and cost of temporary labor, and provide DSW more flexibility going forward.
- Staff should begin to evaluate introduction of drop-off sites within the General Services District (GSD). The Harpeth Valley Utility District area has been suggested as a potential recycling site. The site should be co-located with a fire station or school and sponsors identified prior to the introduction of the site.
- The educational effort for the 11 Metro drop-off sites listed on the Nashville.gov website should include a map showing the address and location of each site. This information should also be made available on the internet outreach to business with emphasis toward small business.

IMPLEMENTATION PLANNING AND ISSUES:

Responsibility	Priority	Precedent Steps	Estimated Cost/(Savings)	Time Frame for Implementation
DSW staff	High	Use lessons learned with regard to directional and	Cost of staff time and materials valued at \$300	Unknown.

Responsibility	Priority	Precedent Steps	Estimated Cost/(Savings)	Time Frame for Implementation
		informational signage at future drop-off sites.	to \$400 per site.	
DSW staff	Medium	The 2007 volumes of recyclables recovered through the existing 11 drop-off sites in the USD need to be monitored to determine how the total volume from drop-off sites and the average volumes per site compare with 2001 levels.	Part of DSW and Public Works staff present responsibilities.	Quarterly.
Public Works, Fleet Management, Purchasing Directors and DSW staff	High	Contract overspill collection (See Issue 5), Sell 4 to 7 vehicles from Metro Solid Waste Collection Unit (4 Emergency and 3 recently refurbished Spares) (See Issue 11) Cross-train and promote seven non-driver DSW staff	(\$489,024) (\$70,000 to \$80,000) Cost neutral for training, and cost to promote to entry level Driver positions approximately \$36,400	January, 2008 September, 2008 July, 2008
Public Works Director, DSW Operations Manager	Medium	Develop drop-site in the Harpeth Valley area of the General Services area.	Cost approximately \$3,000 for drop-off site.	After drop-off site is established for annexed area.
DSW Education staff and Operations Manager	High	Post map of 11 drop-off site locations in the USD on nashville.gov internet site and advertise drop-off sites for use by small business on interactive business website.	Estimated cost of Public Works IT personnel and DSW Operations Manager	November, 2007

Issue 9: Deployment of Educational Resources

DESCRIPTION:

The formal educational effort of the Metro Public Work Department is directed by the Metro Beautification and Environment Commission which is a Division of the Public Works Department and an affiliate of Keep America Beautiful. There are two educational personnel funded in the Division of Solid Waste (DSW) budget. The funding for this program has varied greatly between 2001 and 2005. In two of the five years of this period, the budget was under \$100,000. The budget ranged from \$193,000 to almost \$263,000 during the remaining three years. The scope of the educational effort noted in the 2005 Annual Report was similar to those of other public entities promoting recycling with the bulk of the educational outreach focused on elementary school children. The educational effort is also similar in that the outcomes of this expenditure of time and money cannot be easily measured and that there is a limited amount of time and money expended to supplement the general information program with activities that can directly result in an increase in recycling volumes.

ANALYSIS AND FINDINGS:

- The Metro Public Works educational effort is directed toward increasing recycling participation rates, reducing waste presently disposed of as solid waste, litter prevention and beautification. The focus of the education program is the Kindergarten through 12th grade children. The comprehensive education effort was to meet the DSW goals and be grade appropriate and meet the standards of the Metro Nashville Public School system. The design of the education program included these standards so that teachers could meet their teaching requirements and validate the program.
- Metro Beautification and Environment Commission, a Division of Metro Public Works, uses a behavioral approach to change customer reactions and practices toward reducing waste and increasing recycling. This Division focuses its educational efforts on four key stake holders: school and youth groups, civic organizations, churches and businesses.
- In 2005, the Metro Beautification educational effort was focused primarily on third grade students located in proximity to low performing recycling routes. This approach allowed Metro Beautification and DSW to compare any changes in the recycling rates of the under-performing areas (recycling rates less than 25%) with recycling rates in pre-determined geographic areas. Metro Beautification was also instrumental in designing a state-of-the-art education room at the Rivergate Recycling Center.
- Between July 1, 2005 and June 30, 2006, Metro beautification presented 397 recycling educational programs to 11,531 students that covered what, how and why to recycle. In addition, Metro Beautification presented 84 litter prevention programs to 9,104 students which had a recycling component. There was also an outreach to over 200 neighborhood, civic, church and business groups.
- Between April, 2006 and May, 2007, Metro Beautification provided over 300 compost bins at cost to individuals, schools and community gardens.
- Metro Beautification will be rewarding male and female adolescent scouts with an environmental match for those scouts who completes the required number of environmental projects.

- Information booths at community events reached approximately 35,400 persons with recycling information.
- There is to be an outreach to businesses on recycling and waste reduction. Access to the Nashville government website which houses a do-it-yourself waste audit will be the means of contact between businesses and the DSW.
- There has been a systematic attempt to inform and educate by the Metro Beautification and Environment Commission that has been successful in terms of the numbers contacted. However, an assessment of the degree to which the educational effort correlates with an increase in waste diverted from the landfill, or a marked and sustained increase in recycling in low performing areas is premature with the limited data points in place.

RECOMMENDATIONS:

- In order to move toward more measurable outcomes for the educational effort, there needs to be a level of commitment in the educational effort that targets individuals or groups who are attempting to accomplish the goals of increased recycling and waste reduction. In time, this database can be developed for the K through 12 populations. In the interim, a greater commitment to individual or small group efforts can produce tangible and easy to measure benefits. The Metro Beautification effort to work with Girls or Boy Scouts seeking higher rank may be a fruitful approach. The Scouts will sometimes try to conduct a project in recycling or waste reduction. There should be a means of providing educational assistance to such individuals. This can be done through contacting the Boy and Girl Scout Area Councils that can make this type of opportunity known to the individual troops in the area. If a project is proposed for a Metro owned area such as a park, the educational component of DSW could provide the introduction to key persons in the Parks Department with whom the individual or group would have to coordinate the planned activity.
- The Metro Beautification and Environment Commission should develop a force multiplier concept as part of its goals. This concept involves providing training to individuals in the community who can take action that supports the goals of increased recycling and a reduced waste stream. Each year, at least one group or group of individuals, would receive more in-depth training on recycling and waste reduction so that these newly trained members can support the core goals of the Metro educational effort through action. (The Master Composter Program initiated in 2006 is an example of this type of effort.) Once trained, these persons can serve as volunteers to the Metro educational effort or as leaders in their neighborhoods or member service organizations in the community. (As noted in the survey that accompanies this report, the City of Portland and Multnomah County, Oregon provide a Master Recycler program. This eight week training course was taught by the Agricultural Extension Service. Metro Public Works should use a portion of its educational budget to institute a similar program either through a local junior college or university or through an existing governmental entity that has the expertise such as 4-H, urban forestry or the like.)
- More immediately, two tactics can be pursued to extend the direct impact of the educational effort:
 - Elsewhere in this report, it is recommended that one (1) Supervisor be used to oversee the solid waste collection effort performed by private vendors under contract to the Metropolitan Council. This individual would receive support from the other six DSW Supervisors. It is suggested that these Supervisors use a portion of their time to try to promote recycling on the low performance routes. This would be accomplished by systematically targeting the thirty-two (32) routes with a set out rate below thirty percent (30%), and directing the Supervisors to meet with leaders of key institutions or known community leaders that serve these neighborhoods along the low set out rate routes to determine if these leaders would assist in

promoting recycling. Key local institutions could include neighborhood churches or locally owned businesses. The goal of this outreach would be to ask the customers what tactic might work best in their area to increase recycling. For example, if a small drop-off center is a possible solution instead of individual recycling containers on a given route, the community leaders could be a resource to set and host a larger neighborhood discussion of the problem and possible solutions. This information would be reported to the DSW Operations Manager to coordinate the necessary follow-up.

- o Public Works could also pursue grants from such organizations as Americorps that would allow a volunteer to live in an area within Metro for a year. Public Works should also pursue grants from such organizations as Americorps that would allow a volunteer to live in an area within the Metro area for a year. A fully funded federal grant can be acquired through the federal Americorps Vista program. This program is led by a Program Director who is located in Nashville. (There are two additional Americorps programs that use State of Tennessee and national resources to assist these type of efforts.). The Americorps Vista program provides a person 18 to 24 years of age with a full time position for one year and pays a stipend for living expenses valued at \$9,996. The volunteer’s primary duty could be the improvement of area environmental conditions to assist in the improvement of local health conditions. A recycling effort could be part of this larger context. The Americorps Vista program could cost Metro nothing but time to provide a request and a commitment to work with the volunteer. A Metro PWD program application could focus the volunteer’s efforts to encourage, promote and mobilize several neighborhoods along low set out rate recycling routes to become more involved in recycling and neighborhood clean-ups. This individual would coordinate with the DSW and neighborhood leadership to assist in the implementation of actions that are beneficial to DSW operations and the neighborhoods. As an example, the location of a recycling dumpster could reduce or eliminate semi-automated routes in these areas and provide revenue to a local institution.

IMPLEMENTATION PLANNING AND ISSUES:

Responsibility	Priority	Precedent Steps	Estimated Cost/(Savings)	Time Frame for Implementation
Public Works staff.	High	Public Works staff works with Metro Beautification educational staff to identify individuals or groups who wish to undertake projects that improve recycling collections. Advertise on website and public service announcements.	Staff time estimated to be 48 Hours at approximately \$1,100.	Begin August, 2007.
Public Works staff	High	Identify advanced recycling training program for volunteers using the Master	Education staff 40 hours at approximately \$600.	By August, 2007.

Responsibility	Priority	Precedent Steps	Estimated Cost/(Savings)	Time Frame for Implementation
		Composter Program as a model for a more general intensive training in recycling.		
Public Works staff.		Select training program curriculum and trainer(s).	Staff from PWD, DSW and Education. Estimated cost of five (5) staff for 80 hours at approximately \$2,600	November, 2007
Public Works staff.	High	Implement volunteer training program for recycling (two 6 to 8 week courses annually).	Approximate cost for teaching and materials is \$7,500	Winter and Fall. 2008.
DSW staff.	High	Use DSW Supervisors to work with neighborhood leaders along low participant rate recycling routes.	Four Supervisors for 12 hours training each. Estimated cost of \$1,300 in staff time.	Initiate contacts July, 2007
Public Works staff.	Medium	Public Works staff pursues grant to hire volunteer with expertise in recycling to work in neighborhoods with low set out rates for recycling.	Approximate cost for volunteer is \$7,500.	Prepare in Spring, 2007 for hiring in Spring/Summer, 2008.

Issue 10: Fleet Maintenance

DESCRIPTION:

An evaluation of fleet maintenance was undertaken in order to determine the extent to which the DSW is making use of the vehicles it has at its disposal. In the analysis that follows reference is made to semi-automated and automated vehicles. In general, semi-automated vehicles require a two person crew consisting of a driver and person who collects the waste container. Automated vehicles require a driver only who does not have to leave the truck's cab because the waste container is collected and dumped into the vehicle's hopper by mechanical means.

ANALYSIS AND FINDINGS:

- The central component to the difficulties below is the result of contracts let to the private sector solid waste collection firms that did not require the private firms to collect overspill. The impacts on the DSW use of full-time personnel and temporary hires, equipment and the DSW budget are demonstrated elsewhere in this report.
- The following analysis is based upon data provided by the Metro General Services Department's Office of Fleet Management. These maintenance data cover the operations of the Heavy Equipment Shop for the period from July 5, 2006 through December 31, 2006. This period had a total of 121 Shop days (Monday through Friday except holidays) and 104 DSW days (Tuesday through Friday except when Saturday must be worked to make a four day week.) The Heavy Equipment Shop provided service or maintenance for the 61 vehicle DSW collection fleet in 1,122 instances during the six month study period. This represents 18.5% of all vehicles entering the Heavy Equipment Shop during the study period.
- The final analysis covered 981 of the 1,122 DSW collection maintenance and repair events or 87.4% of the maintenance and repair events the Heavy Equipment Shop provided for DSW vehicles. A total of 141 repair or maintenance events were eliminated. Reasons for elimination included 3 vehicles that appeared 13 different times (39 events). These vehicles were undergoing a retrofit and had minimal operating time during the study period, and were not included in the study. In another case, there were a number of situations in which a vehicle would appear two or more times with no change in the data. This was counted as one event and the remainder excluded from the study. There were a similarly significant number of events in which the data either began or ended outside the study period or in which the beginning or end of the work on the vehicle could not be established with certainty by the data.
- Three types of data situations were studied in depth.
 - First, the number of Ready for Issue (RFI) data were examined. (An RFI is the designation the Heavy Equipment Shop assigns to a vehicle which has had its preventive maintenance or repair(s) completed.) RFI data are important for several reasons. First, an RFI establishes the date the maintenance or repair was completed by the Shop. Second, in Shop records, the RFI marks the beginning of the count of how many days a vehicle was at the Shop after the completion of service. This count has been a source of misunderstanding between the Shop and DSW. Particular focus was placed upon the number of days DSW vehicles were Out of Service. As an additional task, the project team examined the discrepancy between Heavy Equipment Shop records of the time a DSW vehicle was at the Shop "Awaiting Pickup" and the interpretation of this data by DSW. An example of the discrepancy would be a vehicle that the Shop deemed Ready for Issue on a Thursday. The Shop operates until 5 PM and the DSW until 4:30 PM. Prior to the DSW 4:30

PM quitting time, the DSW has already planned vehicle deployment for Friday. The Daily Report from the Shop lists DSW vehicles that are RFI, but DSW does not receive the Shop Report until about 5:30 PM. Moreover, the Daily Reports do not note the time of day at which a vehicle is declared RFI. For these reasons, the Ready for Issue vehicle would not be included in the deployment plan. If the DSW picked up the vehicle Friday, the DSW vehicle was not considered to be one (1) day as “Awaiting Pickup” Due to Monday being a non operational day for DSW, the vehicle would not be returned to DSW until Tuesday of the following week. In this instance, the Shop records will count Thursday, Friday and Monday as time the vehicle was Out of Service, and these three days would also be included in the records as time the vehicle was Awaiting Pickup. In this situation, the project team found that DSW had lost one day, Tuesday, “Awaiting Pickup”. Although the Shop records are factually correct; in counting Friday and Monday as Out of Service days, as a practical matter, DSW does not typically have personnel waiting at the Shop to provide same day return of vehicles to the DSW yard. In this case, the vehicle probably would not be returned to the DSW area and made part of its daily vehicle deployment planning before Friday, and not available for use in DSW operations before Tuesday. Had the RFI stated that the vehicle was available at 8:30 AM and the DSW did not pick the vehicle up until Friday, the one day “Awaiting Pickup” would arguably be justified. Without the temporal data, this remains fuel for debate.

- The second type of analysis examined the time a vehicle was Awaiting Maintenance (AWM), In Work (IW-under repair or service within the Shop) or Awaiting Parts (AWP). Because these categories added significant Out of Service time for the DSW vehicles, they were considered worthy of examination.
- Third, the project team examined the length of time work done outside the Heavy Equipment Shop under Vendor Warranty or Repair to determine the Out of Service time accrued for this service type.
- Ready for Issue Status was found on 401 of the 981 DSW vehicle maintenance/service events examined. This status was given to DSW vehicles an average of 66.8 times per month for the six month study period. DSW vehicle days Out of Service numbered 1,051 or 175.2 per month. The Shop calculated the days DSW vehicles waited at the Shop from the time of being categorized as RFI at 642 days for the period. The project team calculated this number to be 84.under the current DSW operating circumstances.
- As the table below demonstrates, these calculations provide a vivid picture of turnaround time The statements below the table summarize the findings from the table.

RFI Status

Month	Number of Vehicles (Unduplicated)	Days Out of Service	Fleet Calculation of Wait Time after Work Completed	Project Team Calculation of Time after Work Completed
July	41	162	108	15
August	51	170	99	9
September	44	160	94	16
October	43	224	106	8
November	27	149	117	2
December	38	186	118	34
TOTAL	244	1,051	642	84
Average per Month	40.7	175.2	107	14

- The DSW Fleet vehicles generally operate 208 days annually. With a 26 week study period, the total possible vehicle days for the period equals (104 days)*(61 vehicles) = 6,344 Total Potential Vehicle Operational Days for the Study Period
- 1,051 Out of Service days is 16.6% of the Total Potential Vehicle Operational Days Available to the DSW Fleet during the study period.
- At a minimum, an additional 1.3% of the Total Potential Vehicle Operational Days Available was lost because DSW vehicles were left at the Heavy Equipment Shop instead of being returned to service by DSW.
- This a loss of 17.9% of the Total Potential Vehicle Operational Days Available to the DSW fleet in a year.
- The columns entitled “Fleet Calculation of Wait Time after Work Completed” and “Project Team Calculation of Time after Work Completed” should be noted. Under the Shop calculation, 642 days of 1,051 Days Out of Service (61.1%) were due to vehicles remaining in the Shop area after the Shop had completed the work. This calculation begins the same day the work is done and continues with the exceptions of weekends or holidays. The Project Team’s calculation, 84 days or 8.0% of the total Days Out of Service for the DSW fleet, is based upon the reasoning of DSW staff. This was added for means of comparison. This discrepancy is unusually large.
- In many cases, a vehicle taken to the Heavy Equipment Shop for repair or service must stand idle awaiting personnel, a bay or parts for the repair or service. This was the case for the DSW Fleet.

Delays Due

to

Maintenance, Parts and Work

Month	Number of Vehicles (Unduplicated)	Awaiting Maintenance	Awaiting Parts	In Work	Days Out of Service
July	22	61 (22) (17)	2 (1) (1)	8 (4) (4)	71
August	31	89 (27) (19)	15 (3) (3)	27 (10) (9)	131
September	36	83 (31) (24)	8 (4) (4)	22 (9) (8)	113
October	45	120 (38) (30)	60 (9) (8)	47 (9) (7)	227
November	30	79 (25) (22)	30 (2) (2)	49 (6) (6)	158
December	41	131 (25) (30)	27 (3) (3)	34 (8) (8)	192
TOTAL	N/A	563 (168) (142)	187 (26) (x)	142 (50) (x)	892
Average per Month	35	96.7 (23.7)	24.8 (4.3)	26.5 (4.3)	148.7

- The number of vehicles impacted by these types of delays averaged 35 per month
- DSW Fleet had 23.7 vehicles per month that experienced 563 days Awaiting Maintenance during the study period
- DSW vehicles Awaiting Parts accumulated 167 days and affected about 5 vehicles per month.
- The “In Work” status typically followed Awaiting Maintenance, while in some cases, Awaiting Parts was a source of Out of Service Days after the days Awaiting Maintenance had expired.

- Total Days Awaiting Maintenance and Awaiting Parts totaled 563 + 187.= 750 Days or 71.4% of the time associated with maintenance and repairs.
- DSW vehicles placed at the Heavy Equipment Shop averaged about 4.1 days to receive a diagnostic test or access to the personnel, space and equipment necessary to complete the repair or service. At times, this was compounded by the average of 7.5 days that awaited the vehicle that required parts not available on site.
- Of the 1,051 days that DSW vehicles were Out of Service, 750, or about 7 of every 10 days (71.4%) of delay in the service or repair occurred due to the wait for access to the resources necessary to successfully perform the repair or service work.
- Vendor warranty and repair work is noted in 145 instances in the database associated with the six month study period. As noted above, 39 of these data were eliminated from consideration since they represented three vehicles that were being reconfigured to include cart flippers and were not operational for the majority of the study period. The table below displays the down time associated with vehicles that were repaired by the private, off-site vendor. As noted in the table below, 328 days of down time represented 29.5% of the 1,122 days of downtime experienced by the DSW fleet during the study period.
 - 175 days of the 328 days (53.4%) of down time accrued to 11 automated vehicles. The Brush unit had 88 days of down time dispersed among six vehicles and five vehicles of the Curby unit accounted for 87 days of the down time.
 - The average down time per vendor repaired vehicle was 17.3 days. The Brush unit vehicles averaged 17.4 days and the Curby unit averaged 14.7 days.
 - There were eight semi-automated DSW vehicles that had warranty or repair work done by the vendor. These vehicles experienced an average down time of 19.1 days.

MONTH UNIT	Total Days at Vendor Location By Unit						TOTAL DAYS
	July	August	September	October	November	December	
Brush							
Knuckle-Boom							
08D4231	9	5					14
08D4233	7						7
08D4239			8			7	15
08C4240		20					20
Front Loader							
08C5607						6	6
08C5608				26			26
Downtown							
08C5618		6			5		11
08C5619	7	10	15		14		46
Convenience Center							
08C5637	10			2	7	5	24

MONTH UNIT	Total Days at Vendor Location By Unit						TOTAL DAYS
	July	August	September	October	November	December	
Metro Solid Waste Collection							
08C5621			7				7
08C5627			9	14			23
Curby Recycling							
R0001		7	9				16
R0002		6	6				12
R0003	8	5	5				18
R0004	15	5	10		9		39
R0006				2			2
R0009		14					14
R0010						8	8
R0011			8	12			20
TOTAL	56	78	77	56	35	26	328

- Heavy equipment operating 4 days per week, 52 weeks per year with different drivers in all types of weather is subject to breakdown. In the solid waste and recycling environment, the mission is to meet the public’s demand for service in a predictable and reliable manner. Fulfilling the DSW mission requires a sufficient number of vehicles of the right type available when needed. In order to allow for maintenance and repair down time, it is necessary to have a number of vehicles beyond the minimum number necessary to perform the work. These additional vehicles and their availability are key to the success of the DSW mission. The project team calculated “coverage” – a statistical measure of the availability of specific vehicle types to meet mission demands despite downtime due to preventive maintenance, repair or accidents. The Coverage statistic uses the data from the sample period to compare the downtime of Daily Use vehicles in a section to the availability of Spare vehicles within that section to meet the shortfall in the availability of Daily Use vehicles. This is expressed in decimal form. As an example, the ability of Spare vehicles within the Curby Program’s automated section is calculated to be 1.0. This means that there is sufficient support from the Spare vehicles to cover Daily Use down time assuming the level of downtime does not increase for either the Daily Use or Spare vehicles and that the downtime for these two vehicle categories does not occur at the same time. As an example, the coverage for semi-automated vehicles within the Curby Program is .672 which indicates that this unit may have to frequently use semi-automated units from other sections within DSW in order to meet its daily assignments. The coverage calculation for each unit within DSW is displayed below.

- **Curby Recycling Unit Vehicles**

Daily Use Automated Vehicles (5) operating 104 days = 520 Days Needed

Down Time = 174 Days Unavailable / 520 Days Needed = 33.5%

- Daily Use Spares = 2 Vehicles operating 104 days = 208 Operating Days

Availability of Spare Vehicles = 208 Operating Days – 34 Days Spares Unavailable = 174 Days

174 Days Spares Available / 174 Days Daily Use Vehicles Unavailable = 1.0 Coverage

- **Daily Use Semi-Automated Vehicles**

Daily Use Semi-Automated Vehicles (4) operating 104 days = 416 Days Needed

Down Time = 61 Days Unavailable / 416 Days Needed = 14.7%

- Daily Use Semi-Automated Vehicles (8) are necessary to collect the 8 routes assigned to this Unit.
- Availability of Daily Use Spare = 104 Days - 14 Days Spare Unavailable = 90 Days
- 90 Days Spare Available / 134 Days Down Time = .672 Coverage

In the 2006 sampling period, the automated vehicles had a probability of having an available Spare most of the time a Spare was necessary and the semi-automated units had less than necessary Spare capacity within the sampled period. The margin often was insufficient and required the semi-automated Spare and one or more semi-automated units from throughout the Metro Solid Waste Collection Unit to cover the operational shortfall within the automated portion of the Recycling Program. This entails taking an Equipment Operator III off of a unit to drive, and the hiring of temporary labor to collect the recyclables. This equipment shortfall has a ripple effect upon internal staffing and DSW expenditures.

- With 21 vehicles, the Metro Solid Waste Collection unit has more vehicles than any other unit within the DSW. Four of these vehicles do not have cart flippers and are 20 years old. DSW did not request their replacement or retirement in the 2007 Budget request.

- **Daily Use Semi-Automated Vehicles.**

Daily Use Semi-Automated Vehicles (8) operating 114 Days = 912 Days Needed

Down Time = 45 Days Unavailable / 912 Days = 4.9%

Availability of Daily Use Spare = 912 Operating Days – 45 Days Spare Unavailable = 867 Days

113 Days Spare Available / 45 Days Down Time = 2.51 Coverage

- **Daily Use Overspill Vehicles**

Daily Use Semi-Automated Vehicles (4) operating 114 Days = 456 Days Needed

Down Time = 66 Days Unavailable / 456 Days Needed = 14.5%

Availability of Daily Use Spare = 228 Days Available / 145 Days Needed = 1.57 Coverage

Both of these vehicle shortfall ratios appear to place this unit on relatively stable footing. This is bolstered with the retrofitting of 3 additional semi-automated units from the Emergency Use Only part of this Unit's vehicle stock. To meet the Unit's assignments, 12 to 13 vehicles must operate daily. This leaves 4 to 5 units available to cover vehicles out of service. (This is based on the assumption that the 4 Emergency Use Only vehicles without cart flippers are used very sparingly which is supported by the refueling records for these vehicles.). However, vehicle failures within Metro Solid Waste or in the Curby recycling operation rely on the Metro Solid Waste vehicle stock to fulfill their daily assignments. This can reduce the margin quickly based upon the situation within the Unit and throughout the DSW.

The Brush Unit has two divergent missions and two different types of equipment to accomplish this dual mission.

- **Daily Use Alley Clean - Up**

Alley Clean-Up requires 6 Knuckle-boom trucks operating 114 Days = 684 Days Needed

Downtime = 132 Days Unavailable / 684 Days Needed = 19.3%

Availability of Daily Use Spares = 215 Days Available / 132 Days Needed = 1.63 Coverage

o **Daily Use Front End Loaders**

Dumpster Hauling from Commercial and Apartment Complexes requires 5 Front End Loaders Thursday and Friday and 6 vehicles Wednesday and Thursday. The Unit operates with 5 vehicles each of the 4 day work week.

Dumpster Hauling requires 5 Front End Loaders operating 114 days = 570 Days Needed

Down Time = 52 Days Unavailable / 570 Days Needed = 9.1%

Availability of Daily Use Spares = 76 Days Available /52 Days Needed = 1.46 Coverage

- The table below demonstrates the utilization of equipment in the Curby Program during the nine month period from July 5, 2006 through March 29, 2007. The data were obtained through the automated fueling records through the Vehicle Maintenance Shop. It is important to note these use rates because these data are surrogates for vehicle availability. For the nine month period, the Automated Daily Use automated vehicles are available about 63.5% of the days they are needed. This is the equivalent of 2.5 days of the DSW 4 day (10 hours/day) work week. Both Spares were used an average of 56.7% during the nine month period. This is the equivalent of 2.3 days. The necessity of the this high use of the Spare vehicles suggests that down time for the Daily Use vehicles could be the result of multiple Daily Use vehicles being out of service at the same time. For a case in which a combination of 3 automated Daily Use or Spare vehicles are out of service at the same time, semi-automated units must be used. The 4 semi-automated, Daily Use and single Spare vehicles have a low usage due to the low set out rates on the routes these vehicles service; however, down time is also present in this part of the operation. The semi-automated Spare was used about 60% of the time or the equivalent of 2.4 days of the work week. With 2 semi-automated Daily Use vehicles out of service, a semi-automated unit from elsewhere within DSW is necessary. Three or more automated or semi-automated vehicles out of service simultaneously will create the need for the redeployment of equipment and personnel. The long periods to complete off-site warranty work by the private vendor have been conservatively estimated at 14.7 days per automated vehicle for the nine month sample period. If it can be inferred that this same rate of unavailability occurred throughout a 12 month period, this would equate to approximately 15.2 days per year, or almost four weeks of the DSW collection schedule.

Percentage Utilization of Daily Use and Spare Vehicles by DSW Section July 5, 2006 through March 29, 2007	
Curby Program	
Daily Use / Automated	
	58.3
	70.5
	67.3
	54.5
	60.9
Spares /Automated	
	58.3
	55.1
Daily Use / Semi-Automated	
	32.7
	34.0
	43.6
	75.6
Spare / Semi-Automated	
	59.6

- The General Services Department has replaced its previous Computerized Maintenance Management System that used the FleetAnywhere software system with one that will allow a greater degree of integration between Fleet Maintenance and the Finance Department’s fiscal accounting programs. A The new system, EBS EAM, provides work order capabilities and went “live” in June, 2006. The remainder of the system went “live” in June, 2007.
- The project team determined that operational costs per mile or per engine hour were not being recorded and reported at the time that it was on site. This information is to be provided by the new EBS EAM software. These are vital inputs into vehicle replacement decisions.
- The project team found two different record systems operating within the Fleet Maintenance garage. Personnel in the garage’s main office record service and repair requests via EBS EAM. The garage manager maintains records of the vehicle submitted for service or repair, the type of service or repair and time in days between vehicle submittal and the completion of task in an Excel spreadsheet called a “Daily Report”. The two recordkeeping systems were not integrated at the time of this audit, but are now available to all Metro agencies including DSW.

RECOMMENDATIONS:

- The project team found that the warranty work of the private vendor took an average of 19.1 days for each of the 21 vehicles requiring work by the private vendor during the six-month sample period. Although the vendor sometimes performed multiple repairs during a stay, at times, incomplete repairs required the Fleet Shop to return a vehicle to the vendor for further work. The Office of Fleet Management recognizes this situation and is considering issuing a Request for Proposal / Information to Bid when the acquisition of equipment for DSW next occurs. This bid type would require the manufacturers to address the efficiency and effectiveness of the warranty work each contracts, and, at least in part, make the successful bid contingent on the manufacturer’s ability to assure that an improved level of performance and service for warranty work is achieved. As an example, there could be a bid submitted that requires the private vendor to provide equivalent “loaner” equipment if warranty repairs are not completed in a timely manner (e.g., 3 working days). The anticipated improvements in the fleet’s automated information system and documented experience under the current method of monitoring the warranty vendor will provide a strong basis for Fleet Management to evaluate these types of performance standards in future bids.
- The utilization rate for the DSW should be tracked and used as a tertiary variable to mileage and vehicle age in order to assist in the reduction of the DSW fleet size.
- The DSW staff must continue to receive the Daily Report on vehicle status produced by the Fleet Heavy Equipment Shop and make use of this information in planning its daily vehicle deployment decisions. In order to have the greatest flexibility, DSW staff should make arrangements to have vehicles brought to the DSW fleet storage area at the earliest possible time so that all available vehicles are included in the daily plan for vehicle deployment.
- All elements of the Curby Program’s automated and semi-automated collection and the smaller semi-automated units used for in-house recycling collection and back-door service provision lack sufficient back-up equipment under the current Metro policy environment concerning overspill collection and waivers to those over 65 and those with disabilities that prevent these persons from setting out trash. DSW staff should anticipate least cost alternatives to the current equipment scheme based upon the outcome of policy decisions in these or related areas. For example, if collection of overspill were contracted, there should be a sufficient number of quality semi-automated vehicles to allow consideration of auctioning the oldest of these vehicles in the fleet. This could allow a reduction in the DSW fleet size without additional expenditures.
- Conversely, caution should be observed in replacing current equipment on the basis of these same policy considerations. As an example, should DSW be required to continue the collection of overspill, an additional 6 cubic yard packer may be considered to act as a Spare to both in-house recycling collection and the back door service.

IMPLEMENTATION PLANNING AND ISSUES:

Responsibility	Priority	Precedent Steps	Estimated Cost/(Savings)	Time Frame for Implementation
Department of Law, Fleet Manager and Public Works Director	Medium	Contingent upon the findings of the Department of Law, take the steps necessary to introduce a pilot program for	Possible reduction in cost of temporary labor and deferral in the acquisition of equipment that would fund this program for over three years at the	For Budget FY 2008/2009

Responsibility	Priority	Precedent Steps	Estimated Cost/(Savings)	Time Frame for Implementation
		\$40,000 to rent needed operational equipment from a private vendor.	proposed cost and a corresponding reduction in Fleet operational costs.	
Fleet Manager and Public Works Director	High	Use the new automation effort and present experience to produce a bid proposal for the manufacturers of DSW vehicles to base the warranty work that the manufacturers provide to private vendors on performance standards that take into account the quality, quantity, turnaround time and cost of production.	Create performance standards, get policy approval and approach the DSW manufacturers market with a written proposal that requires the successful bidder to have a relationship with the vendor that does its warranty work that reduces turnaround time and complete repairs. Estimated cost of \$10,000 in staff effort. (Possible savings due to a reduction in Spare vehicles necessary and temporary staff needed. Provision of an equivalent loaner vehicle would also support these savings.)	Summer, 2008
DSW Operations Manager and Supervisory staff.	High	Use Daily Report to expedite return of DSW vehicles for use in DSW at the earliest time and use the document to plan daily deployment of vehicles.	Cost in Staff time of 20 hours per month by senior management and supervisors. Estimated staff cost of \$1,100 per month in staff time.	July, 2007
DSW Operations Manager and Senior Supervisory Staff.	Medium	Identify gaps in vehicle equipment needs under different possible policy decisions	Cost of staff effort estimated at 1.5 hours every two weeks for 4 to 5 persons or \$7,500 to \$9,500 annually.	By or before January, 2009
Public Works Director and DSW Operations Manager	Medium	The vehicle replacement standards should be adjusted to take into account situations in which department level fleet sizing is based on "worst case" circumstances.	The DSW should benchmark the fleet in comparison to other cities with similar missions and circumstances in order to determine the policies these entities have in place that may work in Metro. These policies need to avoid rewarding those who have hoarded vehicles and avoid punishment of those	Complete by July, 2008

Responsibility	Priority	Precedent Steps	Estimated Cost/(Savings)	Time Frame for Implementation
			managers that are willing to press the envelope on fleet size.	

Issue 11: Age and Number of Fleet Vehicles

DESCRIPTION:

The Division of Solid Waste fleet provides the basis for its service delivery. The fleet is a mixture of old and, conversely, relatively new vehicles with few of middle age. This vehicle mixture could be viewed as beneficial to the DSW mission; however, the average age of the fleet masks important issues concerning the efficiency and effectiveness of the organization's fleet replacement policy.

ANALYSIS AND FINDINGS:

- The DSW replaced 41 vehicles, or 67.2% of its fleet, between 2003 and 2005. This was accomplished through a vehicle replacement policy and plan in place for DSW and all City vehicles at that time. A five year capital plan was provided by a consulting firm, and covers acquisitions from CY 2004 through 2008. The criteria for replacement of DSW vehicles are 7 years or 90,000 miles.
- There are sixty-one (61) operational collection units within the DSW. (One 2005, rear end loader used by Metro Trash collection is damaged and was scheduled for replacement in April, 2007.)
- The average age of the fleet is 5.24 years. Of the sixty-one (61) vehicles noted above, forty-two (42), or 68.8%, are listed as front line or daily use vehicles on the Division inventory. The remaining nineteen (19) vehicles are classified as Spare or Emergency. Spare vehicles are those used as the first line back-up vehicles. Emergency vehicles are the second line of vehicles.
- The forty-two (42) daily use vehicles average 3.6 years of age. The spare vehicle portion of the fleet has an average age of 6.9 years. The eleven (11) emergency vehicles have an average age of 12.2 years. The table shown below summarizes the age, number and classification of vehicles within the DSW fleet. (Note: Both of the tables below use the following symbols: S = Spare; E = Emergency and Daily = Daily Use.)
- There is also an "Overflow" classification. This term is used within the Metro Solid Waste Collection Unit to define those units that trace the solid waste routes serviced by private contractors who use automated units to make their collections, but are not required to collect waste left adjacent to the collection container.

The table below shows the data as displayed in the DSW inventory. These data should be viewed as an idealized version of the inventory because the daily practice can vary significantly.

Year	DAILY USE VEHICLES		EMERGENCY(E) & SPARE(S) VEHICLES	
	Number of Vehicles	Age	Number of Vehicles	Age
2005	16	2	0	0
2004	6	3	0	0
2003	13	4	5(S)	4
2002	3	5	0	0
2001	0	0	0	0
2000	2	7	2(S), 3(E)	7
1999	0	0	0	0
1998	0	0	1(E)	9
1997	2	10	2(E)	10
1996	0	0	2(S)	11
1994	0	0	1(S)	13
1987	0	0	3(E)	20
TOTAL	42	AVG. = 3.6	10(S) , 9 (E)	AVG. S= 6.9, E=12.2

- The highest demand for vehicles occurs Tuesday through Friday during the ten hour work day during which most collection units operate. On these days, minimum vehicle demand will be approximately 39 vehicles.
- Nineteen (19) vehicles are classified as Spares or Emergency vehicles by DSW but these vehicles can be called up at any time. The average age of the Spare and Emergency vehicles is 9.42 years. Ten (10) of these vehicles are classified as spares. These have an average age of 6.9 years while the nine vehicles classified as emergency use only average 12.2 years. Spare vehicles are typically the first to be used when vehicles are in, or awaiting maintenance. The nine (9) vehicles classified as emergency use are the last to be used. Four of these vehicles are semi-automated trucks that are not configured with cart flippers and present a risk management issue to the Metro leadership and workforce.

Collection Unit	Vehicle Type	Typical Vehicle Use	
		Number of Vehicles Daily Use	Available Vehicles Daily Use and Spare/Emergency
Metro Solid Waste	Semi-automated, rear end load 16 to 20 yards.	12	2 S and 7 E
Downtown	Roll-Offs	5	0
	Semi-Automated, rear end load 11 yards.	2	2 E Semi-automated 6 yd.
Brush	Front end Loaders	5	3 S(2003); 1 Daily (2003)
	Knuckle Boom Trucks	6	2 S (2003)
Curby Recycling	Automated Side arm loaded	5	2 S (2003)
	Semi-Automated 6 yd. (Back Door)	1	0
	Semi-automated 6 yd. (In-House Recycling)	1	0
	Semi-automated 18 yd.	4	1 S (2003)

Collection Unit	Vehicle Type	Typical Vehicle Use	
		Number of Vehicles Daily Use	Available Vehicles Daily Use and Spare/Emergency
TOTAL		41	20

- The table above also notes three cases in which there are no Spare or Emergency vehicles available. These include roll-off trucks used by the Downtown Collection Unit and the semi-automated 6 cubic yard packer trucks used by the Curby Program. The following describes the potential for problems associated with three situations.
 - There are five (5) roll-off trucks available to service the Convenience Centers and drop-off sites. These trucks haul 456 containers during their four day operational week, Tuesday through Friday. This is an average of 91.2 containers each Tuesday through Friday with an average of 22.8 containers for each truck each day. Wednesday requires each truck to haul an average of 25 containers. Should one truck fail or be out of service for a prolonged period of time, this would require the remaining four trucks to haul 114 containers for the week, or an average of 28.5 containers each for the four day work week. This is a 25% increase over the normal daily workload. At this point, time and distance considerations limit the number of containers that can be hauled to be emptied and partially filled containers would have to be ignored. With two trucks out of service, additional containers and leased roll-off trucks would have to be used.
 - There are no comparable vehicles to replace the vehicles used for back door or Metro government recycling. Failure of either of these vehicles creates a further burden to the semi-automated vehicles within Metro Solid Waste Collection.
 - Metro Solid Waste Collection has 8 Daily Use vehicles. There are two Spares and seven Emergency vehicles which are used frequently to cover the eight vehicles needed for the daily routes assigned to this Unit and to cover vehicles experiencing down time or lengthy turnaround time. As a practical matter, 4 of the 7 Emergency Use Only vehicles lack cart flippers and are of little use for solid waste collection. This leaves a balance of two Spares and three Emergency vehicles to cover the minimum of 13 semi-automated packer vehicles used on a daily basis.
- The three tables below portray the use of the collection vehicles of the Curby Recycling, Metro Solid Waste Collection and the Brush Units within DSW. Utilization was determined by using the refueling data maintained by the Office of Fleet Maintenance. The data on refueling is date and vehicle specific and has the mileage the vehicle traveled on a given day. This data allows the user to determine which dates a given DSW vehicle worked and generally spanned a 39 week timeframe. Since the project team knew the daily vehicle commitments of the DSW units and their tasks, the number of operational days for a vehicle can be divided by the number of days that vehicle would ideally work during the nine month timeframe. The number of 156 days was used for the majority of the DSW fleet ($(39 \text{ weeks}) \times (4 \text{ Days / Week}) = 156 \text{ Days}$). The Curby Recycling, Metro Solid Waste Collection and Brush Units each operate four days per week (Monday through Friday), make use of Spare and/or Emergency Only Vehicles, and these Units comprise 82% (50 of 61) of the collection vehicles within the DSW fleet.
 - The table describing the Curby Recycling Unit’s 12 vehicles suggests several points. First, the number of Automated Daily Use and Spare vehicles is sufficient if 5 of the 7 are operational on a daily basis.
 - The Semi-Automated Daily Use vehicles cover routes with generally lower than average recycling rates. This may account for the 4 vehicles having an average operational usage below 50%. Three of the four vehicles work 31.4%, (R0008), 35.3% (R0009), and 42.3% (R0010) of the

156 days. One Daily Use truck and the Spare operate at capacities of 75.6% and 57.7%, respectively.

Curby Recycling Unit	Operational Average (156 Days / Number of Days Utilized)	Number of Vehicles Operational Less Than 50%
Automated Daily Use (5)	63.5%	0
Automated Spares (2)	56.7%	0
Semi-Automated Daily Use (4)	46.1%	3
Semi-Automated Spares (1)	57.7%	0

- The 7 Daily Use, 2 Spares and the 3 Emergency Use Only vehicles that have been retrofitted with cart flippers should be more than capable of dealing with the 8 daily solid waste routes assigned to this Unit.
- Four of the overspill section's 5 vehicles are in the field 89.1% of the time while the fifth vehicle (08C5630) operates only 32.7% of the time. This section is virtually self-sufficient in that 4 of the vehicles collect the overspill from 5.5 of the private vendor's automated routes daily (4 days per week). The problem in this section is threefold. First, this operation costs an estimated \$900,000 annually. Second, this effort takes five, four year old semi-automated with low mileage (average mileage =18,481 miles) that could be used to replace the Emergency stock in the Metro Solid Waste Collection Unit. Third, the collection of overspill takes 8 full time DSW employees. If these employees were available elsewhere in DSW, this would allow cross-training that would allow all of the workforce to qualify as EO III which would, in turn, give DSW more flexibility in covering leave time, retirements and other possible personnel situations that require trained and experienced labor.
- Four of the Semi-Automated Emergency Only vehicles remain without cart flippers and are therefore of little or no value except for specialized tasks such as clean-up after a storm or for leaf collection. Three of these units have been in the fleet for 21 years and the fourth for 11 years. All but one of these units (08C5605 at 41.7%) has a utilization rate below 23.1%. Two vehicles, 08C5558 and 08C5559, had little or no utilization information and could not be included in the analysis.

Metropolitan Solid Waste Collection Unit	Operational Average (156 Days / Number of Days Utilized)	Number of Vehicles Operational Less Than 50%
Semi-Automated Daily Use (7)	73.4%	2
Semi-Automated Spares (2)	34.0%	2
Semi-Automated Emergency Use Only (7)	18.5%	6 (No Data Available for 08C5598)
Overspill (5)	71.3%	1

- The Brush Unit uses 6 Knuckle-boom trucks 4 days per week. However, only 4 of these 6 utilize more than 50% of capacity. The remaining two (08D4238 and 4239) have utilization rates of 20.5% and 45.5%, respectively. The 2 Spares (08D4231 and 4232) have utilization rates of 9.6% and 12.2%. Four of these vehicles have been in service less than 4 years and the remaining two units are in the seventh year of service. This portion of the fleet will probably have gradual, spaced replacement without major disruptions in service.
- This Unit's Daily Use Front Loaders operate 5 of these vehicles 4 days each week. The table below portrays a high level of utilization of the Daily Use vehicles (83.3%). Three of the five Daily Use vehicles have utilization rates above 80% and the vehicle that collects recycling dumpsters on Tuesday and Wednesday has a rate of almost 90%. The other available Daily Use vehicle has a rate of 71.2% while the 3 Spares have an average utilization rate of 29.2%. Two of the three Spares (08D5584 and 08D5591) have utilization rates of 7.1% and 10.3% respectively. Given that the oldest vehicles in this part of the DSW fleet are in their fifth year of service, this operation should be able to meet its mission for years to come through gradual vehicle replacement.

Brush Unit	Operational Average (156 Days / Number of Days Utilized)	Number of Vehicles Operational Less Than 50%
Semi-Automated Daily Use Knuckle- Boom (6)	56.5%	2
Semi-Automated Knuckle-Boom Spares (2)	10.9%	2
Automated, Daily Use Front Loaders (6)	83.3%	0
Automated Front Loader Spares (3)	29.1%	2

RECOMMENDATIONS:

- It is recommended that the DSW establish relationships with local equipment companies that allow the Division to utilize vehicles on a temporary basis for its fleet with a notice of twenty-four (24) to seventy-two hours (72) hours. This could take the form of a rental agreement that specifies a predefined number of days per year over a five year period. This would apply specifically to the Curby automated vehicles, roll-off trucks that service the convenience centers and drop-off centers and a Spare for the two Curby 6 cubic yard packers. It is estimated that this agreement would allow up to three vehicles per day at a price not to exceed \$200 per day per vehicle for a twelve month period. The vehicles available must include automated collection units with an 18 cubic yard capacity for the Curby Program, one rear end loaded packer with a 6 to 11 cubic yard capacity and a roll-off truck. The cost of these units would be approximately \$93,600. This calculation assumes [(3 vehicles/ per day) (\$150/vehicle/day) (208 days)].

- If a rental program is not initiated, it is recommended that at least one additional automated packer be added to the Curby Recycling Unit for recycling collection in order to reduce the number of occurrences in which semi-automated trucks from other parts of DSW and temporary help are required to fulfill the Curby daily assignments.
- It is recommended that the DSW examine its fleet for quantity and quality with the goal of reducing size and enhancing reliability and dependability of the operational fleet while maintaining a reasonable level of redundancy. There are presently 6 vehicles with a utilization rate below 20% and an additional 12 with utilization rates of 21% to 49%. The reduction in fleet size should result in an unknown savings in operations and maintenance costs and administrative overhead associated with the fleet and make available additional time for the completion of cross-training for that portion of the workforce that has not achieved EO III status. This could be accomplished more easily if the 5 semi-automated packers were not committed to overspill collection.

IMPLEMENTATION PLANNING AND ISSUES:

Responsibility	Priority	Precedent Steps	Estimated Cost/(Savings)	Time Frame for Implementation
Department of Law, Department of Purchasing, Public Works Director and DSW Operations Manager	High	Contingent upon the findings of the Department of Law, and Purchasing Departments, take the steps necessary to establish a multi-year rental agreement for high downtime portion of fleet.	Limit number of vehicles in inventory. Estimated contract price of \$83,200 at \$200 per vehicle per day or two vehicles per day.	Effective July, 2009
Public Works Director, DSW Operations Manager and DSW Supervisors	High	Sell four (4) semi-automated vehicles from Metro SW Collection.	Estimated revenue of (\$40,000 to \$50,000) to be placed in the General Services vehicle replacement fund with an earmark for use in the acquisition of DSW rolling stock.	September, 2009
Public Works Director and staff. DSW Operations Manager	High	Reduce DSW fleet to 59 vehicles if the revenue from the sale of the four vehicles can be used to acquire a new semi-automated packer and the Metro Council does not approve a change in the overspill responsibilities of the	Cost of new semi-automated unit is \$90,000 to \$95,000 greater than potential sale price. Acquire if Metro Council does not support an alternative to present in-house overspill collection method.	April, 2008

Responsibility	Priority	Precedent Steps	Estimated Cost/(Savings)	Time Frame for Implementation
		private contractors collecting overspill.		
Public Works Director, DSW Operations Manager and Supervisory Staff.	High	DSW staff evaluates its fleet to maintain reasonable redundancy, while reducing the net number of vehicles in the fleet, the fleet's average age, fleet operating costs and the enhancement of fleet utilization. .	Assuming the Brush vehicles have a minimal part in this reduction [1 or 2 vehicles] there could be cost savings in operational, maintenance and administrative costs on the order of \$2.50 per mile per vehicle and savings from deferral of future replacements.	July, 2008

Issue 12: Fleet Utilization

DESCRIPTION:

The Division of Solid Waste carries out its solid waste and recycling collection efforts with a contingent of 61 vehicles. As has been shown previously, there are instances in which operational requirements and the unavailability of vehicles causes over-utilization of certain pieces of the fleet, however, an examination of fueling records, obtained from the Fleet Management Division of General Services, indicates that some units may also be under-utilized. The retention of under-utilized vehicles is costly to the Public Works Department as well as Metro in that maintenance is more frequent and costly, and, when viewed from a more global perspective, the Fleet Maintenance Shop must retain relatively more mechanics on staff to repair under-utilized units Metro-wide. Finally, insurance costs are incurred on these units, making them disproportionately more costly than units which accrue higher utilization. The project team, through analysis of fueling records, attempted to identify DSW vehicles which have failed to accumulate reasonable utilization levels over a nine month period.

ANALYSIS AND FINDINGS:

- The DSW fleet is relatively new with 41 of its 61 operational collection vehicles (67.2%) replaced between 2003 and 2005.
- The Division routinely fields 42 vehicles to perform its daily assignments. Semi-automated vehicles account for 21 of these vehicles, automated vehicles account for 10 of the daily usage (5 front loaders and 5 sidarm collection vehicles) and 11 vehicles are specialized trucks (6 knuckle-boom and 5 roll-off collection vehicles).
- Of the total contingent of 61, the remaining nineteen (19) vehicles are classified as Spare or Emergency. DSW classifies 10 of its vehicles as Spares and 9 as Emergency Use Only vehicles. These are the vehicles used when the Daily Use vehicles are out of service. In general, Spares are the first replacements to be used.
- Based upon the examination of fuel and mileage records for the DSW fleet for the nine month period of July 5, 2006 through March 31, 2007, it is possible to define the extent to which each of these vehicles have been used. The amount of vehicle use can be measured through a utilization rate. This is number of days a vehicle actually operates divided by the days the vehicle the number of days it could have operated. The number of days of potential operation used was 156 [(39 weeks) X (4 days /week)].
- The table below summarizes the utilization rates by the number and types of vehicle for the Units within the DSW fleet.

Unit			
	Daily Use	Spare	Emergency
Curby Recycling			
Automated	63.6 (5)	56.7 (2)	0
Semi-Automated	46.2 (4)	57.7 (1)	0

Unit			
	Daily Use	Spare	Emergency
Semi-Automated (6 cubic yard)	84.4 (2)	0	0
Metro Solid Waste			
Semi-Automated	73.4 (7)	34.0 (2)	18.5 (7)
Overspill Semi-Auto	71.3 (5)	0	0
Brush			
Knuckle-Boom Trucks	56.5 (6)	10.9 (2)	0
Front Loaders	83.3 (6)	29.2 (3)	0
Downtown Collection			
Semi-Automated	45.5 (2)	No Data (2)	0
Convenience Centers			
Roll-Off Trucks	64.7 (5)	0	0

- The table demonstrates several points concerning utilization. The Daily Use Automated vehicles within the Curby Program depend upon the Spares, and the relatively high rate of use by both Spares, 58.3% (R0006) and 55.1% (R0007), suggests that it is not unusual to have more than one automated Daily Use out of service at a time.
- The Curby Program’s four semi-automated Daily Use vehicles operate in areas with low set-out rates along their recycling collection routes. Although the four vehicles are necessary, 3 of the 4 Daily Use vehicles are underutilized. Collectively, vehicles R0008 through R0010, are used an average of 36.3% of the available days. Based upon an analysis of utilization records, one of the Daily Use vehicles, R0011, operated 75.6% of the time and the Spare operated 57.7% of the time.
- The Metro Solid Waste Collection Unit has 8 Daily Use trucks. The 8 Daily Use trucks have an average utilization rate of 73.4%; however, 5 of the 7 have an average use rate of 86.5%, while the remaining 2 have usage rates of 43.6% and 37.2%. The daily collection of overspill contains similar findings with the 4 Daily Use vehicles averaging 88.9% and the Spare at 32.7%.
- The data for Emergency Use vehicles within the Solid Waste Collection Unit was limited. Vehicle 08C5598 had no data and 08C5559 had data for only one day, indicating that the units were either not utilized at all, or were utilized extremely sparingly. Four of the other five vehicles had limited data histories of two or three months and one had a history of six months, indicating that they received fuel only sparingly. Three of these vehicles have recently been retrofitted with cart flippers and presumably will become used more often in the future. Of the four remaining vehicles, 3 are 20 years old and one is 10 years old. The three 20 year old vehicles are without cart flippers. The project team has no knowledge of their operational viability; however, without cart flippers these vehicles would have minimal use for the operation.
- The Brush Unit has 8 Knuckle-boom trucks that are used for alley clean-up. Six of the eight are Daily Use vehicles and have a collective utilization rate of 56.5%. As in other Units, it is noted that 4 of the 6 vehicles have an average usage rate of 68.3% while the other two Daily Use vehicles have rates of

20.5% and 45.5%. The two back-up vehicles have usage rates of 9.6% and 12.2%. The oldest of these 8 vehicles is 4 years and the average age is 2.4 years. The Front Loader component is similarly situated. There are 6 Daily Use units and 3 Spares. The Daily Use vehicles average very high usage at 83.3% and one of the Spares has a 70.5% rate. The other two Spares have usage rates of 7.1% and 10.3%. The Daily Use vehicles have an average age of 4.3 years but the Spares are 11 to 13 years of age.

RECOMMENDATIONS:

- It is recommended that the DSW and fleet personnel examine the mechanical histories of vehicles 08C5551, 5559, 5567 and 5598 to determine if there is any realistic utility in their retention, and to determine a possible sale price based upon the conditions of the vehicles.
- It is recommended that the Front Loader truck portion of the DSW fleet be examined to determine the mechanical viability of the Front Loader Spares and to determine which two have the lowest operational and maintenance costs if one of the three Spares were sold. This would leave a 33% redundancy for the Front Loader team.
- Elsewhere in the report, alternatives for the collection of recyclables in low set-out areas have been described. If routes are consolidated or dumpsters or roll-off containers can serve the recycling needs of various portions of the Metro area, there will be excess redundancy of at least one vehicle within the semi-automated portion of the Curby Program. Any excess vehicles should be assigned to Metro Solid Waste which will allow one of the three vehicles recently retrofitted with cart flippers to be auctioned.

IMPLEMENTATION PLANNING AND ISSUES:

Responsibility	Priority	Precedent Steps	Estimated Cost/(Savings)	Time Frame for Implementation
Public Works and Fleet Management Directors and DSW Operations Manager	High	Estimate operating, maintenance and administrative costs associated with owning these 4 Metro Solid Waste Emergency Use vehicles and 1 Front Loader Spare versus their viability and necessity in the work environment.	Revenue (\$15,000 to \$20,000 per vehicle) will be gained from the sale of these vehicles. This should be earmarked for DSW vehicle replacement. (Savings of whatever O&M and administrative costs have historically been associated with these vehicles.)	By February, 2008
DSW Operations Manager	High	Sell four (4) semi-automated vehicles from Metro SW Collection.	Estimated revenue of (\$40,000 to \$50,000) to be placed in General Services vehicle replacement fund and earmarked to replace DSW vehicles.	By May, 2008

Responsibility	Priority	Precedent Steps	Estimated Cost/(Savings)	Time Frame for Implementation
DSW Operations Manager and Supervisory Staff	Medium	Consider how vehicles and staff may be redeployed if the recycling effort in low set-out areas is altered.	Expenses of staff time during regular staff meetings. Possible savings should accrue since additional labor will allow cross-training that will benefit the Division in the future.	By June, 2008

Issue 13: Organizational Structure

DESCRIPTION:

The Division of Solid Waste has, in the past two years, undergone a change in direction after a period of reported credibility issues with departmental management as well as with the Metro Council. The previous Superintendent left the organization, and in the interim period since this departure, the Public Works Director has, with assistance from the Operations Manager and the Customer Service Manager, taken over the responsibility for direct oversight of the Division. This form of organizational structure has served the Division well over the past 12 to 18 months, providing focus for the organization in a time of transition – both in structural form as well as in some of the operational initiatives which have taken place during this interim period which have been discussed above. The project team believes that the Division of Solid Waste could now benefit from a more focused direction from a single solid waste professional with authority and control over all operational, financial and administrative matters.

ANALYSIS AND FINDINGS:

- The project team understands, and concurs with, the desire of the Public Works Director to have direct involvement in the operations of the DSW during a period in which the Metro Council had increasing concerns related to workload and budgetary accountability issues.
- Currently, the operation of the DSW is split between the Operations Manager, with responsibility for collection, disposal and contract oversight, and the Customer Service Manager, with responsibility for administrative matters, as well as for the operations of the drop off sites and convenience centers.
- The vesting of authority in a single manager over the DSW would have several benefits, including the following:
 - Appointing a single point of accountability for operational, financial and administrative decisions
 - Allowing the manager to see the financial impacts, and be accountable for, any operational decisions made for the Division.
 - Allowing the manager to deal with the various contractors on an even footing

- All of the participants in the operational survey of similar jurisdictions have single directors of their respective solid waste organizations.
- There are no obvious operational problems with the current form of organization, however the appointment of a single manager for the DSW would allow the Department Director to re-focus attention on issues with broader implications for the Public Works Department.

RECOMMENDATIONS:

- Appoint a single manager over the DSW, with authority and control over all operational, financial and administrative functions.

IMPLEMENTATION PLANNING AND ISSUES:

Responsibility	Priority	Precedent Steps	Estimated Cost/(Savings)	Time Frame for Implementation
Metro Council, Public Works Director	Low	None	None, other than a potential salary increase if an incumbent were appointed.	6 Months

Metro Code	Current Practice Conflict? (Yes/No)	Conflict Detail
<p>persons collecting or processing five thousand pounds or less of recyclable materials in any calendar year, upon filing of an application for exemption with the director of public works.</p> <p>All owners or operators of solid waste disposal points, haulers, collectors, operators or removers, including exempted persons, shall submit to the director of Public Works a report of the quantities of solid waste, residue, or recyclable materials collected, transported, processed or disposed of, including the destination of recyclable materials. The frequency and detail of such reports shall be at the discretion of the Director of Public Works.</p>	<p>NO</p> <p>NO</p>	<p>Some haulers and landfills are not in compliance with this statute, and should be required to submit quantity reports to ensure the accuracy and consistency of figures reported. This would ensure that any discrepancies would be discovered earlier. A potential enforcement mechanism would be to deny licenses, or levy fines, for failure to submit timely reports to the Director.</p>
<p>10.20.060 Sanitary Landfill Site—Extension of Permit and Use</p>	<p>YES</p>	<p>Not applicable. The Metropolitan Government no longer operates a landfill.</p>
<p>10.20.070 Information required on dump trucks—Violation and Penalty. All dump trucks with a capacity of two tons or more and any vehicle used in collection or transporting of solid waste for a fee shall be required to have painted or affixed to the rear of the vehicle the name of the owner of the vehicle and at least one letter and two numerals at least five inches in height identifying the vehicle. The requirement herein shall apply to those vehicles using the secondary road system (not the interstate road system). Each contractor shall have different numbers for each vehicle in their fleet.</p>	<p>YES</p>	<p>Nashville wants to move to a licensing structure that will be based on waste volume in the County or the number of trucks operated in the County. Language in the Code should be altered to reflect this structure if and when this change is made. A vehicle identification system should exist and be tracked/monitored. If the system remains manual, 10.20.070 should remain in place, with operators required to submit current lists of the referenced dump trucks as they are added and deleted from their fleets.</p>
<p>10.20.075 Information required on commercial trucks transporting used tires—Violation and penalty. All commercial trucks used in the collection or</p>	<p>YES</p>	<p>Not currently enforced. The Code should provide some reference to the enforcing</p>

Metro Code	Current Practice Conflict? (Yes/No)	Conflict Detail
<p>transporting of used tires shall be required to have painted or affixed to the side or rear of the vehicle the name and telephone number of the owner of the vehicle. The requirement herein shall apply to those vehicles using the secondary road system (not the interstate road system). Any driver found in violation of this section shall be fined an amount up to fifty dollars.</p>		<p>agency (e.g., MNP, Code Enforcement, other), as well as any restricted uses of the funds collected, if applicable.</p>
<p>10.20.080. Battery box and parts defined—Disposal and placement. It is unlawful within the area of the metropolitan government for any person engaged in the manufacture, storage, handling, salvaging or sale of battery boxes or battery parts to dispose of the same on any of the dumps in the area of the metropolitan government, public, or private, or to place the same in any location where they can readily be obtained by parties desiring to use them for fuel purposes or otherwise.</p>	YES	<p>Not currently in practice. Since Metro no longer operates a landfill, it is recommended that this code be deleted.</p>
<p>10.20.085 Chipper Service. No other types of solid waste in addition to yard waste will be collected by the chipper service; nor will any solid waste or non-uniform yard waste (including logs) be moved or handled to allow collection of other yard waste in the same stockpile. Provided further, that no limbs in excess of four inches in diameter will be allowed to be collected. Placement of the stockpile of yard waste acceptable for collection by the chipper service must be a location at the curb or the edge of the road or street; provided, however, collection by the chipper service in alleys when such alleys are utilized for collection of solid waste. No yard waste will be collected from private property or in an alley, except as otherwise provided in this section. Persons operating tree surgery businesses or other commercial ventures which generate yard waste are required to remove all debris generated by their procedures and to dispose of that debris according to the Public Works Regulation on Collection and Disposal of Solid Waste in Davidson County. Persons collecting, processing or disposing of yard waste in lieu of using the Metro chipper service are required to follow the Public Works Regulation on Collection and Disposal of Solid Waste in Davidson County. The director of public works shall have the authority to suspend any or all of the chipper service rules in an emergency.</p>	NO	<p>Replaced Chipper Service with Brush Removal Service. Brush is collected from 12 routes that assure collections. Collect brush from curb 5 times per year at each location on each route. Taken to compost facility under contract. Tree Surgeons are exempt from this practice. They are to dispose of own waste.</p> <p>It is recommended that a title change be made from “Chipper Service” to “Brush Removal Service”. Any differences in what was collected by the chipper service and what is now collected by the brush removal service should be included in this statute. If no differences exist, a title change is sufficient modification to this code.</p>
<p>Article II. Urban Services District—Garbage Collection and Disposal</p>		
<p>10.20.090 Definitions</p>	YES	<p>While ‘Downtown Area’ is defined in 10.20.390, it is recommended to include it in</p>

Metro Code	Current Practice Conflict? (Yes/No)	Conflict Detail
		<p>the definitions section for ease of access to the defined concept.</p> <p>It is also recommended to reference the definitions of USD and GSD here as well.</p>
<p>10.20.100 Director of Public Works Authority. The removal and disposition of garbage and rubbish from premises in the urban services district shall be under the jurisdiction of the director of the department of public works.</p>	<p>NO</p>	<p>Metro should modify 10.20.100 if and when Director of Public Works receives authority to collect recyclables from GSD.</p>
<p>10.20.110 Adoption of rules and regulations--Administration</p>	<p>NO</p>	
<p>10.20.111 Educational Materials on Recycling. The recycling office of the metropolitan department of public works shall produce and distribute educational materials to promote and encourage "home" composting of yard waste, and other environmentally sound alternatives.</p>	<p>NO</p>	<p>Consider replacing the term, "recycling office" with "Metro Beautification", which is a division of the PW department handling education per this statute.</p>
<p>A. One-Family and Two-Family Residential. The department of public works shall pick up and dispose of garbage and rubbish once a week and shall determine the maximum amount thereof it will pick up each time. All garbage and rubbish shall be placed in thirty-gallon containers and no container's contents shall weigh more than fifty pounds, provided, however, these limits shall not apply if the department of public works or other department furnishes a container with greater capacity. If the department of public works furnishes a waste container for use at a one-family or two-family residence, the residents of such dwelling shall use that container for the weekly collection contemplated by this section. Further, such residents shall comply with waste container capacity and weight limitations established by the director of the department of public works. Any excess garbage or rubbish shall be disposed of at the expense of the owner or the person in charge of the premises.</p> <p>"...All garbage and rubbish shall be placed in thirty-gallon containers and no container's contents shall weigh more than fifty pounds, provided, however, these limits shall not apply if the department of public works or other departments furnish a container with greater capacity.</p>	<p>YES</p>	<p>Metro uses 96 gallon containers. It should be written to read "All garbage and rubbish shall be placed in 96 gallon containers." All references to 30 gallons should be changed to 96 gallons.</p>

Metro Code	Current Practice Conflict? (Yes/No)	Conflict Detail
Commercial-Industrial Establishment. ...”All garbage and rubbish shall be placed in thirty-gallon containers of garbage and rubbish”	YES	
Back Yard Pick-Ups - ...Any contract for collection of garbage entered into with private contractors shall provide for this additional service and shall enumerate the uniform fee for such service.	NO	
10.20.140 Religious and Non-Profit Organizations	NO	
10.20.150 Hazardous, pathogenic and radioactive waste. All pathological waste from physician’s clinics, dental clinics, blood banks and medical or microbiological laboratories shall be separate from normal waste, placed in durable disposable bags that can be tied and sealed when full. The bags shall be stored in metal containers with tight-fitting lids while in the process of being filled. Containers shall be adequately labeled and kept in places restricted from access by the public. Needles shall be separated from disposable syringes by breaking them off at the hub immediately after use. These materials shall only be placed at the collection point on the day they are to be collected. Storage, collection, and disposal of pathological waste shall be in accordance with regulations of the Davidson County health department.	YES	<p>Obsolete code. This section was applicable when Waste Department was Sanitation department under Health Department.</p> <p>The removal of this obsolete code is recommended.</p>
10.20.160 Container Requirements. Containers used for the deposit of garbage for collection by the metropolitan government shall be in good condition so that collection thereof shall not injure the person collecting the contents. Containers having ragged or sharp edges or other defects must be promptly replaced. Individual (can-type) containers provided shall be not larger than twenty-five inches in diameter and thirty inches in height no smaller than fourteen inches in diameter and sixteen inches in height (commonly known as thirty-gallon and twenty-gallon containers). All individual (can-type) containers shall be made of galvanized or plastic material and shall be kept watertight at all times.	YES	<p>Currently use Metro-provided 96 gallon containers.</p> <p>The removal of this obsolete code is recommended.</p>

Metro Code	Current Practice Conflict? (Yes/No)	Conflict Detail
10.20.170 Location of Container—Gate requirements. Metropolitan government garbage collectors shall not enter houses or stores for the collection of garbage or rubbish.	NO	No changes are recommended for 10.20.170
10.20.180 Authorized use of containers.	NO	
10.20.190 Sanitary landfills established—Tip fee required. The metropolitan government may establish sanitary landfills or other places of disposal as may be necessary. Except as provided herein, no person shall use or be permitted to use any sanitary landfill or other place of disposal except upon the payment of a fee. The council may by resolution establish or adjust fees for any persons using metropolitan sanitary landfills, incinerators, or other collection stations, provided nothing herein shall prohibit the establishment of a private landfill by any private developer, provided landfill is approved by the metropolitan health department and the appropriate state agencies.	YES	Metro no longer operates a landfill. It is recommended that this section be deleted from the code.
10.20.191 Composting/processing facility for leaves and wood waste. The metropolitan department of public works shall maintain and operate a composting/processing facility for the purpose of composting/processing leaves and wood waste. End products may be utilized my the metro government, sold by competitive bid, and/or made available to businesses located in Davidson County and to the general public	NO	Metro operates a mulch or wood waste grinding facility, however it is doubtful that the facility could accept food waste for composting without violations of permits for this facility. It is recommended, therefore, that the only change to this section be the modification of the title from “Composting/Processing Facility” to, simply, “Processing Facility.”
10.20.200 Tip fees-Generally. All metropolitan government sanitary landfills, incinerators, or other solid waste collection or disposal facilities, including, but not limited to, energy production facilities, shall have tip fees established and all persons shall pay a tip fee of six dollars per cubic yard or twenty-four dollars per ton of loose or compacted refuse, effective May 1, 1998.	YES	Metro does not operate sanitary landfills, incinerators, or energy production facilities. It is recommended to eliminate mention of facilities that are no longer under the jurisdiction of Metro Division of Solid Waste. The following statute language is recommended, “All solid waste collection or disposal facilities shall have tip fees established. The council may by resolution

Metro Code	Current Practice Conflict? (Yes/No)	Conflict Detail
		establish and adjust fees as appropriate, and to reflect the actual cost of operation.” Establishing a tip fee amount by ordinance would make future changes to the tip fee more difficult and time consuming to alter.
10.20.210 Tip fees—Special waste.	NO	
10.20.211 Tipping fee for wood waste and chipper residue. The metropolitan department may establish a separate tipping fee rate for segregated wood waste and chipper residue. The council may, by ordinance, adjust such fees. The tipping fee for segregated wood waste and chipper residue is established at five dollars per cubic yard for segregated wood waste, and three dollars per cubic yard for chipper residue.	NO	Waste Management does not currently adhere to the tipping fee set by statute. The current fee to enter a Compost Facility is \$.01 per pound with a \$2 minimum. This fee was established in 1991. It is recommended that the section be amended to delete the reference to \$3 per cubic yard for chipper residue.
10.20.220 Tip fees—Reduced when recycling materials. A fee of five dollars per cubic yard or twenty dollars per ton shall be collected from any person or business entity who generates or produces solid waste upon property owned, leased or rented by such person or business entity to separate or cause to be separated recyclable materials there from while the solid waste is on such property to either maintain a title to such recyclable materials for his own use, or to dispose of such recyclable materials by sale or gift, provided such separation and disposition neither creates a public nuisance nor is otherwise injurious to the public health, welfare and safety. Eligible for reduced fee if divert at least 80% of material received...	YES	This fee is not collected, as Metro does not own its own facility. It is recommended that this obsolete code, 10.20.220, be deleted.
10.20.230 Tip fees—Increased when using out-of-county vehicles. All fees and charges imposed in this article shall be doubled when such waste or refuse is transported to any sanitary landfill, incinerator or collection site in a vehicle having other than a Davidson County motor vehicle license tag.	YES	Metro no longer operates any sanitary landfill or incinerator. There is a premium charge for out-of-county vehicles hauling to the solid waste transfer station in Davidson County.

Metro Code	Current Practice Conflict? (Yes/No)	Conflict Detail
		It is recommended that this obsolete code, 10.20.230, be deleted.
10.20.240 Use of tip fees. Five-sixths of the funds derived from the tip fee shall be placed in the solid waste disposal fund, and one sixth shall be placed in the recycling fund. Moneys from the recycling fund may not be expended or appropriated by specific resolution of the metropolitan council.	YES	Statute should be changed to reflect current practice. It is recommended that this obsolete code, 10.20.240, be deleted.
10.20.250 Free dumping on Wednesday by private citizens. Any vehicle presented for dumping at the metropolitan government sanitary landfills on Wednesday of each week shall not be required to pay any fee; provided that such vehicles disposing of refuse be owned and operated by private citizens who do not hold permits provided by Section 10.20.300 and are not engaged in commercial collection of rubbish or industrial waste.	YES	Metro no longer operates sanitary landfills. Should eliminate this statute.
10.20.270 Adoption of rules and regulations—Tip fees. The director of public works shall be authorized to promulgate reasonable rules and regulations for the collection of fees, including collection at the landfills, incinerators or other collection stations. The director shall also make reasonable rules and regulations as shall be necessary to carry out the inspection, supervision and enforcement of tip fees.	NO	No longer operate landfills or incinerators. Statute should be written to reflect this change. Fee to enter recycling convenience center to dump trash: 3 items or less is free, small pick up load is \$5, large pick up truck is \$10, trailers is \$11 per cubic yard. Rate set in 2000. No change is necessary to this particular section
10.20.280 Vehicle requirements—Dumping times.	NO	
10.20.285	NO	
10.20.287 Tip fees—Construction or demolition waste. Any person enjoying the privilege of providing temporary or permanent disposal of solid waste generated or collected within the boundaries of the metropolitan government at a site or	YES	There is no option to dump inside or outside Metro. No landfill operated by Metro.

Metro Code	Current Practice Conflict? (Yes/No)	Conflict Detail
<p>facility located within the boundaries of the metropolitan government or enjoying the privilege of collecting solid waste within the boundaries of the metropolitan government and disposed of outside the boundaries of the metropolitan government shall pay to the metropolitan government a fee of one dollar and fifty cents per cubic yard or six dollars per ton of solid waste accepted into the site or facility or collected within the boundaries of the metropolitan government and disposed of outside said boundaries. The director of public works shall be authorized to promulgate rules and regulations for the operation of any such temporary or permanent disposal site or facility and for the collection and documentation of fees pursuant hereto. Fees charged pursuant to this section shall be imposed on solid waste disposed of at the Nashville Thermal Transfer Plant or any sanitary landfill or other site owned or operated by the metropolitan government, in addition to the tip fee set out at Metropolitan Code of Laws Section 10.20.200.</p>		<p>Construction and Demolition disposal tipping fee is currently \$.50 per cubic yard. Exemptions are provided to Public Works vehicles, and waste is collected monthly. This rate was established in 1998.</p> <p>References to the \$1.50/cubic yard of solid waste should be deleted as all solid waste fees should be charged based on \$6/ton.</p> <p>A title change of this section is recommended, from "Tip Fees: Construction or Demolition Waste", to "Waste Generation Fee".</p> <p>It is recommends that the following phrase be removed from the statute language, "disposed of at the Nashville Thermal Transfer Plant." The statute should read, " Fees charged pursuant to this section shall be imposed on solid waste disposed of at any site within the jurisdiction of the metropolitan government"</p>
<p>10.20.290 Building debris—Responsibility for removal. A. Building debris such as scrap lumber, plaster, roofing, concrete, brickbats</p>	<p>YES</p>	<p>Metro operates no landfill. Language of this statute should be changed to reflect this.</p>

Metro Code	Current Practice Conflict? (Yes/No)	Conflict Detail
<p>and sanding dust resulting from the construction, repair, remodeling or demolition of any building or appurtenances on private property will not be removed by the department of public works, and the owner must cause such materials and waste to be privately moved.</p> <p>B. Nothing herein shall prohibit the dumping of building debris on landfills operated by the metropolitan government, provided the tip fee, as set out in Section 10.20.200 is paid.</p>	<p>YES</p>	<p>It is recommended that Paragraph B be deleted from this section of the Code, as Metro does not operate a landfill of this type</p>
<p>10.20.300 Private collection permits. The private garbage collection permit shall be effective for the fiscal year beginning on July 1st until the next ensuing thirteenth day of June on and after which date it shall be null and void. The licensed private collector shall pay an annual fee of twenty-five dollars payable annually in advance. The fee for a special permit issued to a private collector whose sole collection is a location owned by the private collector shall be twenty-five dollars per annum payable annually in advance. The fee levied herein shall be imposed on each individual vehicle hauling rubbish or garbage.</p> <p>D. Conditions of Issuing Permit. The director may impose conditions upon the issuing of a permit reasonably calculated to eliminate excessive noise, scattering of dust and dirt, scattered materials and similar nuisances and to prevent obstruction of public streets and interference with traffic. The director shall require all vehicles used by commercial haulers and metropolitan government to meet all safety requirements of the Occupational Safety and Health Act.</p>	<p>YES</p>	<p>Should consider raising \$25 fee to account for inflation. Fee instituted in 1974, should increase fee for truck licensing, or move to a licensing structure based on waste volume in county or the number of trucks operated in the County.</p> <p>Truck inspectors currently check only to ensure back-up lights are working. Metro should locate qualified resources to assess safety requirements of the Occupational Safety and Health Act as they relate to waste hauling vehicles. The Public Works Department should enforce compliance by commercial haulers with these requirements, and deny issuance of permits to those failing to meet</p>

Metro Code	Current Practice Conflict? (Yes/No)	Conflict Detail
<p>E. Hours of Collection and Dumpster Requirements. No person shall empty or remove any containers used for the accumulations or handling of garbage or rubbish between the hours of eleven p.m. and seven a.m. when said containers are located within three hundred feet of any building or structure used for residential purposes. Provided, however, the prohibition of such activity shall not be applicable: to the CC and CF zone districts of metropolitan government; or when specifically permitted by the director of the department of public works.</p>		<p>these requirements.</p> <p>No change is recommended for this section</p>
10.20.310 Nuisance declared when.	NO	
10.20.320 Dumping permitted in designated places only.	NO	
10.20.330 Providers of solid waste disposal service—Fees—Other rules	NO	
<p>10.20.331 Wherever in this chapter tip fees are set on an alternative basis of weight or volume, the director of public works shall, by regulation, establish which method shall be used for calculation thereof. Wherever in this chapter tip fees are not set on an alternative basis of weight or volume, the director of public works may, by regulation, establish an alternative calculation method utilizing a ratio of 1 ton = 4 cubic yards</p>	NO	<p>It is recommended that all fees be based on tonnage collected rather than cubic yards.</p>
Article III. Urban Services District—Trash Receptacles		
10.20.340 Private trash receptacles.	NO	
10.20.350 Public trash receptacles.	NO	
10.20.360 Public trash receptacles—Location	NO	
10.20.370 Public trash receptacles—Maintenance contracts—Advertising.	NO	
10.20.380 Public trash receptacles—Bond required.	NO	
10.20.390 Prohibited on sidewalks when—Boundary limits.	NO	
Article IV. Urban Services District—Receptacles Placed by Optimist Club		

Metro Code	Current Practice Conflict? (Yes/No)	Conflict Detail
<p>10.20.400 Specifications and locations. The Optimist Club is authorized to place not more than fifty trash receptacles, with a base of not less than twenty-four inches and not more than thirty inches and with a height of not more than 60 inches, at convenient locations on sidewalks of the urban services district. The locations of such receptacles in all instances shall be approved by the director of public works. Such trash receptacles shall be placed and maintained without charge to the metropolitan government; provided that collections from these trash receptacles shall be made by the department of public works.</p>	YES	It is recommended that this obsolete code, 10.20.400, be deleted.
<p>10.20.410 Bond required. The Optimist Club shall, in consideration of the granting of this permit to place trash receptacles on the sidewalks, execute a bond in the sum of twenty-five thousand dollars or secure a place with the metropolitan clerk a suitable liability insurance policy with a corporate company doing business in the state with the face value of twenty-five thousand dollars wherein the metropolitan government is named an insured in the policy. The purpose and condition of such bond or insurance policy shall be to save the metropolitan government harmless from any liability because of any injury sustained by any person, directly or indirectly, in connection with the placement, use or maintenance of such trash receptacles.</p>	YES	No longer applicable. Public Works supplies trash receptacles. It is recommended that this obsolete code, 10.20.410, be deleted.
<p>10.20.420 Advertising by club. The Optimist Club reserves the right to place on the trash receptacles the name of its club or its advertising sponsors.</p>	YES	No longer applicable. It is recommended that this obsolete code, 10.20.420, be deleted.
<p>10.20.430 Business use prohibited.</p>	NO	

Metro Code	Current Practice Conflict? (Yes/No)	Conflict Detail
Article V. Annual Report		
10.20.500 Waste management plan report.	NO	See Below.
<p>A. All metropolitan agencies and contractors of the metropolitan government shall provide all information to the department of public works to assist in the creation of the annual report on the waste management plan.</p>	YES	<p>Division staff must obtain actual accurate numbers from State report. All vendors do not report accurate tonnage numbers to the department of public works. Statute should be used to enforce this requirement so that numbers will be consistent.</p> <p>The MAXIMUS project team has reviewed the contract with Red River Service Corporation, one of the larger contractors performing work for the Division of Solid Waste, and determined that this contractor is required, under Section 2.04 of the contract signed July 27, 2004, to “maintain and submit to Metro accurate monthly and annual reports, which detail activity related to...” services shown in “Schedule 2”. This schedule requires the submittal of data relating to a variety of metrics, one of which is “tons collected.” There are similar provisions in contracts with other vendors as well. It is recommended that the Division of Solid Waste enforce the intent of these contracts as they relate to data provision, requiring not only contractors, but all entities handling solid waste in Davidson County to provide information to the Public</p>

Metro Code	Current Practice Conflict? (Yes/No)	Conflict Detail
		Works Department.
B. Notices of the presentation will be sent to customers of the district energy system, members of the media, known environmental groups including but not limited to: the Sierra Club, Recycle Nashville, BURNT, RAM, Tennessee Conservation Voters, Tennessee Conservation League, and Cumberland Region Tomorrow.	NO	
C. The annual report will use 2001 as the base year of comparison for all information requested and shall report requested data for the base year, the current year, and the previous three years to the extent possible. To the extent possible, footnote all formulae used in calculating information provided in the report. The annual report shall contain, but is not limited to, the following information:	YES	It is recommended that the code be amended to indicate that information will be reported on calendar year.
1. Recycling: Percent of households in the urban services district participating in curbside recycling annually; Percent of commercial and residential waste recycled (not including the diversion of waste from one class of landfill to another; and tons dropped off at each recycling drop-off and convenience center annually.	YES	In order to calculate a true participation rate, all residences would need to be included in GIS system with bar code on recycling cart. Collection trucks should have a device to read and store information specific to address on bar code. In absence of barcoding, Metro PW provides monthly setout rate and average annual setout rate. (Setout rate is total number of houses with carts set out divided by total # of houses on route.)
2. Composting: Tons composted annually, commercially, and residentially in the area of metropolitan government; Describe Metropolitan Government's composting efforts, costs, participation, and diversion from land filling.	NO	Currently, Metro does not provide commercial or municipal composting. Composting data, including tonnage of composting, its origins (residential or commercial) costs of composting, diversion from landfill, are not in the 2005 report. The Public Works Department currently

Metro Code	Current Practice Conflict? (Yes/No)	Conflict Detail
		administers a pilot compost program, which reports any education related efforts with regard to backyard composting, etc.
3. Education: Breakdown of expenditures for education related to the waste management plan; Explanation of the modes of education used; Number of individuals reached through education.	NO	
4. Waste hauling and disposal: Tons of commercial waste land-filled in Davidson County and Davidson County annually; Tons of residential waste Davidson County land-filled in Davidson County and out of Davidson County from the urban services district and from the general services district annually.	YES	<p>There is no longer a landfill for residential or commercial waste in Davidson County for the USD or GSD.</p> <p>Because residential waste in the GSD is contracted privately by home owners and private hauling companies pick up residential and commercial waste in the same truck without separation, GSD waste cannot be accurately separated by residential and commercial. In addition, USD waste collected by Metro and Metro contractors will include a small amount of commercial waste from small businesses. This waste cannot be separated from residential waste.</p> <p>Can provide USD waste collected by Metro and Metro contractors compared to all the remaining waste generated in Davidson County.</p>
5. Household Hazardous Waste: Amount of household hazardous waste diverted from landfills for electronics/computers, batteries, paint, oil, and other chemicals, antifreeze, waste tires, other.	NO	

Metro Code	Current Practice Conflict? (Yes/No)	Conflict Detail
6. Landfill Diversion: Describe metropolitan government's efforts to divert more household hazardous waste from landfills; Describe metropolitan government's efforts to divert more residential waste from landfills; and describe other efforts by the metropolitan government to divert more commercial waste from landfills.	NO	
7. District energy system: Performance guarantees contained within metro's contract with the contractor for the design, construction, improvement, operation and management of the district energy system; Amount of time that service to the customers has been interrupted and the reason for each interruption; the number of Nashville Thermal employees hired and still employed by metro or with the central district energy distribution plant or its operations contractor; and the number and description of OSHA reportable accidents and lost time accidents that have occurred within the central district energy distribution system	YES	Nashville owns the District Energy System, but it is operated by Constellation, Inc. The DES replaced the Thermal Plant a couple of years ago, and provides energy services to Metro agencies, among others, The change to the Code should reflect the change to DES.
8. Environmental compliance. ...Thermal plant and/or the central district energy distribution system, including non-compliance with water discharge regulations or air quality regulations, and estimated additional vehicle miles traveled with increase in metro sold waste out of county hauling of residential trash.	YES	No thermal plant.
9. Provide the annual costs for: ... transfer and disposal costs of thermal ash; full cost of thermal operations; full cost of operating the central district energy distribution system; annual cost of maintaining the energy distribution system above the one hundred fifty thousand dollar allowance provided by contractor and an explanation of the amount expended. B. ... customers of the central district energy distribution system	YES	Annual cost information for transfer and disposal costs of thermal ash and full cost thermal operations is no longer necessary.
10. Contract compliance. Number and type of contract violations for: trash pickup by contractor or by the metropolitan government; recycling contractor; ash disposal contractor waste disposal/land filling	YES	The ash disposal contractor waste disposal/land filling is no longer necessary.
11. Minority/women participation. Number and percent of employees who are minorities/women for each contractor of metro involved in the plan; and number of minority/women-owned business enterprises that have contractual relationships with the waste management plan	NO	

SECTION IV

NASHVILLE-DAVIDSON COUNTY, TENNESSEE COMPARATIVE SURVEY OF SOLID WASTE AND RECYCLING SERVICE DELIVERY

As part of the operations review of the Metropolitan Nashville-Davidson County Division of Solid Waste, the MAXIMUS project team conducted a comparative survey focusing on the delivery of solid waste, yard waste and recycling services in comparable communities. The survey focused on several characteristics of these functions, including organization and staffing, the range of services provided, fleet use, policies, facilities, as well as other facets of operations. The sections which follow provide an analysis of the survey results.

1. INFORMATION WAS COLLECTED FROM FIVE COMMUNITIES.

The project team, in consultation with Metro officials, developed a list of peer communities, which provided services similar to Nashville, and which were also comparable in size and growth rate using data from the 2000 Census. The table below shows the participating communities, 2005 population levels and annualized growth rates during the 15 year period from 1990 to 2005, and the number of housing units in the jurisdiction.

City	2005 Population	Annual Growth Rate 1990 - 2005	2005 Housing Units
Charlotte, NC	601,598	2.83%	280,259
Austin, TX	678,457	2.54%	317,487
Milwaukee, WI	556,948	(0.88%)	250,712
Denver, CO	545,198	1.03%	268,540
Portland, OR	513,627	1.08%	245,274
Nashville, TN	549,110	0.78%	258,497

While the population of the five cities varies somewhat, Nashville's is close to the median, with three above and two below its 2005 population of 549,110. Further, Nashville's population is only slightly lower than the arithmetic average of 579,166. Similarly, the annualized growth rates for the surveyed communities vary substantially. Nashville's annual average growth rate of 0.78% trailed all but Milwaukee's, which was alone in the survey group in showing a decrease in population over the 15 year period.

The following sections present the results of the survey.

2. CUSTOMER CALL HANDLING.

MAXIMUS collected information with regard to the manner by which customer calls are handled. Below is a summary of these:

- Portland has a dedicated Hot Line which Divisional staff answer. Missed collection complaints are forwarded to Solid Waste and Recycling staff in the field. Calls are logged into an Excel database.
- Milwaukee's calls are answered by staff in the Public Works Department. Calls are logged into a database.
- Charlotte utilizes a 311 call center. Calls are logged into an "Emerald" database management tool, and forwarded to the Solid Waste Division as required.
- Austin has a 311 call center operated by City staff, with appropriate calls forwarded to the Solid Waste Division. The City utilizes a Motorola system for recording calls.
- Denver also utilizes a 311 call center which has been in existence since July, 2006.
- Nashville utilizes a call center operated by the General Services Department of Metro. Appropriate calls are forwarded to the Division of Solid Waste.

3. SOLID WASTE COLLECTION FREQUENCY

There was little variation between jurisdictions in the frequency of the collection of solid waste. The table below summarizes these frequencies.

City	Frequency of Residential Collection	Frequency of Commercial Collection
Charlotte, NC	Weekly	
Austin, TX	Weekly	Varies - 1,2,3,4, or 5 times a week per contract with customer
Milwaukee, WI	Weekly	
Denver, CO	Weekly	Open market system, residential buildings with 7 units or less, the city collects. All others can obtain their own service.
Portland, OR	Weekly, by 30 franchised haulers	Negotiated between business and hauler
Nashville, TN	Weekly	Daily

As the table above shows, all jurisdictions, including Nashville, collect residential waste weekly. Commercial collection is performed by contractors in each of the surveyed jurisdictions. Although frequencies listed in the table indicate that residential and commercial waste is collected daily, the collection of this waste on holidays varies among the survey participants. For example, Charlotte collects on all days except Christmas, Thanksgiving and Martin Luther King holidays. Austin collects on all holidays except Christmas and Thanksgiving, delaying collection until the following days. Milwaukee and Denver do not collect waste on any holidays. Portland collects on all holidays except Christmas and Thanksgiving.

4. HANDLING OF WASTE OVERFLOW AT CURBSIDE

There were several ways by which the surveyed communities handled the issue of overflow (waste placed at curbside which is not in an approved container). The following points summarize these methods:

- Milwaukee’s crews pick up all overflow, sending crews back for this overflow at apartment complexes which, on initial runs, are collected by top loaders. The City does not define overflow as such, directing its collection crews to collect all waste placed at the curb.
- Portland has no automated routes, and therefore collects all waste placed at the curb.
- Charlotte educates its citizens that anything not placed in the cart will not be collected, with the driver leaving a note explaining the reason that it was not collected. Only at the Christmas holiday do drivers collect waste not placed in approved containers.
- In Austin, the Driver exits vehicle to collect if the bag is on the ground next to the cart, and collects the extra bags. If the cart is overstuffed (lid not closed) or there are extra bags without stickers (the City utilizes a “pay as you throw” program), the driver writes a ticket to the resident and the resident is charged \$4/bag or \$4 for the overstuffed cart.
- Denver reports that it does not allow its drivers of automated units to exit the vehicle for overflow. This overflow is collected by different crews, using rear loaders.
- In Nashville, contract drivers do not exit the automated vehicles, however Metro crews collect any overflow reported by drivers.

5. HANDING OF COMPLIANCE ISSUES

The project team asked survey respondents to relate how they handle compliance issues, and what penalties, if any, are associated with violations of ordinances governing the waste collection effort. The table below summarizes these responses:

City	How Are Compliance Issues Handled?	Penalties	Which Department Governs Compliance?
Charlotte, NC	<p>There are many. Top three: Improper item preparation, which includes illegal material placed on the curb for collection; carts left on the curb after service; unscheduled bulky items.</p> <p>Jurisdiction conducts education sessions with customers on how to prepare their items and rules for collection.</p>	Garbage is not collected if items are not properly prepared. Carts on curb after service and unscheduled bulky items can result in fines of at least \$50.00.	A separate department, Neighborhood Development, handles policing and fines for non-compliance.
Austin, TX	Homeowner associations will usually handle the problem of carts being left out by the curb longer than 10 pm after collection. Other complaints will go to Code Enforcement (a division of SWS), and Code Enforcement Officers will follow up on these violations.	Depends on Home Owner Association. Code Enforcement can write a warning and then a citation for violations.	Code Enforcement, division of Solid Waste Services, handles non-compliance issues on a complaint basis.
Milwaukee, WI	Citations are issued by sanitation workers	Fines ranging from \$15 to \$50	Sanitation Division of Public Works
Denver, CO	Very weak in this area. There is only one inspector in department. Should be enforced by Zoning but rare.	Don't penalize violators. Citations are intended to be informative. Don't issue tickets or bring people to court.	Code Enforcement, division of Solid Waste Services, handles non-compliance issues on a complaint basis.
Portland, OR	Haulers leave triplicate notes or 'friendly reminders' for customers for overweight cans, improperly prepared materials, etc. Haulers	No penalties	Office of Sustainable Development

City	How Are Compliance Issues Handled?	Penalties	Which Department Governs Compliance?
	will not take overweight cans.		
Nashville, TN	Container complaints under Ordinance 89-826 (left out beyond hours) and Noise Ordinance for Dumpsters (10. 20.300 A) which bans the emptying of dumpsters after 11PM and before 7AM and within 300 feet of a residence. Also, assist Health Department on such matters as grease in an alley.	\$50 fine after 2 warning letters for container violations	Metro Codes and Division of Solid Waste

As can be seen from the above tabulation of results, the surveyed jurisdictions handle compliance issues in a wide variety of ways. These range from the very passive in Denver, which has no penalties or enforcement, other than that which is done in response to complaints, to Charlotte, which has an active educational and enforcement program. In the middle of this range are locations such as Milwaukee and Portland, which rely upon sanitation workers and contract haulers to leave notices of code violations, and Austin, which relies upon homeowner associations to cite and enforce the codes.

6. PROVISION OF CONTAINERS TO CUSTOMERS

MAXIMUS asked survey respondents about their provision of containers for waste, and their experiences with theft of these containers. The following points summarize the responses:

- Milwaukee provides carts at no cost to the resident, although apartment complexes must provide their own dumpster boxes. There is no cost to the resident for additional containers, and it is reported that more than three such containers is unusual for any single residence. The City of Milwaukee reports that approximately 1,000 containers are stolen each year.
- Portland reports that, for garbage, residents can either rent containers from the contract hauler or provide their own. For recycling, the contractor provides two 32 gallon yellow bins at no cost to the resident, but charges 10% above its cost for the third and

subsequent bins. Since the contractors provide the containers, the City reports that it does not monitor the number that are replaced due to theft or disappearance each month.

- Charlotte provides residents with one 96/95 gallon container, and an additional one can be purchased for a small fee. Charlotte also reports that approximately 150 containers are replaced each month due to theft.
- Austin provides one cart at no cost to the resident, and will provide additional carts but will charge an escalating fee for collection depending upon the size of the additional cart chosen (possible choices are 30, 60 and 90 gallon carts). The City reports that it replaces about 250 carts each month due to theft or unknown cause of disappearance.
- Denver owns all of the 3 cu. yard dumpsters and 95 gallon containers provided to customers. It does not provide additional containers, and does not service a second container, although it also reports that it picks up overflow on each route. The City reports that it is considering allowing residents to purchase a second container from local private providers. Denver reports that the exact number of containers replaced each month due to theft is unknown, but believed to be minimal.
- Nashville provides one 96 gallon container free of charge, with the second and subsequent containers provided to residents upon request. Nashville plans to initiate a \$40 charge for the second container. Nashville's experience with container theft appears to be typical of survey respondents, with 150 and 200 stolen each month.

In summary, there appears to be some consensus among the survey respondents that the first container is provided free of charge, however there is some slight divergence regarding the provision of subsequent containers. Austin appears to be alone in its provision of multiple carts for free, but with the monthly charge for collection from these containers. Others, including Nashville, provide multiple containers, but the charge for these is based on the charge for the container itself. Denver is an exception to this, noting that it does not service second containers at all, however the City is considering modifying this policy.

7. CONTRACTED COLLECTION

Survey respondents were asked to provide information regarding the extent to which they contract out any portion of residential and commercial solid waste collection. Below is a summary of results.

- In Milwaukee, residences of 1 to 4 buildings are collected by City crews. Larger units are collected approximately half by the City and half by private contractors.
- Portland operates a franchised system. The approximately 142,000 residential customers are serviced by 30 franchised haulers, while commercial collection of the approximately 20,000 customers is an open, competitive market (58 haulers).
- In Charlotte, about 30,000 of the 190,000 residential customers are serviced by private haulers. The City has implemented “managed competition” and the City crews lost one bid to private collectors in one section of the City.
- In Austin, some areas that have been annexed are still serviced by private haulers. The City does not have estimates for the total numbers of these customers. Commercial collection is primarily provided by private haulers.
- In Denver, all residences of 7 or more units are serviced by private contractors, with City crews collecting waste at residences under 7 units. All commercial collection is performed by private haulers.
- In Nashville, private haulers service 100,594 residential customers.

8. COLLECTION ROUTE DESIGN

Metro has recently purchased and installed an automated routing system, “Route Smart”, and has begun training in its implementation as a method to minimize travel and maximize productivity of its collection workforce. The project team asked survey participants to provide information on their various methods of designing routes. The results are provided below:

- Milwaukee reports that it has not yet found a software system that addresses all of its needs, and therefore does not have an automated system currently.
- Portland has a franchised system, and is unaware of whether the various contractors operating in the City utilize an automated routing system.
- Charlotte and Austin, like Nashville, utilize Route Smart, and their systems are integrated with their cities’ GIS.

- Denver does not yet utilize an automated routing system, but acknowledges that it needs to move in that direction. Currently, Solid Waste Services utilizes benchmarks based on the number of homes to design routes, and uses historical knowledge and GIS maps for routing.

9. BACK YARD COLLECTION METHODS

The MAXIMUS project team asked each of the five survey participants to provide information regarding whether, and how, back yard collection is accomplished, and under what conditions this collection is provided for their customers. Below is a summary of responses:

- Milwaukee provides back yard collection services for the elderly and disabled, using semi-automated trucks.
- In Charlotte, the non-curbside collection service is provided only in the cases of the physically disabled, and only for garbage collection. The City provides forms to those residents wishing to receive a disability waiver, and this form must be signed by a doctor. For these cases, a semi-automated rear loader is used.
- In Portland, residents can have non-curb service and pay for it, as arranged with their hauler. This service costs \$3 for 32 gallon and containers below 32 gallon. There is no provision for the elderly and disabled, although this segment of the customer base may request a smaller, 20 gallon, container which is more easily transported to the curb.
- Austin does not provide back yard collection under any circumstance, but it instructs its drivers to exit the truck to move the solid waste container to the curb from the front or side of the house in order to empty it. Customers may request this service based on disability or age, but the service is only available for garbage collection, and not yard waste.
- Denver does not provide back yard collection, and does not provide waivers for the elderly or disabled.
- In Nashville, in-house crews collect yard waste and tree trimmings placed in alleyways. DSW has 3 routes using Heil Knuckle-boom trucks that generally use two person crews. The contractor, SRS, has 9 routes.

10. DOWNTOWN DISTRICT COLLECTION METHODS AND TIMES

Survey participants were asked whether they required downtown district customers to place their garbage containers at the curb. Participants were also asked about the collection times in the downtown district. Below is a summary of responses:

- In Milwaukee, downtown district customers must place containers at the curb. Collection is made between 5:00 a.m. and 1:00 p.m.
- In Portland, haulers cannot collect between 10 a.m. and 10 p.m. in the main downtown district, an area of about 45 acres. The City recently created new rules for downtown collection because of noise complaints from new downtown residential residents. Portland does not require customers to place containers at the curb, as private haulers use keys or access codes to enter the basements of buildings to collect trash which residents either place in these areas or drop into chutes. Businesses work out individual arrangements with private haulers for the placement of containers and collection of waste.
- Most downtown Charlotte customers are required to place materials at the curb. A small number are provided service from loading docks because of the lack of sidewalk space and safety issues. Collection is made from 6:30 a.m. to 1:30 p.m., Monday through Friday.
- In Austin, the private contractor starts at 5:00 a.m. and continues till finished 7 days per week. SWS (City crews) collects trash from carts of commercial customers starting at 6:30 a.m. These are collected as part of the residential routes. Some of the commercial customers are located in the downtown area. Dumpsters are located in alleys. Carts must be placed at the curb.
- In Denver, downtown contractors are restricted from collecting garbage between the hours of 10:00 p.m. and 7:00 a.m. All containers must be placed in alleys or in buildings.
- Nashville places a premium on the aesthetics of the downtown district, and therefore restricts the placement of containers at the curb only during collection periods. These periods are from 6:30 a.m. to 3:00 p.m. on Mondays; from 9:30 a.m. till 6:00 p.m. Tuesdays through Fridays; and on Saturdays from 10:00 a.m. till 6:30 p.m. There is also a provision for special collection during the day as well.

11. LANDFILL OPERATIONS

Respondents were asked whether their cities operated a landfill. Responses are summarized below:

- Neither Milwaukee nor Charlotte own or operate a landfill. Milwaukee pays \$26 per ton for disposal, and Charlotte pays \$25 per ton.
- Portland does not operate a landfill. Waste is hauled 150 miles to a private landfill where it is disposed at \$71 per ton.
- Austin had a C&D landfill until May, 2006 when it was closed. It has no other landfill, but pays a private operator \$18.35 per ton for disposal.
- Denver owns a landfill, but it is operated privately. It pays \$7.49 per ton if taken to the landfill via transfer trailer, and \$10 per ton if taken by conventional truck.
- Nashville's Public Works Department is responsible for the monitoring and care of a closed landfill. However, Metro does not operate a functional landfill.

12. TRANSFER STATION OPERATIONS

MAXIMUS asked survey participants about the presence of transfer stations in their respective cities. Below is a summary of responses:

- The City of Milwaukee operates two transfer stations that are operated by its landfill contractor.
- In Portland, the Metro Regional Government operates transfer stations.
- Neither Charlotte nor Austin operate transfer stations.
- Denver owns and operates one, and uses two other private transfer stations. One is located north, one in the southwest, and one southeast of the City.
- In Nashville, there is one transfer station operated by Allied, a private contractor.

13. WASTE CONVERSION FACILITIES

Respondents were asked whether they operated a waste conversion facility in their jurisdictions. Responses are listed below:

- Milwaukee, Portland, Charlotte and Austin have no waste conversion facilities.
- In Denver, there is no waste conversion facility, however there is a small gas project at the landfill, whereby the City will collect waste and sell it back to the electric company for the power grid.
- Until 2002, Nashville owned and operated a thermal plant, which incinerated garbage and sold the resulting energy to power generators. It no longer operates any waste conversion facility.

14. RECYCLING COLLECTION

Survey participants were asked to provide information regarding the methods by which their jurisdictions collect recyclable materials, e.g., single stream, dual stream, curbside, drop off centers, etc. Below is a summary of the results of the survey.

City	Source Separated	Single Stream	Other
Nashville	Drop - Off Centers and Convenience Centers	CURBY	
Milwaukee	Dual compartment carts and trucks		
Portland	Residential – 2 14-gal recycling bins per house		For commercial, it is up to businesses and haulers as to how they set it up.
Charlotte	Dual Stream, manual collection		
Austin	Yes. Paper is separated from the cans, glass, and	Plan to start single-stream in 2008	

City	Source Separated	Single Stream	Other
	plastics		
Denver		X (*including glass)	

15. CUSTOMERS

Most municipalities report that all residential customers who receive municipal solid waste removal are eligible for the recycling program.

City	Residential	Businesses
Nashville	All residents that receive solid waste collection from Metro are eligible	
Milwaukee	190,000	
Portland	140,000 households.	20,000
Charlotte	196,000 – regular part of garbage collection	
Austin	All customers whose garbage is picked up by SWS	
Denver	162,000 (These are eligible subscribers. Only approximately 67,000 have actually signed up)	

16. RECYCLING PARTICIPATION RATE

Survey participants were asked to provide information regarding their set-out rates as well as their overall recycling rates. Set-out rates are the percentages of eligible customers “setting out” a recycling container. Recycling rates are defined as recyclable materials collected as a percentage of the total waste stream.

City	Set-Out	Recycling	Mandatory?
Nashville	40%	22% (combined public & private) This is 39% if PSC metals are included. The overall rate is 27%.	No
Milwaukee	75% (90% in areas of cart collection)		Yes
Portland	80%+ (residential)	52% (residential)	Residential – No Commercial – Yes (require a 50% waste stream diversion rate)
Charlotte	43% (residential)		No
Austin	46% (residential & commercial)		Residential – No Commercial – Apartments of more than 100 units, and businesses with more than 100 employees on site are required to institute a recycling program
Denver	70% (residential 2005) for those residences subscribed to the service. This is 42% overall.	38% (residential)	No

17. RECYCLABLE MATERIALS COLLECTED

Most municipalities reported that they collect more or less the same materials. Materials collected include:

Material	Nashville	Milwaukee	Denver	Portland	Charlotte	Austin
Mixed metals	X	X	X	X	X	X
Paper and cardboard	X	X	X	X	X	X
Plastics	X	X	X	X	X	X
Anti-freeze/oil				X		
Batteries						
Electronics						
Glass		X	X	X	X	X
Yard waste	X				X	X
Tires						

- It should be noted that this was an open ended question so that the absence of a material being listed by a municipality does not necessarily mean that they do not recycle that material.
- The materials listed in the table are those which are collected at the curb. All surveyed cities have provisions for non-curb collection of the omitted materials.
- In Austin, although yard waste is listed as being collected at the curb, this is collected weekly for limbs smaller than 8” in diameter. Other, larger, yard waste is collected twice annually in a separate collection effort.
- In Portland, the city requires that all businesses separate recyclable materials and recycle a minimum of 50% of their waste, within practical limitations. In Portland, businesses may choose their garbage hauler and recycler from a list of over 1,000 companies and negotiate prices for these services. If requested, haulers must offer recycling collection.

- Portland, Charlotte, Austin, and Denver all specified types of papers and plastics that are recyclables, e.g.: telephone books, newspaper, soft drink bottles without the lid, etc.

18. INCENTIVES TO RECYCLE

Only Portland and Austin offer incentives to encourage recycling. However, as jurisdictions were not given a definition of "incentive" it is possible the other jurisdictions offer the same incentive as these two cities.

- In Portland, recycling fees are designed to encourage recycling:
 - Residential "pay as you throw" volume-based rate schedule is reviewed and set annually by City Council
 - Commercial tip fee for food waste is \$40/ton, versus \$70 for solid waste.

City	Incentives	None
Nashville		X
Milwaukee		X
Portland	X	
Charlotte		X
Austin	X	
Denver		X

19. COLLECTION OF RECYCLABLE MATERIALS

When asked if recycling collection is performed in-house or contracted out, four jurisdictions reported in-house collections.

- In-house recycling is performed by Nashville, Milwaukee, and Denver.
- Charlotte does 75% of their collections in-house and 25% is contracted to a private agency.
- Portland and Austin both contract recycling collections to private agencies.

City	In-House	Contracted Out	Combination (by %)
Nashville	X		
Milwaukee	X		
Portland		X	
Charlotte	X	X	75% In-House, 25% contracted to private agency
Austin		X	
Denver	X		

20. TONNAGE

MAXIMUS asked survey participants to report the total tonnage of recyclable material collected in the previous fiscal year. These tonnages, combined with information reported in other sections of the survey, yield results regarding the approximate number of tons of recyclable materials generated per household, as shown in the table below.

City	Potential Recycling Customers	Actual Customers	Tons of Curbside	Setout Rate	Pounds/House/Month
Nashville	119,000	47,600	13,200	40%	46.22
Milwaukee	190,000	142,500	26,000	75%	30.41
Portland	140,000	112,000	50,000	80%	74.40
Charlotte	196,000	84,280	33,126	43%	65.51
Austin	162,000	74,520	29,047	46%	64.97
Denver	162,000	67,000	18,000	42%	44.78
Average	161,500.00	87,983	28,228.8	NA	53.47

- Portland reported the greatest tonnage of recyclables with over 552,800 combined residential and commercial recyclables.

21. EDUCATIONAL PROGRAMS

Municipalities were asked to report on education programs on recycling that are presented to various groups.

- Municipalities reported a range of groups for whom outreach and educational programs were conducted, including schools, civic organizations, and businesses.
- All municipalities reported educational programs for schools, and with the exception of Milwaukee, neighborhood groups and civic organizations.
- Denver and Milwaukee both reported using local municipal channels to encourage recycling.

City	Schools	Neighborhood Groups	Civic Organizations	Businesses	Periodic Mailing	PSAs	Municipal Channel	Press	Special Programs
Nashville	X	X	X	X			X	X	
Milwaukee	X				X	X	X	X	
Portland	X	X	X						X
Charlotte	X	X	X						X
Austin	X	X	X						X
Denver	X	X	X				X		

22. DROP OFF SITES

Municipalities were asked if they provide recycling drop off sites.

- Denver and Austin both reported that they do not have drop-off recycling sites.
- Nashville, Milwaukee, Portland, and Charlotte all reported drop-off sites.

City	Yes	No	NOTE
Nashville	X		9 drop-off sites - 8 are 24 hours, 1 Saturday only.
Milwaukee	X		2 – not 24 hours
Portland	X		Operated by private MRFs
Charlotte		X	The City of Charlotte operates no drop off sites, however there are 4 full service, 9 self-service and 15 business recycling centers in Mecklenberg County
Austin		X	
Denver		X	All recycling curbside & alleys

23. CONVENIENCE CENTERS

Municipalities were asked if they provide recycling drop off sites. Below is a summary of the survey results.

- Nashville, Milwaukee, and Charlotte reported they provide convenience centers.
- Portland, Austin, and Denver do not have drop off centers.
- Milwaukee has 2 centers with 2 employees per site at any given time. The centers recycle computers, tires, used motor oil, used oil filters, yard trimmings, antifreeze, etc. One site’s hazardous waste collection is under contract with a private organization.

City	Yes	No
Nashville	X	
Milwaukee	X	

City	Yes	No
Portland		X
Charlotte	X	
Austin		X
Denver		X

24. RECYCLING PROCESSING FACILITY

Municipalities were asked if there is a municipal recycling processing facility in their communities, and if so, if it is operated privately or by the municipality.

- Both Charlotte and Austin reported that they operate their own recycling processing facility.
- Charlotte reported that while the municipality owns the facility, it is operated by an agency under contract.
- Portland reported that there are six MRFs in the area that can process recyclable materials.

City	Municipally Owned/ Operated	Privately Owned/ Operated
Nashville		Contractor
Milwaukee		X
Portland		X
Charlotte	X	X
Austin	X	
Denver		X

25. COMPENSATION FROM PRIVATELY OPERATED PROCESSING FACILITIES

Municipalities were asked if the recycling facility is privately operated, to explain how the municipality is compensated for recycled materials.

- Milwaukee and their processing facility split the revenues from recycled materials.
- Charlotte does not receive compensation from recycled materials processing.
- Denver reported that the revenue is based on per ton delivered. They further reported that they have an internal audit system to ensure correct compensation is occurring.

City	Market-based	Flat fee	Other
Nashville	X	X	Flat fee of \$10/ton for curbside. Flat fee for cardboard (\$35/ton) and for mixed paper (\$45/ton). Market-based rate for aluminum, metal and plastic
Milwaukee			Revenue split 50/50
Portland	No response		
Charlotte			None
Austin			Unknown (no response)
Denver			Revenue per ton delivered.

26. CONTAMINATION CHARGES

Municipalities were asked if there is a deduction taken from profits for contamination.

- With the exception of Charlotte, municipalities reported charges for contamination.
- Most reported that the charge for contamination was not levied unless a certain contamination threshold was crossed.
- See table below for policies.

City	Yes	No	Policy
Nashville	X		Set % allowed. Fee based on % excess greater than allowance. Nashville pays for contaminated material only if DSW does not pick it up.
Milwaukee	X	X	Processor pays cost to landfill. If recycling is contaminated, will leave cart behind. Charge is \$15-25 assessment for contaminated recycling carts. Crews as they collect, tag cart, collect addresses, forward to sanitation inspectors to enforce. There are 10 total contamination inspectors. Watch for health code violations and what is collected.
Portland		X	There is an overall 3% contamination coming from MRF. Do not recalculate rate for this or any percentage.
Charlotte		X	Entities are asked not to contaminate.
Austin	X		\$21.60 per ton. Vendors charge the city for contaminated items
Denver	X		Monthly weight reports, spot checks, quarterly market reports. Allowed contamination of tonnage delivered is 5%. We have had a 2% contamination rate. Contamination rate of greater than 5% has not occurred in 10 years.

27. YARD WASTE COLLECTION

Municipalities were asked if their jurisdictions provide for the collection of yard waste for residents. If yes, the municipality was asked if the collection is done by the municipality or through contracted services.

- With the exception of Denver, municipalities reported providing for yard waste removal for residents.

- Nashville and Charlotte use both in-house staffing and contracted services for yard waste removal. Charlotte does 75% of the removal in-house.
- Milwaukee, Portland, and Austin all provide yard waste removal services using municipal staff.
- Denver does not provide for yard waste removal, with the exception of seasonal leaf drop-off and holiday tree removal, both of which are done using municipal staff.

City	No	Yes In-House	Yes Private Contract
Nashville		X	X
Milwaukee		X	
Portland		X	
Charlotte		X (75%)	X (25%)
Austin		X	
Denver	X		

28. YARD WASTE COLLECTION

Municipalities were asked to report the types of yard waste they collected.

- Denver picks up leaves five times annually and also has a holiday tree pick up program.
- With the exception of Denver, municipalities reported removing tree limbs.
- Most municipalities reported removing tree limbs, leaves, and grass.

- The following materials are picked up by the responding cities at curbside:

City	Tree Limbs	Leaves	Stumps	Grass	Pallets	Trees	Brush
Nashville	X	X				X	X
Milwaukee	X						
Portland	X	X	X	X	X	X	
Charlotte	X	X		X			X
Austin	X	X	X	X	X		X
Denver		X				X	

29. FREQUENCY OF YARD WASTE COLLECTION

There was little commonality among jurisdictions regarding the frequency of yard waste collection.

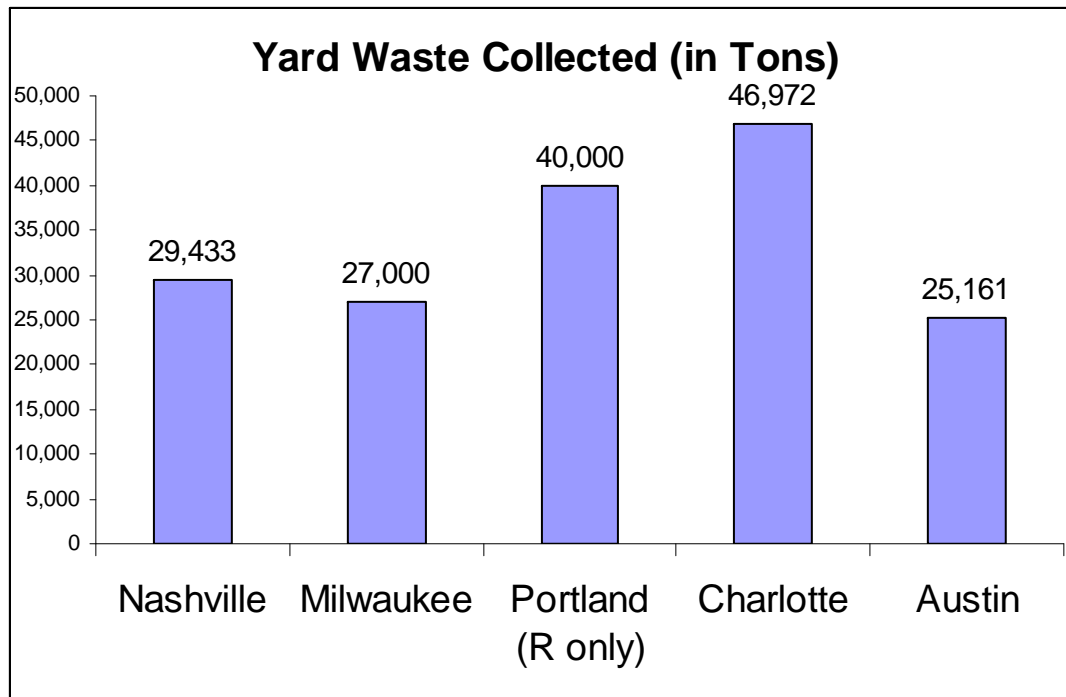
- Nashville collects bulk yard waste 5 times a year and leaves for four months (from approximately December to March).
- Milwaukee picks up yard waste upon request.
- Portland picks up yard waste bi-weekly.
- Charlotte and Austin pick up yard waste weekly.
- Austin also picks up brush twice per year.

- Denver picks up holiday trees two weeks after Christmas. Denver collects leaves on five Sundays beginning in late November. Additionally, Denver has a transfer station during the week where leaves can be dropped off.

30. YARD WASTE TONNAGE COLLECTED

Jurisdictions were asked to report the approximate total volume of yard waste collected in tons in the previous year.

- Nashville reported collecting almost 29,500 tons of yard waste for CY 2005.
- Milwaukee picked up slightly less yard waste – 27,000 tons.
- Portland was only able to report the 40,000 tons of yard waste it picked up for residents and was not able to provide a number for commercial pick ups. Portland also noted that this 40,000 was incorporated into their total residential recycling figure of 128,700 noted above.
- Charlotte collected almost 47,000 tons of yard waste.
- Austin reported that they collected almost 21,000 tons of yard trimmings and almost 4,500 tons of brush in FY 05-06.



31. BAGGED YARD WASTE

Municipalities were asked if they provide residents with bags for yard waste and if so, the charge to residents for bags.

- None of the municipalities who responded provide yard waste bags to residents.
- Austin reported that residents have to buy their own brown Kraft yard bags at Home Depot or Lowes or use their own plastic containers for yard waste.

32. ELECTRONIC WASTE AND BULK GOODS

Municipalities were asked how electronic waste (such as computers) and bulk goods (such as appliances) are collected.

- Each municipality reported a different program for electronic waste and bulk goods.
- *Nashville* – For electronic waste, the major intake point is the East Convenience Center. A contractor is hired to dispose of the materials. Bulk goods are handled by Sheriff's inmates, although until recently, they were collected by DSW.
- *Milwaukee* – Electronic waste is handled at city drop-off sites, and up to four cubic yards of bulk goods are collected by a collection crew. Anything greater than four cubic yards is handled with a skid loader.
- *Portland* - In 2003, the Oregon Legislature enacted SB 867, which established an Electronics Product Stewardship Advisory Committee with a goal of making recommendations for promoting the recycling and reuse of computers, monitors, computer peripherals, and TVs. Several representatives from government and business in the Portland region serve on the Advisory Group, which is meeting to assess infrastructure needs, government action, and educational strategies to expand the recovery of these materials. In 2003, local residents and businesses donated 290 tons of computers and other e-scrap to Free Geek, Portland's non-profit reclamation organization, to be recycled instead of land-filled. Many more tons are being stockpiled in households and businesses, awaiting better recovery options.
- *Portland* – Bulk goods are handled by neighborhood groups that host "clean-ups" once per year.
- *Charlotte* – Residents can drop off electronic waste at County recycling centers or schedule for bulk item collection. Items that are scheduled to be picked up as "bulky items" are land-filled. Bulky item pickup is a weekly program, but residents have to schedule for collection.
- *Austin* – Electronic waste can be donated to Goodwill Industries. There are several companies in the city that have computer recycling businesses and will collect from businesses for a fee. Keep Austin Beautiful has had a computer recycling collection event. For bulk goods, Austin provides collection services twice per year by neighborhood.

- *Denver* – There is not an electronic waste collection program in Denver since 1995. Staffing, money and other priorities caused the city to drop the program that year. Bulk goods are collected every five weeks, and appliances are collected by appointment.

33. SOLID WASTE AND DEVELOPMENT PLAN REVIEW PROCESS

Municipalities were asked if their solid waste division is included in the development plan review process.

- Nashville, Milwaukee, Charlotte and Austin all reported that solid waste is included in development plan review. Nashville reported that this has been occurring for approximately one year. Charlotte and Austin both reported that the solid waste department is included only on certain developments.
- Denver does not include solid waste in planned development review.
- Portland is currently working to create a relationship between the two. They reported a problem due to containers on sidewalk. New rules about containers in right of way are as follows:
 - Containers in the Right of Way: No Permittee shall cause any container for garbage to be newly stored in the public right of way in violation of Portland City Code 16.20.170A. Cause may be shown by actions such as an agreement to store a container in the right of way or providing a container that is larger than any of the entry points to the storage area within the Customer's or Generator's place of business. A container shall not be considered 'newly stored' if the Customer has recently made arrangements to replace the immediately previous service provider (Permittee or Independent Commercial recycler) and the container is a same size or smaller replacement for the previous service provider's container which was also placed in the public right-of-way. (Infraction Assessment \$200 for the first month with "month" defined on a per container basis)

34. CONTRACTOR HAULING LICENSE

Municipalities were asked if their jurisdiction issues licenses for contractors hauling waste over city roads. If so, jurisdictions were asked to report the charge for the license.

- Nashville imposes a \$25 fee for contractor collection and hauling permit per truck.

- Portland issues a franchise for residential collections and permits for commercial haulers (\$60 fee).
- Austin reports that annual applications are required to haul waste. The cost varies by vehicle size and number of vehicles. Private haulers with 6 or less vehicles: \$100/vehicle; Private haulers with more than 6 vehicles: 35,000 lbs or more - \$1000/vehicle; 10,000 - 34,999 lbs - \$500/vehicle; 9,999lbs or less - \$200/vehicle.