

WASTE REDUCTION MANAGEMENT ENACTMENT THROUGH POLICY
AND POLICY CONSIDERATIONS AT TRAVIS COUNTY
CORRECTIONAL COMPLEX

by

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DEDICATION

To my precious family, without your support and patience I would not have been so persistent. Juliana, my passion and drive, is to inspire you to make this world a better place.

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LIST OF ABBREVIATIONS

Abbreviation	Description
CAPCOG-	Capital Area Council of Governments
CCCC-	Cedar Creek Corrections Center
COG-	Council of Governments
DOC-	Department of Corrections
EPA-	Environmental Protection Agency
EPP-	Environmental Preferred Purchasing
EPR-	Extended Producer Responsibility
ILA-	Inter-local Agreement
LEED-	Leadership in Energy and Environmental Deigns
MRF-	Material Recycling Facility
MSW-	Municipal Solid Waste
NIC-	National Institute of Corrections
NPR-	National Public Radio
OSU-	Oregon State University
RCRA-	Resource Conservation and Recovery Act
TCCC-	Travis County Correctional Complex
TEPA-	Taiwan Environmental Protection Agency
USGBC-	United States Green Building Council

1. INTRODUCTION

Thesis Statement

The purpose of this thesis is to examine existing Travis County waste reduction and solid waste management policy through its application at the Travis County Correctional Complex (TCCC). If inefficient, construct comprehensive template policy for the Travis County Correctional Complex which could be applied to other agencies. Jails are unique in that they form a closed system. This closed loop system has a highly controlled input and output of consumption. The Travis County Correctional Complex was chosen as the governmental agency case study due to pressures for fiscal responsibility, the amount of resources to support the system, and accessibility of data. Sound policy on waste reduction in correctional complexes provides the political support for recycling to be interwoven into the waste management operation infrastructure. The policy recommendations developed through this thesis could be used as a template and applied to the Capital Area Council of Government (CAPCOG), other State Planning Regions/Council of Government (COG), or county government in Texas.

This research will demonstrate the benefits of waste reduction management in a county correctional complex through a case study and policy considerations. Waste management in federal correctional facilities is mandated by Executive Order 13514. County correctional complexes are excluded from the executive order. They follow Texas Health and Safety Code 361.425 on the state level; there are no clearly set goals for waste reduction. Consequently, waste reduction initiatives are tied to the political will of the local elected officials and staff. It would be beneficial to create a policy template based on the case study to support best waste reduction practices and integrate them into

a facilities operation structure as a common practice throughout the industry. Such a template could be used in many types of facilities beyond this case study focus of correctional complexes. This could help insure continuation of the practices independent of the elected officials.

Research Questions:

Addressed in this study as they relate to correctional complexes:

1. What are the problems inherent in establishing a single-stream recycling program, and how might they be overcome?
2. What information is available to analyze the volume of generated material and single-stream recycling at the correctional complex?
3. What is the fiscal cost associated with establishing correctional complex recycling? What are the results of a cost benefit analysis of single-stream recycling at the correctional complex?
4. Does the current waste management policy mandate for the Travis County Sherrieff Office to participate in waste reduction? Is the Travis County waste management policy recognized by the Travis County Sheriff? Does the policy support other waste diversion programs?

Scope of Study

This study's focus is on waste diversion within the Travis County Correctional Complex (TCCC) at Del Valle, Texas, and the policies required to support the program. The work specifically examines Travis County's current Waste Management Policy 111.1 and adopted Zero Waste City of Austin Inter-local Agreement (ILA). Travis County entered into an ILA with the city of Austin on their zero waste endeavors. This

thesis examines peer-reviewed articles, government documents, white papers, personal interviews, and published articles, with a focus on the sustainable management of correctional complexes, waste reduction policy, and recycling programs. The literature review supporting this research will include national, state, and county policy and programs. As a result of a lack of waste diversion programs in Texas correctional complexes, research was expanded outside of the state.

This case study does not evaluate the social component of staff and inmate feelings of participation in the program. Although the social aspect is important, this study chooses to examine the available policy, implementation and fiscal benefits of single-stream recycling. It is important to have an examination of effective recycling programs implemented with supportive policy before observing the social component.

Importance of Study

Across the nation, more states and local governments are addressing solid waste issues through policy and recommendations. Waste diversion has recently gained more support through municipalities incorporating waste reduction goals and objectives. Waste diversion is the action to divert discarded materials from disposal, including reuse, recycling, and composting.¹ The waste diversion goal of zero waste has been adopted in several large cities in the United States, including Austin. The Zero Waste Alliance defines this goal as “designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them.”²

¹ Kessler Consulting Inc. "Waste Reduction and Recycling Guide for Florida's Correctional Facilities." Florida Department of Environmental Protection. January 2004. Web. 30, Nov. 2013. p. 2

² Zero Waste Alliance. n.d. Web. 1. Dec. 2013

The study is relevant to existing issues with solid waste management in Travis County's operations, including correctional complexes. The study contributes academic information on waste management and policy in correctional systems. The literature review will also provide resources for recycling coordinators at other county agencies. The potential benefits to Travis County would include cost savings, policy evaluation, and guidance on reaching zero waste goals.

Organization of the Study

The organization of the thesis is broken into seven chapters with supporting documents in the appendices. Chapter 2 includes a discussion of the literature reviewed in relation to recycling behaviors, recycling container signage/placement, correctional complex waste diversion programs, product stewardship, and sustainability in correctional facilities. Following the literature review, Chapter 3 examines varied waste diversion policies and focuses on a case study of specific policy in Travis County. The policies examined range from a global perspective down to local municipality or county. This includes a focus on the following states with existing waste reduction programs: Washington, Florida, Oregon, and Texas.

Chapter 4 delineates the study area, approach, data gathering methodology, sources of data, and waste volume/performance measurements. The approach is broken down into the following: stakeholder process, site assessment, and evaluating existing waste reduction policy. Chapter 5 addresses the case study of single-stream recycling in a Travis County Correctional Complex, discussing the infrastructure, existing policy, history, single-stream recycling implementation, benefits, and summary of findings. This chapter includes interviews, photos related to the case study, and signage examples.

Chapter 6 discusses discuss the effectiveness of the existing Travis County waste reduction and solid waste management policy as it applies to the implementation of single-stream recycling. The discussion includes evaluation of the research questions, case study reflection and importance of the study. Chapter 7 concludes the thesis with a proposed template policy, policy promulgation, cost effectiveness/unfunded mandates, and conclusion.

2. LITERATURE REVIEW

The discussion of literature is organized around sustainability in correctional complex systems and recycling implementation.³ The focus on these two themes was chosen to establish base knowledge necessary to support the research questions stated in Chapter 1 and case study implementation. The literature review examines studies on sustainable jails and recycling programs that have been published in peer-review articles, white papers, thesis/dissertations, and news media.

Correctional facilities across the nation are under scrutiny in attempt to increase fiscal responsibility. Nationally, various State agencies, Universities and County governments have responded by implementing sustainability into policy, correction systems, and the correctional system culture. Correctional facilities would be a good place to practice sustainable waste management because of their capacity and scale of waste and fiscal responsibility. "The incarcerated population constitutes a large, growing, but somewhat hidden component of our society."⁴ Department of Corrections (DOC) have looked to Leadership in Energy and Environmental Design (LEED) guidelines, gardening programs, and recycling as a means to implement sustainable waste management in their correctional complexes.

Most correctional complexes vary in inmate capacity. For example, the Travis County Correctional Complex Facility (TCCC) can support up to 3,000 inmates, with average capacity being 2,500. All items purchased for daily operations, including food,

³³ Mueller, William. (2013) "The effectiveness of recycling policy options: Waste diversion or just diversions?" Waste management. P.

⁴ Ulrich, Craig, and Nalini M. Nadkarni. "Sustainability research and practices in enforced residential institutions: collaborations of ecologists and prisoners." *Environment, Development and Sustainability* 11, no. 4 (2009): P.817

are managed through a warehouse that disperses the materials throughout the facility. The warehouse division also manages the disposal of waste generated from the facility. The jail's operations have a hierarchal system, and it is thus straightforward to examine the cycle of a product from the moment of purchase to its final waste disposal. In 2010, the National Public Radio (NPR) station performed a radio series focusing on our nation's jails. Utilizing national jail statistics from 2008, they examined the 50 counties with the largest numbers of inmates, six of which were located in Texas (Table 1).⁵ NPR found that more than half of the counties had jails operating at 95 percent capacity or greater.

⁵ 2010. NPR. Jails Stuffed to Capacity in Many U.S. Counties. Accessed August 24, 2014. <http://www.npr.org/templates/story/story.php?storyId=122336311>

Table 1. Texas County Jail Capacity in 2008⁶

County	Average Daily Jail Population	Percent Of Capacity	County Population	Inmates Per 100,000
El Paso County	2,226	96	742,062	300
Travis County	2,662	81	998,543	267
Dallas County	6,385	82	2,412,827	265
Harris County	10,000	107	3,984,349	251
Bexar County	4,062	93	1,622,899	250
Tarrant County	3,500	82	1,750,091	200

As a year-round facility, jails demonstrate a resource consumptive system more than a typical building⁷. A county jail with upwards of more than a thousand inmates can generate enough trash to represent a small city.

Sustainability in Corrections

Correctional facilities across the nation are under scrutiny in attempt to increase fiscal responsibility. National associations, state Departments of Correction, university partnerships, and counties are all working together to promote sustainability in corrections. To curb spending, these groups evaluated sustainability practices as a way to reduce per-inmate costs.

⁶ 2010. NPR. Jails Stuffed to Capacity in Many U.S. Counties. Accessed August 24, 2014. <http://www.npr.org/templates/story/story.php?storyId=122336311>

⁷ 2010. "SUSTAINABLE JUSTICE2030: Green Guide to Justice" Academy of Architecture. Accessed August 24, 2014. http://www.aia.org/aiaucmp/groups/ek_members/documents/pdf/aia085932.pdf P. 10

States like Washington are committing to sustainability to reduce the environmental, economic, and human costs of prisons.⁸ In California, three judges in 2004 ruled the state must reduce its inmate population by 55,000 prisoners by 2007 to "constitutional levels of medical and mental health care"⁹. The per-inmate costs for a California state facility in 2001 annually "was around 22,650 or about \$62 per day"¹⁰. To achieve the mandated cost savings, the California Department of Corrections looked into green or sustainable theories/practices. Oregon has put several best sustainable practices into effect, including waste reduction to cut solid waste costs. The Oregon Department of Corrections has saved approximately \$9,600 annually per inmate in garbage fees by composting food waste, leaves, and ground up branches.¹¹

In 2011, the National Institute of Corrections (NIC) came out with a white paper entitled, "Greening of Corrections, Creating a Sustainable System."¹² The NIC is "an agency within the U.S. Department of Justice, Federal Bureau of Prisons. The Institute is headed by a Director appointed by the U.S. Attorney General. A 16-member Advisory Board, also appointed by the Attorney General, was established by the enabling legislation (Public Law 93-415) to provide policy direction to the Institute."¹³

⁸. Warner, Bernard. 2013. "Sustainability Plan, To Reduce the Environmental, Economic and Human Costs of Prisons. Washington State Department of Corrections, Washington. Accessed September 2, 2014. <http://www.doc.wa.gov/sustainability/docs/2013-2015sustainabilityplan.pdf> P 1

⁹ Webster, Andrew. "Environmental Prison Reform: Lower Costs and Greener World." New Eng. J. on Crim. & Civ. Confinement 36 (2010): P 175

¹⁰ Ibid P175

¹¹ 2013. "Oregon: Sustainability 2013." Oregon Department of Corrections. Accessed September 21, 2014. http://www.oregon.gov/doc/docs/pdf/DOC_Sustainability_Magazine.pdf P10

¹² Beauclair, MT. and S. Carroll. (2011) "The greening of corrections: Creating a sustainable system." Washington, DC: US Dept. of Justice National Institute of Corrections.

¹³ National Institution of Corrections. "About the National Institute of Corrections." Accessed September 19, 2014 <http://nicic.gov/>

In “Greening of Corrections,” NIC Director Morris Thigpen stated, “We believe the path to sustainability is not only technically feasible for correctional facilities but also critical as it allows us to reduce our costs of doing business, assist in making our communities more sustainable, help our inmates reintegrate into society in a productive and meaningful way, and ultimately, ensure that we are preserving our environment now and for generations to come.”¹⁴ The NIC included examples throughout the publication of different states’ Department of Corrections’ sustainability projects. This publication was created as a sustainability framework and guide to demonstrate the federal government’s support of sustainability and waste reduction.

“Greening of Corrections” and several other research documents focused on the LEED certification program, which is managed by the United States Green Building Council (USGBC). The USGBC is a private 501c3 membership-based organization whose mission is to promote sustainability in building design, construction operation, and maintenance, utilizing third-party verification of green buildings. There are seven credits of the LEED certification program foci on waste.¹⁵ The credits consist of the following: storage and collection of recyclables (Construction Waste Management Plan), materials reuse, waste stream audit, ongoing consumables, durable goods, facility alternatives, and additions.¹⁶

Several national associations have demonstrated support for “Greening of Corrections” through policy, symposiums, and conferences. The American Correctional

¹⁴ Thigpen, M., T. Beauclair, and S. Carroll. "The greening of corrections: Creating a sustainable system." *Washington, DC: US Dept. of Justice National Institute of Corrections* (2011). P. ii

¹⁵ Waste Management. “LEED Certification Assistance.” Think Green. Accessed August 23, 2014. http://en.wikipedia.org/wiki/U.S._Green_Building_Council

¹⁶ About Us. Green Prisons. Accessed September 19, 2014. <http://greenprisons.org/>

Association supports a “Clean and Green Committee” with an individually supported website,¹⁷ In 2011, the American Correctional Association Delegate Assembly gathered together to create “Public Correctional Policy on Environmentally Responsibility and Sustainability-Oriented Practices.”¹⁸ This policy was unanimously ratified by the American Correctional Association Delegate Assembly at the 141st Congress of Correction in Kissimmee, Florida on Aug. 9, 2011. The National Association of Counties also created “Sustainable Jails: Ripe Opportunities for Saving County Resources.”

Jail facilities with the LEED certification are required to have and maintain the prerequisite of storage and collection of recyclables. One of the limitations of only using the LEED requirements as far as "green correctional facilities" are concerned is the fact that there is no required long-term performance measurement reporting¹⁹. In addition, other limitations were found in the performance of buildings using the LEED requirements. “Current information indicates that most buildings do not perform as well as design metrics indicate. As a result, building owners might not obtain the benefits promised.”²⁰ A correctional complex working to achieve sustainability through LEED certification will need to be aware of these factors.

¹⁷ About Us. Green Prisons. Accessed September 19, 2014. <http://greenprisons.org/>

¹⁸ Thigpen, M., T. Beauclair, and S. Carroll. "The greening of corrections: Creating a sustainable system." *Washington, DC: US Dept. of Justice National Institute of Corrections* (2011). P.

¹⁹ Metalitz, Baty. 2014. "LEED for existing buildings." U.S. Green Building Council. Accessed September 20, 2014. <http://www.usgbc.org/resources/leed-existing-buildings-v2009-current-version>

²⁰Matthiessen, Lisa F. and Peter Morris. 2007. "The Cost of Green Revisited." U.S. Green Building Council. Accessed September 19, 2014. <http://www.usgbc.org/resources/cost-green-revisited> P5

Recycling Programs

“Recycling is a series of activities that includes the collection of used, reused, or unused items that would otherwise be considered waste; sorting and processing the recyclable products into raw materials; and remanufacturing the recycled raw materials into new products.”²¹



Figure 1. Waste Management Hierarchy

²¹ 2013. "Non-Hazardous Waste Management Hierarchy." United States Environmental Protection Agency. Accessed September 21, 2014.
<http://www.epa.gov/solidwaste/nonhaz/municipal/hierarchy.htm>

Correctional complex purchasing agents “provide the last link in recycling by purchasing products made from recycled content.” **(Error! Not a valid bookmark self-reference.)** In a correctional facility, mixed recycling can encompass many different types of materials such as metals, cardboard, organic food waste, packaging, and plastics. It is understood in this section of the literature review that recycling programs mentioned are recycling materials accepted in most material recycling facilities (MRF). Not all MRFs accept the same materials, but most take various plastics designated 1-7, aluminum, corrugated cardboard, mixed paper, and glass.

Some of the correctional facilities have also incorporated material recycling facilities into their waste management systems. In the NIC white paper, a waste reduction example was Cedar Creek Corrections Center (CCCC) in Washington State. The paper discussed how the CCCC implemented a zero waste reduction program by creating a sorting center in order to divert solid waste from the landfill²². The Cedar Creek Project is also cited in "Environmental Prison Reform" with metrics regarding the amount of paper and cardboard recycled per month²³. However, the article fails to give the full scope of their waste diversion initiative with information on container collection systems and metrics of recycling participation. Another article with a focus on the CCCC facility, authored by Craig Ulrich and Nalini Nadkarni, focused on metrics of total waste reduction resulting in 50% less waste going to the Thurston County landfill. The authors bench-marked data prior to the sustainable waste management implementation with an

²² Thigpen, M., T. Beauclair, and S. Carroll. "The greening of corrections: Creating a sustainable system." *Washington, DC: US Dept. of Justice National Institute of Corrections* (2011). P.16

²³ Webster, Andrew. "Environmental Prison Reform: Lower Costs and Greener World." *New Eng. J. on Crim. & Civ. Confinement* 36 (2010): 175.

average .71kg of trash per inmate per day. Once the recycling and composting program was implemented, it dropped 42% to .51kg per inmate per day²⁴. Their research in the article addressed more than just waste reduction. The researchers put together a project which evolved into a program called Sustainability in Prison Project, a collaboration involving ecologists and prisoners with three specific focuses: moss reproduction study, sustainable solid waste management, and environmental literacy.

Other states have incorporated waste reduction into their prison management practice. In South Carolina, the DOC “treats waste reduction and recycling as a management practice, not a state mandate. Their correctional system contractor, Prison Industries, teach inmates how to recycle.”²⁵ Florida’s DOC created “Waste Reduction and Recycling Guide for Florida Correctional Facilities” to encourage and support waste reduction²⁶. Created through a grant from the Solid Waste Authority of Palm Beach and the Environmental Protection Agency, the guide covers policy, purchasing, and recycling program implementation.

The previously discussed peer-reviewed articles validate the Washington, Florida, Oregon, and other states’ DOC openness to implement sustainable theories in facilities. One such article, “Sustainability research and practices in enforced residential institutions: collaborations of ecologists and prisoners”²⁷ discusses university researchers

²⁴ Ulrich, Craig, and Nalini M. Nadkarni. "Sustainability research and practices in enforced residential institutions: collaborations of ecologists and prisoners." *Environment, Development and Sustainability* 11, no. 4 (2009):P 826.

²⁵ Thigpen, M., T. Beauclair, and S. Carroll. "The greening of corrections: Creating a sustainable system." *Washington, DC: US Dept. of Justice National Institute of Corrections* (2011). P.3

²⁶ Kessler Consulting Inc. "Waste Reduction and Recycling Guide for Florida's Correctional Facilities." Florida Department of Environmental Protection. January 2004. Web. 30, Nov. 2013.

²⁷ Ulrich, Craig, and Nalini M. Nadkarni. "Sustainability research and practices in enforced residential institutions: collaborations of ecologists and prisoners." *Environment, Development and Sustainability* 11, no. 4 (2009): 816

working directly with the Washington State Department of Corrections on choosing the best facility to implement the research. The DOC's motives may be different depending on state mandates, such as budget cuts, energy usage, and individual state policy.

The inmates within correctional complexes may be influenced by the discussed perceptions before incarceration. As inmates, their behavior is compulsory under the direction of correctional officers, management, and policy. There are many general tendency benefits such as green job training, behavior change, and reduced recidivism. The literature foci on gardening and composting are the main themes for waste reduction in the majority of cases cited. Recycling is mentioned in a few articles, but no strong depth on scope and metrics in implementation are recorded.

Gardens and Organic Waste Management

An opportunity of incorporating sustainability in correctional complexes relates to food and organic waste management through composting. Food wastes composed 14.5% total municipal solid waste (MSW) in 2012 (Figure 2).²⁸

²⁸ 2012. "Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2012. United States Environmental Protection Agency. Accessed September 21, 2014.http://www.epa.gov/solidwaste/nonhaz/municipal/pubs/2012_msw_fs.pdf P5

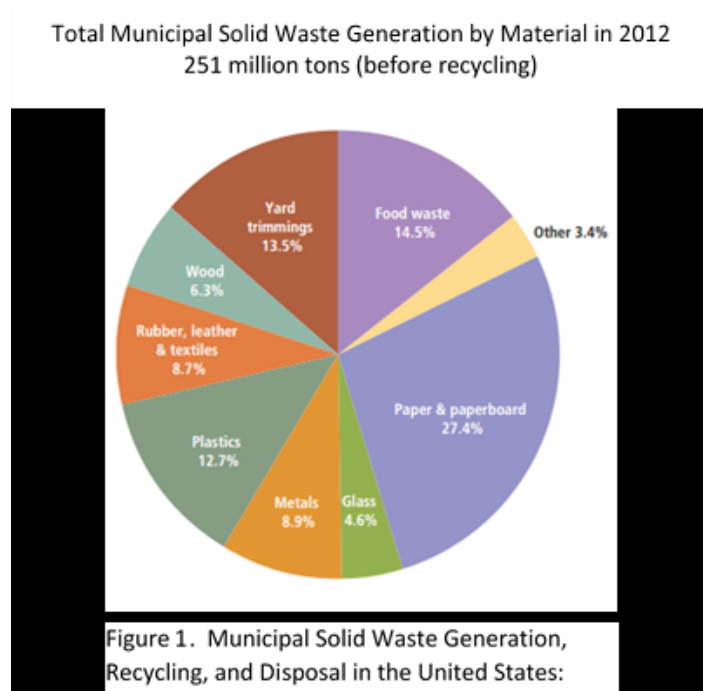


Figure 2. Total Municipal Solid Waste Generation by Material

Composting is one way to manage and divert food waste from landfills.

Composting is using organic matter that has been decomposed as a soil amendment.²⁹

Most of the composting programs in jail facilities work in conjunction with an on-site garden. “From Connecticut to Minnesota to California, correctional authorities are finding all kinds of reasons to encourage inmates to produce their own food inside the walls.”³⁰ These gardens reduce institutional food costs, teach marketable skills, and provide fresh food.³¹

²⁹ Allen, Nancy. "Composting food scraps at Georgia prison." *BioCycle* 35 (1994): p. 90

³⁰ Barclay, Eliza. 2014. "Prison Gardens Help Inmates Grow Their Own Food and Skills." NPR. Accessed September 20, 2014. <http://www.npr.org/blogs/thesalt/2014/01/12/261397333/prison-gardens-help-inmates-grow-their-own-food-and-skills>

³¹ Jiler, James. *Doing time in the garden: Life lessons through prison horticulture*. New Village Press, 2006. P 178

The infrastructure for the composting systems varies from a basic three compartment system to in-vessel units.³² For an in-vessel unit, “organic materials are fed into a drum, silo, concrete-lined trench, or similar equipment where the environmental conditions--including temperature, moisture, and aeration--are closely controlled. The apparatus usually has a mechanism to turn or agitate the material for proper aeration. In-vessel composters vary in size and capacity.”³³ For a basic three compartment system, or aerated static pile composting, organic waste is mixed together in one large pile instead of rows. Facilities that have garden and composting programs are able to capture biodegradable products instead of grinding and disposing of it in their waste water treatment facilities.

In the example given in “Environmental Prison Reform: Lower Costs and Greener World,”³⁴ the Cedar Creek facility in Washington used all their food scraps to create compost for their garden. The Cedar Creek facility’s garden produced 15,000 pounds of vegetables to provide food to the inmates on-site. Another example of a garden program is Oregon’s Lettuce Grow Garden Foundation. The Lettuce Grow Garden Foundation³⁵ as of February 2013 works with all but one Oregon State correctional facility. The food grown by the inmates is donated to emergency food pantries throughout Oregon.

³² 2012. "Composting Food Waste for Correctional Facilities." Green Mountain Technologies. Accessed September 21, 2014. <http://compostingtechnology.com/correctional-facilities/>

³³ 2014. "Types of Composting." Wastes-Resource Conservation. U.S. Environmental Protection Agency. Accessed September 21, 2014. <http://www.epa.gov/wastes/conservation/composting/types.htm#ves>

³⁴ Webster, Andrew. "Environmental Prison Reform: Lower Costs and Greener World." *New Eng. J. on Crim. & Civ. Confinement* 36 (2010): 175.

³⁵ Patterson, Sarah “ Gardens promote sustainability and growth in Oregon prisons” *Corrections Today* February/March 2013 p.37 & 39

In addition to lowering food costs, these sustainability initiatives combine programs with education and post-release job connections. Horticulture programs have been shown to contribute to reduced recidivism rates and lowered rates of parole revocation. Lowering recidivism rates means less cost to taxpayers. At the Travis County Correctional Complex, costs are \$98.00 per inmate per day.³⁶ In the United States Bureau of Justice 2002³⁷ study examining the recidivism rates in 1994, within a year of release from prison, 44.1% of prisoners were rearrested; within 3 years, 67.5% were rearrested and 25.4% had a new prison sentence (Error! Reference source not found.)³⁸.

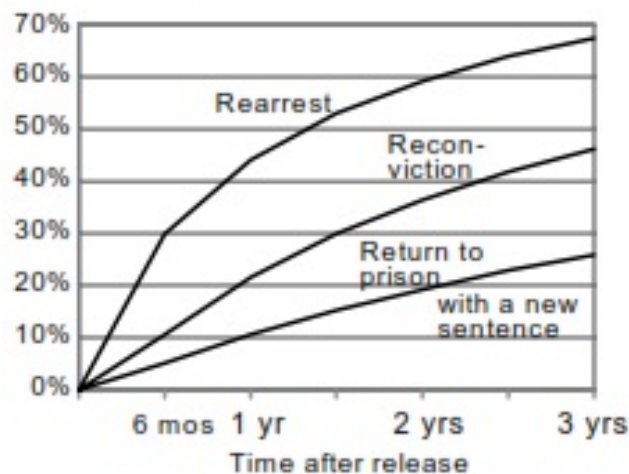


Figure 3. Percent of Recidivism of Prisoners Released in 15 States (1994)

³⁶ Lieutenant Valerie Whitney, email message to author, April , 2014.

³⁷ Langan, PA and David Levin.. 2002. "Recidivism of Prisoners Released in 1994" Bureau of Justice Special Report. www.bjs.gov/content/pub/pdf/rpr94.pdf P 3

³⁸ Ibid.

Recidivism rates are a commonly used measure of criminal activity and an indicator of the long term success of the offender in the community³⁹. Revocation rates measure the failure of offenders while under the supervision of the criminal justice system. The supervision would be the rules of an offender's probation. The violation could be a new offense or as the "result of increased community sanctions, admission to jail, admission to an intermediate sanction facility or admission to prison." ⁴⁰ Recidivism or revocation rate equations differs from state to state. Revocation rates may be calculated as the proportion of revocations from the population served, the year-end population, the average daily population, or the population terminated during a particular period⁴¹.

Through work and education programs related to gardening, horticulture projects decrease inmate recidivism.⁴² The skills gained by inmates during their sentence can contribute to a successful community transition.⁴³ Lettuce Grow Garden Foundation, the gardening program in Oregon, expanded into green job training.⁴⁴ The organization partners with Oregon State University (OSU) and the Extension Master Gardener program to offer the master gardener certification to inmates. The inmates could also take a final exam to receive a horticulture certification from OSU. In San Francisco County, California, a program called The Garden Project started by Catherine Sneed, a

³⁹ 1991. Texas Criminal Justice Policy Council, and United States of America. "Uniform Recidivism and Revocation Rate Calculation: Recommended Methodologies for State Criminal Justice Agencies." P.4

⁴⁰ 1991. Texas Criminal Justice Policy Council, and United States of America. "Uniform Recidivism and Revocation Rate Calculation: Recommended Methodologies for State Criminal Justice Agencies." P.5

⁴¹ Ibid, P4

⁴² Clarke, Sarah E. "Assessing the rehabilitative potential of science and sustainability education in prisons: A study of the Sustainable Prisons Project." PhD diss., The Evergreen State College, 2011. P. 16

⁴³ Ricci, Kenneth. "Justice Goes Green." *American Jails Dated* (2011) P1

⁴⁴ Patterson, Sarah. "Gardens promote sustainability and growth in Oregon prisons." *Corrections Today*

jail counselor, also demonstrated a recidivism rate decrease. "Fifty-five percent of our prisoners are rearrested within a year, those who go through the Garden Project have a recidivism rate of 24 percent, and that's after two years." ⁴⁵

The largest correctional complex in the United States, Rikers Island, houses 20,000 inmates and has a horticulture therapy program that was implemented in 1996.⁴⁶ "GreenHouse provides remedial education, skill development and vocational training in horticulture. Hands-on experience includes designing, installing and maintaining the multi-use gardens, and the design and construction of garden fixtures (benches, trellises, planters, etc.) Upon graduating from the program on their release, they have the option to join the Green Team, our vocational internship program." (Horticulture Society of New York⁴⁷) The program's recidivism rate is 14.5% in comparison with the state of New York's average of 32.1%⁴⁸ for return within three years.

Recycling Implementation

This section of the literature review focuses on public participation behavior and collection methods for recycling implementation. The focus on these two themes was chosen to establish a base knowledge necessary to implement a recycling program. Solid waste issues will continue to increase, particularly in the United States, as the current trend indicates increase in generation of products. Understanding the public's perception

⁴⁵ Van Cleef, 2002. Gardening Conquers All: how to cut your jail recidivism rates by half. San Francisco Chronicle, December 18, B1.P.1 Accessed September 21, 2014.

⁴⁶ "GreenHouse." Horticulture Therapy. The Horticultural Society of New York. accessed August 24, 2014.http://www.thehort.org/horttherapy_greenhouse.html

⁴⁷ Ibid.

⁴⁸ Laichter, Alison. "Reentry and the Role of Bridged Programming: Reconnecting Former Prisoners and Their Communities." PhD diss., Columbia University, 2008. p.52

of solid waste and recycling implementation, as well as collection methods, are important in eliminating shortcomings within the proposed research. The literature has a focus on the general public audience and residential institutions such as colleges due to the lack of peer-reviewed articles on specific residential correctional institutions' inmate recycling behavior.

Public Participation and Behavior

There have been many general studies on recycling behavior regarding non-recyclers and recyclers which focused on encouraging the practice through convenience and guilt introjections. In a correctional complex, the correctional officer's influence has a direct relationship with an inmate's participation⁴⁹.

A common theme within the behavioral literature reviewed, an importance of personal value system is the reason a person participates. Attempting to use guilt--for example, signage stating "if you cared you would recycle"--or financial incentives did not establish long-term behavior change⁵⁰. In the article, "Recycling gone bad: When the option to recycle increases resource consumption," the results of a study on resource consumption demonstrated that consumers increased usage of a product that was free or "no cost" when the recycling option was available⁵¹. However, this study's location, Massey University Turitea campus in New Zealand, was a residential⁵² college, and it

⁴⁹ Lieutenant Valerie Whitney of Travis County Correctional Complex, interviewed by author, Austin, on April 8, 2014.

⁵⁰ Kelly, T. C., I. G. Mason, M. W. Leiss, and S. Ganesh. "University community responses to on-campus resource recycling." *Resources, conservation and recycling* 47, no. 1 (2006): 42-55.

⁵¹ Catlin, Jesse R., and Yitong Wang. "Recycling gone bad: When the option to recycle increases resource consumption." *Journal of Consumer Psychology* 23, no. 1 (2013): 122-127.

⁵² Kelly, T. C., I. G. Mason, M. W. Leiss, and S. Ganesh. "University community responses to on-campus resource recycling." *Resources, conservation and recycling* 47, no. 1 (2006): p 45

was stated that researchers need to investigate if there would have been the same response in a public area versus on campus. It is further questionable whether this study would be applicable to the correctional system where inmate supplies are rationed or purchased from the commissary.

In regards to behavior change to increase participation in correctional facilities, it would be beneficial to focus on educational efforts. For example, correctional officers should be provided educational materials on the fate of the recyclable material following collection. In addition, it is important for captains or warden to be knowledgeable on the cost of recycling and alternatives to waste production, such as compositing. Compost education is especially important because of its impact on waste reduction and the fact that it is already in place at the case study site.

Collection Containers and Distribution

The discussion of recyclables collection methods in the literature is focused on external container location or internal container distribution. In the literature, some non-recyclers claimed their unwillingness to participate was due to convenience⁵³.

Convenience factors varied between proximity to containers in a building, to location of a drop-off facility. With respect to the objectives of this thesis, a review of all literature documents available identified the optimal way to create the infrastructure within a large scale environment, such as a jail facility. The most efficient layout of outside containers allows easy accessibility to the service provider⁵⁴ and results in transportation cost

⁵³ Andrews, Ashley, Mary Gregoire, Heather Rasmussen, and Gretchen Witowich. "Comparison of recycling outcomes in three types of recycling collection units." *Waste management* (2012). P. 533

⁵⁴ Butler, John, and Paul Hooper. 2000 "Factors determining the post-consumer waste recycling burden." *Journal of Environmental Planning and Management* 43, no. 3. P. 412

savings. However, such a layout is not feasible in correctional facilities due to security concerns. Further, in the literature it was found the types of collection units inside a building make a difference in contamination rates and participation.⁵⁵ Contamination in solid waste reduction or recycling is from non-recyclable materials being placed in a recycling container. When evaluating types of collection units on a site with security concerns, there must be collaboration between facility management and the coordinator on what would work best. Review of this literature assisted in identifying any potential weaknesses in collection containers for the research study.

The literature, as well as personal review of day-to-day operations within prison systems, demonstrate that signage on containers is important. However, it does little to

Howard County, Maryland Recycling Signage



Figure 4. Recycling Signage

⁵⁵ Andrews, Ashley, Mary Gregoire, Heather Rasmussen, and Gretchen Witowich. "Comparison of recycling outcomes in three types of recycling collection units." *Waste management* (2012). P. 534

decrease the contamination rates. In addition, the design of signage and language used does affect the user's choices in participation⁵⁶. (**Error! Reference source not found.**)

It would be advantageous to “create messages that induce people to think, because – according to extensive theory and research on cognitive elaboration – inducing people to think is most likely to lead to more persuasion and more attitude accessibility compared to signs that simply give instructions.”⁵⁷ A thought provoking recycling sign⁵⁸ requires the reader to think about the recovery processes to create a new aluminum can versus recycling the can. (Figure 5)

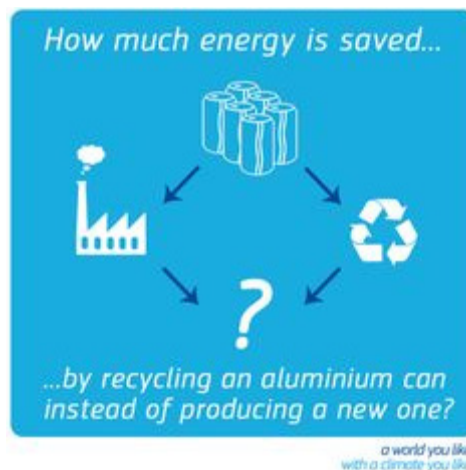


Figure 5. Thought Provoking Recycling Sign

The act of recycling relies heavily on convenience and individual motivations. The behavioral differences between non-recyclers and recyclers needs be considered when implementing a new recycling program. Having a good understanding of recycling

⁵⁶ 2014. "Recycling" Howard County, Maryland. Accessed September 20, 2014. <http://www.howardcountymd.gov/recycling.htm>

⁵⁷ Andrews, Ashley, Mary Gregoire, Heather Rasmussen, and Gretchen Witowich. "Comparison of recycling outcomes in three types of recycling collection units." *Waste management* (2012). P.201

⁵⁸ "Thought Provoking Recycling Sign." Pinterest. Accessed September 20, 2014. <http://www.pinterest.com/nurturenature/recycle/>

behaviors is necessary to increasing recycling rates to match societal consumption patterns. In addition, where the containers are placed in a facility has an impact, such as collection stations. When implementing a recycling program, these factors should be taken into consideration for a program to be successful.

Critical Assessment

In the articles reviewed, there was no discussion of reuse or extended producer responsibility. This may be a result of the specific focus of the articles. Extended Producer Responsibility (EPR) is an important component of sustainable solid waste management for hard-to-recycle materials that have high costs associated with their disposal. EPR, as defined by the Product Stewardship Institute, is the shifting of the government management and financial responsibility of a product upstream to the producer and away from the public sector. The literature gap regarding such factors as EPR creates an opportunity for further research into the implementation of sustainable solid waste management techniques within correctional facilities.

All the articles reviewed consistently agreed that sustainable consumption and solid waste management are complicated multi-layered issues. The other R's--reuse and reduce--do not receive as much focus in the solid waste hierarchy; those two themes are hard to qualify and quantify. Trash is no longer just an American issue. Sustainable solid waste management is a global issue currently becoming one of the United Nations' calls to action. World Bank warns of the potential costs of dealing with an ever-growing deluge of garbage⁵⁹. Examining the operations, waste generation, and recycling in closed

⁵⁹ Hoornweg, Daniel, and Perinaz Bhada-Tata. "What a waste: a global review of solid waste management." (2012). P3

systems such as correctional complexes provides an opportunity for application in local, national, and global environments.

3. POLICY REVIEW

The purpose of this chapter is to examine the existing policy for waste reduction management. Examination of existing policy provides a baseline understanding of the strengths and weaknesses of the types of waste reduction policies. According to the World Bank study, “What a Waste,” municipal solid waste is a growing byproduct of urban lifestyle from urbanization.⁶⁰ While waste management in correctional facilities is mandated on the state level, the national legal actions set the tone for state waste reduction legislation.

This chapter will examine policy starting on a global scale, then the United States as a whole, followed by specific states, and finally Travis County. The state policy examination focuses on the states introduced in the literature review with waste reduction or sustainable jail programs: Washington, Florida, Oregon, and the case study state Texas.

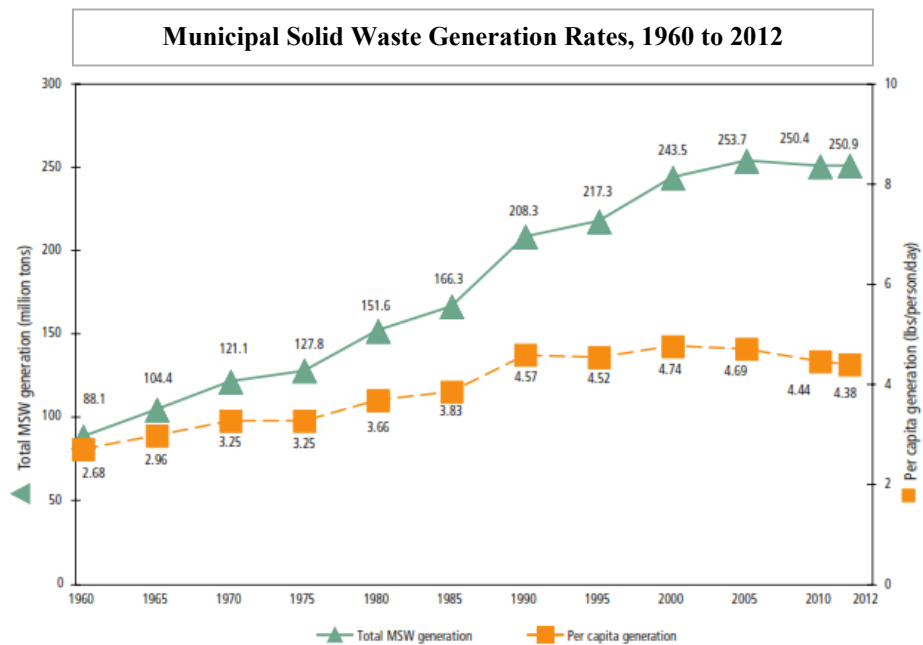
The public is well aware of the term recycling, or “minimizing waste generation by recovering and reprocessing usable products that might otherwise become waste”⁶¹. “In the 2009 IPSOS Research Group survey⁶², 81% of those surveyed cited helping reduce landfills as an advantage of recycling. Of those responding, 29% admitted to suffering from the knowledge that they could and should be doing more to help preserve

⁶⁰ Hoornweg, Daniel, and Perinaz Bhada-Tata. “What a waste: a global review of solid waste management.” (2012) P. 11

⁶¹ Environmental Protection Agency. Web. 20, Nov. 2013.

⁶² 2011. “Nine in Ten Adults Recycle, but Only Half Do So Daily. News and Polls. Ipsos. Accessed September 7, 2014. <http://www.ipsos-na.com/news-polls/pressrelease.aspx?id=5285>

the environment, more than double the percentage (12%) professed to feel guilty”⁶³. This understanding of the benefits of recycling and waste diversion is in contrast to the growing amount of trash which is generated in the world. Unfortunately, many products of today are created for single use, such as paper products and packaging. (Figure 6).⁶⁴ Many other products, such as phones and computers, have a perceived obsolescence, considered no longer deemed useful after two or three years



¹ U.S. short tons unless specified.

Figure 6. United States Municipal Solid Waste Generation Rates

⁶³ 2012. "Recycling surveys offer some surprising results-Waste & Recycling News. Call2Recycle. Accessed September 7, 2014. <http://www.call2recycle.org/recycling-surveys-offer-some-surprising-results-waste-recycling-news/#sthash.ljfaLYY8.dpu>

⁶⁴ 2012. "Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2012." United States Environmental Protection Agency. Accessed September 7, 2014. http://www.epa.gov/solidwaste/nonhaz/municipal/pubs/2012_msw_fs.pdf P5

Global Policy

Sustainable solid waste management is a global issue. The current consumption rates of manufactured goods are growing globally. Recycling alone is, "insufficient to offset the environmental impacts of current consumption rates in a growing population."⁶⁵

Several nations are addressing the issue of recycling participation by policy implementation. Forbes reported that of the top ten waste producers in the world in 2006,

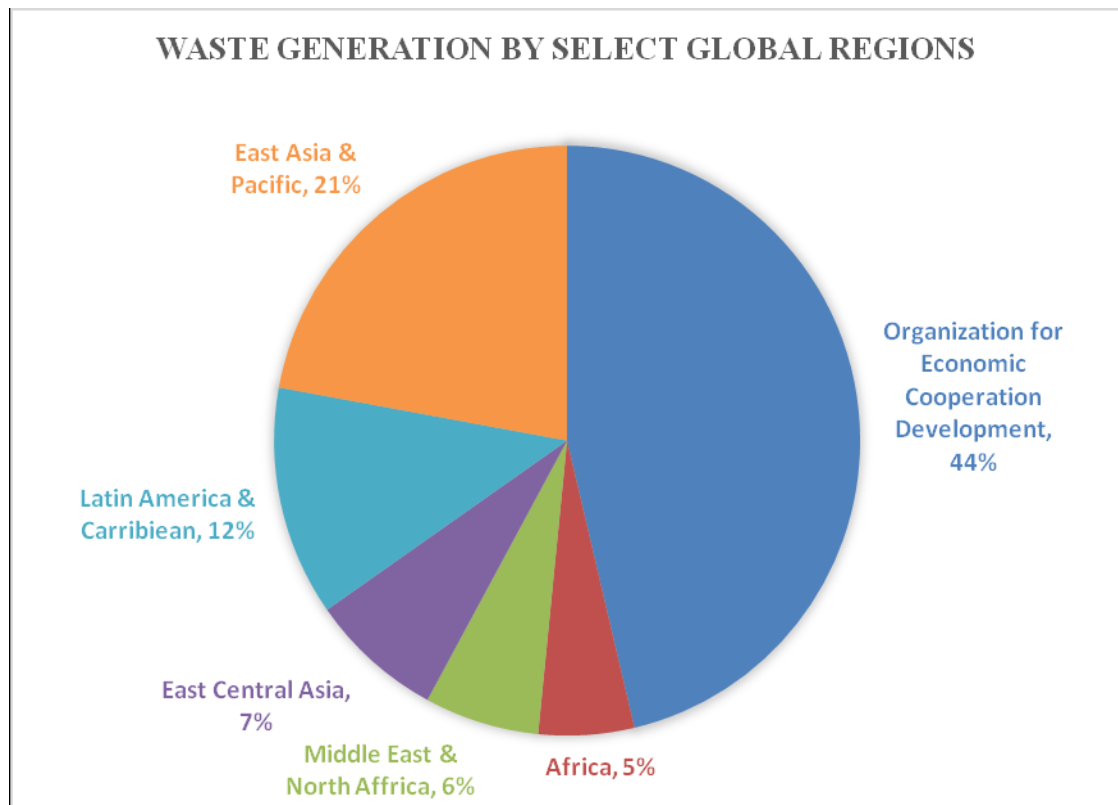


Figure 7. Waste Generation by Select Global Regions

⁶⁵ Mueller, William. (2013) "The effectiveness of recycling policy options: Waste diversion or just diversions?" Waste management.

six of them were within the European Union⁶⁶, including Germany.⁶⁷ (Figure 7) Perhaps in an effort to address this fact, the European Union put out the call for increased recycling rates via the 2013 Packaging Waste Directive 94/62/EC.⁶⁸ The directive requires all producers, including retailers, to recycle with a ban of commercially generated packaging materials from the landfill.

In 2003, Taiwan Environmental Protection Agency (TEPA) adopted a zero waste policy. The policy included waste diversion targets of “25 percent by 2007, 40 percent by 2011, and 75 percent by 2020.”⁶⁹ Taiwan began to make changes in waste management policy due to the lack of space in landfills and opposition to large-scale incineration⁷⁰. Taiwan reached a 46% recycle rate in 2010.⁷¹ The country combines their efforts with green procurement policies. The government developed mandatory specifications for commonly procured items such as paper and office supplies.⁷²

In 2013, China created a policy called the Green Fence. As the largest importer of post-consumer feedstock, recyclable materials, China created this policy to address the level of quality of product being brought to the country, only allowing a 1.5% contamination rate⁷³. Items that may be mixed in with the recycling, such as trash or

⁶⁶ Hoornweg, Daniel, and Perinaz Bhada-Tata. "What a waste: a global review of solid waste management." (2012)

⁶⁷ Malone, Robert. (2006) "World's worst waste." *Forbes*, June.

⁶⁸ Keramitsoglou, Kiriaki M., and Konstantinos P. Tsagarakis. "Public participation in designing a recycling scheme towards maximum public acceptance." *Resources, Conservation and Recycling* (2012).

⁶⁹ Taiwan. Community Action Leads Government Toward Zero Waste. GAIA p. 2

⁷⁰ Ibid. P.1

⁷¹ Community Action Propels the Taiwanese Government towards Zero Waste: On the Road to Zero Waste Blog. GAIA. Global Alliance for Incinerator Alternatives. accessed June 11, 2014. <http://www.no-burn.org/community-action-propels-the-taiwanese-government-towards-zero-waste>

⁷² Ibid.

⁷³ Early, Katherine. "Could China's green fence prompt global recycling innovation?" *Guardian* August 27, 2013. Web. 1, Dec. 2013.

food waste are considered contaminants which affect the recyclable material quality. Previous to 2013, not all material recycling companies' facilities were shipping quality bales of material. Although it varies, the common recycling service company standard is 3 percent contamination rate for recycling customers.⁷⁴ Actual contamination rates through single-stream recycling have been researched to be higher once the material arrives at a material recycling facility (MRF).⁷⁵ This created a strain on an already feedstock-dependent manufacturing industry. The economy of recycling is directly related to the individual through participation and quality levels of material. The Green Fence policy instilled better quality management in recyclable material feedstock.

National Recycling Policy

Examining the operations, waste generation, and recycling in closed systems such as correctional complexes provides an opportunity for application of waste reduction in agencies with residential facilities. With 2,228,424 inmates, the United States has the largest prison population in the world⁷⁶. The United States is the number one generator of waste per day in the world according to the Environmental Protection Agency⁷⁷. In global and national terms, correctional complex systems are a substantial contributor of waste generated. This can be improved through product stewardship and implementation of recycling programs.

⁷⁴ Jason Sanders of Texas Disposal Systems, interviewed by author, Austin, April, 17 2013.

⁷⁵ 2012. Collins, Susan, "A Common Theme", Resource Recycling. Accessed June 16, 2014. <http://www.container-recycling.org/assets/pdfs/ACommonTheme.pdf>

⁷⁶ 2012. "World Prison Brief." International Centre for Prison Studies. Accessed August 24, 2014. <http://www.prisonstudies.org/country/united-states-america>

⁷⁷ Environmental Protection Agency. Web. 20, Nov. 2013.

According to the aforementioned 2006 Forbes report, the United States was the number one producer of waste but has yet to instill policy regarding increasing recycling rates. Although the United States does not have federal goals for waste reduction, many states have implemented policy with their own goals.

Even though there are no current federal goals in the United States, government and non-governmental agencies have been promoting recycling since the 1970's, inspired by Resource Conservation and Recovery Act (RCRA) and Pollution Prevention Act⁷⁸. RCRA gave the EPA the authority to control hazardous waste from the “cradle-to-grave” as well as the framework for management of non-hazardous solid wastes.⁷⁹ RCRA defines solid waste as: “garbage, refuse, sludge and other discarded material, including solid, liquid, and semisolid material resulting from industrial, commercial, mining, and agricultural operations, and from community activities.”⁸⁰ The Federal Hazardous and Solid Waste Amendments in 1984 focused on waste minimization and reducing the land disposal of hazardous waste. In 1980, there was an increase in diversion and recycling without the recycling rate requirements. During this time period, the local governments began recycling programs and establishing state legislation.

⁷⁸ Burnett, Miles L. (1998). "The Pollution Prevention Act of 1990: A Policy Whose Time Has Come or Symbolic Legislation?" *Environmental Management* **22** (2): 213–224. doi:10.1007/s002679900098. ISSN 0364-152X

⁷⁹ "Summary of the Resource Conservation and Recovery Act." Laws & Regulations. United States Environmental Protection Agency. Accessed August 24, 2014. <http://www2.epa.gov/laws-regulations/summary-resource-conservation-and-recovery-act>

⁸⁰ 2002. "Solid Waste Disposal Act" Accessed September 18, 2014. <http://www.epw.senate.gov/rcra.pdf>. P10

State Recycling Policy

The United States created policy to promote recycling at a local level. Waste minimization is addressed differently from state to state with no consistency on recycling rate goals, landfill bans, and funding. The discussion of state policy in this section will focus on specific states with sustainable jail programs mentioned in the literature review. The case study in the state of Texas at the end of this section has the most in-depth discussion of policy.

Washington

In the late-1980s, the Washington legislature anticipated amendments of RCRA and passed (ESHB) ⁸¹1671, The Waste Not Washington Act. Waste reduction was placed in the local governments' hands through required solid waste management plans. Local governments had previously been required to create detailed solid waste plans, but this bill further required the inclusion of "waste reduction and recycling elements"⁸². Key provisions and guidelines were provided by the Department of Ecology. ESHB 1671 included clarification of collection authority for recyclables for city or county. The policy also includes provisions for the Utilities and Transportation Commission who has the authority to arrange for the collection of the materials. Education, waste audits, and performance measures were all required by the bill. All of these elements were meant to support the state goal to achieve a 50% recycling rate by 1995⁸³. The state reached their

⁸¹ 1989. "Focus: "The Waste Not Washington Act." Washington State Department of Ecology. Accessed September 18, 2014. <https://fortress.wa.gov/ecy/publications/publications/fwrrlc91109.pdf>

⁸² Ibid.

⁸³ 2013. "State's recycling rate remains above 50 percent" Washington State Department of Ecology. Accessed August 30, 2014. <http://www.ecy.wa.gov/news/2013/299.html>

goal of 50% recycling rate, although it was achieved in 2011, sixteen years after their original timeline.

To address the cost of implementing “The Waste Not Washington Act⁸⁴,” the state included provisions for funding. A surcharge of one percent on solid waste collection was added. For example, a family setting out one garbage can per week paid a minimum of 96 cents per year. The bill allowed for counties to impose a fee on collection services in unincorporated areas in order to pay for solid waste planning and administrative expenses⁸⁵. Since the bill was introduced, the public schools’ rewards program has given three consecutive annual grants of \$10,000 to incentivize waste reduction. The Washington Department of Ecology was the organization awarding the grants.

Washington has experienced good response to their waste reduction policy. The state’s top-down approach of waste management and use of local governments for implementation required all government agencies--including correctional facilities--to recycle. “Every prison in Washington State has implemented sustainable operations programs in waste sorting, composting, recycling, gardening, water and energy conservation, green purchasing, and more. Sustainable operations in Washington’s prisons range from very small scale, to industrial-size, state-of-the-art operations”⁸⁶.

⁸⁴ Ibid

⁸⁵ Ibid

⁸⁶ 2014. "Sustainable Operations." Sustainability in Prisons Project. Accessed August 30, 2014. <http://sustainabilityinprisons.org/what-we-do/sustainable-operations/>

Florida

In the late-1980s, Florida passed the Solid Waste Management Act⁸⁷ (SWMA) to encourage waste reduction by counties. This act expanded the counties' and municipalities' authority for waste management. It required all counties to increase overall recycling 30% by 1994. Since its introduction, the SWMA recycling goal was changed to reduction, and eventually it was directed at counties with a population of 100,000 or more. Currently Florida's recycling rate is 29%.⁸⁸

SWMA also required a solid waste management plan to be created and implemented by the counties. The counties are required to report to Florida Department of Environment (DEP) annually. This information is then reported to the legislature and governor. SWMA also banned the following items from landfills: construction and demolition debris, lead acid batteries, tires, used oil, refrigerators, clothes washing machines, dishwashers, and yard trash. The top-down approach with SWMA had weaknesses which were continuously addressed by the legislature⁸⁹. Several amendments were added to SWMA from 1976 to 2010 to strengthen the act and tighten MSW reduction. The most significant was House Bill 7243⁹⁰, Environmental Control, which required that all government agencies (i.e. schools, universities, all government facilities including correctional facilities) and certain private industries report recycling data to

⁸⁷ Preston, William D., and Thomas M. DeRose. "1988 Solid Waste Management Act-Facing Up to the Garbage Component of Florida's Burgeoning Growth." *Fla. St. UL Rev.* 16 (1988): 597.

⁸⁸ 2014. "Recycling Program FAQs" Florida Department of Environmental Protection. Accessed September 13, 2014. <http://www.dep.state.fl.us/waste/categories/recycling/pages/faq.htm>

⁸⁹ 2005. "Review of the Solid Waste Management Act."

http://archive.flsenate.gov/data/Publications/2006/Senate/reports/interim_reports/pdf/2006-121ep.pdf. accessed September 13, 2014. P3.

⁹⁰ 2010. "HB 7243-Environmental Control." Florida House of Representatives. accessed September 13, 2014. <http://www.myfloridahouse.gov/sections/Bills/billsdetail.aspx?BillId=44660>

their respective counties. HB 7243 also encouraged environmental purchasing practices (EPP). EPP is the practice of the buyers to choose environmentally preferred purchases with a certain content of recycled product or durability. A correctional facility benefits by the use of EPP companies that has recycled content in their product such as a purchase of toilet paper with 50% recycled content.

The funding for implementation of programs by the counties to increase the recycling rate was facilitated through the Solid Waste Management Trust Fund⁹¹ (SWMTF) in 1988. "The money for the fund came from five major sources: oil over charge settlement funds, waste tire disposal fee, sales tax allowance reduction, annual business registration fee, and the newspaper disposal fee."⁹² The funding was then given to counties through competitive grants. The funding for implementation through SWMTF has had issues of appropriation from the legislature⁹³. However, HB7243 addressed the issue by requiring at least 40% of the fund to be issued to county recycling programs. Florida has had waste reduction and recycling goals in place for 22 years. The recycling goal of 75% in 2020 is recommended rather than mandatory. Currently Florida's recycling rate is at 49% with over ten counties having recycling rates over 55%.

The SWMA and HB7243⁹⁴ waste reduction policy created an environment for partnerships to reach the state's recycling goals. This included correctional complexes

⁹¹ 1998. "Background on the Solid Waste Management Trust Fund Review Commission." Florida Department Environmental Protection. Accessed September 30, 2014. http://www.dep.state.fl.us/waste/quick_topics/publications/documents/trustfund/history.pdfhttp://www.dep.state.fl.us/waste/quick_topics/publications/documents/trustfund/history.pdf. P1

⁹² Ibid P.2

⁹³ Ibid P. 3

⁹⁴ 2014. "HB 7243- Environmental Control." Florida House of Representatives. accessed September 30, 2014. <http://www.myfloridahouse.gov/sections/Bills/billsdetail.aspx?BillId=44660>

within the state. In 2005, the Solid Waste Authority of Palm Beach County⁹⁵ developed a “Model Waste Reduction & Recycling Program for Florida Detention & Correctional Facilities.” The model was developed as the final report in fulfillment of a DEP grant received. The grant funded several waste reduction and recycling programs at Palm Beach Sheriff’s Office facilities.

⁹⁵ 2013. Kessler Consulting Inc. "Waste Reduction and Recycling Guide for Florida's Correctional Facilities." Florida Department of Environmental Protection. January 2004. P. 2

Oregon

In response to the 1976 Resource Conservation and Recovery Act, Oregon passed the Opportunity to Recycle Act in 1983.⁹⁶ Reduce the amount of waste generated

- Reuse materials for their original intended use
- Recycle what can't be reused
- Compost what can't be reused or recycled
- Recover energy from what cannot be reused, recycled, or composted
- Dispose of residual materials safely

The State of Oregon designated the counties as wastesheds, “defined in Oregon law as being an area of the state that shares a common solid waste disposal system, or an appropriate area in which to develop a common recycling system”⁹⁷. These wastesheds were required to establish recycling depots. Recycling depots are recyclable material drop-off locations for residents in rural areas without curbside service. To address recycling in urban areas, municipalities with more than 4,000 residents⁹⁸ were required to provide curbside recycling.

The 1983 Opportunity to Recycle Act created infrastructure and accessibility to recycling services. “However, Oregon policy makers recognized that there were still opportunities to increase recovery of recyclable materials going to landfills. The 1991 Oregon Recycling Act (Senate Bill 66) strengthened and broadened recycling requirements and, for the first time, added activities to develop markets for recycled

⁹⁶ "Opportunity to Recycle Act in 1983." Oregon Recycling Laws. Land Quality, Solid Waste. Oregon Department of Environmental Quality. Accessed August 17, 2014. <http://www.deq.state.or.us/lq/sw/recyclinglaws.htm>.

⁹⁷ "Resources: Local Recycling Contacts for Oregon Counties or Wastesheds and Cities." Oregon Department of Environmental Quality. August 31, 2014. <http://www.deq.state.or.us/lq/sw/contacts.htm>

⁹⁸ "Oregon Recycling Laws." Land Quality, Solid Waste. Oregon Department of Environmental Quality. Accessed August 17, 2014. <http://www.deq.state.or.us/lq/sw/recyclinglaws.htm>.

materials⁹⁹.” The 1991 act changed the tone of the policy to not just recycling but to also include elements of proper material disposal and waste reduction.

A statewide recovery goal of 50%¹⁰⁰ was established along with requirements for the wastesheds to choose and implement certain waste reduction elements, such as establishing a state household hazardous waste program, establishing government procurement requirements for recycled products, or providing funding to develop a school curriculum on recycling and waste reduction¹⁰¹. (Table 2) The funding in the

Table 2. Oregon Recovery Rate

Year	Tons Recovered	Tons Disposed	Calculated Rate	Total Rate*
1992	839,679	2,263,099	27.1	-
1993	974,685	2,280,513	29.9	-
1994	1,118,912	2,312,669	32.6	-
1995	1,257,204	2,362,146	34.7	-
1996	1,338,259	2,497,170	34.9	-
1997	1,462,114	2,633,017	35.7	-
1998	1,604,985	2,695,903	37.3	-
1999	1,626,271	2,788,699	36.8	-
2000	1,765,817	2,778,463	38.9	-
2001	1,999,085	2,635,072	43.1	46.8
2002	2,029,261	2,723,365	42.7	46.3
2003	2,116,880	2,796,787	43.1	46.8
2004	2,317,064 ¹	2,923,462	44.2	48.0
2005	2,523,367 ¹	3,026,457	45.5	49.2
2006	2,494,050 ¹	3,235,828	43.5	47.3
2007	2,437,569 ¹	3,248,126	42.9	46.6
2008	2,326,146 ¹	2,890,503	44.6	48.2
2009	2,082,631 ¹	2,586,721	44.6	48.3
2010	2,163,957 ¹	2,523,808	46.2	49.9
2011	2,301,622 ¹	2,476,864	48.2	51.9
2012	2,398,552	2,422,883	49.7	53.4

* These rates are including the addition of credit allowances enacted by the 2001 Legislature

¹- These tonnage figures are corrected from earlier published values

⁹⁹Ibid.

¹⁰⁰2013. *2012 Oregon Material Recovered Tons and Recovery Rates*. Oregon Department of Environmental Quality. August 17, 2014.

<http://www.deq.state.or.us/lq/pubs/docs/sw/2012MRWGRatesReport.pdf>. P.11

¹⁰¹ "Oregon Recycling Laws." Land Quality, Solid Waste. Oregon Department of Environmental Quality. Accessed August 17, 2014. <http://www.deq.state.or.us/lq/sw/recyclinglaws.htm>.

form of grants for these waste reduction programs was through state tipping fees at landfills.

Several acts and bills, including SB66 and HB3744, combined to form a comprehensive waste reduction policy for the state of Oregon. These policies require waste composition studies every two years, annual reports on recovery rates, and solid waste management plans provided by the wastesheds and Department of Ecology (DEQ). If a wasteshed fails to meet its recovery goal as required by HB3744, it must evaluate its existing policies, conduct a technical review of the programs, and determine revisions to be implemented to meet the recovery goal. These technical review results are reported to DEQ. These policies supported Oregon's goal of 50% recovery rate, which was achieved in 2010.

The infrastructure created by Oregon's recovery goals created an environment for government facilities--including correctional complexes--to be innovative in their programs. Oregon's Department of Corrections releases an annual sustainability report discussing the current programs to achieve the state's energy, resource, and waste reduction goals. Previous to 2013, the main focus of materials recycled in correctional complexes was metal, cardboard, and furniture (via reuse). In 2013, the Department of Corrections created a materials recycling center (MRF) to separate the various recyclable material to reduce resources sent to the landfill. "Central Distribution Center Reuse/Refurbish Center saved the state \$370,000 in 2013 by recycling and refurbishing

office furniture and supplies. Items that cannot be repurposed are dismantled for recyclable materials that generate revenue”¹⁰².

Texas

Texas has fourteen recycling and waste minimization programs (Appendix). In 1991, Texas created the Texas Health Code statute 361.425, “Governmental Entity Recycling.” The statute gave the directive to all governmental agencies to establish a program for the separation and collection of all recyclable material generated by the entity’s operations. This statute mandated recycling of aluminum, steel containers, aseptic packaging, cardboard, and mixed paper. Every governmental agency is also required to evaluate the amount of recyclable material recycled and modify the program as necessary to ensure all material is effectively managed. The statute also establishes educational and incentive programs to encourage maximum employee participation. The mandate allowed for an economic hardship exemption to cities and small school districts if funds were not available for implementation. The state defines “recyclable materials” as materials in an entity’s possession that have been abandoned or disposed of by the entity’s officers, employees, or any other person¹⁰³.

To support the Governmental Entity Recycling bill, another mandate, 361.020, directed the Texas Commission for Environmental Quality to develop a strategic solid waste plan for all solid waste under its jurisdiction, now known as “waste diversion.”

The commission would provide the preferred waste management methods to other

¹⁰² 2013. "First Lady Cylvia Hayes Tours Award-Winning Oregon Department of Corrections Recycling Center." Governor. Accessed August 31, 2014. <http://us2.campaign-archive1.com/?u=41b11f32beefba0380ee8ecb5&id=ad340a0801&e=913467e269>

¹⁰³ Texas Health Code 361.425. Accessed April 6, 2014. <http://law.onecle.com/texas/health/361.425.00.html>.

governmental agencies, namely source reduction and reuse or recycling of waste. The mandate also created two oversight organizations, the Municipal Solid Waste Management and Resource Recovery Advisory Council¹⁰⁴ and the Pollution Prevention Advisory Committee¹⁰⁵.

In the state of Texas in 2001, recycling was a \$37 billion industry in payroll with revenue of \$237 million¹⁰⁶. Texas passed three different bills to encourage the recycling market growth SB1340, SB1051, SB1517¹⁰⁷. SB1340 created the Market Development Board (MDB). The MDB is directed to provide technical assistance, establish a statewide strategy, and analyze potential markets. The State of Texas Alliance for Recycling and the Lone Star Chapter of the Solid Waste Association of North America has developed a survey, Texas Recycling Data Initiative, to gather statewide information on the amount of material recycled in the state. The organizations created the survey to address the fact that statewide information on recycling rate was not available¹⁰⁸.

Case study policy

Texas Health and Safety Code, Section 361.425 establishes county requirements for recycling. Under this law, counties must establish and operate programs to separate and collect recyclable materials generated. Several common classes of materials (e.g. aluminum, steel containers, packaging, cartons, office paper, and cardboard) are

¹⁰⁴ Municipal Solid Waste Management and Resource Recovery Advisory Council Accessed April 6, 2014. https://www.tceq.texas.gov/permitting/waste_permits/advgroups/msw_advCouncil.html

¹⁰⁵ Pollution Prevention Initiatives Advisory Groups
<http://www.tceq.texas.gov/agency/advise/prevention.html> accessed 10/6/14

¹⁰⁶ Beck, R. W. "US recycling economic information study." Prepared for the National Recycling Coalition. Environmental Protection Agency (2001).

¹⁰⁷ Recycling and Waste Minimization Programs published by TCEQ

¹⁰⁸ Burns & McDonnell. October 21, 2014. TRDI Study Seeks to Quantify Recycling Activities in Texas.

specifically targeted for recovery. In addition, Section 361.426 specifies a county government shall give preference to purchasing products made of recycled material and that may be recycled when materials have served their intended use. Section 361.426 applies to county correctional complexes as well.

Travis County Waste Management Policy

To address these requirements, the Travis County Commissioners' Court adopted the Travis County Waste Management Policy on December 17, 1996. The purposes of the policy were to reduce material and waste disposal costs, reduce the volume of material sent to landfills, reduce the use of limited natural resources, prevent environmental pollution associated with waste disposal and promote the purchase and use of recycled materials. The program policy goals are:

(a) "This Policy shall establish a Comprehensive Waste Management Program to implement reduction, recycling, and disposal of waste materials generated by Travis County Operations. The primary goals of this Policy are to reduce the costs of materials and waste disposal, reduce the amount of wastes landfilled, reduce use of limited natural resources, prevent environmental pollution, and promote the purchase and use of recycled products. Additional goals include assisting compliance with State and Federal waste management laws and the promotion of cooperative waste management initiatives through organizations such as the Capital Area Planning Council (CAPCO)"¹⁰⁹

The Policy specifically lined out the management of waste materials

(c) Treatment requirements for individual waste streams are outlined in this Policy. New or unidentified waste streams shall be added as necessary. This Program shall be implemented through staff procedures developed in accordance with this Policy and evaluated in accordance with this Policy. Semi-annual reports shall be provided

¹⁰⁹ 1996. "Travis County Waste Management Operations Policy." Travis County. Accessed April 3, 2014. http://www.co.travis.tx.us/tnr/conservation/pdf/Chapter_111_Waste_Management_Policy.pdf

to the Commissioners Court during the fiscal year detailing the ongoing performance and progress of the Program.

(b) County departments shall minimize the amount of waste materials generated by operations through use of appropriate management strategies, feasible technologies and products, and staff procedures. Wastes that are generated by operations shall be reused when possible and permissible by law. Waste that cannot be reused will be recycled through a qualified contractor. Wastes that cannot be reused or recycled shall then be disposed of at a permitted landfill in accordance with all applicable regulations. The use of hazardous materials shall be reduced and non-hazardous alternatives implemented whenever possible.

The policy directs County departments to minimize the amount of waste materials they generate through the implementation of waste reduction strategies and procedures.

The policy also provides implementation guidelines. Unless otherwise directed by law, the means for achieving the County's goals must meet feasibility criteria related to clearly demonstrable conservation benefits, as well as cost and operational efficiency.

The policy provides guidance for the treatment of several specific County waste streams.

The program has evolved and expanded in the past eighteen years.

The primary goals of the policy are as follows:

<ul style="list-style-type: none">• Reduce material and waste disposal costs
<ul style="list-style-type: none">• Reduce the volume of material sent to landfills
<ul style="list-style-type: none">• Reduce the use of limited natural resources
<ul style="list-style-type: none">• Prevent environmental pollution associated with waste disposal
<ul style="list-style-type: none">• Promote the purchase and use of recycled materials

The County's purchasing goal (see Section 111.005 of the Travis County Waste Management Policy) is to spend at least eight percent of its annual consumable

commodities budget on materials with recycled content or materials that provide some other specific conservation benefit. To be considered, these materials must also meet the program feasibility criteria for cost and operational efficiency. Travis County's purchasing policy is constrained to evaluate cost savings but not environmental benefits. Development of a tracking methodology to verify compliance with the goal has not been developed by the Travis County Purchasing Office. Although the County cannot evaluate the total purchases, it can examine purchases from Office Depot. In FY2013, 28% of the County's total purchases were products with recycled content.

Zero Waste Inter-Local Agreement

In support of waste reduction, the County Commissioner signed the Zero Waste Inter-local with City of Austin (COA) on Jan. 8, 2014. The Inter-local aligns the County with City of Austin's Zero Waste Strategic Plan. The main goal of the inter-local is to combine efforts of both regulatory programs by the City and non-regulatory programs by both parties. The inter-local has several sections with the following focuses: single-stream recycling provided at all facilities, waste audits of facilities, recycling at county events, food service composting, recycling education, and partnership of community drop-off and reuse facilities. Travis County will phase in the requirements of the inter-local over time. The performance measures of the implementation will be reported to the Travis County Commissioners' Court and City Council.

Department Policy

Travis County has been implementing the Waste Management Policy for the past eighteen years. The single-stream recycling program has been highly successful with strong participation. Travis County recycled 116.7 tons of single-stream material in

FY2013¹¹⁰. It will take time to fully implement the program through infrastructure and education. All facilities and departments participate at varying levels.

¹¹⁰ The total of single-stream material recycled time frame is 3rd and 4th quarter. The combination of Texas Facilities Commissions estimated weight 51 tons and Texas Disposal Systems 24.8 tons plus cardboard 40.91 tons.

4. METHODOLOGY

Study Area

There is a tendency for waste reduction in academic study to not be thoroughly discussed. Specifically, there is limited peer-reviewed academic study literature existing with regards to waste management and reduction in correctional complexes. This study is applied research for the benefit of Travis County predominantly, examining only the implementation phase of single-stream recycling with accessibility to both staff and inmates. The project in itself will continue and evolve into the future.

The case study is the Travis County Correctional Facility, a 130-acre facility managed by Travis County Sheriff's Department. It is located in Del Valle, Texas, fifteen minutes from downtown Austin. Travis County has 693 employees at the complex. The complex is a jail with most inmates waiting for trial or serving two-year sentences or less. The jail population varies from 2,500 to a maximum capacity of 5,000.

The approach for this case study was broken into three segments: stakeholder engagement, site analysis, and evaluation of existing policy. In order to implement single-stream recycling at the facility, it was important to have a stakeholder analysis. Stakeholder analysis begins with the process of identifying the individuals or groups most likely to affect or be affected by a proposed action. The stakeholder group is used to assess how their interests should be addressed in the single-stream recycling project. The stakeholders' interests and applicability are then identified to help understand the influence and importance they may have on the project. This process also allows conflict

prevention through a better understanding of who would be the main points of contact for implementing the recycling program.

The second step in the study approach was a site analysis performed at the correctional complex. The analysis gave insight as to how the correctional waste management system functioned. The analysis consisted of a walk-through visual waste assessment, including examination of existing waste reduction equipment as well as indoor and outdoor container needs. The walk-through visual assessment is one of the waste assessment approaches recommended by the U.S. Environmental Protection Agency¹¹¹ and consists of the following¹¹²:

- Observe the layout and operations of various departments
- Identify waste-producing activities and equipment
- Detect inefficiencies in operations or the way waste moves through the organization
- Observe the types and relative amounts of waste produced
- Evaluate existing waste management indoor and outdoor containers to assist in analysis of waste generation volume management and ascertaining recycling container needs
- Assess existing space and equipment, such as a baler or box truck, which can be used for storage, processing recyclables, and other activities
- Assess current waste reduction efforts
- Collect additional information through interviews with supervisors and employees

The final step of the study approach is evaluating Travis County's and the Sheriff's Office existing operational waste management policy. This step is essential

¹¹¹ 2013. "Waste Assessment Approaches." Wastes-WasteWise. U.S. Environmental Protection Agency. Accessed October 4, 2014.<http://www.epa.gov/smm/wastewise/approach.htm>

¹¹² Ibid.

when considering policy changes. A policy in which participation is not obligatory or voluntary has implementation problems if the project increases infrastructure costs.

Data Gathering Method and Sources

The timeline for data collection occurred during the fiscal years of FY2011 to FY2013. The Travis County fiscal year is October 1st to September 30th. The County recycling program was implemented in April of 2011. Examining the waste generation and recycling practices over this time period provided a baseline for program implementation and effectiveness. The data collected during the time period are pertinent to the case study by creating baseline information before a single-stream recycling program was implemented.

The data gathering was through primary, secondary, and tertiary collection methods. The primary data collection methods involved observations and interviews. This research study utilized direct communication with the respondents to arrive at the results of the research. In this observation method, data are collected through observing response or activities of the officers and inmates. Along with this, during the waste assessment walk-through, qualitative information was gathered through conducting in-depth interviews with staff. Under the interview method, the data were also gathered via telephone interviews, in person, and email. The format of the interview method was to ask participants open-ended questions regarding officer participation and feedback on program performance. The format was semi-structured, using the waste assessment form created by the conservation coordinator as guidance with predetermined dataset responses needed from each of the questions. In an informal interview, the researcher will have

prepared questions but has the freedom to ask additional follow up questions as he/she sees fit.

The secondary/tertiary data collection/review methods--data collected and analyzed on the basis of previous data or research--utilized several types of approaches. In the case study approach, historic data from annual reports as well as information which is available on the websites of Travis County and sheriff's department was analyzed. For information collection under the tertiary collection method, published and unpublished sources were used by the researcher. Published sources included government publications, newspaper, and journals. Examples of secondary and tertiary information collection methods included:

- Other sustainable correctional complexes case studies
- Travis County Correctional Complex newsletters
- Sheriff's office waste disposal requisitions orders
- Sheriff's office departmental policy
- Travis County waste management policy
- Copies of all existing waste hauling and disposal related contracts

The data collection and information analysis methods depended on the nature of this particular research problem. The preference of each collection method relates to their benefits and ease of information gathering. The data collection refers to numerical data such as volume of material disposed or cost the program. Information collection refers to understanding the processes or logistics on how operations are managed in a county correctional complex. For example, specific information was needed to examine

the roles of correctional officers within the corrections system to better understand waste generation. The observation method of TCCC employees and the internal part of the management team saved time and money as opposed to administering a questionnaire. In the varying schedule of correctional facility employees, it is difficult to communicate directly with the respondents. In addition, given the 693 employees of the correctional complex, it would not be cost-effective to request the time and attention of all those employees to complete a survey. So in the presence of these conditions, a variety of data collection methods of observation were used.

There are limits to the observation methods. Observation cannot be used to collect data about attitudes, beliefs, thoughts, and covert behaviors¹¹³. Another limitation of observation relates to the “Hawthorne Effect”¹¹⁴, wherein very often, the nature of being observed changes the subject’s behavior. However, observation during the waste assessment walk-through was casual in the natural environment of the correctional complex, which lessened the “Hawthorne Effect.”

The data and information collected had several sources. The literature reviews in Chapter 2 were derived from the Texas State University research databases, primarily Science Direct, ProQuest, Ebsco, and JSTOR. The Texas State University head research librarian assisted in gathering peer-reviewed articles on waste reduction in correctional complexes. The unpublished work on sustainability in correctional complexes was from The National Institute of Corrections. In Chapter 3, the data/information sources resulted

¹¹³ Qualitative Field Research. Oxford Journals. Accessed August 30, 2014. www.oxfordjournals.org/tropej/online/ce_ch14.pdf. P. 4

¹¹⁴ Wickström, Gustav, and Tom Bendix. "The" Hawthorne effect"—what did the original Hawthorne studies actually show?" *Scandinavian journal of work, environment & health* (2000): P 364

from website searches on the U.S. Environmental Protection Agency, individual state environmental department websites, and resources provided through interviews.

Measurement

The baseline measurement and performance measurement were calculated using the guidelines provided by the Florida Department of Environmental Protection (FDEP). The FDEP equation was chosen for consistency and ease of application to other county correctional complexes. (Figure 8) The FDEP equation provided below in the case study application would use the correctional complex recycled material divided by the total waste generated at the complex.

$$\frac{8 \text{ cubic yards}}{\text{dumpster}} \times 90\% \times \frac{3 \text{ dumpsters}}{\text{pickup}} \times \frac{2 \text{ pickups}}{\text{week}} \times \frac{52 \text{ weeks}}{\text{year}} \times \frac{250 \text{ lbs.}}{\text{cubic yard}} \times \frac{1 \text{ ton}}{2000 \text{ lbs.}} = \frac{280.8 \text{ tons}}{\text{year}}$$

Figure 8. Formula to Measure Yearly Waste and Recycling.

The following is a list of key items that should be tracked on an annual basis for any type of recycling program¹¹⁵:

- Purchasers of recyclables
- Diversion per inmate
- Amount of residuals disposed
- Tonnages by material
- Disposal cost avoided
- Revenues by material type

When configuring the recycling and waste dumpster volume for the case study, the equation used the total volume when the dumpster was not completely full. There is a

¹¹⁵ 2008. Beck, R.W. "Recycling and Waste Minimization Case Studies. P7

tendency for containers to not be 100% full or have space before the lid. It is beneficial for the disposal vendor to collect containers not completely full.

5. CASE STUDY

The purpose of this thesis is to examine existing Travis County waste reduction and solid waste management policy via application at the TCCC. If inefficient, construct a comprehensive template policy for the Travis County Correctional Complex which could be applied on other agency levels. Jails are unique in the sense that they form a closed system with a highly controlled input and output of consumption. The Travis County Correctional Complex was chosen as the governmental agency case study due to pressures for fiscal responsibility and resource intensive system.

Introduction

This chapter addresses the case study of single-stream recycling in the Travis County Correctional Complex, including existing policy, history of TCCC waste reduction programs, and case study implementation. The case study implementation discussion is broken into four subheadings: stakeholder process, site analysis, training, and implementation. The implementation process occurred over a period of three years. Several interviews, photos, and signage examples have been included.

All photos used in this document and during the course of case study research were taken by approval of the person. A release and authorization to reproduce likeness photo waiver was obtained from each person included in a photo. (Appendix B) In addition, the faces of any non-employees of Travis County have been made unidentifiable using blurs to further protect their anonymity, even though waivers were obtained for those individuals as well.

The chapter will conclude with the benefits and summary of findings. The benefits include a cost-benefit analysis and waste diversion results. The summary of

findings provides a synopsis of the implementation process. The case study specifically examines Travis County jail. A jail is a building designated or regularly used for the confinement of individuals who are sentenced for minor crimes or who are unable to gain release on bail and are in custody awaiting trial.



Figure 9. Travis County Correctional Complex

Background

The TCCC facility was built in 1977 to manage half the number of inmates it currently supports. (Figure 9)¹¹⁶ Currently this facility houses more than 2,500 inmates on 130 acres. The total square footage of all the facilities in the complex is approximately 920,000.¹¹⁷ Twelve of the twenty buildings are inmate housing facilities. The largest inmate facility, Building 12, is 257,000 square feet¹¹⁸. In Building 12, there

¹¹⁶ Photo provided by the Travis County Sheriff's office

¹¹⁷ John Newbegin. Email message to author. October 15, 2014.

¹¹⁸ 2012. "History." Travis County Sheriff's Office. Accessed September 30, 2014. <https://www.tcssheriff.org/about/agency-history/history>

are 301 staff members, 193 of which are correction officers. The facility employs a total of 693 people, with varying support roles for the complex and sheriff's office.

Existing Policy

Travis County Correctional Facility complies with policies mentioned in Chapter 3 for the recycling program. The Travis County Waste Management Policy 111.001 provides detailed guidelines for treatment of individual waste streams¹¹⁹, however, the rules to enforce this policy are not established, and it does not specifically include the sheriff's office waste stream.

The Travis County Sheriff's Office has a policy 4.4.3 under the Chapter, Sanitation and Hygiene adopted in 2004 which focuses on waste disposables and recyclables.¹²⁰ The policy states that all trash and food waste should be taken out by a contractor, staff, or inmates at least once a day. The policy states "receptacles are provided in each building for collection of paper recyclables. Facilities staff will empty the receptacles on an established schedule, not less than weekly."¹²¹ The policy also states receptacles are provided at most locations for cardboard collection and metal food cans.

History:

The Travis County Sheriff's Office has participated in waste reduction activities since the 1990's, including composting, cardboard, metal battery and pallet recycling.

¹¹⁹ The Waste Management Policy 111.001 is in the Appendix E

¹²⁰ The Travis County Sheriff's Office Policies and Procedures is an internal policy. 4.4.3 Created on January 29, 2004.

¹²¹ Travis County Sheriff's Office Policies and Procedures 4.4.3 1/29/2004

This section will discuss each commodity or program's history from the information provided in interviews and articles.

Composting and Garden

The composting program began in 1997 with a grant from Capital Council of Governments (CAPCOG). Travis County purchased a bio-reactor to compost the post-consumer food waste¹²². The bio-reactor was managed by the conservation coordinator who ran the equipment. Over time, issues arose with staffing and funds for equipment maintenance, and in 1999, the post-consumer waste composting program was discontinued. The bio-reactor was sold for scrap metal.

In 2007, Travis County was awarded a second grant for a composting program. The funds were used to purchase a backhoe, materials to build an in-vessel composting unit, and other needed tools. The composting program was assigned to the marketable skills section with one officer assigned to the compost and garden program. Once the infrastructure was established, the bin composting system went into production in 2008. (

Figure 10)¹²³

The compost is pre-consumer food waste collected from the kitchen. The officers train the inmates on what food scraps are composted. In the food prep areas, the inmates are provided carts for the food scraps. In May of 2013, approximately 1,044 pounds of food scraps were collected from the kitchen, processed, and applied onto the garden. The meals which generate food scraps are hot meals using produce from the garden. If there is not a garden in production, the kitchen follows the "heat-and-serve" practice where the

¹²² Goldstein, Nora "Composting at county correctional facility." BioCycle; Oct 97, Vol. 38 Issue 10, p42

¹²³ Tour Photo by author May 15, 2012

food ordered is in ready-to-eat form with no preparation needed.¹²⁴ During this time, collection of food scraps from the kitchen does not occur. Throughout the complex, other items such as shredded paper and plant material from the garden are collected by the Marketable Skills group for processing into compost. The material is processed by inmates and the assigned corrections officer; however, consistent measurement of amount of material generated or food scraps has not been collected.

The 3.5 acre organic garden began in 2008 with the support of Sheriff Hamilton. (Figure 11)¹²⁵ The program is overseen by the Market Skills group under project manager Pete Troutman. The garden is organic due to liability and health issues if the facility were to use fertilizers and pesticides, however, the garden has not had any need for fertilizers as a result of compost generated on-site. There is one assigned gardener with an average of three to four inmates to assist with the work. All of the food produced at the garden stays on-site with the inmate menu adjusted to include what is in production. Any surplus of vegetables is frozen for future use.

¹²⁴ Lieutenant Valerie Whitney of Travis County Correctional Complex, interviewed by author, Austin, October 18, 2014

¹²⁵ Tour Photo by Author May 15, 2012

TCCC Compost System



Figure 10. Travis County TCCC Compost System



Figure 11. Produce from TCCC Garden

Metal Recycling

The correctional complex generates metal through the kitchen, maintenance, and training range. The different types of metal generated at the facility included steel, copper, piping, copper wire, brass, stainless-steel, electrical motors, lead acid batteries, aluminum, and brass shell casings from the firing range. Since several sections of the facility contribute to the metal recycling, communication between the warehouse sergeant and points of contact in those areas is essential. The warehouse manages most of the metal recycling by separating the metal and delivering it to the local metal recycling facility. In 2012, TCCC added the collection of expired license plates from the Tax Offices. The SWAPPERS—inmates serving their time on the weekend--cut the license plates in half and sort them by metal type.¹²⁶ Newer license plates are made of aluminum and the older ones are steel tin.

The kitchen began recycling their tin/steel food cans in 1997. The inmates would clean, crush and place the cans in a roll-off. Carts full of cans were emptied at every shift change, with an average of 360 cans generated per day depending on the menu. The highest annual revenue collected for metal recycling over the years was \$11,698 in FY2011.

Pallet Recycling

The pallet recycling program was established in 2004 by the conservation coordinator. The warehouse generates the pallets from shipments of food and supplies. The pallets are recycled for an average of \$2,500 a year in revenue for the Travis County general fund.

¹²⁶ Sgt. Mark Jones. Email message to author October 15, 2014.

Cardboard Recycling

Cardboard has been recycled at TCCC since 1990. At that time it was managed by Warehouse Sergeant Mark Jones who would coordinate his staff for collection of the cardboard using an closed trailer which they would drive to the two kitchen locations twice a week with two trustees and one officer. Once they had a full load, the corrections officer would take the material directly to the vendor. The revenue would then be used for purchasing of small items for the jail.¹²⁷

In 2007, Travis County worked with a vendor to provide a cardboard baler for TCCC and instituted a new process where the main cardboard generating buildings were provided a cardboard cart. Twice a week, the warehouse staff would collect the cardboard, and once a week, a corrections officer and three inmates would bale the cardboard for processing. (Figure 12) The vendor would collect the baled cardboard when there was enough available for a full trailer load. (Figure 13) On average seven tons of cardboard were recycled every month.

¹²⁷ Sgt. Mark Jones. Email message to author. April 24, 2013.



Figure 12. Inmates Baling Cardboard



Figure 13. Baled Cardboard at TCCC

Universal Waste

In 2013, the Universal Waste program was started by the Travis County conservation coordinator. This program provided containers to all maintenance and facility operations staff for proper management of batteries, light bulbs, and ballasts. TCCC maintenance staff members collect the items in their day-to-day activities, and warehouse staff ships the material to Arizona for processing.

Implementation of single-stream recycling

Single-stream recycling at the TCCC was implemented at the same time as 34 other Travis County facilities. Before the single-stream recycling program was instituted at all county facilities, a vendor provided recycling services to five locations. The service focused on mixed paper, cardboard, and aluminum cans. This service was free; however, there was no regular schedule for collection.

In 2012, the conservation coordinator who managed the recycling program retired, and the contract with the vendor expired. The contract was revised, requesting single-stream service to all locations with a consistent collection schedule. The largest city within the Travis County jurisdiction and the location of the county seat is in Austin. During that time, the City of Austin (COA) changed their service to single-stream recycling, mixing material all in one container. The county supported the COA's Universal Recycling Ordinance to provide recycling all employees through the language of the agenda back-up for request for recycling services funds.

Stakeholder Process

The new conservation coordinator implemented a stakeholder process before the approval of recycling services funds. This stakeholder process included point of contact

meeting for the site, discussion of recycling issues, and listening to the TCCC needs.

Lt. Whitney, the supervisor for kitchen, warehouse, and laundry facilities, identified who the stakeholders were for implementation of recycling at TCCC.

Lt. Whitney and Lt. Jurica, supervisor over the Austin downtown jail, contacted the conservation coordinator within the first month of their hire date to discuss the history of recycling and the need for a broader recycling program. In 2000, they collected recyclables from the inmates and officers. They tried to separate on-site using inmate workers but had issues with service pick-up consistency. The vendor did not have the site on a consistent schedule. This led to the fire marshal stopping the collection due to the amount of stored material.

The conservation coordinator brought up the need for a meeting with the other stakeholders of the sheriff's office. The meeting was organized by request of Chief Sylvester on Aug. 21, 2012. The following stakeholders were identified at the meeting: Florence Briceno, Captain Wes Priddy, Major Darren Long, Pete Vargas, Chief Sylvester and Valerie Whitney (Figure. 14).¹²⁸ Chief Sylvester discussed the desires of the office to have rain water harvesting, solar panels, and single-stream recycling. He stated that the chain of command would give the support needed to implement recycling at TCCC. The history of TCCC's participation in past TCCC operational recycling programs and issues were mentioned.

The conservation coordinator then toured TCCC to better understand the facility and to meet other potential stakeholders, including the warehouse sergeant, kitchen

¹²⁸ Lieutenant Valerie Whitney of Travis County Correctional Complex, interviewed by author, Austin, October 17, 2014.

sergeant, building lieutenant in charge of inmate buildings, commissary manager, and individual programing directors.

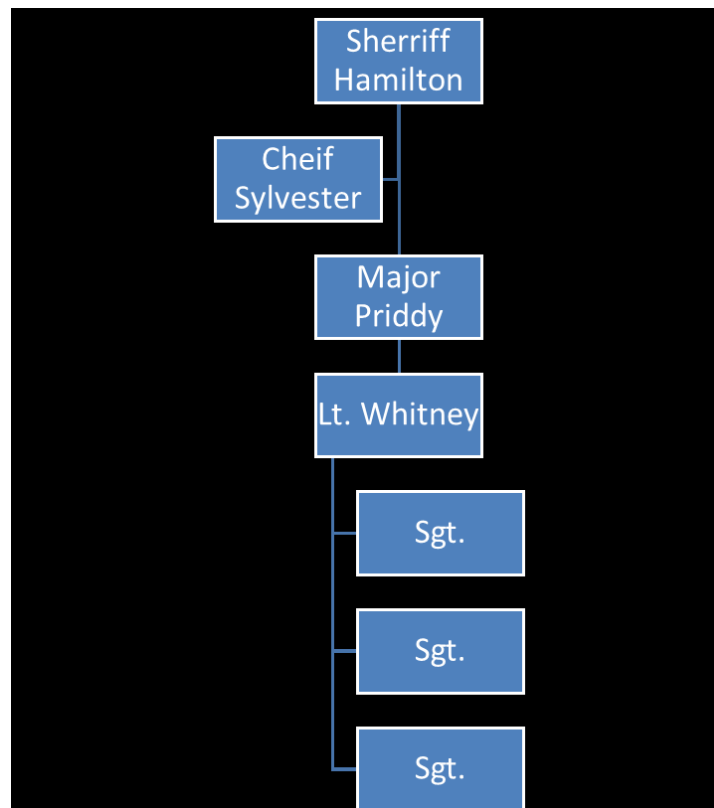


Figure 14. Stakeholder Chart

Site Analysis

The site analysis consisted of several walk-through visual waste assessments of high volume generators at TCCC. These regions were identified as the kitchen, commissary, and warehouse/receiving areas. During a walk-through, an officer would need to accompany the conservation coordinator at all times. For this reason, the conservation coordinator focused the site assessments on the high generation regions. The conservation coordinator utilized two different forms for the assessments, one

personally created (Appendix D) and the Florida's Waste Reduction and Recycling Guide. The warehouse sergeant, Mark Jones, assessed the other buildings in the complex due to his knowledge of the facility and time constraints.

The types of waste observed depended on the individual function of the area. For example, inmate housing waste materials include cans, paper bags, newspaper, and plastic bottles. The finance building generates paper with confidential information, bottles, aluminum, and mixed paper. In the health and safety building, the types of waste generated are medical waste, mixed paper, food waste, and confidential information. The maintenance region generates scrap metal, universal waste, and general food waste from lunches.¹²⁹

The commissary is attached to Building 12, the largest inmate housing building in the complex. The commissary is one of the largest producers of cardboard in the complex. The commissary is managed by a contracted vendor who processes all requests for items which can be purchased by the inmates. The items are received at the warehouse in boxes and delivered to the commissary where they are unpackaged and organized on shelves (Figure 15).¹³⁰ Next, the inmate orders are collected and placed in a reusable bag to be delivered by an officer to their unit on a four-wheeled cart. The items vary from personal hygiene items to food items. Food item packaging is made of a non-recyclable plastic.

¹²⁹ Sgt. Mark Jones. Email message to author. July 24, 2012.

¹³⁰ Tour photo by author April 13, 2012.

Kitchens in county jail facilities usually generate the largest amount of waste. At

Commissary Facility



Figure 15. Commissary Facility

TCCC, there are two kitchens with only one in operation. This area includes a storage area for shipments of food delivered weekly. The food shipments vary based on the menu.¹³¹ The types of waste generated in these regions are cardboard, steel cans, plastics 1-7, plastic film from shrink wrap, and bread bags.(Table 3)

¹³¹ Sergeant Karen Stewart of Travis County Correctional Complex, interviewed by author, Austin, October 17, 2014.

Table 3. Waste Generated in the Kitchen

Food Waste	Peanut Butter (5 Gallon Buckets)	Canned Goods (Steel Cans)	Bread bags (Plastic Film)
3,675 gallons a day	30 weekly	360 daily	3,000 weekly

The kitchen provides three meals a day, operating in two shifts with a total of 20 officers and 34 inmate workers. The facility practices “heat-and-serve” with two hot meals per day; if the garden is in operation, fresh produce is added. Once the meal is prepared, it is placed on a reusable tray made of a rubber-like material and delivered to the unit. The inmates are issued one metal spoon for eating. They are also issued a Solo brand plastic cup for drinking, but most inmates purchase a heavier, reusable plastic cup from the commissary. All trays are returned with food waste which is discarded in the trash.

The waste in the kitchen facility is managed by the worker inmates. They take out all containers at the end of each shift. The types of cardboard containers used are four wheel carts, 30 bushel size. All the trash is collected in 35-gallon carts. There are four 1 cubic yard containers for steel cans.

The other waste region assessed was the warehouse/receiving area. A diversity of materials is delivered to the warehouse, including uniforms, sheets, shoes, hygiene supplies, toilet paper, and cleaning chemicals. These items are shipped in packaging containers or on pallets with shrink wrap. The warehouse generates a substantial amount of cardboard. All trash items are evaluated for reuse, separated for recycling, or landfilled.

All items purchased for TCCC and sheriff's office operations are managed through a warehouse. The items ordered are then issued to the various areas. The jail's warehouse operation receives and manages all purchases. Examining the warehouse provides a holistic perspective to examine the life cycle of a product from the moment of purchase to waste management. The warehouse division also manages the disposal of waste generated from the facility. The facility has no funding allocated to sustainability initiatives, so it has to be a net zero or self-sustaining program.

The walk-through assessment revealed that the warehouse did not generate as much waste as was assumed by the conservation coordinator. This is because all the materials received in the warehouse are shipped to other buildings for use. The types of waste generated were a small amount of office paper, plastic shrink wrap, and pallets. There was not a large volume of cardboard because items were transported within the cardboard boxes to other locations at TCCC. Other waste streams generated within the warehouse include batteries, fluorescent light bulbs, electronic equipment, textiles, shoes, and medical/infectious waste. The warehouse sergeant would manage the shipment of material which would include the recyclable items mentioned in the historical section.

Existing Waste Collection System

Currently, all of the waste generated in the complex is collected by a vendor who disposes of it at a landfill managed by the same vendor. The internal collection of trash is managed by inmates with the oversight of a corrections officer. The trash is piled into carts allotted in each area. The cardboard boxes are broken down and placed into separate designated carts. As mentioned earlier, previous to single-stream recycling implementation, the worker inmates were taking out the trash three times a day. Now

mixed material recycling is collected and the trash is taken out only once a day during B shift. This reduced correctional officer time escorting inmates for disposal. If an extra trash collection is needed at the outside container, the vendor is required to pick up within 24 hours. The vendor charges the County on volume and frequency of collection. The dumpsters have scheduled collection days regardless of whether they are full. Assuming the containers are full at each collection, there is an estimated tons of waste generated monthly at the jail provided by the table below.(Figure 16)

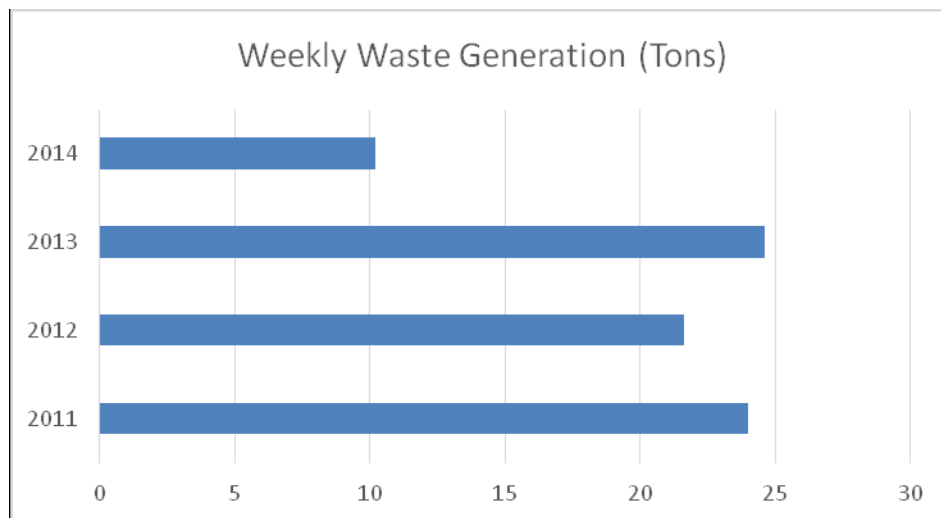


Figure 16. TCCC Weekly Waste Generation

Implementation

Before single-stream recycling was approved operations-wide for Travis County, the conservation coordinator was working with Lt. Whitney and staff on the project. The main contact on evaluating what the container needs were for recycling was the warehouse manager. At the time of the walk-through, the conservation coordinator did not have a total number of on-site visits. Although the coordinator kept track of email

correspondence between the main stakeholders, the warehouse manager, Lt. Whitney and the conservation coordinator.¹³² (Table 4)

After the first walk-through assessment, the warehouse manager provided the

Table 4. Conservation Coordinator Email Correspondence

FY2011	0*
FY2012	44
FY2013	421
FY2014	43

conservation coordinator a count of recycle carts on hand (Figure 17).¹³³ TCCC had fifty carts on hand from previous recycling program attempts. The conservation coordinator and warehouse manager decided each inmate housing unit would need a cart for recycling, totaling 63 for sufficient indoor container needs¹³⁴. The indoor containers were provided in phases due to funding. Since existing carts were owned by the previous vendor and would be removed when the new recycling vendor began service, additional cardboard carts were also purchased.

¹³² An examination of Conservation Coordinator outlook account 10/17/14. *The current conservation coordinator was not in the position during this time period. The email correspondence with the previous coordinator was not accessible.

¹³³ Photo from tour by author April 18th 2013.

¹³⁴ Valerie Whitney. Email message July 11th 2012

Waste Assessment in Building 12



Figure 17. Walk-through Assessment

Once the funding and new recycling contract was approved by the Travis County Commissioners' Court, the conservation coordinator began recycling implementation. Several purchase requests were approved by Captain Priddy of the sheriff's office to provide recycling infrastructure support. The conservation coordinator and warehouse manager presented the number of outdoor containers and size for each building or region. They found it would be best to provide a total of eight recycle dumpsters for the facility. The overall container needs are discussed in the below table (Table 5). This created the potential for six tons of material to be collected weekly.

Table 5. TCCC Recycling Dumpsters

Location	Number	Size (cubic yard)	Frequency
Kitchen	1	8	2
Bldg 12	2	6	2
Bldg 1	1	4	2
Bldg 2	1	4	2
HSB	1	4	2
Academy	1	4	2
Training	1	4	2
Cardboard Baler	1		As needed

Training

The single-stream program was rolled out once all the indoor and outdoor containers were placed at the designated locations. An overall email was sent out by the conservation coordinator notifying all staff of the new program. At TCCC, designated contacts known as “Green Leaders” were notified via specific emails from the warehouse manager, Sgt. Jones.¹³⁵ The conservation coordinator contacted him directly with outreach information, such as flyers, background information on recycling, collection stations, and the process for informal assessments. (Appendix D) Sgt. Jones would then contact the stakeholders at TCCC. The specific information on what was recyclable was shared through briefing meetings. There were four mass briefings for all correctional officers and field officers from each building. Lt. Whitney and Sgt. Jones presented at the briefs with information on cost savings, benefits on decreased landfilling, and a demonstration on how to recycle.

¹³⁵ Mark Jones. Email message to author on June 5, 2013.

Implementation of the single-stream program required monitoring of the trash and outside recycling containers. Sgt. Jones performed weekly waste assessments. He examined the recycling and waste dumpsters by noting and photographing what was in the dumpster for each building. These assessments were then emailed to all points of contact for each building. As the program progressed, the assessments were named “Oscar Reports.” An example of an “Oscar report” from April 16th 2013 reads as follows: “Building 170 laundry put cardboard in the dumpster. Email sent to all staff to not let this happen again. Also blue recycle cart is being placed in the laundry office.”¹³⁶ In this assessment, of the six dumpsters evaluated, four of them improperly contained cardboard.

Benefits

There are several benefits to waste reduction practices in a correctional complex, specifically single-stream recycling. The “Literature Review” chapter discussed operation cost reduction, green job training, behavior change, and reduced rates of recidivism. (Figure 18) ¹³⁷ With the recent implementation of single-stream recycling at TCCC, operation cost reduction was evaluated. The amount of waste diverted through single-stream recycling was also evaluated. Since the single-stream recycling program is new to TCCC, the measurement of the benefits of green job training, behavior change, and reduced recidivism rates were not measured.

¹³⁶ Single-stream Recycling Report Card Date April 16th 2013 Sgt. Mark Jones

¹³⁷ Thigpen, M., T. Beauclair, and S. Carroll. "The greening of corrections: Creating a sustainable system." Washington, DC: US Dept. of Justice National Institute of Corrections (2011). P1

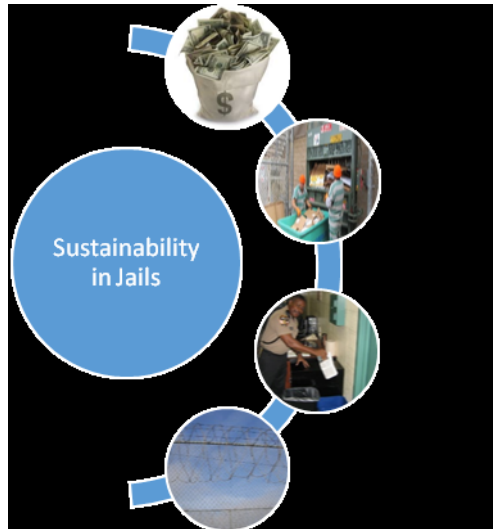


Figure 18. Potential Benefits of Sustainability in Jails

Waste Diversion

The focus on waste diversion through implementation single-stream recycling was demonstrated through the “right-sizing” of the waste dumpsters at the facility. As mentioned in the Chapter 4, the outside recycling and waste containers were evaluated with the assumption they were at capacity. In fiscal year 2011, TCCC had a total of twelve 8-cubic-yard containers, with collection schedules varying based on the function of individual buildings. The facility was only recycling cardboard at all buildings. The barrack’s location dumpster was removed in February 2011, and an additional dumpster at Building 12 was added in April. The following year, the waste dumpsters stayed with the same size, amount, and frequency of collection as the previous year, and cardboard recycling continued under the oversight of Sgt. Jones. In July of 2013, the property location waste container was removed, and the kitchen was reduced to one 8-cubic-yard container for four months. After the single-stream recycling program was implemented in 2013, the waste dumpster sizes changed. In 2014, six of the containers were changed

from 8-cubic-yard containers to 6-cubic-yard containers. The largest waste generator facilities, Building 12 and the kitchen, were reduced to a single 8-cubic-yard container

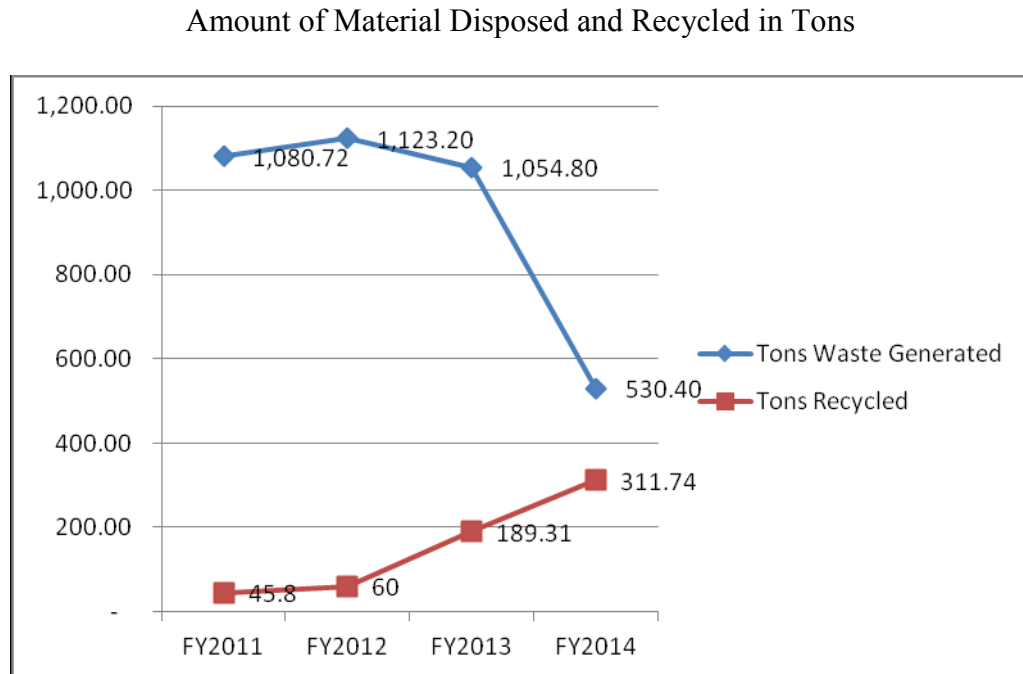


Figure 19. Amount of Material Disposed at TCCC

each due to recycling program. During this time-period of “right-sizing” the containers there was a significant demonstration in decrease of waste generated. (Figure 19)

The changes in waste container size and implementation of single-stream recycling created a cost savings for Travis County. Over a period of four years, the waste disposal cost was reduced by 57%. (Figure 20) The total disposal cost of recycle and waste was reduced by \$6,877.56. The amount of waste reduced from the landfill from single-stream recycling was an estimated 550 tons.

Cost-benefit Analysis

The cost-benefit analysis includes an examination of data from FY2011-FY2014. Included in the analysis are the costs of waste disposal, recycling services, and equipment

needs. This includes the revenue generated from cardboard recycling because of its connection to the recycling vendor.(Figure 21)

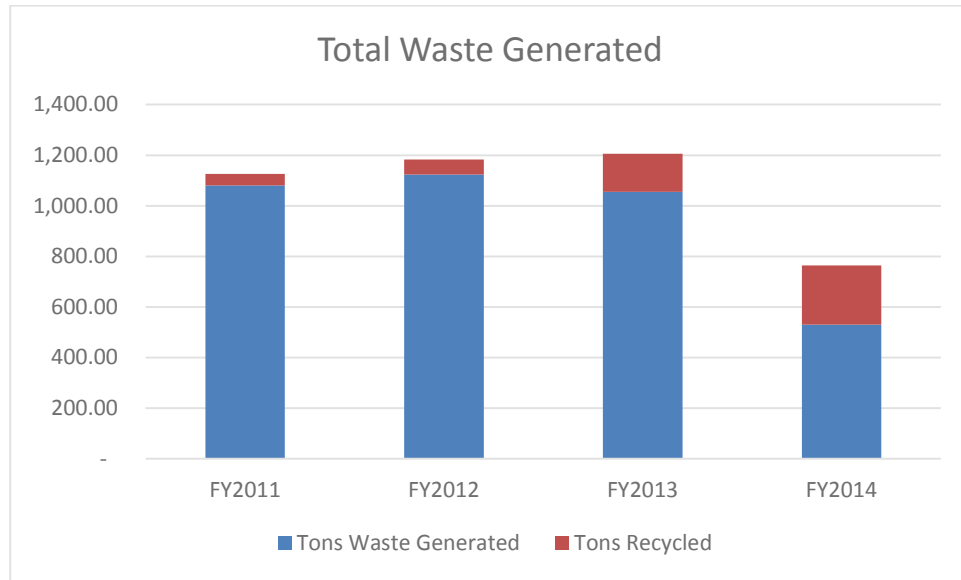


Figure 20. Total Waste Generated at the Complex.

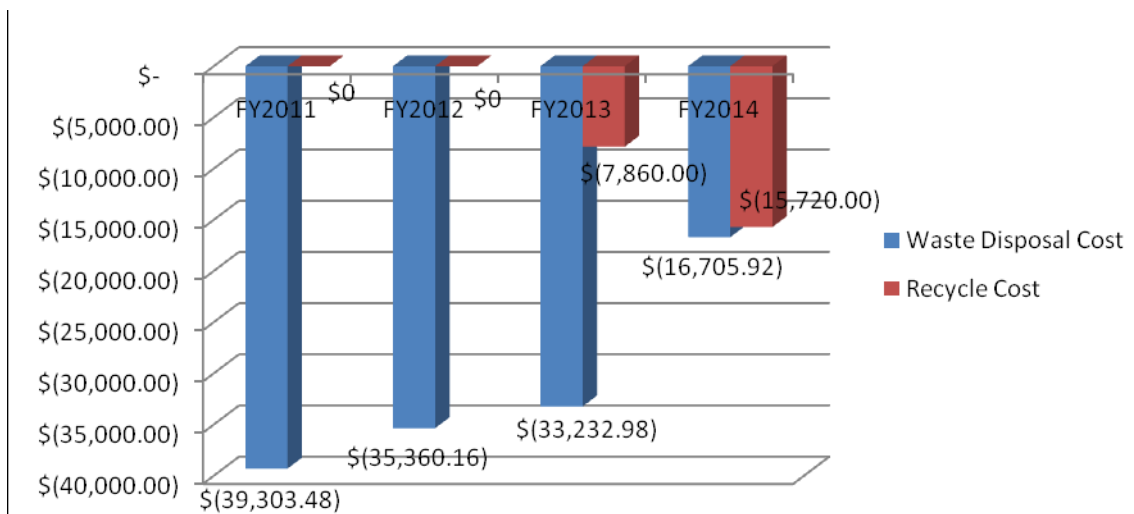


Figure 21. Disposal Cost Comparison

The single-stream program required container infrastructure to be purchased. Containers for the program will continued to be purchased in the future to replace broken containers or as participation increases.

Table 6. Cost to Collect, Bale and Recycle Cardboard.

	2019	2020	2021	2022	2023	2024	2025
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2020							
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2100							

The containers purchased in the first phase of implementation were cardboard containers to replace the containers provided by the previous vendor. Thirty-six 30-bushel containers were purchased during the study time period. Eighty-two carts were purchased for collection of single-stream recycling within the buildings, and an additional 15 office recycle containers were purchased for individual use.(Table 6)

Throughout the implementation of single-stream recycling programs, the staff at TCCC was continuously coming up with innovative ideas for waste reduction, including ceasing to use trash bags in the single-stream office recycling containers resulting in an estimated cost savings of \$7,200 annually¹³⁸. These cost saving ideas could not be completely captured in the cost analysis. A confirmation that all buildings and staff were no longer using bags in recycle cans could not be provided. The data used to create the

¹³⁸ Mark Jones. Email message between Sgt. Jones and Conservation Coordinator on June, 19 2013.

analysis were recycle service cost, disposal cost, container cost, estimated cost to bale cardboard, and revenue generated.

Summary of Findings

Previous to the implementation of single-stream recycling, the TCCC had a strong waste reduction environment. The warehouse manager most generated peripheral materials such as metals, pallets, and post-consumer food waste by recycling them. Waste assessments were performed at three of the twenty buildings. The training and outreach for single-stream recycling education was performed by the lieutenant who oversaw the warehouse and the sergeant who managed the warehouse. The education was performed face-to-face and through email correspondence to building lieutenants and supervisors. During this time, the communication was with the stakeholders in the building not with the chief and captains. The overall cost for the waste reduction program increased during the case study time period due to the cost for container infrastructure.

6. DISCUSSION

This chapter will discuss the effectiveness of the existing Travis County waste reduction and solid waste management policy as it applies to the implementation of single-stream recycling at TCCC. This discussion is based on the case study at TCCC with an evaluation of the following research questions:

1. What are the problems inherent in establishing a single-stream recycling program, and how might they be overcome?
2. What information is available to analyze the volume of material generated and single-stream recycling at the correctional complex?
3. What is the fiscal cost associated with establishing correctional complex single-stream recycling, and has a cost-benefit analysis of single-stream recycling at the correctional complex been performed?
4. Is the current waste management policy efficient for the Travis County Complex? Is the policy recognized by the Travis County sheriff? Does the policy support other waste diversion programs?

The discussion will also demonstrate the importance and efficiency of this study through cost-benefit analysis and performance review. Finally, the chapter will conclude with a discussion on the efficacy of the single-stream recycling program.

Current Policy

The Travis Country Waste Management Policy 111.001 was an early effort to engage the county department directors through leadership of the Commissioners' Court. At that time, there was resistance from internal management to recycle paper and other

materials such as cardboard. The policy was intended to deliver an expectation to all County departments from the Commissioners' Court.¹³⁹ However, Policy 111.001 does not apply to the sheriff's office or any of the divisions the office manages, including the county jail. Since the sheriff is an elected official, he does not report to the Commissioners' Court. There is also an understanding that the business needs of protecting the constituents come before waste reduction¹⁴⁰.

The Zero Waste Inter-local was an effort supported by the Commissioners Court and City of Austin to encourage waste reduction and information sharing between the organizations. The Zero Waste ILA does not apply to the Sheriff's Office. The Zero Waste ILA would need to have the Sheriff's signature for application to the office and operations.

The Texas Health and Safety Code, Section 361.425 establishes county requirements for recycling. This code mandates the Sheriff's Office to recycle all materials accepted currently as discussed in Chapter 3. The peripheral recycling materials such as pallets, food waste, and metal are not outlined in this code. The code does not have consequences, goals or funding for Sheriff's Office recycling program.

The sheriff's office has practiced recycling in a voluntary fashion. The chief and hierarchal leaders at the corrections facility have made waste reduction and diversion a priority in the corrections' operations. This is apparent by the funding support given to purchase the containers for establishing the single-stream recycling infrastructure. The sheriff's office and TCCC will participate in waste reduction and recycling programs as

¹³⁹ Melinda Maliha of Travis County Environmental Quality, interviewed by author, Austin, on October 23, 2014

¹⁴⁰ Julie Joe. Email message to author, November 11, 2014

long as it's in favor with current the current sheriff and financial feasible. This has been demonstrated in the past when Margo Frasier was sheriff. She had fiscal and staffing pressures which required her to discontinue the bioreactor composting program.

Case Study Reflection

The following case study reflection is guided by the research questions outlined in Chapter 1 and again at the beginning of this chapter. At the Travis County Correctional Complex, there were several programmatic issues, including the following:

- Insufficient staff to manage the program with consistent participation
- Consistent metrics needed to evaluate diversion rate
- No formal research on the social impact of recycling within the facility
- Waste composition analysis at TCCC necessary to further program and understanding of what is landfilled
- Lack of thorough training by the conservation coordinator for inmates or officers on proper recycling techniques
- No follow-up with hierarchal stakeholders, such as main supporters Chief Sylvester, Captain Priddy, and Captain Long
- No thorough walk-through assessment of all the buildings in the complex which resulted in insufficient numbers of containers provided to buildings

The participation in waste reduction for the complex increased drastically between 2012 and 2013 because in of the single-stream program. With single-stream implementation, the number of tons recycled increased by 27% in 2014, even with the lack of consistent education and adequate containers provided to the facility. These issues were not effectively addressed during the case study time period.

In the course of three years, three different people with different priorities and styles of communication held the position of warehouse manager. Weekly audits previously performed by the warehouse manager discontinued in FY2014 when a new sergeant was placed in the position. The continuity of management and education for

recycling was interrupted. When a new sergeant came into the role, the relationship with stakeholders had to be re-established. Each warehouse manager focused on the recycling program at different levels. For example, one warehouse manager focused on re-use and durability of products while another on fiscal benefits. Also, the conservation coordinator chose not to assess the other buildings because of the need for a required escort to all facilities, resulting in a disconnected approach for single-stream implementation. During a tour in October 2014, the conservation coordinator and lieutenant found that the non-assessed buildings lacked the proper amount of containers for recycling or collection stations and that the staff did not have a full understanding of what was recyclable or how the material was collected inside the buildings.

The information available to measure the volume of material generated, individual waste stream, and single-stream recycling was inconsistent. The amount of food waste composted was not measured consistently until 2013. When recycling of a material was generated by a different division within the complex, poor communication between the warehouse manager and generator led to irregularities in metrics. Purchase orders were used to compile the metrics, but due to the use of a non-visual assessment, the volume generated could only be estimated. Currently there are no reporting requirements on waste reduction within the complex.

Fiscal

The fiscal cost of establishing correctional complex recycling is estimated at \$66,467.26. The cost-benefit analysis performed through this case study was developed with that implementation cost spread out over three years. The purchasing of container infrastructure was tiered with a slow roll-out which dispersed container funding. As

mentioned in Chapter 5, the program was effective through reductions in outside container volume and collection frequency.

The cost to manage the cardboard recycling was higher than initially figured. The required investment for cardboard collection containers at each of the buildings was \$38,508. The cardboard baling, cost of container infrastructure, and labor costs for a correctional officer increased dramatically in FY2013. Each week, one officer worked with 2-4 inmates to collect the cardboard and bale. This process on average was fifteen hours of the officer's time. The labor cost for a correctional officer to manage the inmates fifteen hours a week is an estimate of \$14,040.00 a year¹⁴¹. The figure below presents an overall perspective of cardboard recycling cost during the case study timeline.(Figure 22)

¹⁴¹ Texas Department of Criminal Justice Salary Information. Texas Department of Criminal Justice. Accessed October 1, 2014. <http://www.tdcj.state.tx.us/divisions/hr/coinfo/cosalary.html>

Importance of Study

Examination of Cardboard Baling Cost

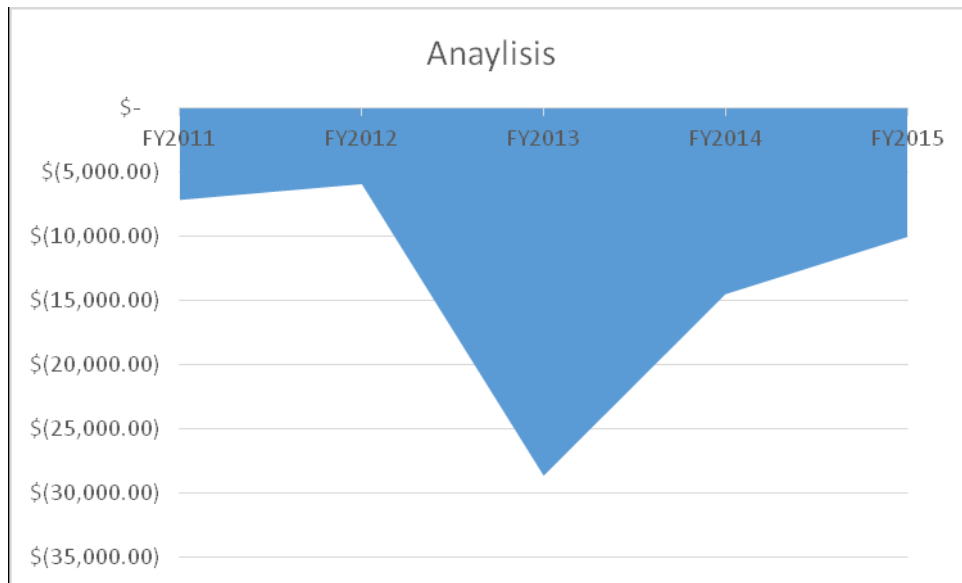


Figure 22. Examination of Cardboard Baling Cost.

This research demonstrated the benefits of waste reduction management in a county correctional complex. While TCCC is required to follow Texas Health and Safety Code 361.425 on a voluntary basis, there continues to be no clearly set goals or mandates for waste reduction. Consequently, waste reduction initiatives are tied not just to the will of locally elected officials and staff but also to fiscal pressures. As local governments address solid waste issues through policy and recommendations, it is important to have more case studies demonstrating the fiscal benefits.

7. CONCLUSION

This research was an examination of Travis County's waste reduction policy and the implementation of single-stream recycling in at the county's correctional complex. It is founded through an examination of the county's policy. Even though the case study demonstrated that the recycling program contributed to waste reduction from the landfill, there is not sufficient support for the program to continue at its current scope. This chapter will include a discussion of a policy template to be interwoven in the operations infrastructure, with recommendations to improve the current waste reduction program

Policy Template

An avenue to create resiliency of a waste reduction program within TCCC is through a sheriff's office internal policy and demonstration of fiscal sustainability. From the literature review and interviews with industry professionals, county project managers, elected officials, an internal comprehensive policy was developed. (Appendix C) The policy was created specifically for the Travis County Sheriff's Office following their format¹⁴² and utilizing the American Corrections Association language for the policy purpose and policy statement. The policy language was written to be aligned with the Zero Waste Inter-local Agreement and Travis County's Waste Management Policy 111.001. For example, Section 1 of the policy outlines the Zero Waste goals of "diverting 75% of waste from landfills and incinerators by 2020"¹⁴³. Due to the market instability for recyclables, all of the waste streams identified in the Travis County Waste Management Policy 111.001 are reiterated in Sections 2, 3, and 4.

¹⁴² Lori Rivers message to author on August 1, 2014.

¹⁴³ 2014. Zero Waste Inter-local Agreement City of Austin and Travis County. Accessed February 20, 2014. <http://www.austintexas.gov/edims/document.cfm?id=202323> P. 1

In t 111.001 there were no consequences connected to a department or office written into internal policy. However, the template policy has connected the captains' performance review to the waste reduction timeline. Eight captains are assigned different facets of the sheriff's department operations.¹⁴⁴ By connecting the captains' performance reviews to the waste reduction timeline, the policy creates top management support and follow-through.

Policy Promulgation Process

Policy on waste reduction in correctional complexes provides the political support for recycling to be interwoven into the waste management operation infrastructure statewide. The policy recommendation developed through this thesis could be applied as a template to TCCC, Capital Council of Government (CAPCOG), and other State Planning Regions/COG in Texas. In order to have a policy approved within TCCC and CAPCOG, a staff person would need to be assigned to the project. The staff person is in charge of drafting policy, follow-up, and consistency. This person would also need to find an elected official as the sponsor to demonstrate support.

The process for policy approval within the sheriff's office follows the chain of command. The lieutenant over the warehouse would be the main contact and monitor. The policy would be reviewed by the direct captain before being sent to the major. Once the major approves the policy, the draft would move up the chain to the chief. Finally the chief would approach the sheriff for approval and signature.

¹⁴⁴ 2012. "Command Staff." Sherriff's Office. Travis County. Accessed 10/18/14. <https://www.tcsheriff.org/departments/command-staff>

The process for CAPCOG to adopt a policy template for waste reduction is more extensive. The suggested template would need to be approved by Travis County Commissioners' Court before approaching CAPCOG. An agenda request and back up documentation would be developed for that approval. Once approved by Commissioners' Court, the assigned staff would submit a letter of request for consideration of the proposal to CAPCOG Executive Director¹⁴⁵. Once approved by the Executive Director, the Solid Waste Advisory Committee (SWAC) and the Executive Committee considers the proposal. If approved, a county representative is invited to present the proposal to CAPCOG. The presentation is for CAPCOG to adopt the template policy into the Regional Solid Waste Management Plan (RSWMP) before the SWAC. If SWAC approves the recommendation through majority vote, the policy recommendation is placed on the Executive Committee's agenda for consideration. With approval from the Executive Committee, the Solid Waste Program submits a proposal to the TCEQ for final review and approval. If TCEQ approves, they will send a letter to CAPCOG who will then update the RSWMP with the template policy.

Recommendations

The following recommendations regarding advancing TCCC correctional complex's waste reduction programs are supported by the information collected through the case study, literature review, and policy evaluation. The two strongest driving factors of the waste reduction system are the people who manage the disposal of items and the disposal contracts. Regarding the first factor, one recommendation to create an

¹⁴⁵ Ken May. Email message to author on October 29, 2014. from Ken May

environment of people who influence and encourage behavior change is to institute a corrections-specific Green Team program. A Green Team has TCCC staff as the members who foster enthusiasm for waste reduction by the employees. Green Team members provide continued interest and ownership in recycling, thereby addressing the limitations of continuity from staff changes with recycling programs.

Education and Partnerships

As stated in Chapter 6, the conservation coordinator did not educate the inmates on the recycling program. This is a weakness in the implementation of recycling at TCCC. The literature reviewed presented data that showed recycling participation was linked to personal values. Education on environmental literacy created specifically for the inmate audience would be a pathway to create a personal value connection. One environmental literacy program, Roots for Success, was used in conjunction with correctional facility horticulture therapy programs throughout the United States.¹⁴⁶ Travis County Sheriff's Office could create partnerships with universities and non-profits for research and inmate education opportunities. Chapter 2 discussed Washington State University's development of a partnership with the Washington Department of Corrections that benefited the university in research support. In turn, the DOC received support in funding and staffing. Education regarding environmental literacy would also

¹⁴⁶ 2013. "Roots of Success Increasing Job Skills and Environmental Literacy in Washington Prisons." Roots of Success. Accessed October 28, 2014. <http://rootsofsuccess.org/2013/09/17/roots-of-success-increasing-job-skills-and-environmental-literacy-in-washington-prisons/>

need to expand to the facility staff, with the warehouse sergeant continuing education of staff through the “Oscar reports”, new employee orientation, and presentations.¹⁴⁷

Consistent Performance Measurement

As mentioned in Chapter 6, there was not a consistent data gathering process for performance measurement. The consistency of data collection is overcome by cross-training program staff. For example, a sergeant would learn the waste reduction processes to cover the warehouse manager. Another recommendation to avoid this issue in the future is to have hierarchical support. Support is garnered through reports to upper management stakeholders. The progress reports baseline data is through bi-annual waste audits.

Potential Cost Saving Measures

The case study discussion in Chapter 5 presented two recommendations on cost saving measures. The facility could consolidate all of the trash to be placed into separate trash and recycling compactors, effectively cutting down on individual container cost. It would also cut back on TCCC paying for waste collection when the container is not full. Since haulers traditionally charge per visit, they have an incentive to empty dumpsters even when they’re only half full. The second recommendation is for food waste generated within the kitchen to be composted by a service provider or donated to a local pig farm.

¹⁴⁷ Mark Jones. Email message with author on October 23, 2013.

Environmentally Preferred Purchasing

In the articles reviewed and case study, there was no discussion of reuse or extended producer responsibility (EPR). This may be a result of the specific focus of the articles reviewed. The TCCC purchasers did not demonstrate knowledge of EPR, an important component of sustainable solid waste management for hard-to-recycle materials that have high costs associated with their disposal. EPR is the shifting of the government management and financial responsibility of a product upstream to the producer and away from the public sector. The literature gap, such as that seen regarding EPR, creates an opportunity for further research into the implementation of sustainable solid waste management techniques within correctional facilities. It would be beneficial for the sheriff's office to provide training to the warehouse buyer and administrative staff on environmental preferred purchasing. This training would also include 'take-back' specifications request for proposals in contracts.

Conclusion

At the end of the case study, TCCC hosted a tour for the City of Austin Resource Recovery Department and Good Will Industries with a focus on the sustainable program. The participants provided positive remarks regarding the recycling program.

“Whenever we were on the tour, I asked various people how they felt about recycling at the complex. Everyone I asked was supportive of the work that they were doing to recycle. Some said at first there was a learning curve, and they had to figure out what materials went where, but once they knew that, it became second nature. Part of the reason, is because they set up an infrastructure that made it just as easy to recycle as it would be to throw the material away. Every

trash can had a recycling bin paired with it. The staff not only recycled, but was eager to tell you about the system and best practices that they had in place.

Another thing that was mentioned was that the top management was very supportive of recycling and this made a significant impact on the rest of the staff following along and recycling as well.”¹⁴⁸

Although issues were identified regarding the implementation of the single-stream recycling program, the above quote is an informal look on the success of this program. As this program moves forward, demands such as pressures for fiscal responsibility, container needs, and continuity of management will not change. The Sheriff’s Offices political influences will continue to be an issue for waste management.

However, sound policy on waste reduction in correctional complexes would provide the continued political support for recycling to be interwoven into the waste management operation infrastructure. As local governments continue to create waste reduction ordinances and goals they need to consider engagement with agencies who manage correctional complexes. These facilities are a resource intensive system with a high population. The fiscal advantages to waste reduction infrastructure and participation are what will withstand political changes. The policy recommendations developed through this thesis would be beneficial as a template which could be applied to the Capital Council of Government (COG), other State Planning Regions/COG or county governments in Texas.

¹⁴⁸ Lauren Savage. Email message to author on October 9, 2014.

APPENDIX SECTION

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APPENDIX A

From: sszabo@txstate.edu
To: geoshaun@outlook.com; sr50599@txstate.edu
CC: drboblarsen@txstate.edu; lasser@txstate.edu
Subject: RE: EXP2014C490381U more information needed
Date: Wed, 4 Jun 2014 13:25:50 +0000

Hello Shaun,

Thank you for the clarification. According to the regulation for a project to be under IRB review it must meet the definition of research and also of human subject research.

For it to be human subject research the subject has to be "a living individual about whom you will obtains: (1) Data through intervention or interaction with the individual, OR (2) Identifiable private information."

It is clear that your project does not involve intervention or interaction with your individuals; also, it does not involve identifiable private information about the individual since it is about monthly waste generated at a site.

Because your project does not meet the human subject research definition it is excluded from IRB review and therefore it does not need to be reviewed at all by the IRB.

I am going to close down your exemption application.

Good luck with you study and please let me know if there is anything else we can assist you with,

Szende Szabo
Compliance Specialist
Research Integrity & Compliance
512.245.2314
sszabo@txstate.edu

APPENDIX B

**RELEASE AND AUTHORIZATION
TO REPRODUCE LIKENESS**

In consideration of the benefit of participating in the project which is the subject of this Release, and for good and valuable consideration, the receipt of which is acknowledged, I hereby expressly grant to _____ and to its employees, agents, and assigns, the right to photograph and use my picture, silhouette and other reproductions of my likeness (as the same may appear in any still camera photograph and/or motion picture film, in the connection with the exhibition, on print or television for promotional, advertising, or publicizing).

Furthermore, I release _____ and its employees and its agents and assigns from any and all claims and causes of action that I presently have or may have in the future relating to my participation in the photograph or motion picture film.

I hereby certify and represent that I have read the above and fully understand the meaning and effect by signing this release form.

Today's date: _____

Signature_____

Witness_____

More information about the waivers or information about reproducing the photos in this document can be obtained by contacting the author

APPENDIX C

TRAVIS COUNTY SHERIFF'S OFFICE POLICIES AND PROCEDURES

Chapter: Sanitation and Hygiene

Policy Number:

Subject: Waste Disposal and Waste Reduction

Number of Pages: 2

References: ACA 3-ALDF 4 D03 NFPA, OSHA, TCEQ/EPA Regulations, Travis County Policy Chapter 111.001, ACA 2011-1, Zero Waste Initiative ILA with City of Austin, [Texas Health and Safety Code \(Section 361.425\)](#)

PURPOSE:

To provide guidelines for all TCSO employees to follow in regards to waste reduction required by federal, state and county policies.

POLICY:

It is the policy of the Sheriff's Office to support short and long term cost-effective facilities and materials management strategies that are resource efficient and environmentally responsible.

PROCEDURE:

- 1) Promote and engage in recycling efforts and agree to the zero waste goals of Travis County by the following timeline;
 - a) Diverting 75% of waste from landfills and incinerators by 2020, based upon periodic audits conducted by Travis County Conservation Coordinator or private auditor; and
 - b) Diverting 90% of waste from landfills and incinerators by 2040, based upon periodic audits conducted by Travis County Conservation Coordinator or private auditor.
- 2) However, each division and program should pursue all reasonable alternatives that the effect of an overall reduction in the waste stream; including
 - a) Construction and Demolition Waste
 - b) Yard and Wood waste
 - c) Scrap Metal Recycling
 - d) Textile Recycling
 - e) Plastics 1-7
 - f) Cardboard
 - g) Glass

- h) Paper
 - i) Toner cartridges
- 3) Promote and engage in composting of appropriate materials;
 - 4) Reduce pollution through the use of nontoxic, non-caustic, non-caustic chemicals, liquids and powders; and
 - a) Universal Waste: paint and mercury containing items
 - a) Battery Recycling
 - b) Light bulb
 - c) Ballast
 - b) Electronics
 - 5) Promote and engage in reuse. Whenever practical, use reusable items instead of single use disposable items.
 - 6) Promote and engage in environmental preferred purchasing. Environmentally preferable purchasing is an effort to purchase products and services with a reduced negative impact on the environment and human health. The cost to properly handle and dispose of a product at the end of its usable life should be considered and planned for when purchasing materials.
 - a) The Sheriff's Office shall expend 45% of its annual commodities purchasing budget for purchasing commodities that have recycled material content or achieve other conservation benefits under the following timetable;
 - a. 15% of commodities budgets in FY 2016
 - b. 20% of commodities budgets in FY 2018
 - c. 30% of commodities budgets in FY 2020
 - d. 45% of commodities budgets in FY 2022
 - b) When appropriate include in contract language for hard to dispose materials have the manufacture "take back" the item at end of use.
 - 7) Sheriff office special events; events sponsored by the Sheriff's office to include the following waste reduction:
 - a) Restrictions on use of Styrofoam, glass, and single-use carryout bags; and
 - b) Recycling by event organizers.
 - 8) Performance reviews of Captains are tied to Sheriff's office achieving zero waste goals by the timeline.
 - 9) Provide appropriate training to staff (and offenders) regarding environmental responsibility and cost-effective, sustainability-oriented practices. For offenders, training may include preparation for future jobs in building retrofit industries or in alternative energy industries such as solar, wind turbine, or geothermal installation,

operation and maintenance. For staff, facilities should seek ways to share information among staff on the importance of energy, water and resource conservation, to aid in the efficient and cost-effective operation of their workplace. Training will include, but is not limited to:

- a) Email
- b) Mass Briefings
- c) 5 minute briefings

10) Provide for organizational strategies that allow time and opportunity for staff to focus on environmental and resource efficiency issues.

Current, Sheriff _____ Effective Date _____

APPENDIX D

Facility Name:	Department:							
Department Address:	Division:							
City, Zip:	Type of Bus:							
Contact Person:	Supervisor:							
Phone Number:	Phone:							
Email Address:	Email:							
# Employees:	Hours:							
Other Information:								
	Aluminium	Batteries	Cardboard	Glass	Paper	Plastic	Metal	Toner
Generate								
Hauler								
Pick-up date								
Recycling?								
Shredding?								
Recycling Issues:								
Container Information								
Container Type	Number		Location(s) Existing					
Office Bin								
SlimJim			Lobby ____ Conference Room ____ Copy Room ____ Break Room ____ Other ____					
55 gallon container			Lobby ____ Conference Room ____ Copy Room ____ Break Room ____ Other ____					
95 gallon cart								
Circular Can			Break Room ____ Other ____					
Iron Mountain Cart								
Container Needs Information								
Container Type	Number		Location(s) Needed					
Office Bin								
SlimJim			Lobby ____ Conference Room ____ Copy Room ____ Break Room ____ Other ____					
55 gallon container			Lobby ____ Conference Room ____ Copy Room ____ Break Room ____ Other ____					
95 gallon cart								
Circular Can			Break Room ____ Other ____					
Iron Mountain Cart								
Action Items								
○								
○								
○								
○								
○								
○								
			Outdoor Containers					
			Recycling			Landfill		

APPENDIX E

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VS 12-17-96
#3

ORDER OF THE TRAVIS COUNTY COMMISSIONERS COURT APPROVING CHAPTER

111

OF THE TRAVIS COUNTY

POLICIES, PROCEDURES, AND REGULATIONS MANUAL

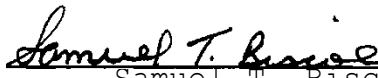
STATE OF TEXAS

COUNTY OF TRAVIS

The Travis County commissioners court hereby orders that
Chapter
111 of the Travis County Policies, Procedures, and
Regulations
Manual is adopted

Ord 17 day of Dec., 1996.


Bill Aleshire, County Judge


Samuel T. Biscoe
Commissioner,
Precinct One

Valarie Bristol
Commissioner, Precinct Three

CHAPTER 111: TRAVIS COUNTY WASTE MANAGEMENT POLICY

111.1 Program Policy Goals

(a) This Policy shall establish a Comprehensive Waste Management Program to implement reduction, recycling, and disposal of waste materials generated by Travis County operations. The primary goals of this Policy are to reduce the costs of materials and waste disposal, reduce the amount of wastes landfilled, reduce use of limited natural resources, prevent environmental pollution, and promote the purchase and use of recycled products. Additional goals include assisting compliance with State and Federal waste management laws and the promotion of cooperative waste management initiatives through organizations such as the Capital Area Planning Council (CAPCO).

(b) County departments shall minimize the amount of waste materials generated by operations through use of appropriate management strategies, feasible technologies and products, and staff procedures. Wastes that are generated by operations shall be reused when possible and permissible by law. Wastes that cannot be reused in operations will be recycled through a qualified contractor. Wastes that cannot be reused or recycled shall then be disposed of at a permitted landfill in accordance with all applicable regulations. The use of hazardous materials shall be reduced and non-hazardous alternatives implemented whenever possible.

(c) Treatment requirements for individual waste streams are outlined in this Policy. New or unidentified waste streams shall be added as necessary. This Program shall be implemented through staff procedures developed in accordance with this Policy and evaluated in accordance with this Policy. Semi-annual reports shall be provided to the Commissioners Court during the fiscal year detailing the ongoing performance and progress of the Program.

111.2 Program Implementation Guidelines

(a) Daily implementation of the Program shall be the responsibility of county departments management and staff ("Operational Staff"), implemented through integrating the most simple, practical procedures possible into existing operations. Specific department and/or program staff ("Oversight Staff") shall be designated responsible to coordinate and assist Operational Staff with implementation. The division of duties and procedures between Oversight and Operational staff shall be developed at the staff level and approved by the Executive Managers and Elected Officials involved as necessary. The primary goal of procedures shall

always be the most effective implementation of the Policy goals and requirements of law.

(b) Operational Staff responsibilities shall include, but are not limited to: daily implementation. Coordinate with designated Program oversight Staff for implementation assistance; Identification of all waste streams generated by operations and implementation of procedures to achieve the requirements of this Policy and the law within 6 months of Policy adoption; Develop and utilize commodity codes specified by the Purchasing Agent for the purchase of recycled material products, hazardous materials (chemicals), and waste recycling/disposal services, for tracking and reporting purposes; and Periodically record amounts of operational wastes generated, recycled, and disposed of, and/or compile the reports provided by waste contractors. Provide this information to designated Program Oversight Staff for reporting purposes.

(c) Oversight Staff responsibilities shall include, but are not limited to:

- (1) Assistance to Operational Staff through information, direction, training, procedures development, contract development, contract management, inspections, audits, etc.;
- (2) Evaluation and recommendations on alternative practices, products, services and equipment proposed for use, in cooperation with the Operational Staff responsible for implementation;
- (3) Review and make recommendations to County Purchasing Agent on contracts, specifications, and purchases involving waste management services and commodities;
- (4) Program performance and progress reports compiled from information supplied by all County departments; and
- (5) Policy and budgeting recommendations.

111.3 Program Feasibility Criteria

Unless otherwise required by federal or state law, the methods, services, or cooperative agreements for the implementation of waste management programs and the acquisition of products, commodities, or materials, which contain recycled materials or result in energy savings, shall meet the following conservation, cost, and operational planning feasibility criteria for use in County operations, unless otherwise required by law:

(1) Conservation Criteria. One or more of the following conservation benefits shall be achieved:

- (A) An increase in the amount of waste recycled/reused;
- (B) A decrease in the amount of raw material resources used;
- (C) A decrease in actual environmental pollution or potential pollution risk; and
- (D) A decrease in the amount of waste landfilled.

(2) Cost Criteria. As a goal, total costs should be equivalent to current practices, however, alternative practices costing up to 10% more than current practices may be justified if they will result in reduced long-term costs within a specified time frame. Alternative practices costing over 10% more than current practices may be approved by the Commissioners Court, if the Court determines that the cost is justified in order to develop the market for the alternative practice. In the planning process, the estimate of total costs must include up-front and long-term costs, including product lifespan, reusability, program operational effects, disposal, legal liability and risk, and any other applicable cost factors. Sources to be considered in the planning process include product and purchasing information, which may be obtained from manufacturers, other governmental entities, and private businesses. Specifically desired services, materials, commodities, and products must be specified in the bidding process.

(3) Operational Criteria. Operational efficiency and staff convenience and safety should be at least equivalent to practices and products currently being used.

111.4 Treatment Goals for waste Streams

(a) The County shall implement the treatment requirements for its individual waste streams as outlined or specified in this Policy. Waste stream treatments are methods which result in any combination of the following results: source reduction, landfilling reduction, operational reuse, contracted recycling, and/or raw materials/resource reduction. The waste streams identified below shall be in substantial compliance with this Policy

under the following timetable, including establishment of baseline measures for each waste stream:

- (1) Facilities/OfficeWastesFY97
- (2) Fleet MaintenanceWastesFY97
- (3) Road/Park MaintenanceWastesFY97
- (4) Other Wastes FY97

(b) Waste streams will continue to be treated to reach an optimum level of effective waste management for each waste stream under the Program Feasibility Criteria.

111.5 Purchasing Goals

(a) The County shall expend the below-specified minimum percentage of its annual commodities purchasing budget for purchasing commodities that have recycled material content or achieve other conservation benefits, under the following timetable:

5 percent of commodities budgets FY97
8 percent of commodities budgetsFY98-
Contractors performing services for the County shall comply with all applicable waste management law. County waste Management Policy requirements not specifically required by law shall be incorporated into services contracts and commodities specifications whenever they meet the Program Feasibility Criteria.

111.6 County Waste Streams

(a) Facilities/Office Maintenance Wastes

(1) Used Paper. Waste paper shall be recycled as much as possible, including white, brown, manila, mixed paper, magazines, corrugated cardboard, etc.

(2) Used Aluminum Cans. Aluminum cans shall be recycled whenever feasible, providing collection bins at the most convenient and appropriate locations.

(3) Used Batteries. Rechargeable and mercury-free batteries shall be used in place of disposable whenever feasible. Collection bins shall be established for contracted used battery disposal, both nickel-cadmium rechargeable batteries and disposable alkaline batteries (40CFR 261.24, 335TAC Subchapter R).

(4) Used Toner Cartridges. Spent toner cartridges shall be recycled and remanufactured toner cartridges purchased.

(5) Used Fluorescent Light Bulbs. A program to recycle used fluorescent light bulbs instead of landfilling them shall be developed.

(6) Waste Chemicals and Pesticides. Chemical and pesticide annual inventories should be purchased in amounts that will be expended in routine annual operations, to minimize need for disposal and extended storage of surplus materials. Travis County will move toward use of Integrated Pest Management (IPM), which employs an array of preventative measures with chemical control as a last resort, to minimize the use of chemicals and pesticides whenever possible and feasible.

(7) Miscellaneous Facilities and Office Wastes. Used or surplus miscellaneous equipment such as machinery, desks, computer hardware, etc., shall be recycled whenever feasible, rather than disposed as landfill waste.

(8) Glass, Plastic, and Styrofoam. Waste glass, plastic, and styrofoam generated in areas such as employee break rooms should be recycled whenever feasible. When contract recycling is unavailable for small amounts of such waste, personal recycling and/or the use of reusable utensils and containers will be encouraged.

(b) Fleet Maintenance Wastes

(1) waste Tires. Tires shall be recycled through a licensed contractor, not landfilled.

(2) Used Motor Oil, Differential Oil ; Used Transmission, Power Steering , Hydraulic, Oil Filters and Brake Fluid. Used oils shall be recycled, and purchasing preference given to motor oils and lubricants that contain at least 25 percent or more recycled oil and meet the Program. Feasibility Criteria Waste oil storage facilities shall be aboveground instead of underground as much as feasible.

(3) Waste Oil Absorbent. Absorbent materials used to soak up spilled oil products must be recycled, reused, bioremediated, or disposed of as a special waste at a landfill.

(4) Used Antifreeze/Coolant. Used antifreeze/coolant shall be recycled and preference given to purchase of recycled or biodegradable antifreeze/coolant that meets the Program Feasibility Criteria.

(5) Used Lead-Acid Batteries. Used lead-acid batteries shall be recycled.

(6) Freon/ CFC Capture & Recycle. Freon air conditioning system maintenance and repair must utilize approved freon recovery equipment by trained and certified mechanics. Scrap AC compressors must have freon emptied and recaptured before disposal as scrap metal.

(7) Wash Bay Wastes. Fleet wash bays must be maintained regularly and wastes generated managed as special waste. Fleet maintenance facilities without access to sewer discharge shall utilize non-discharge, water recycling wash bays, or a treatment system to clean discharges to applicable water standards. Petroleum wastes generated by asphalt emulsion truck cleaning shall be recycled back into road resurfacing operations as allowed by law. Designated areas shall be designed for this clean out operation.

(8) Grease Trap/Stormwater Pond Wastes. Traps or ponds for pollution control that receive stormwater or wash water from fleet maintenance operations and facility sites must be maintained to optimize effectiveness and minimize waste sludge and soil generation, which must be managed as special or hazardous waste.

(10) Parts cleaning solvent Wastes. Auto parts cleaning practices utilized shall minimize non recyclables waste generation and hazardous material generation, provided that the practices meet required Program Feasibility Criteria.

(c) Road/Park Maintenance Wastes

- (1) Used Asphalt, Flex Base, Aggregate. The reuse of reclaimed asphalt, base, and aggregate shall be maximized whenever feasible. A goal will be established to give preference to the use of rubberized asphalt made from scrap tires, provided its use meets the Program Feasibility Criteria.
- (2) Waste Striping/Signage Paint. Paint wastes shall be minimized to the greatest extent possible and managed as hazardous or special waste. Non-hazardous paint shall be utilized in operations as soon as economically feasible or required by law.

- (3) Excess Soil. Excess soil shall not be disposed of at a municipal landfill unless no other alternative exists. Excess, uncontaminated soil generated from operations may be used on County-owned land for landscaping, embankment, fill, erosion control, stockpiling for future use, etc., provided County approved Best Management Practices for erosion control are always utilized. Excess soil may be disposed of on private land only by legal agreement with the landowner.
- (4) Brush and Tree Limbs. Brush and tree limb waste will be mulched, not landfilled. Mulch can be used for erosion control, landscaping, composting, trails, etc.
- (5) waste Pesticides and Chemicals. Chemical and pesticide annual inventories should be purchased in amounts that will be used up in annual road maintenance operations, to minimize need for disposal or extended storage of surplus chemicals. Travis County will move toward integrated pest management to minimize the use of chemicals and pesticides whenever possible and feasible.
- (6) Roadside Litter. Litter and household wastes dumped illegally on county property shall be removed and disposed of properly as resources permit, with every feasible effort made to identify responsible parties and hold them accountable for clean-up costs. Alternative methods to achieve economical roadside litter abatement should be used whenever possible, such as roadside adoption agreements with local residents. Litter crews should separate recyclables such as aluminum and metals if feasible.
- (7) Scrap Metals. Scrap metals shall be recycled, not landfilled.
- (8) Dead Animal Waste. A rendering plant will be used for dead animal disposal when possible. When the condition of the animal precludes all other disposal alternatives, it shall be landfilled. Farm animals by law may be buried on private farm property with the permission of the landowner. Localized composting disposal sites for dead animals may be developed in accordance with State law.

(9) Hazardous Materials-Illegal Dumping and Accidental Spills. Hazardous materials/special wastes abandoned or accidentally spilled on county property constitutes a potential threat to public health and safety and must be contained, removed and properly disposed of as soon as possible. Every feasible effort should be made to identify responsible parties and hold them accountable for clean-up costs. Small petroleum spills may be treated with absorbent and/or petroleum eating bacteria. Spent absorbent and soil shall be removed and/or remediated, if compliance with laws can be maintained. If not, the waste material shall be disposed of at a landfill.

(10) Septic/Sewage Wastes. Septic waste disposal methods which best meet the Program Feasibility Criteria shall be used. In parks not served by sanitary sewer, County will move towards composting toilets as economically feasible. Use of low flow toilets in facilities can reduce wastewater generation as well as water consumption.

(11) Stormwater Pond Wastes. Ponds that receive stormwater for pollution control must be maintained to optimize effectiveness and minimize contaminated soil/sludge generation, which must be managed as special or hazardous waste.

(d) Other Wastes

(1) Cafeteria Wastes. Composting programs for cafeteria food wastes shall be considered and recycling of aluminum, steel, tin cans, glass and plastic if this meets the Program Feasibility Criteria. Grease traps must be maintained regularly and pumped out using a licensed waste contractor.

(2) Medical Wastes. Medical wastes from the County Medical Examiner's Office and the County booking and jail facilities must comply with the regulations laid out in Texas Health & Safety Code 330.1004.

(3) Printing/ Photographic Wastes Chemical inventories for operations such as the Print Shop, Sheriff's Photo Lab, Records Management, or Medical Examiner should be purchased in amounts that will be used up in annual operations, to minimize need for disposal or extended storage of surplus chemicals. Disposing of chemicals into the sanitary sewer is prohibited unless a sewer discharge permit is obtained with the City of Austin's Water and Wastewater Department Industrial Waste Division.

(4) Closed Landfill Leachate. Leachate waste from closed County landfills such as the 290 East Landfill shall be disposed of using methods which best meet the Program Feasibility Criteria.

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