



United States Department of Transportation  
Federal Transit Administration



# FTA EMS Training & Assistance

October 1, 2010 – October 31, 2012

[cota.vt.edu/ems](http://cota.vt.edu/ems)

**esms**INSTITUTE  
environmental & sustainability management system



# Foreword

The report summarizes FTA's environmental management systems (EMS) training and assistance project. This report includes the results of a two-year effort to advance international environmental management standard ISO 14001 in public transit agencies in the United States.

Participation included:

- Federal Transit Administration (FTA);
- Ten local transit agencies; and
- The Center for Organizational and Technological Advancement (COTA) at Virginia Polytechnic Institute and State University (Virginia Tech).

The intent of this program responds to requests from transit industry representatives that FTA establish an EMS training and assistance program similar to FTA's successfully concluded EMS Institutes.

FTA's focus was threefold:

1. To introduce a geographically and size diverse set of public transit entities throughout the US to EMS;
2. To stimulate these agencies into adopting EMS and becoming EMS champions in the universe of public transit agencies; and
3. To develop an EMS training program that would be, to a certain extent, transit specific.



EMS training and assistance participants included FTA grantees from the Mid-West, the East Coast, Southern US and Washington state and California on the West Coast. These agencies ranged from medium-sized traditional bus and para-transit operations to large organizations operating buses and commuter rail. As the FTA project comes to a close, nine participating transit agencies have declared their intent to submit their EMS for ISO 14001 certification.

## Acknowledgements

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FTA, Virginia Tech and the participants would like to thank Jerry Benson of Utah Transit based in Salt Lake City, Utah; Doy Miller of the Maryland Transit Administration in Baltimore, Maryland; Scott Darling and Janis Kearney of the Massachusetts Bay Transportation Authority in Boston, Massachusetts; and Cris Liban of LA Metro in Los Angeles, California, for their generous support of FTA's Round 3 EMS Training and Assistance Institute. All mentioned above are graduates of Round 1 and 2 of FTA's EMS Training and Assistance Institutes. Each generously donated their time, expertise and enthusiasm to the effort to continue proactive EMS education for their fellow transit agencies.

### Federal Transit Administration

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# Foreword

## FTA Participating Transit Agencies

- Capital Metropolitan Transportation Authority, Austin, TX
- Champaign-Urbana Mass Transit District (CUMTD), Urbana, IL
- Foothill Transit, West Covina, CA
- Intercity Transit, Olympia, WA
- King County Metro Transit, Seattle, WA
- Long Beach Transit, Long Beach, CA
- Metropolitan Atlanta Rapid Transit Authority (MARTA), Atlanta, GA
- Port Authority of Allegheny County (PAAC), Pittsburgh, PA
- San Joaquin Regional Transit District, Stockton, CA
- Southeastern Pennsylvania Transportation Authority (SEPTA) Philadelphia, PA

## Prepared by:

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# Executive Summary

In 2010, the Federal Transit Administration (FTA) placed a notice in the Federal Register inviting transit agencies throughout the United States to apply for the FTA sponsored training and assistance for implementing an ISO 14001 based EMS. FTA's initiative of EMS training for public transit agencies supported Executive Order 13148 Greening the Government initiative and Executive Order 13274 Environmental Stewardship and Transportation Infrastructure Project Reviews, which directed federal agencies to promote environmental stewardship in the nation's transportation system while streamlining the environmental review and development of proposed transportation projects.

An Environmental Management System (EMS) is a set of processes and practices which enables an organization to reduce its environmental impacts and increase its operating efficiency. Organizations with an EMS report being able to more effectively manage their environmental obligations. Additionally, organizations report an enhanced ability to analyze, control and reduce environmental impacts, and to operate with greater efficiency and control.

FTA believes that an EMS is a valuable tool and desired to continue its ongoing effort to introduce the doctrine of environmental management systems within the public transit sector. The ISO 14001 Standards served as the foundation of EMS training. FTA left the option of ISO 14001 certification to the discretion of the individual agencies.

## How Were Teams Selected?

After receiving applications and completing interviews, FTA selected ten applicant agencies to participate in the training. FTA used a number of criteria to select participants, including:

- Organizational commitment by transit agency leadership to EMS implementation;
- Geographical diversity;
- Previous environmental experiences; and
- Environmental challenges from operations and/or pending capital projects.

FTA believed that organizational commitment to environmental protection and sustainability were the most important elements of the program and additionally, that senior management buy-in was crucial to successful EMS implementation.

It was important to the Federal Transit Administration that participating agencies attempt to demonstrate quantitative costs and benefits of the EMS implementation. FTA required teams to track:

- Internal and external costs such as staff dedicated to EMS training and implementation;
- Costs of potential consulting assistance and outside training of personnel; and
- Quantitative benefits achieved by measuring environmental objectives and targets.

## FTA Assistance

FTA contracted with The Center for Organizational and Technological Advancement (COTA) at Virginia Polytechnic Institute and State University (Virginia Tech) to provide training and assistance under a cooperative agreement.

COTA developed a Letter of Agreement with each participating transit agency that outlined the roles and responsibilities of all the parties (FTA, Virginia Tech and the transit agency). The Letter of Agreement was acknowledged by the parties as a condition of participation, prior to any work being performed.

COTA provided assistance in the form of:

1. Baseline Environmental Reviews at each agency;
2. Four 3-day workshops spaced approximately 3 months apart;

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3. Web based EMS library with Word documents that included both templates and completed documents of previously certified ISO 14001 transit agencies
4. Transit agency guest instructors at each workshop who had successfully implemented ISO 14001 based EMS;
5. Quarterly WebEx/team conference calls between workshops;
6. Senior Management Conference Calls prior to Workshops 2, 3 and 4;
7. EMS gap audit by qualified ISO 14001 Lead Auditor at each agency's home location; and
8. One concluding formal EMS audit at each agency's home location.

## Benefits to Transit Agencies in Adopting an EMS

Benefits of implementing an EMS were reported by each participant transit agency and are documented in individual case studies immediately after this section.

Environmental benefits include:

- Reduction in the number, type and severity of compliance incidents;
- Improved relationships with state and federal regulators;
- Pollution and waste quantify reductions;
- Recovered resources;
- Reduction of air emissions; and
- Reduction of amount of oil in waste water.

Business benefits reported by transit agencies include:

- Enhanced public image with system users and the general public;
- Reduced regulatory oversight;
- Improved employee awareness and efficiency of potential environmental impacts of work activities;
- Improved communications and cooperation through training and outreach;
- Increased management awareness of environmental issues;
- Reinforcement of environmental processes currently in place;
- Proactive management systems for environmental issues;
- Captures employee knowledge (“institutional memory”) prior to retirements;
- Documentation of standard operating procedures;
- Institutionalization of best practices in and permanent improvements of on-time performance; and
- Increased fuel economy.

## Cost Savings

Cost savings and avoidances are identified in each agency case study found immediately after this section.

## Federal Transit Administration Effort

**Baseline Environmental Reviews:** COTA, a US EPA Public Entity EMS Local Resource (PEER) Center ([www.peercenter.net](http://www.peercenter.net)) began its effort in October 2010 with a one day visit to each participating agency to meet with executive management and the initial core EMS team. The site visit included a presentation of FTA expectations, briefing of workshop(s) curriculum and an environmental audit of the agency's fenceline facility. Fencelines chosen by participants typically included a bus or rail maintenance facility. During the baseline environmental review, Virginia Tech took note of:

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- ✓ Physical improvements;
- ✓ Site storm water runoff;
- ✓ Hazardous waste disposition;
- ✓ Water and energy usage;
- ✓ Recycling efforts;
- ✓ Waste management;
- ✓ Fuel storage; and
- ✓ Environmental permitting.

A summary report of the environmental findings was prepared (and mailed to each agency) by Virginia Tech within two weeks of the Baseline site visit. The Baseline Environmental Review became a part of the curriculum for each agency as background material for Workshop #1.

**EMS Training Workshops:** Four 3-day workshops were held over a 10 month period at Virginia Tech's training facility in Roanoke, Virginia.

Workshop # 1: February 2011

Workshop # 2: May 2011

Workshop # 3: August 2011

Workshop # 4: November 2011

Ten transit teams, carefully chosen by FTA from their pool of applicants, came to Roanoke for each of the four workshops. Approximately one-fourth of the 17 elements of ISO 14001 were presented at each workshop. The instructional concept for the 4-workshop series was to introduce the ISO 14001 Standard; provide transit specific case studies and examples to practice implementation; and then to release the teams back to their locality for a 3 month implementation period of what they just learned.

The ISO 14001 implementation strategy included selecting individualized environmental objectives and targets based upon agency need and rigorous homework requirements. Each team had access to a web based EMS library. The EMS library included a comprehensive set of worksheets, procedures and operational controls for implementing an ISO 14001 EMS. The web based EMS library included detailed sample EMS procedures for every section of ISO 14001 which were easily modified to meet specific user needs. Additionally, the electronic library contained Best Management Practices from transit agencies participating in the first and second FTA EMS Institutes.

Onsite training in Roanoke, Virginia was supported by regular WebEx based conference calls with EMS teams, Virginia Tech and the FTA project manager. Conference calls helped to identify problems teams might be having implementing workshop homework. Virginia Tech was also available to transit participants by phone or email during the duration between workshops. As a condition of participation, all teams were required to hold regular agency EMS meetings, maintain good meeting minutes and regularly brief senior management on the progress of their EMS. Teams completed Workshop 1 homework prior to returning to Workshop 2. A comprehensive review of the homework was led by one of the EMS lead instructors with each participating team prior to the commencement of the next workshop. This pattern was adhered to throughout each of the four workshops.

The FTA project manager held quarterly conference calls with agency senior management representative in an effort to maintain a high level of management support for the implementation efforts and to address intra-agency roadblocks. As the project went forward, these calls were critical in sustaining the momentum of the EMS core teams.

**Post Workshop Activities:** Final homework assignments were to be completed by the end of January, 2012. COTA then scheduled a one-day site visit to each agency to conduct an ISO14001 Gap Audit. Approximately three to four months later, COTA returned to each agency to conduct a formal two-day ISO14001 EMS Final Audit. This enabled a certified ISO 14001

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auditor to verify and document systematically the degree to which each transit agency has an EMS in place in conformance with the audit criteria set out in ISO 14010, Guidelines for Environmental Auditing - General Principles of Environmental Auditing and ISO 14011, Guidelines for environmental auditing - Audit procedures - Auditing of environmental management systems. Final scoring from the COTA EMS Audit for each agency is provided at the end of each case study.

The ten transit agencies produced an initial draft EMS case study documenting the organization's efforts related to their obligations. Case studies include:

- Narrative outlining their participation in the program;
- Costs and benefits of EMS implementation;
- Documentation on hours spent implementing the EMS;
- Statement of benefits of adopting an EMS;
- Cost savings and cost avoidances; and
- Next steps for the EMS in the agency.

## What is an EMS?

An Environmental Management System (EMS) is a set of processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency. Organizations with an EMS report being able to more effectively manage their environmental obligations. Additionally, organizations report enhanced ability to analyze, control and reduce environmental impacts, and to operate with greater efficiency and control.

Additional benefits include cost savings over time, reduced insurance premiums, and better community relations. An EMS integrates the environmental ethic into business operations and environmental stewardship becomes part of the daily organizational responsibility.

An EMS is appropriate for organizations of varying size in public and private sectors. From start to finish, a two-year timeframe is suggested for the EMS implementation process. FTA realized that agencies could not dedicate their EMS teams full time to the implementation of the management system. However, the process can be shortened or extended based upon the organizational culture and needs.

FTA transit participants utilized the 17 elements of ISO 14001 (2004) International Standard. Working definitions of the 17 elements are as follows:

1. **Environmental policy:** Statement by the organization of its intentions and principles in relation to its overall environmental performance. The Environmental Policy is the driver for implementing and improving the organization's environmental management system so that it can maintain and potentially improve its environmental performance.
2. **Environmental aspects:** Elements of an organization's activities, products and services that can interact with the environment. Consideration should be given to normal and abnormal operations within the organization and to potential emergency conditions.
3. **Legal and other requirements:** Element is heavily focused on all regulatory obligations legislated by local, state and federal environmental enforcement agencies as well as other requirements that subscribe to industry codes of practice and agreements with public authorities.
4. **Objectives, targets and programs:** Element requires that once the agency's aspects have been deemed significant, to consider setting objectives and targets that are measurable and in concert with the Environmental Policy, applicable legal requirements and the principle of continual improvement.
5. **Resources, roles, responsibility and authority:** Element requires organization to define, document and communicate roles, responsibility and authorities to implement the EMS. Roles refer to appointing a specific management representative(s) who has responsibility for ensuring the ongoing implementation of the EMS as well as reporting the performance of the EMS to top management.

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6. **Competence, training and awareness:** Element requires the organizations identification of training needs and requires that all personnel who work for, or on behalf of the organization, who may impact the environment in regards to their environmental duties and activities, receive specific and appropriate training.
7. **Communication:** Element requires organization to insure that procedures be established and maintained that assure good internal communication between the various levels and functions of the organization as well as receiving, documenting and responding to relevant communications from external interested parties.
8. **Documentation:** Element requires the agency to establish and maintain information in paper or electronic format to describe the management system.
9. **Control of documents:** Organization is required to establish and maintain procedures for controlling all documents and assure that documents can be located, periodically reviewed, revised and approved by authorized personnel.
10. **Operational control:** Element requires the establishment and maintenance of documented procedures to cover operations where the absence of procedures could lead to deviations from the environmental policy and the objectives and targets.
11. **Emergency preparedness and response:** Element requires the establishment and maintenance of procedures to identify potential for and response to accidents and emergency situations and periodically test the procedures where practicable.
12. **Monitoring and measurement:** The organization establishes and maintains documented procedures to monitor and measure the key characteristics of its operations and activities that have a significant impact on the environment. The organization commits to monitor the calibration and maintenance of its equipment and ensures procedures are in place that requires periodic evaluation of compliance with environmental legislation.
13. **Evaluation of compliance:** Consistent with its commitment to compliance, the organization shall establish, implement and maintain a procedure for periodically evaluating compliance with all legal requirements.
14. **Nonconformity, corrective action and preventive action:** The organization establishes and maintains procedures for defining responsibility and authority for handling and investigating nonconformance and taking action to mitigate any impacts caused. Additionally, the element requires a further review to identify preventive actions to eliminate nonconformances.
15. **Control of records:** The organization is required to develop procedures that will establish and maintain the identification, maintenance and disposition of environmental records, training records, and the results of audits and reviews.
16. **Internal audit:** The internal EMS audit evaluates the adequacy of documents, procedures, programs, and records and reviews the implementation, integration, and consistency of procedures and programs. It looks at the organization's planned activities for meeting its objectives and targets, its control of significant aspects, and pollution prevention accomplishments. Internal audit looks for evidence of management's commitment to the environmental policy and the EMS, and awareness and competency among employees. Finally the audit has a look at how the organization is fulfilling its commitment to continual improvement. Results of internal audits are part of, not a substitute for the management review process.
17. **Management review:** The EMS core team ensures the management review addresses the possible need for changes to policies, objectives and other element of the EMS, in light of EMS audit results, changing circumstances and the commitment to continual improvement. Senior management must be informed on the progress of objectives and targets as well as results of internal EMS audits. Senior management will then review the recommendations from the EMS Team for suitability, adequacy and effectiveness. The frequency of Management Review is recommended quarterly during the first two years of the EMS implementation to keep Senior Management informed and engaged with the process of setting and tracking progress on the Objectives, Targets and Programs and monitoring the results of Audits.



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## Four Phases of EMS

A four-phased implementation process (four workshop series) was utilized and ultimately provided a successful model for manageable implementation of the EMS elements/requirements. Most EMSs are built on the “Plan, Do, Check, Act” model. This model leads to continual improvement based upon:

### PLAN

Planning, including identifying environmental aspects and establishing goals

### DO

Implementing, including training and operational controls framework

### CHECK

Checking, including monitoring and corrective action

### ACT

Reviewing, including progress reviews and acting to make needed changes.



## Keys to Successful Implementation

**EMS Core Team:** FTA required each team to be organized around a minimum of five persons. A number of agencies created sub-teams made of six to eight individuals. Having sufficient manpower to learn the ISO elements, and to implement the elements after each workshop was critical to the success of the EMS.

Virginia Tech identified a skill set for an “**Ideal EMS Team**” and guided the FTA teams to create their teams based on:

**Senior Management Representative:** This person should be a member of the executive team with the authority to ensure the core team has access to the resources and support of the organization. The Senior Management Representative attends the workshops to learn the management system but is not likely to invest the time between workshops related to the core EMS team.

**Top Management Representative:** This person is a top management representative within the organization and has the authority and responsibility to ensure that the EMS is fully implemented through the FTA Institute. This team member will participate in homework review as well as the four Virginia Tech workshops.

**Environmental Champion:** This person should be:

- An excellent communicator;
- A respected leader;
- Experienced at delegation;
- Experienced at implementing change; and
- Capable of transferring information learned and developed at the workshops back to the facility/department.

**Operations Manager, Superintendent or Supervisor:** This person should have the following characteristics:

- Possess strong communication skills;
- Effective at delegation;
- Strong knowledge of all facility/department operations;
- Respected by the organization;
- Exhibit leadership characteristics; and
- Possess the management authority to implement changes as necessary.

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**Administrative Assistant:** This person is critical to the success of the core team and must possess the following skill set:

- Excellent computer skills;
- Highly organized and project oriented;
- Diligent in tracking assignments, organizing meetings, creating records and building the infrastructure for the EMS;
- Effective communication skills;
- Ability to work with top management; and
- Ability to keep the core team on schedule and on task.

**Senior Management Support:** The interest and support of senior management proved critical to the success of EMS implementation. FTA required a formal commitment by senior management to conduct a quarterly management review of the team's homework prior to returning to workshops 2-4.

More importantly, FTA required the transit agency senior management representatives to participate in an FTA conference call one week prior to workshops 2-4. Two categories of critical questions were asked in the FTA conference calls to ensure quality:

1. Are you satisfied with the quality of instruction provided by Virginia Tech? Do you have any concerns or requests for changes?
2. Is your team completing their assigned homework? Are you discussing barriers to EMS implementation? Are you coaching your core EMS team how to overcome barriers or if necessary, intervening on their behalf?

**Objectives and Targets:** FTA urged teams to select measurable objectives and to chart their progress based on valid baseline data. Relevant Objectives and Targets are critical to long term success of the EMS. Senior Management will discuss and approve Objectives and Targets at an early stage, and the team will track the progress of the steps necessary to achieve the objectives through quarterly management review sessions.

**EMS Audits:** Along with the above, Virginia Tech's auditing the progress of the EMS was without question indispensable in ensuring ongoing progress of the EMS. The result of the audit drives the continual improvement effort that is the centerpiece of EMS. This institute offers a gap audit approximately 3 months after Workshop # 4 and then a formal ISO 14001 EMS audit approximately 3 months after the gap audit. Both audits are conducted at the transit facility home location.

**Management Review:** Regular participation by Senior Management in the development and progress of the EMS is vital to its success. FTA required this effort as a condition of participation. FTA believes that senior management participation in management review was a crucial factor in the success of the participating agencies.

**FTA eSMS INSTITUTE**  
cota.vt.edu/ems



**Capital Metropolitan Transportation Authority**  
**Austin, Texas**  
**Case Study**  
**September 28, 2012**

## PROFILE

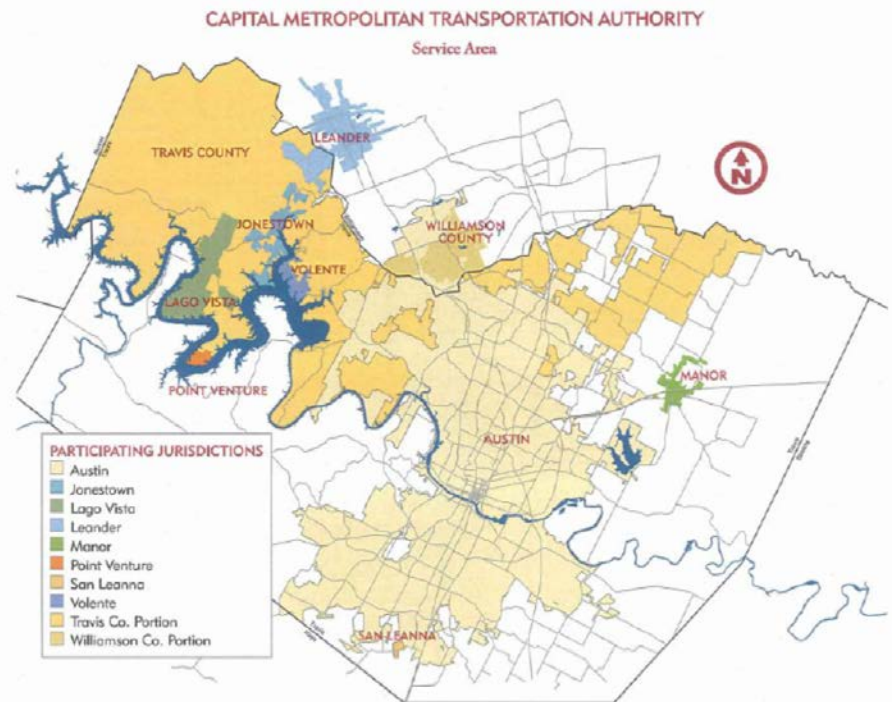
**Capital Metro** is the leading public transportation provider in the Central Texas region. The transit authority was established in 1985 by voters in Austin and the surrounding area. Today, the service area extends across more than 500 square miles and includes nearly one million residents in Austin, Leander, Manor, Jonestown, Lago Vista, Point Venture, Volente, San Leanna, portions of Travis County Precinct 2 and Anderson Mill in Williamson County.

Today, Capital Metro provides Local, Flyer, Express bus and UT shuttle service on flexible, convenient schedules at approximately 2,700 bus stops. Capital Metro also provides MetroAccess service for passengers with disabilities, van and carpool coordination, and freight rail service. In March 2010, Capital Metro began providing weekday commuter rail service on 32-miles of existing track between Leander and downtown Austin.



Capital Metro is led by an eight-member board of directors, appointed by various governing entities within the service area. Capital Metro's president/CEO is responsible for the day-to-day operation of the agency and reports to the Board. Capital Metro employs approximately 1,500 people, including contractors.

Capital Metro's operating budget for FY2012 is \$172.9 million. The majority of Capital Metro's revenue comes from a one percent sales tax from communities within the service area.





#### FAST FACTS:

- Service Area: 522.4 miles
- Population Served: 937,332
- Services: MetroBus, MetroExpress, University of Texas Shuttles, MetroRail, RideShare, MetroAccess and freight rail
- Routes: 82
- Bus Stops: 2,700
- Buses: 413 (3 diesel-electric hybrid buses, 1 hydrogen)
- Trains: 6 diesel-electric vehicles
- Paratransit: 117 vehicles
- Vanpools: 130
- Carpools (Toyota Prius): 14
- Park & Rides: 15
- Transit Centers: 10
- Rail Stations: 9
- Weekday boardings (FY2011): 108,700
- Annual boardings (FY2011): 32.4 millio

## Fenceline

Capital Metro's headquarters is located at 2910 East Fifth Street in Austin, Texas. Completed in 1986, the headquarters facility is 4.9 acres and includes a 43,000 square foot administrative building and maintenance facilities comprising of 105,000 square feet. The maintenance facility includes a garage, bus wash, bus yard, waste water storage pond, and 10 underground storage tanks ranging in size from 6,000 to 120,000 gallons.

The majority of Capital Metro's fleet is housed at its headquarters. Approximately 280 revenue vehicles and 93 non-revenue support vehicles operate from this location.



Capital Metro headquarters facility

## Core Team



The Capital Metro Core Team is referred to as the Environmental Sustainability Management System (ESMS) Team and is comprised of personnel representing various departments within the agency that also have a strong interest or responsibility in reducing Capital Metro's use of resources and its impact on the environment.

The Core ESMS Team consists of:

- Felix "Chico" Cantu, Master Mechanic
- Jennifer Golech, Transportation Planner
- Perry Dillard, Quality Assurance Coordinator for Building Maintenance
- Todd Hemingson, VP of Strategic Planning and Development
- James Hoskins, Manager of Safety
- Misty Whited, Communications Specialist
- Catherine Peterson, Executive Assistant
- Gerardo Castillo, Chief of Staff (not pictured)

## Key Drivers For Adopting an ESMS

Austin and the Capital Metro Service Area are situated on the edge of the Hill Country in Central Texas. The location offers unique, beautiful landscapes and ecosystems. Barton Springs pool, Lake Austin, Wild Basin Wilderness Preserve and miles of cherished hike and bike trails are just some of the local treasures that citizens value. Realizing that our natural resources are limited, Capital Metro considers environmental protection, conservation and efficient use of natural resources to be consistent with our vision, mission, goals and values and an important consideration in all of our activities.

Additionally, the Austin area has been on the cusp of non-attainment designation by the Environmental Protection Agency (EPA) for the last several years. Capital Metro supports efforts by the City of Austin, the Clean Air Force of Central Texas and other organizations to reduce ozone levels and improve our air quality.

Preserving the quality of life in Central Texas is a key driving force behind Capital Metro's efforts to improve its environmental stewardship. Developing an ESMS Program is assisting Capital Metro in integrating environmental considerations into everyday business operations and the processes outlined in the ISO 14001 standard also provides Capital Metro an improved framework for identifying and correcting issues before they become problems.

An ESMS structure will improve Capital Metro's ability to train and communicate the goals and expectations to all employees. As a result of this effort, the agency has identified several key drivers for adopting an ESMS which includes the following:

- Development of better day-to-day management systems
- Creation of a more efficient operational system
- Implementation of cost-saving measures
- Avoidance of environmental violations and disasters
- Enhanced awareness of employee impact on the environment

## Significant Aspects and Impacts

The ESMS team analyzed Capital Metro's activities within the fenceline and identified all possible environmental aspects. Ninety-nine aspects were identified. Those aspects were then evaluated based on ISO 14001 and EMS's established criteria, considering each aspect's potential for adverse environmental impacts, the extent of those potential impacts, the degree to which there were existing environmental controls in place and the ability of the authority to manage and/or influence those impacts. The ESMS team completed this evaluation by rating each of these aspects in a scoring matrix using the aforementioned criteria. The aspects with the highest score, indicating they were the least controlled, were then identified as the significant aspects of the ESMS program. Significant aspects are as follows:

- Battery control
- Labeling
- Painting activities
- Fuel delivery process
- Fuel spills
- Chemical spraying

## Objectives and Targets

ASPECT	OBJECTIVES	TARGETS
<b>Water Usage</b>	To reduce water usage within the fenceline, specifically focusing on the bus wash.	<p>Conduct a complete assessment of the bus washing practices and needs and reduce water use by 20% by 6/1/2012.</p> <ul style="list-style-type: none"> <li>• Determine bus wash water usage and overall facility water usage</li> <li>• Assess staffing needs related to bus wash usage</li> <li>• Conduct Texas Peer Review bus wash policies and procedures.</li> <li>• Create a report which includes wash use levels, peer review information, staffing implications and recommendations.</li> <li>• Work with maintenance management to revise bus wash procedures or new bus washing procurement.</li> <li>• Implementation of new procedures by 4/1/2012.</li> </ul>
<b>Carbon Emissions</b>	To reduce unnecessary vehicle idling within the fenceline to reduce emissions and fuel costs.	<p>To reduce fuel use as compared to in service miles operated by 2 percent by 9/1/2013.</p> <ul style="list-style-type: none"> <li>• Establish baseline amount of fuel use per service miles operated and set specific goals for improvement.</li> <li>• Review current anti-idling policy, including non-compliance procedure and recommend changes in those areas.</li> <li>• Amend policy through policy review process.</li> <li>• Develop educational and awareness campaign.</li> <li>• Implement new policy by 9/1/2012.</li> </ul>

## Benefits of Adopting an ESMS

Capital Metro recognizes several benefits in adopting an ESMS that will have a positive impact for the agency and the Austin area. The positive impacts include but are not limited to the following:

- Reduced environmental impact
- Financial savings
- Ensures the agency meets all local, state and federal regulations
- Increased value to the community
- Positive public perception
- Increased employee support of environmental stewardship
- Streamlines processes with all contractors
- Auditing component ensures compliance and continual improvement



## Resources

Capital Metro estimates it has devoted the following staff time to undergo the training (including travel cost/time) and develop the ESMS from February 2010 to July 2012.

GROUP	ESTIMATED HOURS
ESMS Core Team	1,426 hours
Other staff	200 hours
<b>Total</b>	<b>1,626</b>

## Cost Savings and Avoidance

Capital Metro has already begun realizing significant cost savings and environmental benefits as a result of our ESMS program. By changing bus washing and idling policies and installing a new bus wash and retrofitting the lighting in our fenceline maintenance facility within the framework of the ESMS, we estimate that this year alone we are saving \$326,000. This poster, which we proudly display on our intranet page and throughout the fenceline, shows savings resulted from each individual action.

**GOING GREEN EVERY MILE EVERY DAY**

*We all have a responsibility to make good choices for our family, our community and future generations. Realizing that our natural resources are limited, Capital Metro is implementing an Environmental & Sustainability Management System to help reduce our environmental impacts and operate more efficiently. With an ESMS, Capital Metro will:*

- Establish environmental objectives and targets that are measurable, meaningful and understandable
- Consider the efficient use of energy and materials that minimize environmental impacts while ensuring fiscal responsibility
- Implement reduction, recycling, and reuse practices
- Handle and dispose of waste safely and responsibly
- Continually improve management policies, programs and performance, based on results of ongoing reviews

*For more information, including the Environmental Policy, visit the ESMS section of the Capital Metro Intranet.*

THIS YEAR ALONE OUR **ESMS PROGRAM** WILL HELP SAVE CAPITAL METRO REAL MONEY, TO THE TUNE OF ABOUT **\$326,000**

SMALL CHANGES TO **BUS IDLING POLICIES** SAVED **\$117,000**

THESE CHANGES ALSO SAVED APPROXIMATELY **29,250 gallons** OF **DIESEL FUEL**, WHICH RESULTS IN AN ANNUAL **CO2 REDUCTION** OF **652,275 lbs**

WHEN A **NEW BUS WASH** WAS INSTALLED & **WASH POLICIES WERE CHANGED**, IT RESULTED IN NEARLY **\$146,000** IN FINANCIAL SAVINGS & BELIEVE IT OR NOT, AN ANNUAL SAVINGS OF **3,016,000** GALLONS OF WATER.

THIS YEAR'S MAINTENANCE **LIGHTING REPLACEMENT** PROJECT SAVED **\$63,000**

**METRO**

## Next Steps

Capital Metro is in the process of making some very big changes to our labor structure, contractors and workforce. As of August 19, 2012, the contractor that operates the majority of our service and much of its support staff will switch over to a new contractor, operating from our fenceline. Along with these changes, we will be making decisions about the future direction that our ESMS program will take and assigning new roles and responsibilities. While we have given much thought to this transition during the past year and a half while designing our ESMS program, much of the implementation is just beginning. Additionally, we plan to hire a full-time Environmental and/or Sustainability Officer in the near future, with the money



## Next Steps

allocated for this position coming as a direct result from the savings garnered by applying the ESMS.

Regarding our significant aspects, Capital Metro will continue to build on the ESMS program to accommodate all significant aspects and continue reviewing all aspects indentified within the fenceline for operational and environmental improvements. Additionally, regarding our Objectives and Targets, we think by aggressively addressing excessive idling we can see major further reductions which could potentially result in a cumulative 3-year cost savings of approximately \$500,000.

We are also at the beginning of a major bus replacement process that is really helping us to do our part for a cleaner planet and community. In total we will retire 54 old vehicles and replace them with new buses that conform to EPA 2010 clean diesel standards and have a significant reduction in NOx. This type of reduction is very important in Austin because we're always sitting just at the cusp of air quality non-attainment. Using new technology, these buses are 10 times cleaner than buses from just a few years ago and 20 times cleaner than the oldest buses in our fleet. Even with all the additional technology, the fuel efficiency of the buses is just about the same.

## Management Commitment

Capital Metro's executive leadership team is committed to development and successful implementation of the ESMS program.

*"As a steward of public funds and trust, Capital Metro has a responsibility to improve its sustainability, both financially and environmentally. Over the past decade, the agency has taken steps to reduce its impact on the environment; however, I want Capital Metro to "raise the bar" and become a leader among other Texas transit agencies when it comes to environmental sustainability. The ESMS Program is not only a good business practice; it's the right thing to do for our agency and our community."*

– Linda S. Watson, President and CEO



**For more information about Capital Metro's ESMS Program, please contact:**

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Detailed scoring on next page

## Final Audit

This section compares the percentage of requirements met, partially met and not met with respect to meeting the requirements of an EMS as specified in the ISO 14001:2004 standard. The following scores are the result of the EMS audit presented in this report:

Percent meeting all requirements <b>“Overall Score”</b>	86%
Percent of requirements <b>“Met”</b>	78%
Percent of requirements <b>“Partially Met”</b>	15%
Percent of requirements <b>“Not Met”</b>	7%

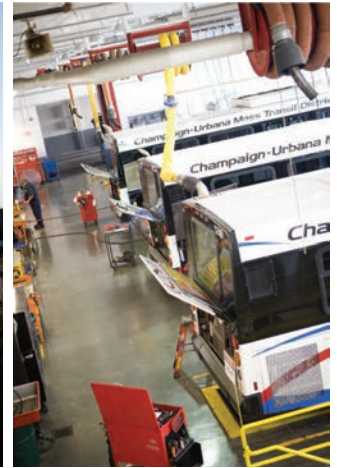
THE ISO 14001:2004 STANDARD ELEMENTS OF AN EMS		OVERALL SCORE (%)	MET (%)	PARTIALLY MET (%)	NOT MET (%)
4.1	General Requirements	83	67	33	0
4.2	Environmental Policy Requirements	80	70	20	10
4.3.1	Environmental Aspects Requirements	100	100	0	0
4.3.2	Legal and Other Requirements	100	100	0	0
4.3.3	Objectives, Targets and Programs Requirements	100	100	0	0
4.4.1	Resources, Roles, Responsibility and Authority	40	20	40	40
4.4.2	Competence, Training and Awareness	29	29	0	71
4.4.3	Communication	100	100	0	0
4.4.4	EMS Documentation	100	100	0	0
4.4.5	Control of Documents	83	67	33	0
4.4.6	Operational Control	63	25	75	0
4.4.7	Emergency Preparedness and Response	100	100	0	0
4.5.1	Monitoring and Measurement	100	100	0	0
4.5.2	Evaluation of Compliance	100	100	0	0
4.5.3	Nonconformity, Corrective Action and Preventive Action	100	100	0	0
4.5.4	Control of Records	100	100	0	0
4.5.5	Internal Audits	83	67	33	0
4.6	Management Review	83	67	33	0



**Champaign-Urbana Mass Transit District  
Urbana, Illinois  
Case Study  
September 28, 2012**

# Champaign-Urbana Mass Transit District

## Urbana, Illinois



## Profile

The Champaign-Urbana Mass Transit District (CUMTD) provides public transportation bus service to the communities of Champaign, Urbana, the Village of Savoy, and the University of Illinois.

MTD's system includes:

- **Fixed Route Bus Service** – 102 clean burning buses, 45 of which are diesel-electric hybrids, serve 20 weekday routes.
- **Paratransit Service** – 10 ADA vans and contract services complete over 60,000 trips annually (2012).
- **Direct Service** – Demand response van service that operates in areas not served by fixed routes providing connections from outlying areas of the community to fixed route service.
- **SafeRides** – Demand response van service operating on the University of Illinois campus, giving students and faculty the freedom to travel safely alone or in small groups late at night.
- **Illinois Terminal** – Multimodal facility that houses MTD buses, regional charter buses, taxis, Amtrak station, rented office space, a banquet and meeting facility, as well as bike parking and lockers.

CUMTD is governed by a Board of Trustees made up of seven members selected by the Champaign County Board from submitted applications. In 2012, the District employed 199 full-time and 130 part-time employees. The FY2012 budget for operating expenses was \$35.2 million.

CUMTD was formed in 1971, replacing the previous privately-owned transit provider. The District provides service to a combined population of approximately 130,000 residents with an additional 42,600 University of Illinois students present during the school year. During FY2012, CUMTD recorded a ridership of over 11.1 million.

CUMTD owns and operates four facilities: two Maintenance garages, an Administration and Operations building, and Illinois Terminal. The District also maintains and updates a network of 89 bus shelters, each with custom signage to provide passengers with detailed and tailored-to-the-stop schedule data.

## Fenceline



CUMTD's fenceline consists of the two Maintenance facilities located at 801 and 803 E. University Ave., Urbana, IL 61802. These facilities sit on a four-acre site and service all of the District's 102 buses, as well as Paratransit and Direct Service vehicles.

The fenceline includes a fueling station, bus wash, body shop, light and heavy maintenance bays - that handle everything from oil changes to engine overhauls, a machine shop, tire shop, parts storage, bus overflow storage, and rented office space.

## Core Team

CUMTD's Core Team is made up of seven members representing various departments. The team includes the following members (listed from left to right):



- **Dave Moore**, Maintenance Director
- **Karl Gnadt**, Director of Market Development
- **Cynthia Hoyle**, Transportation Planning Consultant
- **Amy Snyder**, Communications Specialist
- **Adam Shanks**, Director of Illinois Terminal
- **Jane Sullivan**, Sustainability & Transportation Planner
- **Drew Bargmann**, Transportation Planner

## Key Drivers For Adopting an ESMS

CUMTD has been actively pursuing environmentally sound practices for many years. Programs and initiatives have been implemented to reduce the District's environmental footprint. These programs began with the creation of idling policies and recycling programs, and have expanded to continual replacement of fleet vehicles with diesel-electric hybrids, the addition of a geothermal heating and cooling system, and installation of permeable pavers in our parking lot.

Like other transit agencies, CUMTD is responsible for compliance with federal, state, and local environmental laws and regulations. While these laws and regulations serve as necessary guidelines for our environmental performance, CUMTD strives to go beyond these policies when possible.

## Key Drivers For Adopting an ESMS

CUMTD values the pursuit of sustainability initiatives and the time commitment associated with institutionalizing these changes. These programs and initiatives require a management method to ensure that they remain a part of the District's culture for years to come. Within the next five to ten years, CUMTD will be experiencing a significant transition phase with many members of senior management retiring. Participation in the FTA EMS Institute and the creation of an ESMS provided the perfect vehicle to achieve our goals—minimizing the impact that CUMTD has on the environment, preventing pollution, exceeding environmental laws and regulations, and encouraging community awareness and environmental stewardship.



## Significant Aspects and Impacts

For the initial implementation phase, the core team created a list of 26 activities, products, and services within the fenceline that may have a potential environmental impact. Each of these aspects was scored and rated. The top six aspects represent CUMTD's initial focus in the ESMS. Once these aspects are considered "controlled", the ESMS team reviews the aspect list and determines the next group of significant aspects.

# KNOW YOUR SIGNIFICANT ASPECTS

### **UNDERGROUND STORAGE TANKS**

Maintenance of diesel UST systems in accordance with applicable Federal and Illinois laws to lower the chance of an uncontrolled release. These efforts prevent possible soil and water contamination.

### **COACH BATTERIES**

Increase the lifespan of coach batteries through research in new technologies and proper maintenance of existing batteries. Following proper procedures keep soil clean from pollution.

### **NEW OILS**

Reduce the chance of new oil spills from aboveground tanks. Oils reaching storm and ground water can have negative effects on nature and the environment.

### **FUELING FLEET VEHICLES**

Reduce the number of spills and air emissions associated with fueling fleet vehicles. These efforts promote better air quality for our community.

### **DELIVERY OF FUEL**

Control the delivery of diesel fuel by contractors and reduce the chance of a reportable spill. Cooperation with procedures avoids the addition of diesel fuel to stormwater systems.


### **OIL-WATER SEPARATOR**

Maintaining our Oil-Water Separator in accordance with applicable Federal and Illinois laws to lower the chance of an uncontrolled release. A properly kept Oil-Water Separator keeps harmful fluids out of stormwater sewers.



# Objectives and Targets

Once the significant aspects were decided, the ESMS Team established action plans to achieve goals and targets established for each. It was important to ensure that these goals and targets were measurable so that continual progress could be shown over the life of the program. A few of the goals and targets are reduction based, but most focus on maintaining an already high level of success, while strengthening the steps taken to control these significant aspects.

ASPECT		OIL/WATER SEPARATOR (OWS)
Objective	Maintain zero spills & uncontrolled releases from the OWS	
Target	Maintain current preventable maintenance plan & revise employee training program by January 1, 2012	
Impact	If the OWS were to exceed its capacity the contents of the reservoir would be released into the storm sewer.	
		
Operational Controls	<ul style="list-style-type: none"> <li>Employee instructions in the event of an OWS alarm</li> <li>Contractor instructions for service of OWS</li> </ul>	
Status	<ul style="list-style-type: none"> <li>Established a baseline of uncontrolled releases into the storm drain system by reviewing the past five years' manifests</li> <li>Researched, created, &amp; implemented operational controls for maintenance of OWS</li> <li>Retrained 100% of maintenance employees &amp; 100% of contract employees utilizing updated training program</li> <li>Monthly monitoring of OWS</li> <li><b>As of January 20, 2012, this Aspect is considered to be controlled</b></li> </ul>	

ASPECT		UNDERGROUND STORAGE TANKS (UST)
Objective	Maintain zero spills & uncontrolled releases from USTs	
Target	Retrain 100% of pertinent contractors by January 1, 2012	
Impact	The structural failure of an UST could result in contamination of soil & groundwater.	
		
Operational Controls	<ul style="list-style-type: none"> <li>Contractor instructions for servicing &amp; maintaining Diesel USTs</li> </ul>	
Status	<ul style="list-style-type: none"> <li>Established a baseline of reportable uncontrolled releases for USTs</li> <li>Researched, created, &amp; implemented UST Monitoring System Plan</li> <li>Evaluated current contractor UST training program</li> <li>Retrained 100% of contract employees utilizing updated training program</li> <li><b>As of January 16, 2012, this Aspect is considered to be controlled</b></li> </ul>	



# Objectives and Targets

## ASPECT NEW OIL ABOVE GROUND STORAGE TANKS (AST)

<b>Objective</b>	Maintain zero spills & uncontrolled releases from AST
<b>Target</b>	Maintain current preventable maintenance plan & revise current employee training program.
<b>Impact</b>	Improper handling of new oil ASTs could lead to fluids contaminating soil & storm water.



<b>Operational Controls</b>	<ul style="list-style-type: none"> <li>Contractor instructions for filling of New Oil ASTs</li> </ul>
<b>Status</b>	<ul style="list-style-type: none"> <li>Established a baseline of reportable uncontrolled releases</li> <li>Researched, revised, &amp; implemented operational controls for delivery, storage, &amp; dispensing of new oil from ASTs</li> <li>Retrained maintenance employees &amp; contract employees utilizing updated training program</li> <li><b>As of January 30, 2012, this Aspect is considered to be controlled</b></li> </ul>

## ASPECT BULK FILLING OF DIESEL UNDERGROUND STORAGE TANKS (UST)

<b>Objective</b>	Maintain zero uncontrolled releases of 25 gallons or more
<b>Target</b>	100% retraining of maintenance and contract employees with updated procedure
<b>Impact</b>	If the equipment used to fill these tanks was to fail, a large volume of diesel fuel could drain into the oil/water separator quickly. This could lead to a release into the storm sewer.





<b>Operational Controls</b>	<ul style="list-style-type: none"> <li>Contractor instructions for safe filling of Diesel USTs</li> </ul>
<b>Status</b>	<ul style="list-style-type: none"> <li>Established a baseline of uncontrolled releases of 25 gallons or more in the past five years</li> <li>Revised existing Bulk Filling UST Standard Operating Procedure</li> <li>Initiated creation of a Spill Prevention, Control, and Countermeasure Plan</li> <li>Revised bulk filling contract employee training program</li> <li>Retrained contract employees utilizing updated training program</li> <li><b>As of June 30, 2012, this Aspect is considered to be controlled</b></li> </ul>





# Objectives and Targets

ASPECT	DISPENSING DIESEL FUEL TO FLEET
<b>Objective</b>	Maintain zero spills & uncontrolled releases while dispensing fuel to fleet
<b>Target</b>	100% retraining of maintenance & contract employees with updated new oil delivery, storage, & dispensing procedures by January 1, 2012
<b>Impact</b>	A spill during the fleet fueling process would result in the addition of diesel fuel to the oil/water separator. This could lead to a release from the separator into the storm sewer.
	
<b>Operational Controls</b>	<ul style="list-style-type: none"> <li>Employee instructions for proper dispensing of fuel to fleet vehicles</li> </ul>
<b>Status</b>	<ul style="list-style-type: none"> <li>Established a baseline of uncontrolled releases to achieve a goal of 0%</li> <li>Researched possible spill prevention methods &amp; revised existing Standard Operating Procedure</li> <li>Retrained maintenance employees utilizing updated training program</li> <li><b>As of June 30, 2012, this Aspect is considered to be controlled</b></li> </ul>

ASPECT	USED COACH BATTERIES
<b>Objective</b>	Reduce the number of batteries prematurely disposed
<b>Target</b>	Reduce the number of batteries prematurely disposed of by 20%
<b>Impact</b>	Improper maintenance & disposal of coach batteries could result in contamination of air, soil, & groundwater.
	
<b>Operational Controls</b>	<ul style="list-style-type: none"> <li>Contractor instructions for handling of Used Coach Batteries</li> <li>Employee instructions for the correct handling of Coach Batteries</li> </ul>
<b>Status</b>	<ul style="list-style-type: none"> <li>Established a baseline of prematurely disposed coach batteries over the past two years</li> <li>Researched, revised, &amp; implemented operational controls for handling &amp; maintaining used batteries</li> <li>Retrained maintenance employees &amp; utilized updated training program</li> <li>Monthly monitoring of coach battery disposal to ensure batteries are only disposed of when acceptable</li> <li><b>The program for this Aspect remains effective until May 1, 2013</b></li> </ul>

## BENEFITS OF ADOPTING AN ESMS

- The ESMS process allows for a better understanding of how activities within our fenceline interact with the environment as well as gain a perspective on which of these activities pose the greatest opportunity to have an impact.
- The ESMS process facilitates the transition of sustainability initiatives and programs despite turnover or retirement.
- The development of Standard Operating Procedures ensures that tasks performed within the fenceline are done in a uniform manner.
- The ESMS process provides a central location for many of the documents and logs already being recorded as well as brings to light other data not previously recorded.
- The creation of Objectives and Targets gives the District clearer metrics to measure environmental reduction goals.
- The ESMS process allows for more complete awareness to all of CUMTD's employees of the environmental factors that day-to-day operations affect.
- Implementation of the ESMS allows for greater accountability throughout the organization.
- The ESMS process provides a strong foundation for the selection of environmental projects and programs.
- This system allows CUMTD to be better stewards of the environment for our community.
- All of CUMTD's current sustainability programs and projects will be mainstreamed and comply with the ISO 14001 standard.

### ACCOMPLISHMENTS TO DATE

The implementation of an ESMS has been the driving force behind the search for several solutions associated with the District's Significant Environmental Aspects as well as strengthening current practices and policies. This has led to:

- Strengthening current monitoring, inspection, and reporting procedures by defining intervals at which these must occur. Previously these measurements were taken and recorded, but no formal document existed to ensure completion.
- Researching new ways to mitigate the chance of an incident in regards to our Significant Aspects.
- Controlling five of our six initial Significant Aspects as of July 2012.
- Proactively initiating development of a Spill Prevention, Control, and Countermeasure (SPCC) Plan and a Stormwater Pollution Prevention Plan (SWPPP).
- Increasing the information available to the public by expanding the "Go Green" section of our website to include details of CUMTD's creation and implementation of an ESMS.



## Resources

The Champaign-Urbana Mass Transit District estimates that the following resources have been devoted to the training and development of the ESMS during the period between November 2010 and May 2012:

- ESMS Team: 986 hours
- Subcommittees and other personnel: 80 hours

## Cost Savings and Avoidance

While we have not been able to measure cost savings and avoidance from our current Significant Aspects, we anticipate that new aspects chosen will cause substantial cost savings for CUMTD. Our improved maintenance training program has undoubtedly lowered the risk of potential environmental emergencies and improved compliance with state, federal, and local regulations. We plan to continue monitoring and measuring our progress to quantify cost savings and avoidance more directly.

## Next Steps

The next steps CUMTD will take include:

- Obtaining ISO 14001 Certification for the Maintenance Facility
- Continuing the development of ESMS policies for CUMTD's other facilities
- Increasing overall awareness of ESMS principles throughout the organization
- Hosting public informational sessions to educate community members on our ESMS

## Management Commitment

Management support has been evident through all stages of the ESMS creation and implementation. From attendance at ESMS Institute workshops and participation in weekly ESMS meetings, to creation of the procedures and policies that make up the ESMS, management is present every step of the way.

- On March 30, 2011, CUMTD's Board of Trustees approved the Environmental Policy which formalized its commitment to protecting the environment, continuously improving environmental practices, regulatory compliance, and minimizing its negative environmental impact.
- Senior Management is involved in the creation of all ESMS policies and procedures, and account for three of the seven members of the ESMS Core Team.
- Members of senior and middle management outside of the Core Team assist in the development of various ESMS policies and practices.
- The Board of Trustees Facilities Committee (two of the seven member board) takes part in management reviews.

Even with an excellent environmental record, the Champaign-Urbana Mass Transit District was searching for a way to organize the sustainability initiatives that were in place as well as ensure a continued presence in the organization's culture. The ESMS program provides the District with useful tools to be proactive with its environmental performance as well as realize the potential for cost savings in the process.

## Management Commitment

The current focus of the ESMS process is on the two maintenance facilities with CUMTD's goal to extend ESMS principles and policies to all four operating facilities, to reduce the organization's environmental footprint, and to continue to be a sustainability leader in the community.

*“Technology, full accessibility for the disabled, low floor buses, unlimited access for university students, and the construction of a true multimodal facility are just a few areas that the District has taken a leadership role in the past. Environmental stewardship is another area that we must take a leadership role if we are to successfully promote public transportation as a green solution. From the Board of Trustees on down, the District is committed to doing our very best to make our ESMS a model for the transit industry.”*

– Bill Volk, Managing Director



Photo courtesy of *Mass Transit Magazine*.

### **For more information about CUMTD's ESMS program, please contact:**

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Detailed scoring on next page



## Final Audit

This section compares the percentage of requirements met, partially met and not met with respect to meeting the requirements of an EMS as specified in the ISO 14001:2004 standard. The following scores are the result of the EMS audit presented in this report:

Percent meeting all requirements <b>“Overall Score”</b>	96%
Percent of requirements <b>“Met”</b>	93%
Percent of requirements <b>“Partially Met”</b>	7%
Percent of requirements <b>“Not Met”</b>	0%

THE ISO 14001:2004 STANDARD ELEMENTS OF AN EMS		OVERALL SCORE (%)	MET (%)	PARTIALLY MET (%)	NOT MET (%)
4.1	General Requirements	100	100	0	0
4.2	Environmental Policy Requirements	95	90	10	0
4.3.1	Environmental Aspects Requirements	100	100	0	0
4.3.2	Legal and Other Requirements	100	100	0	0
4.3.3	Objectives, Targets and Programs Requirements	100	100	0	0
4.4.1	Resources, Roles, Responsibility and Authority	100	100	0	0
4.4.2	Competence, Training and Awareness	100	100	0	0
4.4.3	Communication	100	100	0	0
4.4.4	EMS Documentation	100	100	0	0
4.4.5	Control of Documents	100	100	0	0
4.4.6	Operational Control	100	100	0	0
4.4.7	Emergency Preparedness and Response	88	75	25	0
4.5.1	Monitoring and Measurement	50	0	100	0
4.5.2	Evaluation of Compliance	100	100	0	0
4.5.3	Nonconformity, Corrective Action and Preventive Action	100	100	0	0
4.5.4	Control of Records	100	100	0	0
4.5.5	Internal Audits	100	100	0	0
4.6	Management Review	100	100	0	0

# FTA eSMS INSTITUTE

[cota.vt.edu/ems](http://cota.vt.edu/ems)



**Foothill Transit**

GOING GOOD PLACES

**Foothill Transit  
West Covina, California  
Case Study  
September 28, 2012**

## Profile



**Foothill Transit** is a public transportation agency that has been serving the San Gabriel and Pomona valleys of Los Angeles County since 1988. Its 314 bus fleet provides fixed-route bus service on 35 routes, over approximately 327 square miles (highlighted below), carrying over 14 million passengers annually. Foothill Transit is the primary fixed route operator in eastern Los Angeles County.

General membership in the Foothill Transit Joint Powers Authority includes one city council member from each of the 22 cities in the Foothill Transit service area. Additionally, three appointed representatives from the County of Los Angeles serve on the Governing Board. A five member Executive Board governs Foothill Transit: four elected officials representing four clusters of cities, and the fifth member is elected by the Los Angeles County representatives.

The Board directs policy that is implemented by an administrative staff provided under a management contract, currently held by Veolia Transportation. The Foothill Transit Environmental and Sustainability Management System (ESMS) ESMS Core Team is part of the Veolia Transportation team. The operations and maintenance is performed at two different operations and maintenance facilities, operated under a contract held by First Transit.

The Foothill Transit mission is to be the premier public transit provider committed to safety, courtesy, quality, responsiveness, efficiency, and innovation.

Foothill Transit's operating budget for Fiscal Year 2013 is \$71 million.

- **Management:** Veolia Transportation
- **Operations:** First Transit (Pomona Operations and Maintenance Facility and Arcadia Operations and Maintenance Facility)
- **Unions:**
  - Teamster Local 848 represents the operators at Pomona
  - Amalgamated Transit Union (ATU) Local 1756 represents the operators in Arcadia
- **Operations:**
  - Buses: 314 (288 compressed natural gas (CNG), 23 diesel, 3 electric)
  - Routes: 33
- **Area Served:** 327 square miles of the San Gabriel and Pomona Valleys
- **Annual Ridership:** 14 million

## Fenceline



Foothill Transit's Arcadia Operations and Maintenance Facility is located at 5640 North Peck Road, Arcadia, CA. The site is located within the cities of Irwindale and Arcadia and encompasses a total of 12.10 acres. There are approximately 130 revenue vehicles maintained and 400 employees working at the facility. The facility is owned by Foothill Transit and operated by contractor First Transit to maintain revenue vehicles and other vehicles under a contractual agreement.

The Arcadia Operations and Maintenance Facility consists of the administrative building, vehicle maintenance building, vehicle wash building, fuel dispensing island, and warehouse. The remaining areas are concrete paved parking space for the revenue vehicles and other non-revenue vehicles. The building areas are divided into:

BUILDING	AREA (GSF)
Administrative Building	15,195
Vehicle Maintenance Building	30,550
Vehicle Wash Building	4,560
Fuel Dispensing Island	6,200
Warehouse	5,779

Under the contractual agreement, First Transit is responsible for the operation and maintenance of all revenue vehicles and non-revenue vehicles, equipment, supplies, storage, and facilities required to operate the services.

## Core Team



The ESMS Core Team is comprised of five representatives from the Management Team and one representative from the Arcadia Operations and Maintenance Facility Contractor.

- Roland Cordero, Facilities Director
- Kevin McDonald, Deputy Executive Director
- Dennis Smith, Former Safety Manager
- Sharlane Bailey, Project Manager
- Lauren Festner, Sustainability Manager
- Cynthia Baldwin, Procurement and Facilities Administrative Assistant
- Aaron Lim, Facilities Manager (not pictured)



## Key Drivers For Adopting an ESMS

As part of Foothill Transit's commitment to environmental stewardship and innovation, the agency has taken major steps over the years to ensure that it is doing its part to protect the environment. Cutting edge, 'green' business practices are modeled in every possible way because we believe that every little bit helps; however, without formal environmental governance, our efforts were piecemeal and not officially measured. As such, formal measurement and contractor oversight are the specific elements of an ESMS system that were most appealing to our agency.

The Foothill Transit "Green Team" (now the ESMS Core Team) took notice of the Virginia Tech and FTA opportunity to the Governing Board and received resounding support for program participation. We knew that this was an opportunity to familiarize ourselves with our day-to-day environmental impacts and create partnerships with our contractor to improve efficiency and environmental performance.

Once chosen as an Institute participant, Senior Management decided to start the program at the Arcadia Operations and Maintenance Facility before rolling it out to the Pomona facility. The agency had already implemented a number of proactive environmental measures at this fence line, including installation of secondary containment pallets, implementation of aqueous-based parts cleaning sinks, and a wastewater recycling system at the bus wash. While these projects display our commitment to sustainability and environmental safety, they lacked the formal measurement that would typically be included in a system-wide management plan like an ESMS.

## Significant Aspects and Impacts

### CREATION OF A SUB-TEAM

Since the majority of the Core Team members are not physically present at the Arcadia Operations and Maintenance Facility, we collectively decided to create a sub-team comprised of individuals "on site" at the Arcadia Operations and Maintenance Facility. These individuals represented maintenance, operations, and facilities departments and held a realistic grasp on day-to-day products and services of our operations. The Core Team worked alongside the sub-team to develop an initial list of environmental aspects. Since the initial development of the list, the sub-team has not been involved further in the ESMS development and implementation process, though they will be involved going forward as the ESMS cycle continues, especially with annual aspect identification.

### DEVELOPING A LIST OF ASPECTS

The Core Team and sub-team (or "Aspect Team") identified environmental aspects of activities within the ESMS fence line (Arcadia Operations and Maintenance Facility) that have the potential to impact the environment. Aspect identification lasted approximately one month and considered:

- Positive and negative environmental impacts;
- Normal and abnormal/emergency situations; and
- Current activities and planned or new developments.



# Significant Aspects and Impacts

The Core Team and Aspect Team developed a draft list of aspects by soliciting input from key employees on-site in Arcadia. Initially, the ESMS Core Team identified six main activity categories including fueling, storm water runoff, cleaning, fleet maintenance, facility maintenance, and hazardous material storage and disposal. Within these areas, a total of 81 environmental aspects were evaluated by the Core Team and sub-team. Since then, the team has revised the aspect list to reflect the input of the Virginia Tech staff and changing priority levels at the Arcadia Operations and Maintenance Facility.

### DEVELOPING AND MAINTAINING EVALUATION CRITERIA

The ESMS Team established criteria that were used to evaluate the five identified significant aspects.

### EVALUATION AND PRIORITIZATION OF ASPECTS

The ESMS Team determined the aspect ranking based on the total of the consequence and likelihood score, which are both detailed below.

**CONSEQUENCE SCALE**  
Scale rates the severity of the potential consequences of the impact.

Environmental:	
1	Mild: Environmental effects are unlikely.
2	Moderate: Environmental effects are possible or could cause noticeable degradation.
3	Severe: Likely to cause substantial environmental problems and/or destruction or degradation.
Project:	
1	Mild: Project impacts such as increased cost, schedule delays or other scope or operational impacts are unlikely.
2	Moderate: Project impacts such as increased cost, schedule delays or other scope or operational impacts are possible.
3	Severe: Project impacts such as increased cost, schedule delays or other scope or operational impacts are very likely.
Exposure:	
1	Mild: Unlikely to produce an adverse perception of the Agency within the community OR unlikely to raise regulatory interest or enforcement OR minimal political interest/public visibility.
2	Moderate: Poses a moderate potential for an adverse perception of the Agency within the community OR receives regulatory enforcement OR potential political interest/public visibility.
3	Severe: Poses a potential significant adverse affect on community perception of the Agency OR high likelihood of regulatory enforcement exposure OR high negative political interest/public visibility.

**LIKELIHOOD SCALE**  
Scale rates how common (likely) it is for the aspects to occur. (Use the normal/abnormal indicator as applicable).

Environmental:	
1	Rarely/Never occurs as a part of normal activities or operations. Probably/Definitely would not occur during abnormal conditions.
2	Occurs occasionally as a part of normal activities or operations. May occur during abnormal conditions.
3	Occurs every day or is very likely to occur as a part of normal activities or operations. Would probably occur during abnormal conditions.



Consequence scores were summed by the respective likelihood ratings; the product of the two ratings was recorded in the “Total” column. Total scores of 10 and above received a Primary (P) Significance classification 9 to 5 are Secondary (S) significance, while 4 to 1 were deemed Temporary (T) significance.

Ranking the aspects (higher ranking=higher environmental impact) helped us to determine that the following five significant aspects are the Arcadia Operations and Maintenance Facility’s highest priority, and thusly served as the focus of the first ESMS implementation cycle.

SIGNIFICANT ASPECTS		
Activities/Products/Services	Significant Environmental Aspect	Impact
1. CNG bus and car fueling	CNG fumes	air quality, economic
2. Cleaning	contaminated fluids and absorbents	waste generation, economics
3. Lighting	GHG emissions	energy use, economics
4. Facility maintenance	storm water runoff	groundwater, storm water, soil contamination, economics, visual/aesthetic
5. Idling	fuel use and fumes	air quality, economics, sensitive habitat, energy use

## Objectives and Targets

Foothill Transit’s mission is to be the premier public transit provider committed to safety, courtesy, quality, responsiveness, efficiency, and innovation. With these goals in mind, an agency-wide environmental policy was developed and adopted to operationalize our ESMS. The Environmental Policy was shaped by blending the agency’s existing strategies with the requirements of the ISO 14001 standard.

Through the Board-adopted Environmental Policy Foothill Transit commits to:

- Environmental protection and sustainability in the planning stages of new programs, construction, and in all work conducted at Foothill Transit.
- Compliance with applicable local, state, and federal regulations and policies, supported by regularly-scheduled internal review.
- Minimization of significant environmental impacts identified in the ESMS by establishing environmental and sustainability objectives, targets, and programs.
- Evaluation of the effectiveness of Foothill Transit’s environmental performance through the periodic review of ESMS to ensure that established objectives, targets, and programs are met.
- Provide necessary education and tools to all transit staff and those working on Foothill Transit’s behalf in order to successfully carry out this policy in their daily responsibilities and work functions.
- Strive for continued overall improvements in environmental consciousness and prevention of pollution.


# Objectives and Targets

The team developed these five objectives and targets to correspond with the five significant environmental aspects listed on the previous page.

ASPECT	OBJECTIVE	TARGET	PERFORMANCE INDICATOR		
<b>1. CNG Fuel Leaks and Spills</b>	Reduce leaks and spills while fueling CNG buses.	Reduce by 50% by incident by 07/01/2012.	# of leak or spill incidents	Environmental Impacts	Monetary impacts
<b>2. Storage of Contaminated Fluids and Absorbents</b>	Reduce amount of hazardous waste generated.	Reduce by 20% by volume by 07/01/2012.	Gallons removed from inventory	Gallons avoided annually	% of products replaced
<b>3. GHG Emissions Reductions</b>	Reduce GHG emissions and energy consumption.	Reduce by 20% by 07/01/2012.	Solar energy produced	Tons of CO2 saved	Monetary impacts
<b>4. Storm Water Runoff</b>	Develop a training program for existing SWPPP.	100% employees trained and tested on comprehension by 09/01/2012.	% of employees trained	% of storm drains labeled	% of employees who've demonstrated comprehension
<b>5. Fuel Consumption from Idling</b>	Reduce fuel consumption from idling.	Reduce fuel consumption by 10% in time spent idling 07/01/2012.	% increase/decrease in time idling	Environmental benefits (avoided)	Fuel saved to date

In order to further prioritize our organization's significant aspects and translate the stated goals of our newly-adopted Environmental Policy into action, the Core Team set out to develop specific action plans around each of the five identified aspects. Each action plan outlined specific tasks to meet stated objectives. The tasks are listed in the table below.

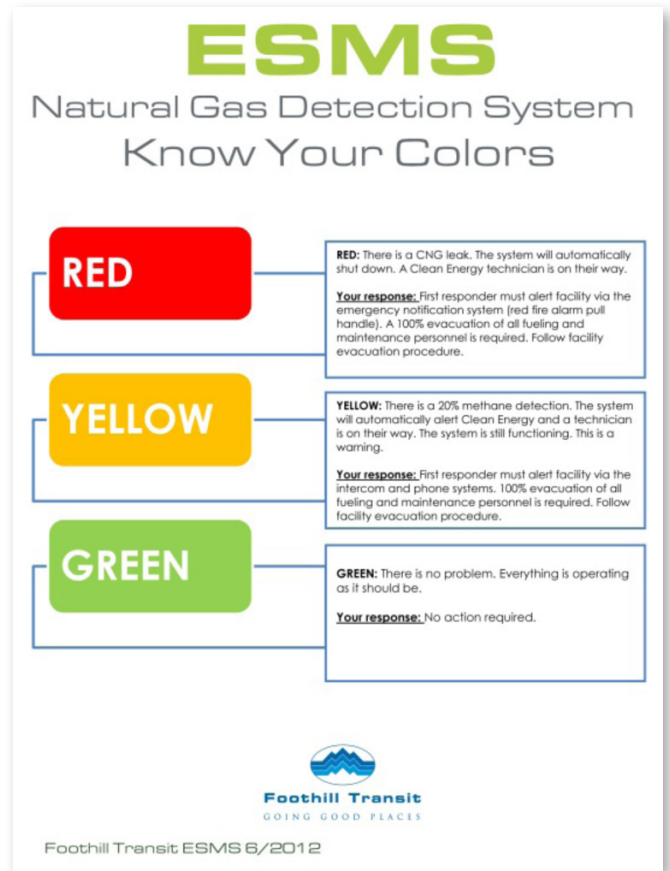
## ACTION PLANS

ASPECT	TASKS
<b>1. CNG Fuel Leaks and Spills</b>  Gas Detection System Visual Warning System	<ol style="list-style-type: none"> <li>1. Establish a baseline</li> <li>2. Develop a fueling SOP for buses and cars (ESMS SOP01)</li> <li>3. Update SOP to reflect ISO standards</li> <li>4. Identify equipment-related issues</li> <li>5. Correct failures</li> <li>6. Request and monitor preventative maintenance (PM) schedule and work order confirmation from Clean Energy</li> <li>7. Have detection alert parameters lowered</li> <li>8. Install audible and visual warning system</li> <li>9. Monitor and measure incidents of CNG releases (outlined in #1)</li> <li>10. Identify Training Needs for ESMS SOP01 (CNG Fueling SOP for buses and cars)</li> <li>11. Conduct SOP and warning system training</li> </ol>



**ACTION PLANS**

ASPECT	TASKS
<p><b>2. Storage of Contaminated Fluids and Absorbents</b></p>  <p>Sample Product Replaced with Non-Hazardous Product</p>	<ol style="list-style-type: none"> <li>1. Identify current specifications (vehicle-related reduction)</li> <li>2. Identify current material utilization (establish baseline)</li> <li>3. Identify vendor-related reductions and obsolete inventory</li> <li>4. Identify alternate (non-hazardous) products and replace in increments of 10</li> <li>5. Include labeling and MSDS check as part of Facility Maintenance Plan (FMP)</li> <li>6. Identify Training Needs</li> <li>7. Conduct training for ESMS SOP05 (Spill Prevention Control and Countermeasure Plan)</li> <li>8. Monitor waste generation reduction monthly</li> </ol>
<p><b>3. GHG Emissions Reductions</b></p>  <p>Arcadia Facility Solar PV Panels</p>	<ol style="list-style-type: none"> <li>1. Review and approve Contractor's submittals for solar project</li> <li>2. Complete construction</li> <li>3. Test and commission</li> <li>4. Solar turnover system training with Facility Manager</li> <li>5. Prepare SOP for preventative maintenance of PV panels (ESMS SOP02)</li> <li>6. Set baseline</li> <li>7. Review and compare energy invoices</li> <li>8. Conduct ESMS SOP02 Solar PMI Training</li> </ol>
<p><b>4. Storm Water Runoff</b></p>  <p>Labeled Storm Drain</p>	<ol style="list-style-type: none"> <li>1. Review current documented Storm Water Pollution Prevention (SWPPP)</li> <li>2. Review current training requirements</li> <li>3. Review monitoring system</li> <li>4. Review regulatory updates</li> <li>5. Review as-built drawings and identify storm drain and clarifiers</li> <li>6. Develop training program</li> <li>7. Implement training program on ESMS SOP03: SWPPP</li> <li>8. Label storm drains and clarifiers</li> <li>9. Conduct staff testing on SWPPP comprehension</li> </ol>
<p><b>5. Fuel Consumption from Idling</b></p>  <p>Revenue Vehicle Affected by Idle Reduction Policy</p>	<ol style="list-style-type: none"> <li>1. Establish a baseline</li> <li>2. Determine current regulatory idling requirements</li> <li>3. Develop Idle Reduction Policy ESMS-SOP04 and seek Operations Director approval</li> <li>4. Issue Idle Reduction Policy to all affected staff (both Operations and Maintenance Facilities)</li> <li>5. Identify training needs</li> <li>6. Train all affected staff on ESMS-SOP04: Idle Reduction Policy</li> <li>7. Have Quality Assurance Inspectors conduct random visual idling inspections (non-revenue vehicles) at selected time points</li> <li>8. Run monthly Zonar reports to monitor and measure revenue vehicle idling reductions</li> </ol>



### MARKETING AND COMMUNICATION

The team felt that in addition to the training tasks outlined for each aspect, it was also significant to raise general awareness of the ESMS program. As such, the Core Team sought the assistance of the Marketing Department to “promote” the program around the Arcadia Operations and Maintenance Facility. A series of posters related to each significant aspect as well as general ESMS “awareness” posters, specific to the fundamentals of the management system and environmental policy commitments were developed and posted around the Arcadia Operations and Maintenance Facility. Two sample posters are pictured below.

The Core Team also developed a specific procedure to establish internal and external communication practices related to the ESMS. This procedure was written to facilitate two way communication between Arcadia Operations and Maintenance Facility’s entire employee body, key external stakeholders and the Core Team, as well as to establish and maintain communication channels between the various management levels and departments.

The procedure specifically calls for ESMS updates to the Executive Board on a quarterly basis. These updates on the team’s progress have allowed for a greater understanding by Executive leadership of the ESMS “Plan, Do, Check, Act” cycle and have shed light on the benefits of our ESMS program.



## Benefits of Adopting an ESMS

Going through the implementation process (particularly during aspect identification) has allowed the agency to hone in on how our daily operations are impacting the environment in ways that we had not previously considered. As part of the ESMS process, the Core Team has conducted a number of walkthroughs “on site” and has had the opportunity to view our operations from the ground level. Bringing these aspects to light in a “hands on” approach has allowed us to impact them not only through the aspect identification and goal formation process, but we also have a better overall understanding of our operations from this perspective.

Because of the ESMS, not only are we now monitoring our environmental impacts, we are putting systems and controls in place to measure them, giving the Arcadia Operations and Maintenance Facility contractor greater accountability to Foothill Transit and the Foothill Transit Management team greater accountability to our Board of Directors.

The agency and the Core Team in particular, are excited by a heightened sense of “environmental awareness” that has spread throughout the agency. This enthusiasm continues to escalate as we delve more deeply into the implementation process.

## Resources

Each Core Team member devoted many hours to the paramount cycle of ESMS implementation. The Core Team anticipates that the hours will be greatly reduced in future cycles of the ESMS, as the Core Team is now well versed in program implementation.

ESMS CORE TEAM MEMBER	LABOR HOURS
Deputy Executive Director	110
Director of Facilities	250
Sustainability Manager	300
Project Manager	201
Administrative Assistant	225
Safety Manager	186
Facilities Manager	50
<b>Total</b>	<b>1,136</b>

## Cost Savings and Avoidance

Foothill Transit has realized significant accomplishments as a result of the ESMS program. The specific achievements are detailed below, by significant aspect and corresponding objective, target, and program.

The first goal was to reduce compressed natural gas (CNG) leak and spill incidents during fueling by 50% by July 2012. As a result of retrained fuelers, posted SOPs, the installation of a new CNG leak detection system, and an associated “know your colors” campaign, the fence line has had **zero spills and releases since program implementation, resulting in a reduction of 100% of leak and spill incidents while fueling.** This accomplishment greatly exceeds our initial goal.

The second goal was to reduce the amount of hazardous waste generated from cleaning solvents by 20% by July 2012. The Core Team worked with the Contractor to identify current material utilization, remove obsolete inventory, and identify alternate, “green” products to replace existing hazardous solvents. As a result of these actions, the fence

## Cost Savings and Avoidance

line removed 19 gallons of hazardous materials from the site and 47% of identified hazardous cleaning products were replaced with alternatives, exceeding the stated objective. By removing obsolete inventory and replacing existing inventory, we are now avoiding the purchase of 489 gallons of hazardous inventory annually.

The third goal was to reduce energy consumption by 20% by July 2012. To meet this goal, a solar PV system was installed and producing solar energy in January 2012. To date, we have generated over 100,000 kilowatt hours of clean, solar power. In one year, we will receive nearly \$45,000 in the form of a rebate incentive from our utility provider, Southern California Edison, with an expected return on investment (ROI) in 11 years. Every year, the clean energy produced by the solar installation is expected to equate to 26,000 gallons of gas saved.

The fourth goal was to train 100% of employees on the Operations and Maintenance Facility's Storm Water Pollution Prevention Program (SWPPP). The SWPPP was updated by an external consultant to comply with all federal and state laws. To date, 100% of relevant employees are aware, trained, and competent related to the SWPPP, meeting the stated objective.

The fifth and final goal was to reduce fuel consumption from the time spent idling by 10%. To accomplish this goal, we developed and implemented an agency-wide Idle Reduction Policy that limited idling time to five minutes or less while Foothill Transit logoed vehicles were in operation. Since the policy went into effect, we have reduced bus idling at the Arcadia Operations and Maintenance Facility by 19%, exceeding our original goal. In one year, we expect to reduce CO<sub>2</sub> emissions by 170,000 tons.

### KEYS TO SUCCESS

Regularly scheduled, weekly meetings with the Core Team have kept us up-to-date on all tasks in order to meet the goals of our program, held us accountable, and have provided avenues for communication, necessary to ESMS implementation.

The ESMS Core Team also held two, all day in-house "workshops" following the formal workshops administered by Virginia Tech. We collectively decided that these days provided an opportunity for us to review our ESMS as a whole, which is a key to program success. The in-house workshops were also necessary to discuss all ESMS action items in depth, and prioritize activities moving forward. The workshops were viewed by the Core Team as a success and will be held as needed moving forward.

Quarterly reporting to the Board of Directors and staff has helped to familiarize them with the ESMS program and keep them informed of progress. These updates will continue as we move forward with ISO 14001 certification and as we carry the program over to the Pomona Operations and Maintenance Facility.

## Next Steps

In fall 2012 the Core Team will pursue ISO 14001 certification for the Arcadia Facility. We are confident that the ESMS Institute has fully prepared us for this recognition. Additionally, the Core Team will begin to implement an ESMS at the Pomona Operations and Maintenance Facility over the next year.



## Management Commitment

Foothill Transit's Environmental Policy was adopted by the Executive Board at the June 2011 Executive Board meeting. The Executive Board was briefed on the developments of the program quarterly thereafter.

The first Management Review session was held in August 2011 and was attended by the Executive Director, the Interim Deputy Executive Director, and the entire Core Team. The significant aspects and corresponding objectives, targets, and programs were presented to the Executive Director and his full support was gained. Management Review meetings not only steer our efforts in the right direction, but also serve as a morale booster for the team. The next management review meeting is scheduled for August 2012.

The Foothill Transit Board adopted the ESMS program and subsequent ISO 14001 certification as a "major initiative" in both the FY 2012 and FY 2013 business plans. As such, updates are given by the team leader of each major initiative to senior staff on a monthly basis to assess the progress made towards the corresponding target of each initiative.



*"As the Executive Director of Foothill Transit I am personally and unwaveringly committed to the agency-wide implementation of a comprehensive, cutting-edge environmental management system. With the partnership of the FTA and Virginia Tech, Foothill Transit has lessened the environmental impact of our agency and improved the quality of life of our coworkers, customers, and wider community through the implementation of a holistic ESMS."*

— Executive Director, Doran J. Barnes

### **For more information about Foothill Transit's ESMS program, please contact:**

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Detailed scoring on next page



## Final Audit

This section compares the percentage of requirements met, partially met and not met with respect to meeting the requirements of an EMS as specified in the ISO 14001:2004 standard. The following scores are the result of the EMS audit presented in this report:

Percent meeting all requirements <b>“Overall Score”</b>	97%
Percent of requirements <b>“Met”</b>	95%
Percent of requirements <b>“Partially Met”</b>	4%
Percent of requirements <b>“Not Met”</b>	1%

THE ISO 14001:2004 STANDARD ELEMENTS OF AN EMS		OVERALL SCORE (%)	MET (%)	PARTIALLY MET (%)	NOT MET (%)
4.1	General Requirements	100	100	0	0
4.2	Environmental Policy Requirements	100	100	0	0
4.3.1	Environmental Aspects Requirements	100	100	0	0
4.3.2	Legal and Other Requirements	100	100	0	0
4.3.3	Objectives, Targets and Programs Requirements	100	100	0	0
4.4.1	Resources, Roles, Responsibility and Authority	100	100	0	0
4.4.2	Competence, Training and Awareness	93	86	14	0
4.4.3	Communication	100	100	0	0
4.4.4	EMS Documentation	100	100	0	0
4.4.5	Control of Documents	94	89	11	0
4.4.6	Operational Control	100	100	0	0
4.4.7	Emergency Preparedness and Response	100	100	0	0
4.5.1	Monitoring and Measurement	100	100	0	0
4.5.2	Evaluation of Compliance	75	50	50	0
4.5.3	Nonconformity, Corrective Action and Preventive Action	100	100	0	0
4.5.4	Control of Records	100	100	0	0
4.5.5	Internal Audits	100	100	0	0
4.6	Management Review	83	83	0	17

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# **INTER***city* **TRAN I**

**Intercity Transit  
Olympia, Washington  
Case Study  
September 28, 2012**

## Profile



Intercity Transit is the public transportation provider in Thurston County, Washington. Operating within its Public Transportation Benefit Area (PTBA), the agency provides a mix of transportation and related services including: fixed route; Dial-A-Lift paratransit; vanpool; workforce development vans (Village Vans); local and regional express; and travel training.

Intercity Transit serves approximately 161,000 residents in the cities and urban growth areas of Lacey, Olympia (the state capital), Tumwater, and Yelm. Intercity Transit also operates express service on Interstate 5 between Olympia/Lacey and Lakewood/Tacoma - a major commuter corridor also serving Joint Base Lewis-McChord. Intercity Transit provides connecting service to five other transit systems. Included is connection to Sound Transit which provides broad access to the Puget Sound region, Sea-Tac International Airport, Seattle, Tacoma, and Snohomish County.

Intercity Transit's maintenance and operations facility is located at its Pattison Street Maintenance, Operations, and Administrative Facility (Pattison Facility). The agency has outgrown this 27-year-old facility and plans to expand over it in the next four years. The Environmental and Sustainability Management System (ESMS) will help ensure that the design, planning, and construction phases adhere to sound operational, environmental, and sustainable practices.

Intercity Transit's customer service center and main operating hub are located at the Olympia Transit Center in downtown Olympia. This facility, currently operating above capacity, includes the customer service office, a passenger lobby, and 13 bus bays, with three of these bays operating off of three city streets surrounding the facility. The agency also operates the Lacey Transit Center, a 12-bay, unstaffed facility in Lacey, Washington. Federal funding has been secured and plans are under way to expand the Olympia Transit Center in 2013.

Intercity Transit operates several park and ride lots in its service area with the newest and largest one opening in late 2012. Combined, these park and ride lots provide 759 parking stalls and are located along highly traveled corridors including Interstate 5, one of the most congested corridors in Washington State. In addition, the agency operates the nation's only volunteer-run Amtrak train station, Centennial Station, supported by contract agreements with all area jurisdictions.

## Profile

Intercity Transit's 2012 operating budget is \$33.3 million, with a capital budget of \$25.4 million. Most of Intercity Transit's funding comes from a local option sales tax of 0.8 percent levied within the PTBA. Intercity operates and maintains 356 vehicles. They include 68 fixed-route coaches, 34 paratransit vehicles, 235 vanpool vans, 19 staff and support vehicles, three Village Vans, and two Community Vans. There are 953 bus stops within the PTBA, 89 percent of which are ADA accessible and 28 percent of which have shelters.

In 2011, Intercity Transit facilitated a record 5,338,850 passenger trips on its fixed-route, Dial-A-Lift, and vanpool services. Fixed-route service averages nearly 15,000 rides each weekday on 20 regular and three express routes .

Annual fixed-route ridership has grown more than 57 percent since 2005 when gas prices jumped and Intercity Transit began increasing service frequency and implementing transit facility enhancements. Vanpool use has grown 78 percent during this same time. Dial-A-Lift, the agency's paratransit service, has steadily increased as well. Dial-A-Lift had about 144,000 boardings in 2011 as compared to about 118,000 boardings in 2005, a 22 percent increase. The agency anticipates it will set new ridership records in 2012 as fixed-route ridership for January through June is up three percent and vanpool ridership is up 13 percent over the same time period last year.

## Fenceline



Intercity Transit's Pattison Facility is home of ESMS program. The Pattison Street Maintenance, Operations and Administrative Facility (Pattison Facility) located at 526 Pattison SE in Olympia, Washington, has been in operation since 1985. The facility houses the business office, Operations and Maintenance facilities, and a vehicle yard set on a 6.6-acre lot. The existing Maintenance building is 38,576 square feet, the Administration building is 9,878 square feet, and the Operations building is 6,404 square feet. There is also more than 110,000 square feet of pavement on site.

A pedestrian bridge connects the Maintenance and Administration/Operations buildings. A large parking lot for service and employee vehicle parking includes six plug-in, electric vehicle charging outlets for employee and visitor use. Approximately 300 employees are either assigned to or interact with the Pattison Facility.

## Core Team

Intercity Transit's ESMS Core Team is comprised of seven members representing various departments and responsibilities throughout the agency. Their responsibility is to provide leadership in developing, implementing, and maintaining Intercity



Transit's ESMS. The broad spectrum of skills and knowledge on this team enabled Intercity Transit to create an ESMS that encompasses a range of perspectives from general management to specific environmental and sustainability issues while considering practical day-to-day operational needs, such as planning, training, permitting, procurement, operational controls, and monitoring processes and performance. Core Team members are:

- **Jim Merrill**, Operations Director
- **Bob Holman**, Grants Program Administrator
- **Mike Harbour**, General Manager
- **Pat Messmer**, Executive Assistant
- **Mark Kallas**, Facilities Manager
- **Karl Shenkel**, Maintenance Director
- **Jessica Brandt**, Environmental and Sustainability Coordinator

## Key Drivers for Adopting an ESMS

Key drivers for adopting an ESMS are:

- Be an environmental leader in the transit industry
- Improve our environmental and sustainability awareness
- Elevate our current environmental and sustainability processes and programs
- Gain commitment from our employees and contractors on environmental and sustainability issues and to show the community our support for these issues
- Develop a fully documented environmental and sustainability program for the benefit of the future of Intercity Transit
- Begin a paradigm shift from “reactive” to “proactive” management approach to environmental management
- Create a more efficient operational system and improve on current methods and processes
- Strengthen existing procedures and plans to avoid adverse environmental events
- Continue to promote enhanced awareness of potential agency and staff impacts on the environment and sustainability



## Key Drivers For Adopting an ESMS

Intercity Transit’s sustainability philosophy revolves around its mission and vision:

- Intercity Transit’s mission is to provide and promote transportation choices that support an accessible, sustainable, livable, healthy, and prosperous community.
- Our vision is to be a leading transit system in the country, recognized for our well-trained, highly-motivated, customer-focused, community-minded employees committed to enhancing the quality of life for all citizens of Thurston County.

Intercity Transit more than complies with legal and regulatory requirements. The agency works to raise employee and public awareness of the impacts of its operation and, most importantly, strives to minimize all negative environmental impacts. Intercity Transit’s ESMS program is a management tool that will help the agency achieve its economic, environmental, and sustainability goals through a structured process to set objectives, implement plans, analyze results, and seek improvement. Intercity Transit also recognizes that the processes outlined in the ISO 14001:2004 standard provide a framework for identifying and correcting minor, non-compliance areas before they become problems.

## Significant Aspects and Impacts

The above key drivers guide the ESMS Core Team as it identifies and evaluates the products, activities, and services (aspects) Intercity Transit uses. They also guide Intercity Transit while it evaluates these aspects’ impacts (actual and potential) relative to its commitment to protect the environment and encourage sustainable practices. The ESMS Core Team, with input from other agency staff, analyzed over 80 agency aspects. To analyze and determine what aspects were “significant”, the team used an evaluation matrix that ranked 10 areas of impact. Out of the master list of over 80 aspects, eight were identified as “significant.” The top four Significant Aspects were the focus of subsequent Action Plans developed to achieve specific objectives and targets. The top four Significant Aspects are listed in the following table:

RANK	ACTIVITY	ASPECT	IMPACTS	OTHER OBSERVATIONS	SCORE
1	Managing Fluids Storage (non UST)	Non-UST Fluids	Ground- and stormwater, soil pollution and disposal issues related to all non-UST stored fluids (transmission fluid, used oil, etc.)	none	35.95
2	Vehicle performance. Fuel Types	Fuel Use	Excessive fuel consumption, increased fuel cost, and unhealthy emissions. Increased GHG levels.	Minimize GHG, vehicle maintenance, operator training, effective procurement of inputs.	35.70
3	Stormwater management systems	Stormwater	Storm- and groundwater/soil contamination from various hazards including fertilizers and pesticides.	Sweep lots, sample, test, report, eliminate spills, manage program.	31.45
4	Fuel, liquid lubricants and chemical deliveries.	Fluids Management	Risk of leakage contaminating facilities, soil, and ground/storm water. Structural failure. Health & safety risks.	Delivery. Monitoring, fueling, filters (changing/disposal, spill clean-up, emergency plans. Soil and ground water pollution.	33.15

## Objectives and Targets

Objectives and Targets for the top four Significant Aspects were created in order to improve operational controls, minimize risk, and optimize sustainability practices. The top four Significant Aspects drove the Action Plans used to improve operational controls in these areas. The ESMS Core Team appointed Action Plan Lead staff who in turn worked with Task Leads and other staff to implement the Action Plans.

The ESMS Core Team then established a series of objectives and targets with expected benefits for five Action Plans. The following tables outline objectives, targets, and expected benefits.

ACTION PLAN	OBJECTIVE	TARGETS & TASKS	BENEFITS
Emergency Preparedness & Response (AP1)	Increase employee preparedness and emergency response while decreasing environmental impacts of a potential hazardous spill event.	<p><b>Target:</b> 100% of Maintenance, Facilities and Inventory employees will receive training by September 30, 2012.</p> <p><b>Tasks:</b></p> <ul style="list-style-type: none"> <li>• Create a baseline of existing IT emergency response procedures and develop new emergency procedures in regards to potential hazardous chemical or fluid spill events by March 2012.</li> <li>• Develop accident response training procedures for affected and/or injured personnel following a hazardous chemical or fluid spill event by April 2012.</li> <li>• Design and conduct an emergency response exercise simulating the spill of hazardous chemicals and fluids. Record and monitor staff actions and response procedures. Organize and conduct a follow-up debriefing and training session by July 2012.</li> <li>• Prepare and present an annual progress report on this action plan including an assessment of time since previous training and knowledge of employees of procedures December 2012.</li> </ul>	Maintenance, Facilities, and Inventory employees are prepared to act quickly in the event of a hazardous or fluid spill
Spill Prevention & Emergency Clean-up (AP2)	Implement effective measures and procedures to prevent spills and eliminate pollution from entering stormwater runoff.	<p><b>Target:</b> Spill Prevention and Emergency Cleanup Plan updated by August 2012 and all maintenance personnel trained by September 2012.</p> <p><b>Tasks:</b></p> <ul style="list-style-type: none"> <li>• Establish baseline by reviewing current SPECP material handling procedures, storage requirements, cleanup equipment/ procedures, and spill logs by December 2011.</li> <li>• Identify Best Management Practices (BMPs) in regards to Spill Prevention and Emergency Clean-up Plan (SPECP) by May 2012.</li> <li>• Create, edit and update Spill Prevention and Emergency Clean-up Plan (SPECP) to contain all necessary aspects in accordance with the current Industrial Stormwater General Permit August 2012.</li> <li>• Evaluation of work instructions (SOPs) relating to this action plan. Have written SOPs in place, and reviewed by the EMS Team for possible revisions as needed by September 2012.</li> <li>• Awareness and Operational Training for all maintenance employees relating to this action plan September 2012.</li> <li>• Complete approved training for all maintenance employees in regards to the official Spill Prevention and Emergency Clean-up Plan (SPECP) by September 2012.</li> </ul>	<p>Maintenance, Facilities, and Inventory employees will be able to prevent hazardous or fluid spills</p> <p>In the rare event of a spill, employees will be prepared to prevent the spill from entering the storm drain</p> <p>Employees will be able to cleanup a spill if it occurs</p>





ACTION PLAN	OBJECTIVE	TARGETS & TASKS	BENEFITS
Stormwater Management (AP3)	Implement effective and improved procedures to eliminate pollution from entering storm water runoff.	<p><b>Target:</b> Updated Stormwater Pollution Prevention Plan (SWPPP) updated by August 2012 and all maintenance personnel trained by September 2012.</p> <p><b>Tasks:</b></p> <ul style="list-style-type: none"> <li>Establish baseline by reviewing current SWPPP, site map, inventory of facility activities, and materials that have the potential to introduce pollutants into the stormwater runoff by December 2011.</li> <li>Identify SWPPP Best Management Practices (BMPs) by May 2012.</li> <li>Edit and update SWPPP to contain all necessary aspects in accordance with the current Industrial Stormwater General Permit by August 2012.</li> <li>Evaluation of work instructions (SOPs) relating to this action plan. Have written SOPs in place, and reviewed by the EMS Team for possible revisions as needed. Complete for review by ESMS Core Team by September 2012.</li> <li>Complete writing "SWPPP Awareness and Operational Training Plan" for all maintenance employees relating to this action plan for Stormwater Pollution Prevention Plans September 2012.</li> <li>Complete approved training for all maintenance employees in regards to the official SWPPP September 2012.</li> </ul>	<p>By following an updated SWPPP and SOPs, we will avoid fines associated with stormwater permit violations</p> <p>Reduced likelihood that pollutants will be introduced into the facilities' stormwater runoff</p>
Fluids Management-non-UST (AP4)	To accurately control and reduce (if applicable) the number and quantities of fluids in above ground tanks, drums and aerosols.	<p><b>Target:</b> Establish minimum quantities of fluids necessary to meet daily operation needs by August 2012.</p> <p><b>Tasks:</b></p> <ul style="list-style-type: none"> <li>Create baseline of inventory fluids currently stored in above ground tanks, drums and aerosols by November 2011.</li> <li>Work with Facility Manager, Maintenance Supervisors and maintenance and facility staff to create baseline of current fluids needs by August 2012</li> <li>Establish appropriate fluid stocking levels and types needed by August 2012.</li> <li>Establish storage methods for necessary fluid stocks by August 2012.</li> <li>Assure secondary containment and establish procedures for containment in event of spills by September 2012 (related to spill prevention)</li> <li>Establish aerosol &amp; product requirements by 2013.</li> </ul>	<p>Eliminating 60% of the chemicals in our inventory will reduce costs</p> <p>Assuring secondary containment and training will reduce the likelihood of a contaminating spill</p> <p>Needing fewer MSDS sheets in the future with the use of alternative, less toxic chemicals</p>
Fuel Use: Reduce Fuel Usage (AP5)	Reducing revenue vehicle fuel consumption by 3 % in 2012 is the initial objective. Subsequent year's objectives will be to, at minimum, maintain that reduction and continue to use fuel more efficiently.	<p><b>Target:</b> 3% reduction in overall revenue vehicle fuel consumption as measured by fuel use per vehicle mile by November 30, 2012.</p> <p><b>Tasks:</b></p> <ul style="list-style-type: none"> <li>Train 100% of revenue vehicle operators in optimal vehicle operation. Classes to begin in October 2011. All Operators will complete VET training by May 2012. New operators will receive VET training as part of initial training.</li> <li>Establish baseline of Vehicle Fuel Consumption, efficiency of Paratransit Services, and Vanpool Services by October 2011.</li> <li>Develop training module for fuel consumption reduction for volunteer vanpool drivers by November 2011.</li> <li>Develop "no idle" policy for vanpool vehicles by November 2011.</li> <li>Create and disseminate information in strategic locations to remind operators to use the vehicles most efficiently by November 2011.</li> <li>Awareness Campaign started in November 2011. (Ongoing)</li> <li>Explore technology advances or equipment modifications that improve fuel economy. (Ongoing)</li> <li>Make fuel economy a key criterion when replacing existing or buying new vehicles. (Ongoing)</li> </ul>	<p>A 3.85% increase in fuel economy for revenue generating vehicles</p> <p>A six month analysis showed 22,853 gallons in fuel savings from 2011 to 2012.</p> <p>22,853 gallons of fuel saved is almost \$82,000</p> <p>Customers receive a smooth ride when drivers accelerate and brake slower</p> <p>Fewer maintenance costs with less wear and tear on tires and brakes</p>

## BENEFITS OF ADOPTING AN ESMS



Implementing an ESMS has improved our ability to evaluate the normal aspects of our operations and to identify those aspects that potentially have the most significant impact on the environment and sustainable practices. ESMS provided a systematic managerial framework for identifying and implementing operational controls that minimize negative environmental impacts and facilitate sound sustainability practices. Intercity Transit believes that in the course of implementing the ESMS it has achieved and can continue to build on the following benefits:

- Increased employee, management, and contractor/vendor awareness of environmental and sustainability issues
- Reinforcement of environmental processes currently in place
- Employee involvement with ESMS implementation
- Proactive management systems
- Documentation of standard operating procedures
- Institutionalization of best practices
- Improved database for tracking employee training
- Increased employee initiative
- Increased accountability throughout the organization
- Built-in controls
- Increased ability to identify exposure and smaller aspects
- Framework for sustainable growth
- Establishment of crucial institutional knowledge into written form and establishing document control
- Provision a strong foundation to support the Agency in choosing sustainable and environmentally responsible practices
- Involved multiple departments within Intercity Transit to assist and partner in the development of the ESMS program
- A documented process for managing our environmental issues
- The adoption of an Environmental and Sustainability Policy which demonstrates to the general community our environmental commitment

## Resources

### RESOURCES USED FOR ESMS DEVELOPMENT (January 2011 - July 2012)

STAFF HOURS	
Core Team	2,816
Other Staff	432
<b>Total</b>	<b>3,248</b>



## Cost Savings and Avoidance

Intercity Transit believes many quantifiable cost savings are yet to be realized given they are in the early stages of implementation. However the agency has quantified fuel savings associated with implementing **ESMS Action Plan 5 – Reduce Fuel Usage**. Intercity Transit saved almost \$82,000 just from January to June 2012 with annual savings estimated at \$164,000.

ACTION PLAN 5: FUEL SAVINGS COMPARISON FROM JANUARY TO JUNE OF 2011 AND 2012					
Fuel Use (gallons)	January to June 2011	January to June 2012	Gallons Saved	\$ Savings (assume diesel is \$3.57/gallon)	% Savings in Fuel Usage
Fixed Route Hybrid Bus Fleet	28,248	26,136	2,112	\$7,540	7.48%
Fixed Route Regular Coach Bus Fleet	278,728	263,821	14,907	\$53,217	5.35%
Dial A Lift Fleet	26,636	20,802	5,834	\$20,827	21.90%
<b>TOTAL</b>	<b>333,612</b>	<b>310,759</b>	<b>22,853</b>	<b>\$81,584</b>	<b>6.85%</b>

The fuel efficiency training conducted under Action Plan 5 will reduce maintenance costs. Operators are trained to accelerate slowly and brake gently at stops. With the ultimate focus being a “smooth ride”, Intercity Transit saves money by reducing wear and tear on brakes and tires. More time and analysis will determine the amount of savings.

Action Plans 1, 2, and 3 focus on avoiding costs related to spills and accidents. By focusing on training and standard operating procedures for spill prevention and emergency response, Intercity Transit will avoid fines related to non-compliance with environmental regulations. Since beginning ESMS efforts, the agency has had no reportable spills. In the event of an actual spill, employees are prepared to act quickly and follow emergency response Standard Operating Procedures for safety, containment, and cleanup.

Due to Intercity Transit’s fluids inventory and use analysis efforts under Action Plan 4, procurement personnel buy less of all chemicals and look for less toxic alternatives. After assessing the inventory of chemicals and fluids products, maintenance staff was able to eliminate 60 percent of the products used. Many products have multiple uses and were combined to cut the number of chemicals stocked and eliminate duplications. Long term, this will save money, and means the agency will maintain fewer active MSDS files. Additionally with fewer chemicals on the shelves, the less likely we are to have a spill.

Lastly, an overall intangible benefit is the preservation of institutional knowledge. Ideas, information, and experiences are preserved through written procedures, standardized documentation, and efficient and effective records management.

Intercity Transit has experienced savings due to their ESMS efforts. Related to the agency’s broader sustainability efforts, the American Public Transportation

## Cost Savings and Avoidance

Association awarded Intercity Transit the nation's first "Gold" signatory status level for their commitment to sustainability in 2012.

Intercity Transit received the gold award for accomplishments in multiple areas. Between 2006 and 2010, the agency has:

- Reduced total agency waste output by 4.8 percent;
- Reduced total agency water use by 5.5 percent;
- Reduced energy use per transit trip by 8 percent;
- Increased transit ridership by 31.9 percent;
- Increased displaced emissions by 35 percent by replacing older emissions technology with new, cleaner technology; and
- Reduced greenhouse gas emissions (carbon dioxide and nitrous oxide) by 23.6 percent.



## Next Steps

The next steps for Intercity Transit's ESMS work are to:

- Implement improvements based on suggestions from the final audit conducted by Virginia Tech on July 9, 2012.
- Continually improve Intercity Transit's ESMS by continuing maintenance efforts in all 17 ISO 14001:2004 elements.
- Track progress on Objectives and Targets specified in current and future Action Plans.
- Develop a request for qualifications (RFQ) for an ISO 14001:2004 certification audit.

The next steps for sustainability efforts at Intercity Transit are to:

- Aim for a "Platinum" level award from the APTA Sustainability Committee.
- Update Intercity Transit's Sustainability Plan for 2013 with detailed sustainability objectives and targets.
- Continue to increase staff awareness of sustainability issues and practices.
- Focus on "greener" purchasing such as smaller, more fuel-efficient Dial-A-Lift vehicles where possible.

## Management Commitment

*“The entire Intercity Transit organization, from our front-line employees to our Board of Directors, is committed to sustainability, environmental protection and to implementing a successful Environmental and Sustainability Management System. This is demonstrated by the presence of senior management on our core ESMS team, the achievement of Gold Status in the American Public Transportation Association (APTA) Sustainability Commitment program, and the continuing commitment of resources by the Board to improve environmental protection and reduce our impact on the environment consistent with the Board’s Environmental and Sustainability Policy.”*

– Mike Harbour, General Manager, Intercity Transit



**For more information about Intercity Transit’s ESMS program, please contact:**

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(360) 705-5855

Detailed scoring on next page



## Final Audit

This section compares the percentage of requirements met, partially met and not met with respect to meeting the requirements of an EMS as specified in the ISO 14001:2004 standard. The following scores are the result of the EMS audit presented in this report:

Percent meeting all requirements <b>“Overall Score”</b>	88%
Percent of requirements <b>“Met”</b>	78%
Percent of requirements <b>“Partially Met”</b>	21%
Percent of requirements <b>“Not Met”</b>	1%

THE ISO 14001:2004 STANDARD ELEMENTS OF AN EMS		OVERALL SCORE (%)	MET (%)	PARTIALLY MET (%)	NOT MET (%)
4.1	General Requirements	100	100	0	0
4.2	Environmental Policy Requirements	100	100	0	0
4.3.1	Environmental Aspects Requirements	100	100	0	0
4.3.2	Legal and Other Requirements	83	67	33	0
4.3.3	Objectives, Targets and Programs Requirements	100	100	0	0
4.4.1	Resources, Roles, Responsibility and Authority	100	100	0	0
4.4.2	Competence, Training and Awareness	50	0	100	0
4.4.3	Communication	100	100	0	0
4.4.4	EMS Documentation	100	100	0	0
4.4.5	Control of Documents	94	89	11	0
4.4.6	Operational Control	63	50	25	25
4.4.7	Emergency Preparedness and Response	100	100	0	0
4.5.1	Monitoring and Measurement	83	67	33	0
4.5.2	Evaluation of Compliance	50	0	100	0
4.5.3	Nonconformity, Corrective Action and Preventive Action	81	63	38	0
4.5.4	Control of Records	100	100	0	0
4.5.5	Internal Audits	83	67	33	0
4.6	Management Review	100	100	0	0



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**King County Metro  
Seattle, Washington  
Case Study  
September 28, 2012**



## Profile



**King County Metro Transit** provides a variety of public transportation services to the 1.7 million residents of King County in the State of Washington and to the thousands of commuters and visitors who travel through the greater Puget Sound and Seattle metropolitan region on a daily basis. Metro's mission is to provide the best possible public transportation services, while improving regional mobility and the quality of life in King County.

Metro operates a fleet of about 1,500 buses, including diesel coaches, electric trolleys, hybrid diesel-electric coaches and transit vans. In 2011, the fleet carried an annual ridership of more than 112 million within a 2,134-square-mile service area on more than 230 regular bus routes. Metro supplements this fully accessible bus service with its paratransit vans, providing more than 1.2 million passenger trips a year for people with disabilities who are unable to use regular buses.

The agency also operates the largest publicly owned vanpool program in the country - with nearly 1,000 vans carrying 2.8 million passenger trips a year, removing approximately 4,500 vehicles from area roads during peak commute times each day. Commuters can use Metro's regional Ridematch system to form and sustain new carpools and vanpools.

The agency operates an extensive network of transportation facilities and supporting infrastructure, including:

- Seven transit operating bases
- 133 park-and-ride lots with over 26,000 parking stalls
- 10 transit centers
- 9,500 bus stops with 1,500 bus shelters
- A 1.3-mile bus tunnel in downtown Seattle
- 68 miles of overhead wire for electric trolleys, powered by 37 rectifiers



Metro also operates the Central Link light rail line and Regional Express bus service on behalf of Sound Transit and the South Lake Union Streetcar on behalf of the City of Seattle.

## Fenceline

The Environmental and Sustainability Management System (ESMS) Fenceline is defined as the two contiguous transit properties that comprise King County Metro's South Base and the Component Supply Center. The two properties are located in Seattle at 12100 E Marginal Way E and 122000 E Marginal Way E, respectively.

South Base (SB) is one of seven transit bases at King County Metro Transit. The base has two main service functions: the management and dispatch of drivers through the Operations section and the maintenance and repairs of buses through the Vehicle Maintenance section.



## Fenceline



South Base (SB) and Component Supply Center (CSC).

The Component Supply Center (CSC), managed under the Vehicle Maintenance section, provides coach component re-build and fabrication services for the transit fleet of approximately 1,500 King County Metro Transit and Sound Transit coaches assigned to the seven bases. It also provides inventory and materials management for bus parts and supplies. CSC's various shops perform work for body repair and paint, mechanical rebuild, signage, upholstery, electrical/electronic repair, welding, machine work, rebuilt parts repairs and retrofit fabrication.

The CSC's shared infrastructure (electricity, gas, water and sewer) and location next to South Base as well as related work practices help define this fenceline for the ESMS.

## Core Team

The ESMS Core Team has overall responsibility for developing, implementing, and maintaining the ESMS. The Team is made up of six team members representing the General Manager's Office, the Power and Facilities section, and the Vehicle Maintenance section. Team members include:



- **John Alley**, Assistant Manager, Vehicle Maintenance
- **Christine Anderson**, Special Projects Manager, General Manager's Office
- **Wendy Chin**, Project/Program Manager, Power and Facilities
- **Cathy Johnson**, Environmental Compliance Officer, Power and Facilities
- **Jerry Rutledge**, Manager, Power and Facilities
- **Mike Usen**, Sustainability Program Coordinator, Power and Facilities (not pictured)

## Key Drivers For Adopting an ESMS

### FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS

King County Metro Transit is responsible for compliance with environmental laws and regulations that are enforced by federal, state, and local environmental agencies. They include (among others):

- Resource Conservation and Recovery Act
- Hazardous and Solid Waste Amendments Act
- Clean Water Act
- Clean Air Act
- Code of Federal Regulations, Title 49
- Code of Federal Regulations, Title 40
- Code of Federal Regulations, Title 29
- Washington State Environmental Protection Act

King County Metro also complies with other key regulatory guidelines that pertain to specific key issues associated with the identified significant aspects for the ESMS fence line site. The above and other regulations, including their applicability, are listed in the South Base and Component Supply Center ESMS under Legal and Other Requirements.

### STATE AND LOCAL POLICIES

There is a strong policy basis in King County and Washington State that supports King County Metro's goals to be a leader in environmental responsibility. These policies include the King County Energy Plan, adopted by the King County Council in October 2010, the Cool Counties Initiative, signed by more than 40 counties throughout the U.S., and Washington State law mandating a reduction by 2020 of greenhouse gas emissions to 1990 levels.

### KING COUNTY ENERGY PLAN

The King County Energy Plan, adopted by the King County Council in October 2010, is a detailed roadmap to achieve goals and objectives outlined in the 2010 King County Strategic Plan. The Energy Plan builds on the County's past efforts to improve energy efficiency and advances the use and production of renewable and greenhouse gas-neutral energy.

The 2010 Energy Plan focuses on the following key objectives for reducing energy use and greenhouse-gas emissions in King County:

1. Reduce energy use through continuous improvements in facility and equipment efficiency, procurement, construction practices, and resource conservation.
2. Increase transit use and provide transportation choices that reduce overall energy use and emissions in the county, while improving the efficiency of King County's fleet.
3. Be a leader in early adoption and promotion of innovative technology for buildings and vehicles with a focus on electric vehicles.
4. Increase production and use of renewable energy.
5. Pursue sustainable funding strategies for energy efficiency, renewable energy projects, waste-to-energy projects and greenhouse-gas-reduction efforts.



# Key Drivers For Adopting an ESMS

The following near-term targets are set in the Energy Plan:

- Achieve a 10% normalized net reduction in energy use in County buildings and facilities by 2012 and a 10% normalized net reduction in energy use by County vehicles by 2015.
- Produce, use or procure renewable energy equal to 50% of total County energy requirements by 2012.

## STRATEGIC PLAN ALIGNMENT

The ESMS is well-aligned with the following organizational goals and strategies.

FROM THE KING COUNTY STRATEGIC PLAN:	
<b>Goal</b>	Safeguard and enhance King County's natural resources and environment
<b>Objective 4</b>	Minimize King County's operational environmental footprint
<b>Strategies</b>	<ul style="list-style-type: none"> <li>a. Incorporate sustainable development practices into the design, construction and operation of county facilities and county funded projects</li> <li>b. Measure energy usage in county facilities and use this information to guide conservation investments.</li> <li>e. Encourage King County employees to reduce their environmental impact.</li> </ul>

FROM THE KING COUNTY METRO TRANSIT STRATEGIC PLAN FOR PUBLIC TRANSPORTATION 2011 – 2021:	
<b>Environmental Sustainability</b>	Safeguard and enhance King County's natural resources and environment.
<b>Objective</b>	Minimize Metro's environmental footprint.
<b>Strategies</b>	<ul style="list-style-type: none"> <li>• Operate vehicles and adopt technology that has the least impact on the environment and maximizes long-term sustainability.</li> <li>• Incorporate sustainable design, construction, operating and maintenance practices.</li> </ul>

# Significant Aspects and Impacts

## CHEMICALS

The “chemicals” aspect covers all products that come in container sizes up to and including 55 gallon drums. We will be implementing a chemical management plan that will look at a variety of ways to reduce the environmental impacts of the chemicals that we use. Elements of this plan will incorporate strategies such as evaluating less hazardous replacement products and putting together a process to ensure that 100% of new products are reviewed by Transit Safety and Environmental Compliance prior to use.

## SPILL CONTROL

Spill potential is a risk reduction aspect that will involve looking at ways to prevent, reduce or mitigate the potential environmental impacts associated with spills. It will have multiple components, and will tie in closely with the emergency response requirements in the ISO 14001 standard. Examples of these components



are: designing for spill containment, equipment inspections/PMs, specific work instructions, and training employees to recognize and correctly respond to spills.

**ELECTRICITY**

The goal of this aspect is to reduce electrical consumption through more efficient building systems, better operating practices and user (behavioral) changes. This is consistent with King County’s 2010 Energy Plan as applied to transit facilities. Currently, two types of energy audits are in progress at South Base and CSC that will identify potential areas for conservation actions. Staff involvement will help develop the plan and strategies for implementation.

**NATURAL GAS**

Like the electricity conservation goal, this goal is to reduce gas consumption through more efficient systems equipment and better operating practices. Gas powers boilers that contribute to the heating component of HVAC (heating, ventilation, air conditioning) systems, equipment that generates hot water and steam, and domestic hot water. Gas consumption is included in the energy audits at South Base and CSC.

**Objectives and Targets**

<b>Significant Aspect 1</b>	<b>Manage &amp; mitigate use of chemicals</b>
Objective	Perform a safety and environmental review of 99% of all chemical products prior to their purchase and use
Target	Purchase 90% of non-bulk chemicals through VM’s M-5 purchasing and inventory system
<b>Significant Aspect 2</b>	<b>Manage &amp; mitigate the spill potential of the activities that occur on the property</b>
Objective	Safely and completely clean up 95% of incidental spills while maintaining an “externally reportable” spill rate of one or fewer events per year
Target	<ul style="list-style-type: none"> <li>• Train 90% of employees by December 31, 2012</li> <li>• Track the number of incidental spills through the existing spill reporting process</li> <li>• Track the number of externally reportable spills through the existing spill reporting process</li> <li>• Track the number of employee injuries and incidents resulting from chemical exposure</li> </ul>
<b>Significant Aspect 3</b>	<b>Reduce electricity use by implementing energy efficiency conservation action plans</b>
Objective	Achieve 5% reduction in electricity use by December 31, 2012
Target	<ul style="list-style-type: none"> <li>• Conduct energy audits</li> <li>• Install electrical sub-meters</li> <li>• Replace interior T-12 lighting</li> <li>• Replace CSC paint booth fans</li> </ul>
<b>Significant Aspect 4</b>	<b>Reduce natural gas use by implementing energy efficiency conservation action plans</b>
Objective	Achieve 5% reduction in natural gas use by December 31, 2012
Target	<ul style="list-style-type: none"> <li>• Conduct energy audits</li> <li>• Install gas sub-meters</li> <li>• Replace heat recovery units at CSC</li> </ul>



## Benefits of Adopting an ESMS

King County Metro Transit recognizes that there are many benefits to developing and implementing an ESMS, including:

- Reducing our risk of harming the environment
- Making South Base and the Component Supply Center a healthier place to work by reducing the exposure to potentially harmful chemicals
- Helping us to continually improve performance
- Reducing operating costs by reducing electricity and natural gas consumption and cost avoidance due to chemical management and spill control
- Ensuring federal, state and local environmental regulatory compliance
- Engaging our work force
- Enhancing our image with the public.

## Resources

Time spent developing and implementing the ESMS, from February 7, 2011, through March 31, 2012, including the time spent at the four workshops in Roanoke, Virginia, is as follows:

GROUP	ESTIMATED HOURS
Total ESMS Core Team hours	1,258.5
Total ESMS Fenceline Advisory Committee hours	60
Total ESMS Task Team hours	24.5
Employee Training	75
<b>Total</b>	<b>1,343</b>

## Cost Savings and Avoidance

Many of the anticipated outcomes of the ESMS will not be fully evident until it has been implemented for a period of time; however, we have seen some significant results:

- The value of documentation and systematic management of documents and their review in ensuring that we are compliant with federal, state and local environmental regulations
- Savings in reduced spills and mitigating spills
- Reduction in products with chemicals without Material Safety Data Sheets (MSDS)
- Estimated annual savings of more than \$13,000 through an anticipated reduction in electricity consumption (216,107 kWh, 129.53 metric tons of GHG)
- Estimated annual savings of more than \$6,000 through an anticipated reduction in natural gas consumption (9,021 Therms, 45 metric tons of GHG)
- Received \$76,635 in utility incentives as a result of ESMS fenceline energy reduction aspects
- Received \$69,579 in grants as a result of ESMS fenceline energy reduction aspects



## Next Steps

King County Metro's next steps include seeking ISO 14001 certification by the end of 2012. We also plan to develop and implement an ESMS at a second operations and maintenance base in 2013.

## Management Commitment



Senior management is fully committed and supportive of our ESMS. The ESMS was identified as one of the agency's top initiatives for 2012 and was featured in the July/August 2012 In Transit employee newsletter.

*"By adopting these management principles, Metro will be an even better organization underscoring our commitment to sustainability."*

– General Manager Kevin Desmond

**For more information about King County's ESMS program, please contact:**

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Detailed scoring on next page



## Final Audit

This section compares the percentage of requirements met, partially met and not met with respect to meeting the requirements of an EMS as specified in the ISO 14001:2004 standard. The following scores are the result of the EMS audit presented in this report:

Percent meeting all requirements <b>“Overall Score”</b>	99%
Percent of requirements <b>“Met”</b>	97%
Percent of requirements <b>“Partially Met”</b>	3%
Percent of requirements <b>“Not Met”</b>	0%

THE ISO 14001:2004 STANDARD ELEMENTS OF AN EMS		OVERALL SCORE (%)	MET (%)	PARTIALLY MET (%)	NOT MET (%)
4.1	General Requirements	100	100	0	0
4.2	Environmental Policy Requirements	100	100	0	0
4.3.1	Environmental Aspects Requirements	100	100	0	0
4.3.2	Legal and Other Requirements	100	100	0	0
4.3.3	Objectives, Targets and Programs Requirements	100	100	0	0
4.4.1	Resources, Roles, Responsibility and Authority	100	100	0	0
4.4.2	Competence, Training and Awareness	100	100	0	0
4.4.3	Communication	100	100	0	0
4.4.4	EMS Documentation	100	100	0	0
4.4.5	Control of Documents	100	100	0	0
4.4.6	Operational Control	100	100	0	0
4.4.7	Emergency Preparedness and Response	100	100	0	0
4.5.1	Monitoring and Measurement	100	100	0	0
4.5.2	Evaluation of Compliance	75	50	50	0
4.5.3	Nonconformity, Corrective Action and Preventive Action	100	100	0	0
4.5.4	Control of Records	100	100	0	0
4.5.5	Internal Audits	100	100	0	0
4.6	Management Review	100	100	0	0



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**Long Beach Transit  
Long Beach, California  
Case Study  
September 28, 2012**



## Profile



Our mission at **Long Beach Transit** is to provide public transit services that enhance and improve the quality of life for the residents of our community. We take pride in the fact that our annual surveys consistently document that 90% of our customers rate our service as good to excellent.

- **Services Provided:** Fixed-route bus service, including ZAP express routes; Passport shuttle service; AquaLink and AquaBus water taxi service; Dial-A-Lift paratransit service; and seasonal Museum Express service.
- **Service Area:** The 98 square mile service area includes the cities of Long Beach, Lakewood, Signal Hill and portions of Artesia, Bellflower, Carson, Cerritos, Compton, Hawaiian Gardens, Norwalk, and Paramount.
- **Ridership:** Our system serves 88,000 boarding customers on an average weekday and over 27.8 million boarding customers per year.
- **Routes:** 36 routes, 29 of which serve our downtown First Street Transit Gallery at 1st Street and Pine Avenue. All routes serve Metro Blue Line rail stations; two serve the Norwalk Green Line rail station. Connecting service at the Transit Gallery is provided by Metro, LADOT, and Torrance Transit.
- **Fleet:** 225 active buses total, including 182, 40-foot coaches; 30 mid-sized Passport shuttles; and 13, 60-foot articulated coaches. We operate 16 Dial-A-Lift vans and 4 water taxi vessels. All of our buses use low-floor curb level technology and all are fully ADA accessible. Fixed-route buses accommodate up to three bikes and the Passport shuttles accommodate up to two bikes using pull down racks.

Nearly half of Long Beach Transit's fixed route vehicles are **hybrid gas-electric** buses, with low-floor technology. Long Beach Transit was the first transit agency in the nation to utilize this technology. Long Beach Transit is replacing 64 aging **ultra-low-sulfur diesel** buses with new **CNG** buses in 2012, making our fleet run even cleaner.

All buses have a state-of-the-art **TranSmart** communications system that includes two-way text, data, and voice communication capabilities; automatic stop announcements; and a global-positioning vehicle location system, which enables our dispatch center to track the exact locations of our buses, improving performance and security. TranSmart also provides real-time schedule information to customers' phones, on our website, and on electronic displays in our Transit Gallery and over 60 major stops.

## Fenceline

Long Beach Transit is located at 1963 E. Anaheim Street, Long Beach, CA. Our second facility is located at 6860 Cherry Avenue, Long Beach, CA. The fenceline includes these two facilities.

The inherent shape of the buildings being low and equal in width and depth increases the facilities' survivability. Bus storage is on open paved lots adjacent to the structures.



## Fenceline

The maintenance facilities include one paint booth, three air conditioning bays, two electrical shop bays, three PM inspection pit bays, a front-end alignment bay, and body and tire shops. Additionally, there is a 3,300 square foot component rebuild shop, 9,700 square foot parts store rooms on two levels, and seventeen repair stalls with lifts. The fuel islands include two lanes with brake inspection pits, fuel facilities, engine oil, ATF, water service, vacuum machines and bus washers. Both facilities are equipped with back-up diesel-powered generators. Currently, the 68th Street facility is being retrofitted to accommodate servicing and fueling CNG vehicles.



## Core Team

The Core Team is comprised of seven team members representing the Risk Management and Maintenance Departments. Core Team members include (left to right):



- **Rolando Cruz**, Executive Director/VP Maintenance and Facilities
- **LaVerne David**, Executive Director/VP Risk Management
- **Rhea Mealey**, Project Manager
- **Duane Zertuche**, Environmental Health and Safety Officer
- **Jobel Rentino**, Maintenance Analyst
- **Robyn Peterson**, Chief Operating Officer
- **Jocelyn Alvarez**, Risk Management Administrative Assistant (not pictured)

## Key Drivers For Adopting an ESMS

- Unification of sustainability initiatives with environmental solutions.
- Pollution reduction.
- Reduced risk.
- Increased operational efficiency.
- Positive public image and public relations.
- Improved interdepartmental communication.
- Enhanced documentation.
- Goal setting and analyzation.
- Monitoring and measurement of progress.



## Significant Aspects and Impacts

The core team identified four significant aspects:

### (1) CNG (Compressed Natural Gas) fueling conversion

- Reduce air pollution generated from diesel vehicle emissions.
- Reduce diesel emissions by 58% by 2015.
- Replace 95 of 163 diesel driven buses with CNG by 2015.
- Monitor number of buses in diesel fleet on an annual basis.



### (2) Storage, Use and Disposal of Fuels

- Increase recycling of recyclable regulated wastes to reduce waste generation.
- Increase recycling of waste oils to 100%.
- Contract with single vendor for all waste disposal with emphasis on recycling opportunities for waste oil either by credit back to LBT and/or recycling certificates.
- Recycling of waste oil documented by certificates of recycling rather than manifests.
- Decrease annual waste disposal volumes.



### (3) Waste Water Discharge

- Reduce pollution to the industrial sewerage system.
- Decrease surcharge statement costs by 10%.
- Investigate wastewater system upgrades to reduce strength and volume of wastewater discharge.
- Annual wastewater surcharge data, flow, volumes and costs tracked annually.



### (4) Use of Electricity in Maintenance Shop

- Reduce Green House Gas Emissions by reducing electricity usage.
- Replace shop lighting with more efficient system.
- Reduce kWh by 62%.
- Meet Southern California Edison target of reducing kWh from 734,211 to 280,539.





## Objectives and Targets

ASPECT	OBJECTIVE	TARGET	PERFORMANCE INDICATOR	PROJECT COMPLETED DATE	STATUS/ COMMENTS
(#20.1) CNG (Compressed Natural Gas) Fueling Conversion	Reduce air pollution generated from diesel vehicles emissions.	<b>Reduce Diesel Emissions by 58% by 2015.</b> Replace 95 of 163 diesel driven buses with CNG fueled buses by 2015.	Monitor Number of buses in diesel fleet on annual basis. Please see attached forecast for CNG bus implementation.	December 31, 2015	A&E firm has been retained to design CNG facility. Bus vendor notified of proposed fleet change. Schedule in place to meet target date.
(#36) Storage, Use and Disposal of Oils	Increase recycling of recyclable regulated wastes to reduce waste generation.	<b>Increase recycling of waste oils 100%.</b> Contract with single vendor for all waste disposal with emphasis on recycling opportunities for waste oil either by credit back to LBT and/or recycling certificates.	Recycling of waste oil is documented by certificate of recycling rather than manifest. Also the annual waste disposal volumes should also decrease.	December 31, 2013	LBT is working on RFP for single contract vendor for waste disposal. RFP emphasizes recycling requirements.
(#16) Waste Water Discharge	Reduce pollution to the industrial sewerage system.	<b>Decrease surcharge statement cost by 10%.</b> Investigate wastewater system upgrades to reduce strength and volume of wastewater discharge.	Annual wastewater surcharge data, flow volumes and cost tracked annually.	August 1, 2013	Investigating water reduction options such as nozzle change outs for bus wash as well as pretreatment/pre-filters on clarifier.
(#28) Use of Electricity	Reduce Green House Gas Emissions by Reducing Electricity Usage	<b>Reduce kWh by 62%.</b> Meet SCE Target of reducing kWh from 734,211 to 280,539.	Replace lighting with more efficient system. Please see attached lighting specification and savings calculation by SCE. Verify reduction on electricity bills.	TBD, depending on CNG Project completion	LBT working with SCE to change out fixtures with more efficient ones.

## Benefits of Adopting an ESMS

- The ESMS process allowed for a better understanding of what personnel within the Risk Management and the Maintenance and Facilities Departments are doing and how processes are implemented.
- An understanding was gained of which processes and activities need to be documented and the importance of such documentation.
- Development of Standard Operating Procedures (SOP) allows the company to systematically address environmental issues.



## Benefits of Adopting an ESMS

- Setting Targets and Objectives in this process helped us clearly define our expectations.
- The Senior Management meetings better informed senior management of environmental issues.
- Departments are more knowledgeable on environmental and sustainable programs.
- Employees become stakeholders and are better able to leverage the power of working together to reduce pollution, conserve resources, and ensure compliance with laws and regulations.

## Resources

Since first meeting with Virginia Tech and FTA, from February 2011 through the end of July, 2012, the following labor hours have been estimated to prepare LBT's ESMS:

GROUP	ESTIMATED HOURS
ESMS Core Team	1,682
Other LBT Employees	183
Consultant	456
Employee Training	75
<b>Total</b>	<b>2,396</b>

## Cost Savings and Avoidance

Shop Lighting Replacement (Aspect # 28)  
Return on Investment (ROI)

LOCATION	DESCRIPTION	COST	SCE REBATE	NET COST	ANNUAL UTILITY SAVINGS	ROI
68th St. Shop	Replace metal halides and wall mounts	\$29,163	\$15,379	\$13,784	\$18,232	9 months
Anaheim Facilities	Replace metal halides and wall mounts	\$29,312	\$12,406	\$16,906	\$19,864	10 months
<b>TOTALS</b>		<b>\$58,475</b>	<b>\$27,785</b>	<b>\$30,690</b>	<b>\$38,096</b>	<b>9.5 months</b>

Cost saving and emission measurements will be forthcoming when CNG vehicles are put in service.

Waste oil cost savings will be calculated and forthcoming now that waste oil haulers have ceased to charge Long Beach Transit for removing oils.

Waste water cost savings were put in effect prior to the ESMS program.

## Next Steps

- Increase awareness of the ESMS program among Long Beach Transit employees
- Refine policies and procedures related to the ESMS
- Integrate ESMS with existing Enterprise Management Systems
- Develop and maintain better recordkeeping mechanisms
- Establish the ESMS projects as part of the annual Long Beach Transit budget review
- Continue creating Standard Operating Procedures (SOPs) and Work Instruction Plans (WIPs)
- Monitor costs and determine return on investment (for example, CNG)

### PLAN - DO - CHECK - ACT



## Management Commitment

The development of an environmental and sustainability management system (ESMS) is how an organization can make sure it is remaining compliant with all local, state and federal regulations; training and monitoring its employees, making sure everyone works with good practices that protect the environment while using resources wisely; initiating work practices that improve the environment; and making plans for the future by being alert to new methods and products that will offer continual improvement and efficiency.



Photo courtesy of Janna Starcic Executive Editor of Metro Magazine

Larry Jackson, President and Chief Executive Officer

### For more information about Long Beach's ESMS program, please contact:

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Detailed scoring on next page



## Final Audit

This section compares the percentage of requirements met, partially met and not met with respect to meeting the requirements of an EMS as specified in the ISO 14001:2004 standard. The following scores are the result of the EMS audit presented in this report:

Percent meeting all requirements <b>“Overall Score”</b>	96%
Percent of requirements <b>“Met”</b>	91%
Percent of requirements <b>“Partially Met”</b>	9%
Percent of requirements <b>“Not Met”</b>	0%

THE ISO 14001:2004 STANDARD ELEMENTS OF AN EMS		OVERALL SCORE (%)	MET (%)	PARTIALLY MET (%)	NOT MET (%)
4.1	General Requirements	100	100	0	0
4.2	Environmental Policy Requirements	90	80	20	0
4.3.1	Environmental Aspects Requirements	100	100	0	0
4.3.2	Legal and Other Requirements	100	100	0	0
4.3.3	Objectives, Targets and Programs Requirements	100	100	0	0
4.4.1	Resources, Roles, Responsibility and Authority	100	100	0	0
4.4.2	Competence, Training and Awareness	93	86	14	0
4.4.3	Communication	100	100	0	0
4.4.4	EMS Documentation	100	100	0	0
4.4.5	Control of Documents	100	100	0	0
4.4.6	Operational Control	63	25	75	0
4.4.7	Emergency Preparedness and Response	100	100	0	0
4.5.1	Monitoring and Measurement	100	100	0	0
4.5.2	Evaluation of Compliance	75	50	50	0
4.5.3	Nonconformity, Corrective Action and Preventive Action	100	100	0	0
4.5.4	Control of Records	100	100	0	0
4.5.5	Internal Audits	100	100	0	0
4.6	Management Review	100	100	0	0

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**Metropolitan Atlanta Rapid Transit Authority**  
**Atlanta, Georgia**  
**Case Study**  
**September 28, 2012**



## Profile



Fixed Route Bus Service

The Metropolitan Atlanta Rapid Transit Authority (MARTA) is the ninth largest transit system in the United States and has provided combined bus and rail service to DeKalb and Fulton Counties and the City of Atlanta for over 30 years. MARTA serves as the backbone of a growing regional transit network operating 92 bus routes and 38 rail stations on nearly 48 miles of double track. MARTA provides transportation for approximately 500,000 passenger boardings each weekday and helps to remove more than 100,000 cars from Metro Atlanta roads each day.

As the only multi-modal transit system in the state, MARTA operates and maintains over \$6 billion in public assets providing safe, reliable, and affordable public transportation to the Atlanta region. MARTA serves as a significant economic catalyst attracting major companies and international events to the Metro area, providing transportation to employment centers throughout the region, and offering a direct connection to Hartsfield-Jackson Atlanta International Airport, which is considered the world's busiest airport. In 1996 MARTA served as the official transportation provider for the Centennial Olympic Games in Atlanta. In 2007, MARTA became the first transit system in North America to convert entirely to a "smart card" fare collection system. The system, aptly named Breeze, uses convenient smart card technology, which enables customers to store a variety of fare products on one card, offers easy tap-and-go entry and exiting, and allows for the creation of a regional fare collection system with other transit providers.



Heavy Rail Service

## Fenceline



Armour Yard Vehicle Maintenance Facility (EMS scope outlined)

The Armour Yard Rail Vehicle Maintenance Facility opened May 23, 2005. All 338 revenue rail vehicles are brought through this shop for inspection and overhaul. Operations supporting light maintenance, heavy maintenance, rail car reliability engineering, and rail car appearance are performed in four buildings on the 33 acre site: the Maintenance and Overhaul Facility; the Petroleum, Oil, and Lubricants (POL) Building; the Train Wash Facility; and the Industrial Wastewater Treatment Plant.

## Fenceline

Rail vehicles are cleaned and washed daily. Extensive interior cleaning is performed every 30 days. Undercar degreasing is performed every six months.

Light maintenance includes daily pre-service checks of all vehicles available for revenue service, 15,000-mile interval preventive maintenance inspections of all rail car equipment, service based on manufacturer's recommendations, service required to rectify defects found during the inspections, and the unscheduled repair of defects that occur during revenue service.

The L-CARE (Life Cycle Asset Reliability Enhancement) Program is a comprehensive predictive maintenance program that addresses rail car reliability through a systemic component replacement process. Each rail car system is analyzed to identify critical systems and/or components that have a failure mode that compromises normal operation. These components are then bundled into a program interval that creates a best fit of component life and maximizes rail car operation. From this analysis, the program establishes a 42 month, 60 month, and 84 month component replacement interval for each car model and car type.

Heavy maintenance activities within the back shops support both running repairs and the L-Care program. In these shops, rail car components are dismantled down to their smallest parts and rebuilt. Once defective components are removed from rail cars they are turned in to the storeroom where they are distributed to various maintenance shops for internal rebuild. The refurbished parts are returned to stock for future use.

## Core Team

Creative thinking, professional networking, and influencing change are vital to the success of our EMS program. Individuals on MARTA's core team were chosen, in part, because of their proven ability to successfully implement major initiatives. The core team is comprised of leaders from the Offices of System Safety, Rail Car Maintenance, Bus Maintenance, Maintenance of Way, Architecture and Design (which includes Sustainability), Engineering and Development, and Program and Contract Management. This diverse, interdisciplinary team created a strong bond and worked to foster cooperative spirits across the organization.

Meet our team (pictured left to right):



- **David Springstead**, Senior Director of Engineering and Development
- **Rhonda Allen**, Project Manager
- **Jeffrey Kowalski P.G.**, Environmental Safety Engineer.
- **Garry Free**, Director of Maintenance of Way
- **Georgetta Gregory**, Assistant General Manager of Safety, Quality Assurance
- **Anton (Tony) Bryant**, Director of Bus Maintenance
- **Connie Krisak**, Director of Architecture and Design
- **Joseph Erves**, Director of Rail Car Maintenance
- **Timothy Carvana**, Manager of System Safety (not pictured)

## Key Drivers For Adopting an ESMS

Long before it was fashionable, MARTA made a staunch commitment to its customers, partners and the Atlanta community to provide environmentally sensitive transit without sacrificing its core mission. MARTA is an original signatory to APTA's Sustainability Commitment Initiative, reinforcing its pledge to make metro Atlanta more livable by integrating and balancing the community's economic, social and environmental needs. While voluntary efforts are commendable, MARTA realizes its efforts have an impact on a much broader scope. All of our state and metro Atlanta federal transportation funding depends on meeting mandated air quality standards. Without MARTA, the region and state would risk losing its eligibility to qualify for billions of dollars in future transportation investments

Environmental laws and regulations that affect Armour Yard include:

- Clean Water Act (CWA) (40 CFR 122 and GA 391-3-6);
- Resource Conservation and Recovery Act (RCRA);
- Hazardous and Solid Waste (40 CFR 260);
- Georgia Hazardous Waste Management Rules (GA 391-3-11);
- Ozone Depleting Substances (ODSs) (40 CFR 82);
- Universal Waste (40 CFR 273);
- Used Oil (40 CFR 279);
- Spill Prevention, Control, and Countermeasures (SPCC) (40 CFR 112);
- Tier II / Emergency Planning and Community Right-to-Know (40 CFR 302, 355, 372); and
- Federal Transit Administration (FTA) System Safety Program Plan.

As an industry leader for transit sustainability practices, MARTA is committed to developing facilities that complement its commitment to the environment. In fact, design for all new facilities must be LEED certified. MARTA's transit-oriented development program encourages commercial, residential, and retail development around rail stations resulting in smart growth and sustainable communities. Rolling stock is not exempt from MARTA's sustainable practices. MARTA operates 158 full size clean diesel buses and 373 "clean fuel" Compressed Natural Gas (CNG) buses, which reduce carbon monoxide by a full 95%. The agency recently installed the state's largest photovoltaic installation at the Laredo Bus Maintenance Facility. MARTA also houses two regional compressed natural gas fueling stations as well as four water recycling centers for bus and rail operations.

MARTA's efforts have been recognized nationally. MARTA is a recipient of the Clean Cities Lifetime Appreciation Award from the United States Department of Energy for working with the City of Atlanta to reduce petroleum consumption and lead the industry in the use of clean natural gas. Adoption of an EMS is yet another means of demonstrating MARTA's commitment to provide a safe, healthful workplace and contribute positively to the quality of life of the Atlanta region.

## Significant Aspects and Impacts

The core team, led by the environmental safety engineer, conducted a complete site survey of the activities and services performed at Armour Yard. The team generated a list of 133 environmental aspects and performed a risk analysis based on several criteria: the probability of occurrence; the severity of impact; and legal, industry, regulatory, or voluntary requirements. Aspects rated 15 or above were deemed significant. Five significant aspects were identified.

ACTIVITY/PRODUCT/SERVICE	ASPECT	IMPACT
Rail car cleaning	Degreaser	Soil and groundwater pollution (phosphorous loading of IWTP)
Pressure Washing and Steam Cleaning of Truck Bed	Degreaser	Soil and groundwater pollution (overconsumption of materials)
Brake Parts Cleaning in Ultrasonic Cleaner	Cleaning solvents	Hazardous waste generation
Light Maintenance and Inspections	Replacing refrigerants for air conditioning units on rail cars	Air Emissions from Ozone Depleting Substances
Light Maintenance and Inspections	Used mercury containing lamps	Universal waste generation

### Phosphorus Loading to IWTP

Armour Yard operates an Industrial Wastewater Treatment Plant (IWTP) under an Industrial Wastewater Discharge Permit issued by the City of Atlanta. The permit issues limits on specific parameters (i.e. phosphorus and total petroleum hydrocarbons) in the wastewater that can be discharged to the City of Atlanta wastewater treatment facility. The IWTP collects industrial wastewater generated from the Maintenance and Overhaul Facility operation; however, it is not designed to treat the phosphorus from chemicals used to clean train parts. The IWTP operations consist of oil skimming, grit removal, ultra-filtration, and a pH adjustment system. When not recycled back to the day tanks for non-potable cleaning use, the treated effluent from the IWTP is discharged to the City of Atlanta's sanitary sewer system. The goal is to minimize the phosphorous sources leading to the IWTP by substituting chemicals currently used for low phosphorous or phosphorous free cleaners.



Industrial Wastewater Treatment Plant



## Wastewater Generation From Degreasing Activities

Rail car undercarriages and trucks are cleaned at the blowdown pit and truck steam bay, respectively, in the Maintenance and Overhaul Facility. The vehicle undercarriage and truck components are sprayed with a degreaser detergent solution, manually scrubbed, if necessary, and cleaned via a high pressure water line. Often chemicals are not mixed according to manufacturer's specifications. This can lead to overconsumption of chemicals and increased phosphorous levels in the waste stream. The EMS has been used to develop a controlled process for accurately measuring and dispensing chemical concentrations in these areas.

Degreasing the car undercarriage entails mixing chemicals, applying a degreaser, and pressure washing the car.



## Hazardous Waste Generation From Ultrasonic Parts Cleaner

A sonic parts washer, with non-flammable parts washing fluid, is located inside the Brake Shop. The sonic parts washer waste solvent has been characterized as hazardous waste based on waste characterization sampling exhibiting a cadmium concentration above the threshold limit of 1 milligram per liter (1mg/L). The cadmium generated in the sonic parts washer solvent materials is from the metal brake parts cleaned in the unit. Cadmium from the brake parts is washed from the parts and remains in the solvent materials after each cleaning cycle. Spent solvent from the sonic parts washer is collected on an as-needed basis by a local contractor for offsite disposal. Due to the amount of hazardous waste (i.e. cadmium) generated by the sonic parts washer, Armour Yard is classified as a small quantity generator of hazardous waste. MARTA's goal is to upgrade the classification to a conditionally exempt generator. This can be accomplished by comparing the cleaning performance with the frequency of solvent disposal to reduce the amount of cadmium on site.



Solvent must be replaced before reaching the threshold for hazardous waste.



ODS releases must be prevented

### Ozone Depleting Substances (ODSs)

Rail car air conditioning systems contain Freon R-22, which has been characterized by regulatory agencies as an ODS. Certain chemicals are recognized as ODSs because they breakdown in the stratosphere and release chlorine or bromine, which destroy the stratospheric ozone layer. At the time of the initial EMS site survey there was no tracking mechanism for the possible release of the refrigerant or other ODSs. The EMS is being used to develop a compliance program for ODS management, including training mechanics to be EPA Section 608 Technician Certified, Type II.



Fluorescent lamps must be disposed as universal waste.

### Universal Waste Management of Fluorescent Lamps

Fluorescent lamps contain mercury and are classified as universal waste. Used and broken lamps are managed as universal waste through the LampTracker Program. Lamptracker boxes are used to store and transport used fluorescent lamps to a facility that can properly recycle them. Management of the used lamps is inconsistent; therefore a hazardous waste plan and compliance program will be developed to help employees understand the environmental significance of this aspect.

## Objectives and Targets

MARTA chose to set objectives and targets for each significant aspect. These are described below.

OBJECTIVE	TARGET
Reduce the amount of phosphorus that is discharged from the facility to the IWTP.	Maintain concentration of phosphorus in effluent to IWTP at seven (7) milligrams per liter (mg/L) of phosphorus or less by September 2012.
Reduce chemical usage and total petroleum hydrocarbon (TPH) levels in IWTP.	Reduce the use of Metro Track Bed cleaner by 5% by January 2012. Maintain total petroleum hydrocarbon (TPH) in effluent less than 20 mg/L by January 2012.
Minimize waste generation and attain RCRA Conditionally Exempt Small Quantity Generator (CESQG) status for the facility.	Minimize hazardous waste generation from process by 5% by March 2012. Attain CESQG status by December 2012.
Comply with motor vehicle air conditioning (MVAC) Ozone Depleting Substances (ODS) requirements.	Attain 90% training for HVAC technicians by March 2012. Have fewer than five compliance findings for MVAC ODS requirements under 40 CFR 82 by March 2012. Attain 95% training for HVAC technicians by September 2012.
Comply with fluorescent universal waste requirements.	Attain 80% completion of training for Railcar Maintenance personnel by July 2012. Have 5 or fewer compliance findings for universal waste requirements under 40 CFR 273 / GA 391-3-11-.18 during March 2012 audit. Attain 100% completion of training for active staff of Rail Car Maintenance personnel by September 2012.



## Benefits of Adopting an ESMS

- Stronger operational controls can lead to reduction in operating and maintenance costs as well as reductions in inventory of materials (parts & chemicals).
- Better safety and regulatory audit response capability.
- Established framework for expansion of the EMS Program to other facilities.
- Regional leader and example setter for other transportation providers in the Atlanta region.
- Increased awareness and ownership of the social, environmental, and financial impacts of our actions.
- Efforts to minimize environmental and financial impacts (i.e. identifying cause-effect relationships) have led to greater interaction between departments.
- Employees who were once reserved are now eager to share their views and have developed into comrades of management on environmental issues.
- Some employees are involved in civic activities that have environmental components. They are excited to know that MARTA is also involved in similar activities.
- Documentation control and records management of the EMS help ensure procedures are reviewed regularly and are consistent with current practices, goals, and objectives of MARTA.

## Resources

The MARTA core team enlisted the help of its environmental management consultant and several other employees to develop and implement the EMS. Reductions in time of implementation are expected as the fenceline expands. The estimated time and cost of the effort between February 2011 and June 2012 are:

RESOURCE	HOURS
MARTA Staff	1547
Consultant	1254
Core Team EMS /Lead Auditor Training	1035
Travel	-----
<b>Total</b>	<b>3836</b>

## Cost Savings and Avoidance

The control and management of the five significant aspects are expected to lead to cost savings and cost avoidance. The prospective annual returns are as follows:

ASPECT	EFFICIENCY	COST SAVINGS	COST AVOIDANCE
Degreaser Usage (train washing)	Regulation of the amount of phosphorus in the IWTP.	\$0	\$22,300
Degreaser Usage (truck washing)	Reduction in the amount of cleaner used	\$1,163	\$29,300
Cleaning solvents (brake parts cleaning)	Minimization of hazardous waste generation and optimization of the disposal rate.	\$0	\$3,000
Replacing refrigerants for air conditioning units on rail cars	Comply with motor vehicle air conditioning (MVAC) Ozone Depleting Substances (ODS) requirements	\$12,420	\$27,500
Used mercury containing lamps	Comply with fluorescent universal waste requirements.	\$0	\$27,500
<b>Total Prospective Cost Savings and Cost Avoidances</b>		<b>\$13,583</b>	<b>\$109,600</b>

Management of the current significant aspects is heavily influenced by regulatory requirements. After these aspects are controlled and their risk rating reduced, other aspects with high risk ratings will move into the significant category. These aspects may be more closely tied to voluntary or corporate requirements. Management and control of these aspects could result in even greater cost savings.

## Next Steps

MARTA is preparing for the ISO 14001 certification audit of the Armour Yard Rail Maintenance Facility in January 2013. The core team continues to measure, monitor, and control the significant aspects. Contract specialists are reviewing and revising contracts to meet requirements of the EMS program. Strategic trainers introduce the EMS program to new employees bi-weekly. Other departments will receive general EMS training and more in-depth explanations on roles and responsibilities as the EMS program matures. Senior Management has tasked the core team with establishing a plan to expand the EMS program to other rail yards and bus maintenance facilities. The Avondale Rail Maintenance Facility has been chosen as the next project. Administrative buildings may be considered as the program matures.



## Management Commitment

The mission of the Metropolitan Atlanta Rapid Transit Authority is to strengthen communities, advance economic competitiveness, and respect the environment by providing a safe and customer-focused regional transit system. In order to fully accomplish our mission, one of our strategic priorities is to embrace sustainability through the implementation of environmentally responsible practices. The Environmental Management System will become one of the leading tools used to realize and sustain this goal. As byproducts of the EMS, we expect to reap the benefits of continuous improvements to service delivery, financial strength, and enhanced employee development and relations. MARTA management is committed to continuous improvement of the EMS program. We are researching ways to expand the program beyond the current fenceline and to further develop the program at Armour Yard.



*“Transit stakeholders in the Atlanta region expect MARTA leaders to manage the business in a conservative manner. This ideology extends beyond fiscal responsibility to encompass social and environmental responsibilities as well. At times, balancing the demands of financial sponsors and maintaining an aging infrastructure can be challenging. The EMS program can be used to systemically identify ways to better manage operations and resources.”*

– Mr. Dwight A. Ferrell, Deputy General Manager/Chief Operating Officer, Metropolitan Atlanta Rapid Transit Authority.

### For more information about MARTA's ESMS Program, please contact:

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Detailed scoring on next page

## Final Audit

This section compares the percentage of requirements met, partially met and not met with respect to meeting the requirements of an EMS as specified in the ISO 14001:2004 standard. The following scores are the result of the EMS audit presented in this report:

Percent meeting all requirements <b>“Overall Score”</b>	100%
Percent of requirements <b>“Met”</b>	100%
Percent of requirements <b>“Partially Met”</b>	0%
Percent of requirements <b>“Not Met”</b>	0%

THE ISO 14001:2004 STANDARD ELEMENTS OF AN EMS		OVERALL SCORE (%)	MET (%)	PARTIALLY MET (%)	NOT MET (%)
4.1	General Requirements	100	100	0	0
4.2	Environmental Policy Requirements	100	100	0	0
4.3.1	Environmental Aspects Requirements	100	100	0	0
4.3.2	Legal and Other Requirements	100	100	0	0
4.3.3	Objectives, Targets and Programs Requirements	100	100	0	0
4.4.1	Resources, Roles, Responsibility and Authority	100	100	0	0
4.4.2	Competence, Training and Awareness	100	100	0	0
4.4.3	Communication	100	100	0	0
4.4.4	EMS Documentation	100	100	0	0
4.4.5	Control of Documents	100	100	0	0
4.4.6	Operational Control	100	100	0	0
4.4.7	Emergency Preparedness and Response	100	100	0	0
4.5.1	Monitoring and Measurement	100	100	0	0
4.5.2	Evaluation of Compliance	100	100	0	0
4.5.3	Nonconformity, Corrective Action and Preventive Action	100	100	0	0
4.5.4	Control of Records	100	100	0	0
4.5.5	Internal Audits	100	100	0	0
4.6	Management Review	100	100	0	0

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**Port  
Authority**

**Port Authority of Allegheny County  
Pittsburgh, Pennsylvania  
Case Study  
September 28, 2012**

## PROFILE



**Port Authority** of Allegheny County (Port Authority) provides a network of public transportation services to persons traveling within a 730 square-mile area of southwestern Pennsylvania, including the City of Pittsburgh and all of Allegheny County. Port Authority began operations in March 1964 following the passage of state legislation in 1959 enabling the consolidation of 33 private transit carriers, including the Pittsburgh Railways Company and 32 independent bus and inclined plane companies. By combining fare structures and centralizing operations, Port Authority established the first unified transit system in Allegheny County.

Today, Port Authority has a fleet of approximately 700 buses and 83 light rail vehicles (LRVs). With the Monongahela Incline and sponsorship of ACCESS, one of the nation's largest paratransit programs, Port Authority is one of the nation's most diversified public transit agencies. Port Authority's 2,400 employees serve approximately 230,000 riders daily and more than 60 million riders annually via 102 bus and rail routes and the Monongahela Incline.

The Port Authority Board also authorizes operation of many other private carriers, including university and hospital shuttles. Port Authority owns and operates four bus staging and maintenance facilities, a major bus overhaul facility, a light rail maintenance and transportation control center, and a major service facility that supports and maintains Port Authority facilities, properties and rights-of-way.

Port Authority provides service on three exclusive busways: the 4.3-mile South Busway, the 9.1-mile Martin Luther King Jr. East Busway, and the five-mile West Busway. Port Authority also operates the T, a 26-mile light rail system that features the popular Downtown Subway. Port Authority's Park and Ride program includes 53 lots and approximately 13,000 spaces.

Port Authority recently completed the North Shore Connector, a 1.2-mile extension of the T to Pittsburgh's North Shore. Pittsburgh's North Shore is home to the Carnegie Science Center, the Community College of Allegheny County, Del Monte Foods, Equitable Resources, Stage AE amphitheater, Rivers Casino, PNC Park and Heinz Field, among other existing and proposed cultural, business and residential destinations.

Port Authority has made great strides in modernizing and expanding its bus fleet. The Authority has placed into service 500 new buses in the past ten years reducing the average age of the fleet to less than eight years. The Authority now operates 32 hybrid electric buses, the first of their kind in its fleet. In 2009, the transit agency also launched an ambitious initiative to connect the region, its neighborhoods and resources, and Port Authority customers and employees. Called Connect '09, this effort is a broad analysis of the Authority's business practices designed to ensure the most efficient operations possible with available future funding. The strategic goals of Connect '09 include connecting neighborhoods through new service models and connecting the region by enhancing coordination of transit services and adopting a regional fare collection system.

## Fenceline

The Port Authority of Allegheny County's Ross Garage, located at 4600 Perry Highway in Pittsburgh, PA, is a maintenance facility primarily engaged in the repair, cleaning, and staging of Port Authority buses. Bus service originating from this location is provided to the regions north and west of and including the City of Pittsburgh.



Ross Bus Garage

The garage is a 150,000 square foot building situated on 7 acres in a mixed use suburban neighborhood north of Pittsburgh in Ross Township. Approximately 70 percent of the surface area of Ross Garage property is impervious. The location houses 175 buses operated by 220 drivers and supported by 90 maintenance and administrative personnel. Twelve service bays, an engine/chassis wash bay, and a body and paint bay are located at the building's northwest side, with two indoor wash racks and bus staging area accessible from the southwest face. On the southeast side of the building an addition houses the driver dispatch, layover area, and administrative offices.

The Port Authority's South Hills Village Rail Center is located at 1000 Village Drive in Pittsburgh, PA. The Rail Center contains Port Authority's Operations Control Center, rail fare collection and administrative offices, and the Car Shop, the major staging, maintenance and repair facility for LRVs. The Car Shop includes multiple lanes for maintenance and repair, two service lanes with wash racks, a power spray washing area, and a major storage area in the basement. One of the six electrical substations owned by the Port Authority is also located at the Rail Center. The rail center is situated on 25 acres located in a mixed use neighborhood and straddles the Township of Upper St Clair and Bethel Park Boro. Approximately 60% of the surface area of the Rail Center property is impervious. The location houses 83 LRVs, 120 operators and 90 maintenance and administrative personnel.



South Hills Village Rail Center

A total of 10 rail tracks enter the building for LRV service. Five rail tracks are dedicated solely for maintenance and repair operations of LRVs with another three entering booths within the building for painting and preparation. Exterior washing and interior cleaning of LRVs are conducted in the maintenance center on two tracks along the north side of the building. A new vehicle wash rack is under construction which will eliminate inefficiencies associated with the antiquated system

## Core Team



Port Authority formed a nine-member core team, seven of which attended the ESMS training in Roanoke, Virginia, adding two others as support members at the Port Authority. The core team consisted of representatives from the Technical Support & Capital Programs Department, Bus Operations, the Rail Service Delivery Department, the Facilities & Rail Maintenance Department and the System Safety Department. Core Team members included:

- **Dan Flanagan**, Health and System Safety Specialist
- **Eric Bilsky**, Assistant Director of Capital Programs
- **Winston Simmonds**, Former Rail Operations & Engineering Officer
- **Dean Pregel**, Environmental Compliance Coordinator
- **John Grinder**, Assistant Manager of Facilities
- **Clay Blair**, Manager of Maintenance & Service, Ross Garage
- **Dave Kramer**, Manager of Railcar Maintenance at South Hills Village Rail Center (not pictured)
- **Stacey Roessler**, Administrative Assistant (not pictured)
- **Jeff David**, Environmental Intern (not pictured)

The core team established a standing meeting every two weeks. Subteams were formed from within the core team and additional employees were brought in from each fenceline to aide in the continuous improvement of the EMS.

## Key Drivers For Adopting an ESMS

Port Authority's diversity of current service operations, ongoing capital improvement and expansion projects, and planning for the future transit needs of a major metropolitan area make the implementation of an EMS an important part of our business operations. The diverse geographic, hydro-geologic and seasonal weather conditions of Southwestern Pennsylvania necessitate great environmental awareness in the implementation of operations and capital improvement projects. Numerous streams feeding to three major rivers transect hills and valleys throughout the service area that provide public water supply and recreation. In addition to assuring best management in terms of water quality, Port Authority finds it important to contribute to the improvements in air quality made since the days when Pittsburgh was known as the "Smoky City."

The provision of a frame work for integrating environmental stewardship and awareness into daily decision making and practices as well as improvement in areas of training and records management will continue to allow Port Authority to minimize its impact on Pittsburgh's unique natural resources.

## Significant Aspects and Impacts

The Core ESMS team identified and prepared a preliminary list of environmental aspects for each of the fenceline facilities. The preliminary lists were reviewed by subteams from each fenceline facility to ensure they were complete and relevant. Another sub team was formed to establish a weighted system for ranking the significance of the aspects. The identified environmental aspects and impacts were evaluated with consideration given to the potential regulatory and legal exposure as part of the review. The criteria under the ranking system included the following:

## Significant Aspects and Impacts

- Environmental impact of each environmental aspect/activity including releases to water, emissions to air, solid waste management, contamination of soil or land, and use of raw materials and natural resources.
- Scale of impact
- Severity of impact
- Probability of occurrence
- Duration of impact
- Ease of changing impact
- Effect on Public Image or Parties of Interest

The subtotal score was multiplied by the Regulatory/Legal score factor to produce the total score or total rating of the aspect. Five significant aspects as presented below were identified for the fenceline facility with aspects 2 and 4 being combined into a general “hazardous waste” category. Potential impacts from these aspects include hazardous or solid waste generation, soil, water, and air pollution.

### 1. Underground Storage Tanks

Port Authority stores bulk vehicle fuels and fluids in underground storage tanks (USTs). The Veeder Root system provides 24 hr. monitoring of the USTs.



### 2. Used Lacquer Thinner and Paint Waste Related Materials

Parts cleaning and vehicle coating operations generate these hazardous wastes. Port Authority’s fencelines are classified as large quantity generators of hazardous waste.



### 3. Wastewater

Vehicle washing operations and housekeeping activities generate wastewater that is directed to the local publicly-owned wastewater treatment plant. Trench drains within the fencelines flow through an oil/water separator before discharge into the sanitary sewer system.

## Significant Aspects and Impacts

### 4. Used Solvent Based Parts Cleaner

Parts washers are used to degrease vehicle hardware during maintenance and service. Solvent used in the washers is considered a hazardous waste upon removal. Some ultrasonic washers are used by Port Authority, employing a non-hazardous aqueous solution.



### 5. Gasoline

Each fenceline has a gasoline UST and fueling system for use by Port Authority non-revenue vehicles. Gasoline is Port Authority's most hazardous material.



## Objectives and Targets

The core team developed these objectives and targets for the five identified significant aspects. These objectives and targets are consistent with Port Authority's Environmental Policy and meet regulatory requirements.

### SOUTH HILLS VILLAGE Environmental Management System

Aspect	Objective	Target
Hazardous Waste	Reduce the amount of used parts cleaning solvent, paint waste and used lacquer thinner sent off site.	Reduce hazardous waste generated by 15% to achieve small quantity generator status.
Wastewater	Prevent discharge of non-compliant levels of oil, gas, and suspended solids to public waterways.	100% completion of preventive maintenance procedures on pretreatment units.
Storage tanks	Minimize potential for spill incidents during transfer through tank management program.	100% implementation of improved inspection, monitoring and training procedures .
Gasoline	Safe handling during delivery, storage and dispensing to prevent release into environment.	100% implementation of gasoline management program.
<b>Impacts</b>	<b>Hazardous or solid waste generation, soil, water, and air pollution</b>	



All Port Authority personnel should be familiar with both the **significant aspects** and related actual or potential **impacts** associated with their work.



Handout distributed to personnel at fenceline training sessions.





**HAZARDOUS WASTE REDUCTION**

<b>Objective</b>	Reduce the amount of used parts cleaning solvent, paint waste and used lacquer thinner sent off-site as hazardous waste.
<b>Measurable Target and completion date</b>	Reduce by 15% the amount of hazardous waste generated by January 1, 2013, to achieve small quantity generator status.
<b>Action Plan</b>	<ul style="list-style-type: none"> <li>• Implement and maintain the hazardous waste source reduction strategy.</li> <li>• Establish a baseline by reviewing the past two year's manifests and identify types and quantities of hazardous waste generated.</li> <li>• Evaluate each waste stream for reduction, reuse, and recycling of hazardous waste by 15% from baseline. Review findings with the EMS team to determine methods for reduction.</li> <li>• Evaluation of work instructions (SOPs) relating to this action plan. Have written SOPs in place, and reviewed by the EMS Team for possible revisions as needed.</li> <li>• Begin operational training for affected employees relating to this action plan for methods of reducing hazardous waste generation.</li> <li>• Reduce hazardous waste generation by reducing the change out frequency of used solvent in the solvent parts washers.</li> <li>• Conduct characterization study of parts cleaning solvent to eliminate used solvent as hazardous waste.</li> <li>• Measure quarterly hazardous waste generation to track progress toward this action plan and present to the EMS Team.</li> </ul>

**WASTEWATER MANAGEMENT**

<b>Objective</b>	Reduce likelihood of exceeding industrial wastewater permit limits.
<b>Measurable Target and completion date</b>	100% completion of preventive maintenance procedures on pretreatment units by September 31, 2012.
<b>Action Plan</b>	<ul style="list-style-type: none"> <li>• Review new permit requirements and revised pretreatment standards.</li> <li>• Review SOPs and Preventive Maintenance (PM) procedures and other relevant documents to ensure they are current with new permit requirements and existing facility activities. Implement new and revise existing SOPs &amp; PMs as required.</li> <li>• Inspect potential for uncontrolled wastewater, shop spills and leaks. Inspect integrity of operational controls to reduce uncontrolled releases.</li> <li>• Complete wastewater monitoring and track results versus permit conditions.</li> <li>• Begin awareness and operational training for affected employees relating to this action plan.</li> <li>• Complete installation and startup of new LRV wash system that includes a washwater recycling system.</li> </ul>

**STORAGE TANK MANAGEMENT**

<b>Objective</b>	Improve management of storage tank systems in accordance with the applicable federal and Commonwealth of Pennsylvania storage tank regulations.
<b>Measurable Target and completion date</b>	100 percent implementation of improved inspection, monitoring and training procedures associated with the storage tank management program by August 31, 2012.
<b>Action Plan</b>	<ul style="list-style-type: none"> <li>• Development of UST maintenance specification for contractor bid.</li> <li>• Award UST Maintenance Contract and give Notice to Proceed.</li> <li>• Development of Updated UST Release Detection Monitoring and Response Procedures.</li> <li>• Implement Updated UST Release Detection Monitoring and Response.</li> <li>• Determine employee classification to fulfill Class A, Class B and Class C UST Operator requirements of storage tank regulations.</li> <li>• Provide PaDEP approved third-party training to Class A and Class B operators.</li> <li>• Develop and implement training program for Class C operators under UST Release Detection Monitoring and Response Procedure.</li> <li>• Conduct annual Veeder-Root Tank Monitoring System operational inspection per manufacturer's recommendations through Storage Tank Maintenance Contract.</li> </ul>





GASOLINE HANDLING	
<b>Objective</b>	Improve management of gasoline delivery, storage and dispensing processes in accordance with best management practices to reduce the likelihood of releases to the environment.
<b>Measurable Target and completion date</b>	100 percent implementation of gasoline management program by September 1, 2012.
<b>Action Plan</b>	<ul style="list-style-type: none"> <li>• Evaluation of work instructions (SOPs) relating to this action plan. Have written SOPs in place, and reviewed by the ESMS Team for possible revisions as needed.</li> <li>• Review and revise as necessary the delivery specifications located in the gasoline contract. Ensure fuel delivery contractor is prepared and trained to respond to a release during delivery operations.</li> <li>• Develop fueling station operating practices signage</li> <li>• Develop spill prevention and response procedures for gasoline fueling operations.</li> <li>• Procure and place spill kits and catch basin cover mats adjacent to fueling areas.</li> <li>• Train 100% of employees who fuel non-revenue vehicles on correct fueling practices and response to a release.</li> </ul>



## Benefits of Adopting an ESMS

Port Authority plays a key role in the economic growth and vitality of Southwestern Pennsylvania by serving those residents who choose public transportation for its convenience and its economic and environmental benefits. The ESMS integrates environmental awareness and stewardship throughout the Port Authority system, minimizing its environmental impact on the public, service area and our employees, as well as protecting and improving the environmental quality of Southwestern Pennsylvania. In summary, Port Authority’s ESMS will provide the following to the organization:

- A standardized, organization-wide Environmental Policy
- Heightened environmental awareness
- Environmental stewardship
- Reduction of environmental impact of operations
- Protection of resources and improvement of environmental quality of the region
- Compliance with regulations
- Cost and resource savings

## Resources

Port Authority has estimated that the following labor hours have been expended in the development and implementation of the ESMS, from the first meeting with Virginia Tech and FTA through July 1, 2012.

GROUP	ESTIMATED HOURS
ESMS Core Team	2,500
Other PAAC Employees	275
Employee Training	125
<b>TOTAL</b>	<b>2,900</b>



## Cost Savings and Avoidance

Port Authority has realized cost savings by reducing the amount of hazardous waste generated on site as part of the hazardous waste reduction objective. Since implementing solvent recycling parts washers, a **\$91,000 per year savings has been realized while reducing hazardous waste by 54% annually**. This cost and waste savings is representative of all seven active Port Authority facilities.

Falling under Port Authority's wastewater management objective, the installation of a new recycling LRV wash system at the South Hills Village Rail Center is expected to save 500,000 gallons of water per year and generate subsequent cost reductions for intake and outlet.

The improved management of underground storage tanks and gasoline will help to avoid costs associated with potential non-compliance issues. On-site availability of spill kits and emergency drain cover spill mats should defray the possibility of large-scale cleanup and remediation activities resulting from accidental releases.

## Next Steps

The EMS has been activated at Port Authority's Ross Bus Garage with positive reception. The EMS will be implemented at Port Authority's fenceline rail facility, South Hills Village Rail Center, in August 2012 beginning with employee training and awareness.

## Management Commitment



Stephen G. Bland, Chief Executive Officer of Port Authority, gives his support to the ESMS program and has commended the ESMS team for their dedication.

Port Authority's executive management has been committed to the ESMS project from the beginning, providing the necessary resources to implement the program.

On February 15, 2012, Port Authority of Allegheny County Senior Staff approved the Environmental Policy which formalizes Port Authority's commitment to environmental & sustainability management.

In addition to top management support, the support and participation of key managers from the Bus, Rail and Facilities Maintenance & Service Departments has been critical to achieving and maintaining the momentum Port Authority has gained in the development and implementation of the ESMS.

### For more information about Port Authority's ESMS program, please contact:

Dean Pregel  
Environmental Compliance Coordinator  
dpregel@portauthority.org  
(412) 566-5170

Detailed scoring on next page



## Final Audit

This section compares the percentage of requirements met, partially met and not met with respect to meeting the requirements of an EMS as specified in the ISO 14001:2004 standard. The following scores are the result of the EMS audit presented in this report:

Percent meeting all requirements <b>“Overall Score”</b>	97%
Percent of requirements <b>“Met”</b>	94%
Percent of requirements <b>“Partially Met”</b>	6%
Percent of requirements <b>“Not Met”</b>	0%

THE ISO 14001:2004 STANDARD ELEMENTS OF AN EMS		OVERALL SCORE (%)	MET (%)	PARTIALLY MET (%)	NOT MET (%)
4.1	General Requirements	100	100	0	0
4.2	Environmental Policy Requirements	95	90	10	0
4.3.1	Environmental Aspects Requirements	100	100	0	0
4.3.2	Legal and Other Requirements	100	100	0	0
4.3.3	Objectives, Targets and Programs Requirements	100	100	0	0
4.4.1	Resources, Roles, Responsibility and Authority	90	80	20	0
4.4.2	Competence, Training and Awareness	64	29	71	0
4.4.3	Communication	100	100	0	0
4.4.4	EMS Documentation	100	100	0	0
4.4.5	Control of Documents	94	89	11	0
4.4.6	Operational Control	100	100	0	0
4.4.7	Emergency Preparedness and Response	100	100	0	0
4.5.1	Monitoring and Measurement	100	100	0	0
4.5.2	Evaluation of Compliance	100	100	0	0
4.5.3	Nonconformity, Corrective Action and Preventive Action	100	100	0	0
4.5.4	Control of Records	100	100	0	0
4.5.5	Internal Audits	100	100	0	0
4.6	Management Review	100	100	0	0

**FTA eSMS INSTITUTE**  
cota.vt.edu/ems



**San Joaquin Regional Transit District**  
**Stockton, California**  
**Case Study**  
**September 28, 2012**



## Profile



Photo Credit: Wikipedia 2012: [http://en.wikipedia.org/wiki/File:Stockton\\_skyline.jpeg](http://en.wikipedia.org/wiki/File:Stockton_skyline.jpeg)

A land of beauty, recreation and natural riches – from the waters of the Delta to the vines of the wine country, San Joaquin County has it all. San Joaquin County boasts seven cities (approximately 921,600 total acres) and some of the finest opportunities in the state for boating, fishing, camping, history-gathering, or just plain fun in the sun.

Each city, as well as the unincorporated County areas, offers a unique opportunity to enjoy natural California beauty and nature, or music, arts and culture. Whatever your interest, it can most likely be found in San Joaquin County.

The City of Stockton, the seat of San Joaquin County, is the fourth largest city in California’s Central Valley. With a population of 291,707 at the 2010 census, Stockton ranks as the state’s 13th largest city. The city is located in Northern California, south of the state capital Sacramento and north of Modesto.

Stockton is along Interstate 5, State Route 99 and State Route 4 amid the farmland of the California Central Valley. It is connected westward with San Francisco Bay by the San Joaquin River’s 78-mile (126 km) channel, and is, with Sacramento, one of the state’s two inland sea ports. In and around Stockton are thousands of miles of waterways and rivers that make up the California Delta.



San Joaquin Regional Transit District (RTD) is the regional public transportation provider for San Joaquin County. RTD’s primary mission is to

provide a safe, reliable and efficient transportation system for the region, and its vision is to become the transportation service of choice for the residents it serves. RTD provides public transit services in the Stockton metropolitan area, as well as Intercity, Interregional Commuter, and Rural transit services countywide.

STATISTICS	
Service Area	1,426 square miles
Service Area Population (2010)	687,744
SERVICES	
Metro Routes (including three BRT routes)	32
Intercity and Countywide Routes	11
Metro Hopper Deviated Fixed Routes	8
Interregional Routes	11
TOTAL	62
Dial-A-Ride (DAR) Services:	Countywide General Public (GP DAR)
RIDERSHIP STATISTICS	
Total Annual Ridership (FY12)	4,265,608 trips

Total Annual Passenger Miles: 18,370,837  
Number of Vehicles: 120

## Profile



### INFRASTRUCTURE:

RTD operates service out of three separate facilities in downtown Stockton. Two of the three facilities, the “Metro” and “County” facilities, are used to maintain vehicles and control operations. The Downtown Transit Center (DTC) is the third facility located at 421 E. Weber Avenue. The DTC is Stockton’s downtown public transit hub, located in the heart of Stockton’s central business district, and houses the organization’s primary administrative offices. Nearly all RTD routes connect at the DTC, with 20 sheltered, off-street bus stops on two passenger-boarding platforms, and additional stops on Channel Street and Weber Avenue.

On April 23, 2009, RTD opened its Mall Transfer Station that includes dedicated bus lanes, shelters, and crosswalks. This location serves as a major transfer point in north Stockton for many of RTD’s routes.

On January 25, 2011, the addition of Metro Express Route 44, the second of RTD’s Bus Rapid Transit (BRT) routes, expands express bus service south of the Downtown Transit Center (DTC) along the Airport Corridor to the Stockton Airport. Route 44 connects at the DTC to Metro Express Route 40, which operates along the Pacific Corridor to the Hammer Triangle. Combined, these two routes operate 11+ miles of BRT service, more than doubling the length of Route 40, RTD’s first BRT route and the first in San Joaquin County. During peak times, buses on these routes arrive every 10 minutes, and every 15 or 30 minutes during non-peak times.

On July 30, 2012, RTD opened its third BRT route to serve the Hammer Lane corridor.



### BUS FLEET AND EMPLOYEE INFORMATION:

SERVICE CATEGORY	FLEET COUNT
SMA Fixed Route	52
Bus Rapid Transit	20
Metro Hopper	12
County Hopper/Intercity Route	15
Commuter Route	19
Work Connection	2
<b>Total Fleet</b>	<b>120</b>



RTD has 39 employees at the Downtown Transit Center and 145 employees at the Metro Yard.

RTD County Operations is operated by MV Transportation and employs 80 employees.



## Fenceline



Metro Facility

Built in 1974, the Metro facility has outlived its intended useful life of 30 years. The facility, built on a five-acre lot in downtown Stockton, was designed to accommodate a fleet of 50 buses. With four maintenance bays, two minor service bays, and one wash bay and fuel service island, the facility is too small to accommodate the metropolitan service fleet. Housing the only fuel island and washing bay for RTD, this facility regularly services 100 fleet vehicles a day. The overnight parking lot is overcrowded and hinders maintenance activity.

The following areas are located within the fenceline:

- The Fuel and Wash Area: Located along the easternmost boundary of the Metro Facility, the Fuel and Wash Facility is the primary location for fueling, washing, and inspecting fleet (revenue and non-revenue) vehicles maintained and operated by RTD.
- The Maintenance Area: Located along the north-central and southern boundary of the Metro Facility, this area houses four bays on the northern side and four bays and two pits on the southern side. The Maintenance Area is the primary location for maintaining, repairing, and inspecting fleet (revenue and non-revenue) vehicles maintained and operated by RTD; receiving parts and associated goods; housing facilities maintenance; and housing RTD's wellness activity center.
- The Administration Area: Located in the southwestern area in the Metro Facility, the Administration Section is the primary location for dispatching, training, and managing service operations including but not limited to human resources activities, and executive team leadership.
- The Staging Areas: Located throughout the facility, the Staging Areas are the primary locations for staging fleet (revenue and non-revenue) vehicles maintained and operated by RTD. These open areas include site drainage, landscaping, public and staff parking, security amenities, signage, and fencing.







## Core Team

The RTD Environmental and Sustainability Management System (ESMS) Core Team is comprised of personnel representing the various departments within the agency.



Representatives of the five-member core team are from the Executive, Planning, Facilities and Maintenance departments.

The ESMS Core Team encourages involvement in ESMS from capital development, project delivery, and operations departments as well as from environmental staff.

From left to right, the RTD ESMS Core Team Members are:

- **Nathaniel Atherstone**, Planning Manager
- **Brad Menil**, Maintenance Supervisor
- **Donna DeMartino**, General Manager/ CEO
- **Wendell Krell**, Facilities Superintendent-Projects
- **Mark Fairbanks**, Superintendent-Operations

## Key Drivers For Adopting an ESMS

RTD recognizes that a healthy and sustainable environment is important to its economy, its future, and the citizens of San Joaquin County. RTD has devoted its best efforts and attention to managing environmental resources for the benefit and enjoyment of current and future generations. Consistent with its environmental commitment and its goal of improving and documenting environmental performance, RTD decided to develop and implement the ESMS.



RTD will use the ESMS as its primary tool in applying sustainable principles and practices in its planning, construction, operations, and procurement to protect the environment for present and future generations. RTD will do this by:

- Identifying potential environmental impacts generated by its activities and developing mitigation measures to address those impacts;
- Operating and maintaining RTD vehicles and facilities to minimize negative impacts on the environment;
- Reducing consumption of natural resources;
- Reducing or eliminating the use of hazardous materials;
- Increasing the amount of recycling and use of recycled products; and
- Reducing and/or diverting the amount of solid waste going to landfills.

RTD is committed to planning and constructing its projects, operating and maintaining its facilities and vehicles, and procuring products and services consistent with state, federal laws and regulations, in a manner protecting human health and the environment. To demonstrate RTD's commitment, RTD will:

## Key Drivers For Adopting an ESMS

- Comply with all federal, state, and local environmental laws and regulations;
- Restore the environment by providing mitigation and corrective action by monitoring to ensure that environmental commitments are implemented;
- Continuously improve RTD's ability to manage and account for environmental liabilities and risk;
- Avoid environmental degradation by minimizing releases to air, water, and land;
- Prevent pollution and conserve resources by reducing waste, reusing materials, recycling, and preferentially procuring environmentally-friendly products and materials;
- Encourage and support the development of standards that encourage public transit use and environmental protection;
- Conduct training to raise awareness among employees and the general public regarding environmental protection and sustainable practices;
- Ensure that the planning, design, construction, and operation of its facilities and services consider environmental protection and sustainable features;
- Periodically review and implement updated environmental protection procedures and practices to ensure that they provide effective solutions for the problems they are designed to prevent or correct;
- Recognize and encourage citizen awareness and involvement in its efforts to protect the environment;
- Build relationships with contractors, vendors, consultants, and transit partners during planning, design, construction, operation and procurement to protect and enhance the environment;
- Consider alternative and innovative solutions to address energy and environmental challenges in providing public transportation services;
- Establish and maintain an ESMS with environmental objectives and targets that are measurable, meaningful and understandable; and
- Communicate the goals and progress of this Policy and the ESMS to its Board of Directors, officers, employees and the public

## Significant Aspects and Impacts



Within the fenceline, the ESMS Core Team established and identified aspects by determining RTD's activities that impact the environment in either a beneficial or an adverse manner. The ESMS Core Team prioritized and identified significant aspects based on the following criteria:

- Scale of Impact
- Severity of Impact
- Probability of Occurrence
- Duration of Impact
- Potential Regulatory and Legal Exposure
- Ease of Changing Impact
- Effect on Public Image & Interested Parties
- Effect on RTD's Sustainability
- Potential Savings
- Cost of Changing Impact



## Significant Aspects and Impacts

Significant aspects, meaning those of the highest priority in meeting RTD's commitment to the environment, were then identified by the Core Team as being the following:

- Diesel Fuel and Vehicle Emissions
- Electronics Waste
- Hazardous Materials Risk Assessment, Management, and Cleanup



## Objectives and Targets

When setting objectives, the Team's goal was to be consistent with following RTD's Environmental Policy.

OBJECTIVES	TARGETS
Develop a written electronics disposal program or work instruction (WI), establish appropriate pre-disposal storage and disposal means, train all RTD personnel.	<ol style="list-style-type: none"> <li>1. 100% electronics disposal compliance by the end of June 2012</li> <li>2. Staff training by the end of June 2012</li> </ol>
Use of Hybrid Technology and reduction of idling time to reduce emissions and decrease fuel consumption.	<ol style="list-style-type: none"> <li>1. Reduce bus idling time 10% by June 30, 2012</li> <li>2. Reduce fuel consumption by 10%</li> <li>3. Replace 100% of revenue fleet vehicles when retired, with Diesel/Electric Hybrid buses by December 31, 2013</li> </ol>
Eliminate hazardous material spills along with decreasing emergency response time if a spill occurs.	<ol style="list-style-type: none"> <li>1. Eliminate all hazardous material spills (Diesel, Gasoline, Oil, Transmission Fluid, Antifreeze).</li> <li>2. Improve hazardous material spill response – Field &lt; 20 minutes; Fence line RTC &lt; 5 minutes.</li> </ol>





## Benefits of Adopting an ESMS

Some of the benefits of the ESMS:

- It provides a mechanism for expanding RTD's ESMS Program to include all RTD facilities.
- It communicates to the public RTD's commitment to environmental sustainability.
- It provides a forum for a new level of interdepartmental communication and cooperation.
- It creates a positive impact on RTD's environmental performance and enhanced its ability to conduct core business.
- It provides an excellent training mechanism, allowing for a single repeatable consistent message broadcast throughout the organization.
- It creates a structure that encourages and enables employee participation in environmental and workplace process improvements.
- It elevates the priority of environmental performance and safety compliance at all levels of the organization; problems tend to get immediate attention.
- It dramatically reduces revenue vehicle emissions, electronics disposal and hazardous material spill potential.
- It puts crucial institutional knowledge into written form and establishing document control.
- It provides a strong foundation to support RTD in choosing sustainable and environmentally responsible practices.

## Resources

RTD estimates it has devoted the following staff time to undergo the training (including travel cost/time) and develop the ESMS from the period between January 2011 and July 2012:

GROUP	ESTIMATED HOURS
ESMS Core Team	1,161
Subcommittees and Other Personnel	400
<b>Total</b>	<b>1,561</b>

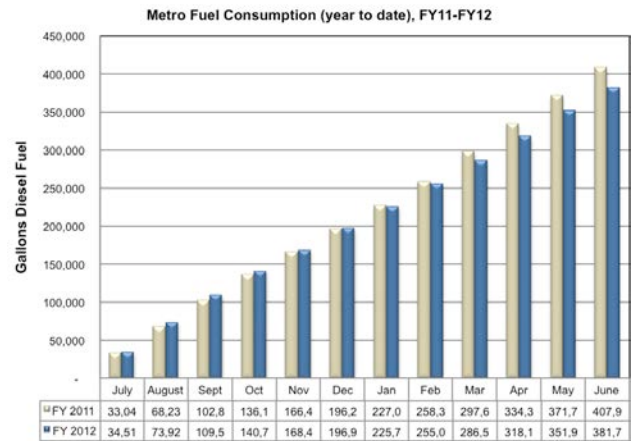
Most of the effort was expended on development of ESMS procedures and work instructions. Additional time was also expended for ESMS training, auditing, and communicating the status of the ESMS and creating an ESMS video.

# Cost Savings and Avoidance

## SAVINGS

RTD was able to demonstrate a 4% increase in fuel economy from FY11 to FY12. This has resulted in a savings of \$51,214.00 in diesel fuel costs. RTD believes these are a fraction of the savings yet to be realized by implementing strategies to reduce fuel consumption (or, increase fuel economy) as a result of implementing the ESMS.

The strategies RTD used were the reduction of bus idling time in maintenance and the ongoing replacement of non-hybrid buses with diesel-electric hybrid buses. The most significant fact of the data gathered is that the diesel-electric hybrid buses are averaging a 1.75 mpg increase in fuel economy vs. the non-hybrid buses.



RTD's FY or CY 2013 goal to replace all of its Metro-based non-hybrid buses with diesel-electric hybrid buses will significantly reduce fuel consumption and emissions. RTD will also be testing two fully electric zero-emission buses during 2013.

	DIESEL FUEL	FUEL COST
FY 2012 Actual	381,799	\$1,191,214
FY 2012 RTD Would Have Used	398,214	\$1,242,428
<b>FY 2012 Savings</b>	<b>16,415</b>	<b>\$51,214</b>



## AVOIDANCE

RTD targeted significant aspects specifically to reduce the risk of fines and reduce our potential for negative environmental impacts. Cost avoidance activities include proper electronics waste disposal and effective emergency spill response. Through the ESMS, RTD staff applied updated procedures and work instructions to improve, monitor, and measure our operations in order to reduce risks.



Before implementing the procedures identified within the ESMS program, RTD stored electronics waste in a maintenance area within the fence line. Over time that area increased in size to exceed 500 cubic feet. RTD staff was not trained in proper electronics waste removal and improper waste removal could have resulted in fines of \$37,000 per day. With the proper procedures and work instructions in place, RTD removed the electronics waste and reduced the risk of hazardous injury associated with excessive clutter. RTD is now fully compliant with electronics waste removal regulations.

Emergency spill response is a very important aspect of RTD operations. In 2005, RTD accidentally spilled 100 gallons of diesel fuel into the local waterways as a result of poor spill response training and environmental awareness. This incident cost RTD approximately \$30,000 in clean-up costs. The ESMS program improved our spill response by putting into place new procedures and work instructions to train staff. This training is coupled with more frequent testing and monitoring, ensuring that RTD staff remain prepared to respond at any time. Through testing, we reduced spill response times in the field by more than 5 minutes (or 25%) in the first year of the ESMS program. In addition, bus operators are now more aware of storm drains and waterways while in the field, reducing the risk of fluid leak spills going into drainage inlets when emergencies occur.

## Next Steps

The ESMS Team will continue to refine the process within the Metro Yard with a focus on further expanding employee participation. Additionally, the team will work to involve more RTD departments in the process. Finally, the team will look for opportunities to expand ESMS concepts developed within the fenceline to other parts of the organization, with the long-term goal of extending the ESMS program to all areas of RTD.

The ESMS team strives to:

- Increase awareness of the use of ESMS and its principles to the entire RTD organization
- Continue development and implementation of policies and procedures related to the ESMS
- Develop and maintain better recordkeeping mechanisms
- Establish the ESMS and sustainability projects as part of the annual RTD budget, completely paid for by cost-savings generated from the implementation of these projects

## Management Commitment

RTD's executive management has been committed to the ESMS project from the beginning, providing the necessary resources to implement the program.

*"For a long time, the employees at RTD have been concerned about the impact we as an agency have on our environment. So much so, in 2003, in our Strategic Plan, we declared our commitment "to play an active role in improving the environment in San Joaquin County." And not only are we employees of RTD, but many of us are parents, concerned about the legacy we're leaving for our families. It is up to us to do the right thing to protect the environment for our children and our children's children.*

*"We at RTD are committed to creating a positive legacy by using sustainable technologies and responsible procedures.*

*"The goal of ESMS here at RTD is to create a business practice that is sustainable, eco-friendly and has benefits not only for the employees here today but the community in general and for our families and kids for generations to come. The services we provide improve the quality of life for those who live and work in San Joaquin County. The work we do at RTD every day reflects our commitment to protect and manage the resources around us.*

*"Every RTD employee has the responsibility of environmental stewardship and sustainability."*

– Donna DeMartino, General Manager/CEO

### For more information about RTD's ESMS program, please contact:

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Detailed scoring on next page



## Final Audit

This section compares the percentage of requirements met, partially met and not met with respect to meeting the requirements of an EMS as specified in the ISO 14001:2004 standard. The following scores are the result of the EMS audit presented in this report:

Percent meeting all requirements <b>“Overall Score”</b>	96%
Percent of requirements <b>“Met”</b>	92%
Percent of requirements <b>“Partially Met”</b>	7%
Percent of requirements <b>“Not Met”</b>	1%

THE ISO 14001:2004 STANDARD ELEMENTS OF AN EMS		OVERALL SCORE (%)	MET (%)	PARTIALLY MET (%)	NOT MET (%)
4.1	General Requirements	100	100	0	0
4.2	Environmental Policy Requirements	100	100	0	0
4.3.1	Environmental Aspects Requirements	100	100	0	0
4.3.2	Legal and Other Requirements	100	100	0	0
4.3.3	Objectives, Targets and Programs Requirements	100	100	0	0
4.4.1	Resources, Roles, Responsibility and Authority	100	100	0	0
4.4.2	Competence, Training and Awareness	86	86	0	14
4.4.3	Communication	100	100	0	0
4.4.4	EMS Documentation	100	100	0	0
4.4.5	Control of Documents	100	100	0	0
4.4.6	Operational Control	100	100	0	0
4.4.7	Emergency Preparedness and Response	100	100	0	0
4.5.1	Monitoring and Measurement	100	100	0	0
4.5.2	Evaluation of Compliance	75	50	50	0
4.5.3	Nonconformity, Corrective Action and Preventive Action	69	38	63	0
4.5.4	Control of Records	100	100	0	0
4.5.5	Internal Audits	100	100	0	0
4.6	Management Review	83	67	33	0



# FTA eSMS INSTITUTE

[cota.vt.edu/ems](http://cota.vt.edu/ems)



**Southeastern Pennsylvania Transportation Authority**  
**Philadelphia, Pennsylvania**  
**Case Study**  
**September 28, 2012**

## Profile



The Southeastern Pennsylvania Transportation Authority (SEPTA) was established by the Pennsylvania General Assembly in 1964 to provide public transit services for Bucks, Chester, Delaware, Montgomery and Philadelphia Counties. Over the next 20 years, SEPTA gradually took over the assets of multiple private transit operators as they went out of business. Today, SEPTA is the nation's sixth largest public transportation system, with a vast network of integrated services including motor bus, light rail, trolley bus, heavy rail, and commuter rail. This network spans area of southeastern Pennsylvania encompassing five counties over 2,202 square miles with a population of 4.0 million.

SEPTA is one of the Greater Philadelphia region's largest employers, with a workforce of more than 9,000 employees. Its multi-modal transit system consists of 144 fixed routes that run approximately 1,833 one-way miles, plus demand responsive paratransit service to comply with the Americans with Disabilities Act (ADA). In fiscal year 2011, SEPTA set a 22-year ridership high-water mark with 334 million total passenger trips, and fell just shy of an all-time ridership record on its commuter rail services. More than 500,000 residents of the region use SEPTA each weekday.

SEPTA AT A GLANCE			
MODE	ROUTES	MILES	VEHICLES
Motor Bus	117	1445	1507
Light Rail	8	68	185
Trolley Bus	3	15	38
Heavy Rail*	3	25	343
Commuter Rail	13	280	357

\*Includes Norristown High Speed Line

## Fenceline



SEPTA elected to approach EMS as a pilot and carefully selected a fenceline for the training program. The Oversight Team selected the Berridge Shop due to the relative complexity of its operations - responsible for both vehicle overhaul and print shop functions - as well as the presence of a stable management team at the facility. The ESMS Oversight Team determined that these two factors would both facilitate implementation and establish a strong foundation for bringing the program to scale at other SEPTA facilities. SEPTA elected to not include certain administrative functions at Berridge, such as revenue collection and storeroom operations, to ensure that the scope of the pilot program was manageable from an administrative perspective.

## Core Team

With a mandate from General Manager Casey, senior management appointed a collaborative, multi-departmental team of planners, system safety officers, engineers, and maintenance personnel to participate in FTA training workshops over the course of 2011.

Team members were appointed based on their job description's control over the organization's

environmental & sustainability performance. The "ESMS Oversight Team" was tasked with participating in training workshops, collaborating with other business units as needed, apprising senior management with regular progress updates. Core team members, left to right, include:



- **Erik Johanson** - Strategy & Sustainability Planner, Strategic Planning & Analysis Department
- **Tom Hoffman** - [Former] Assistant Maintenance Director, Berridge Shop
- **Jim Fox** - Director, System Safety & Risk Management Department
- **Rick Harris** - Environmental Compliance Officer, System Safety & Risk Management Department
- **Steve Gaspari** - Compliance Officer, Bridges & Buildings Department

The Oversight Team is comprised of the Core Team members in addition to the following team members (Not Pictured):

- **Donna Lucas** - Program Development Specialist, Training Department
- **Marty Brunges** - Manager, Occupational Safety & Environmental Management, System Safety & Risk Management Department
- **Fil Tosto** - [Current] Assistant Maintenance Director, Berridge Shop
- **John Antrim** - Maintenance Manager, Berridge Shop
- **Vince Ferguson** - Records Management Coordinator
- **Stephanie Baer** - Environmental Safety Officer
- **Bill Devine** - Environmental Safety Intern
- **Dan Whaland** - Environmental Safety Intern

At the conclusion of the 2011 training workshops, SEPTA hired two interns from a local university's environmental planning program to support the full roll-out of the program. By the beginning of 2012, the Oversight Team had expanded from its five initial members to a total of 13 members, and held weekly meetings to coordinate the development and implementation process.

## Key Drivers For Adopting an ESMS

SEPTA's Sustainability Program is a framework for implementing new and innovative solutions to persistent problems facing the organization. The program advocates for a triple bottom line approach to planning - taking into account the economic, social, and environmental costs and benefits of strategic investments. But advancing an agenda of economic prosperity, social responsibility, and environmental stewardship in an era of budgetary constraints and limited resources requires implementation approaches that streamline operations.



Recognizing this, a key component of SEPTA's Sustainability Program implementation strategy is a focus on management systems - squeezing more out of less by making institutional processes more efficient. It is in this context that in 2010, General Manager Joseph M. Casey directed SEPTA staff to apply for the Federal Transit Administration (FTA) Environmental Management System (EMS) training and assistance program for public transportation agencies. SEPTA's desire to participate in the FTA EMS training program was, above all else, a function of its desire to translate management system efficiencies into improved environmental performance.

Additional factors supported SEPTA's participation. One was SEPTA's interest in becoming more competitive in discretionary grant programs. Tighter budgets at all levels of government have squeezed public funding. Granting agencies, including the FTA, have increased their diligence in overseeing grantees. The ISO 14001 standard is an imprimatur of sound management, which in turn gives grantors confidence in their awarding of funds to these organizations. An EMS would make SEPTA more competitive in this limited funding environment.

Another was a looming workforce transition. SEPTA - like many public agencies - faces a wave of retirements in the near future as the "baby boomer" generation reaches retirement age. More than 50% of SEPTA's management employees are eligible to retire by 2015. As these employees retire, institutional knowledge goes with them. Standardized management systems will become even more important to capture this institutional knowledge and enable new employees to seamlessly backfill their roles and responsibilities.

These three factors - operational efficiency, funding competitiveness, and workforce transition - are the context within which SEPTA applied for and was accepted to the FTA EMS training program. And, the wide-reaching importance of this program - beyond environmental compliance - has compelled SEPTA to rebrand the initiative as an environmental **and sustainability** management system (ESMS).

## Significant Aspects and Impacts

The foundation of SEPTA's ESMS is its list of significant aspects. Following the first training workshop, the ESMS Oversight Team canvassed the Berridge Shop fenceline to catalog the activities, products, and services that could have an impact on the environment. After cataloging these "environmental aspects," the Oversight Team ranked them based on a risk matrix that reflected SEPTA's vulnerability to environmental impacts. Categories included:

- **Scale:** What is the relative size of the aspect or impact? (10 of 100 points)
- **Severity:** How bad is the adverse environmental consequence caused by the aspect or impact? (10 of 100 points)
- **Probability:** What is the likelihood that the aspect or impact will cause an adverse environmental impact? (10 of 100 points)
- **Duration:** How long will the adverse environmental consequence persist in the environment? (10 of 100 points)
- **Exposure:** The likelihood and severity of incurring fines or civil liability. (10 of 100 points)
- **Changeability:** What are the technical difficulties of implementing the change and what will be the impacts to operational procedures? (10 of 100 points)
- **Public Image:** To what degree will the impact negatively influence the public's perception? (10 of 100 points)
- **Sustainability:** Would a change enhance the organization's sustainability? (10 of 100 points)
- **Concerns:** Consider the concerns of interested parties and cultural changes necessary to implement the change. (10 of 100 points)
- **Change Cost:** What is the cost consideration of changing the impact? (10 of 100 points)

The ranking process produced a quantitative assessment of "significant" aspects. From that list, the team chose five to serve as the focus of the ESMS (Rankings out of 100):

- Asbestos Management (75 of 100 points)
- Hazardous & Non-Hazardous Waste Management (58 of 100 points)
- Fuel & Bulk Storage (56 of 100 points)
- Permit Compliance & Record Keeping (51 of 100 points)
- Hazardous Material Storage (40 of 100 points)

To strengthen the integration between environmental management and SEPTA's Sustainability Program, the Oversight Team also elected to incorporate the Sustainability Program's four environmental goals into the ESMS list of significant aspects:

- Greenhouse Gas & Criteria Air Pollutant Emissions
- Water Use & Pollutant Discharge
- Energy Consumption
- Municipal Waste Management

The outcome: nine significant environmental & sustainability aspects - the foundation of SEPTA's ESMS.

## Objectives and Targets

SEPTA's ESMS is designed to control these nine significant aspects. The Oversight Team developed action plans with performance targets to measure progress towards goals for each. Action Plans extend through 2015 to synchronize the time horizon of ESMS with the Sustainability Program's time horizon. The following table spells out specific objectives, targets, and performance indicators for each significant aspect. Task lists were developed to achieve these goals. Performance is tracked on a quarterly basis; the action plans themselves are updated on an annual basis.

ASPECT	OBJECTIVE	TARGET	PERFORMANCE INDICATOR	TASK ITEMS
<b>Asbestos Management</b>	Manage, with the intent to eliminate, all remaining asbestos	Eliminate asbestos from facility	Development & implementation of phased approach for elimination	<ul style="list-style-type: none"> <li>• Conduct ACM inspection survey</li> <li>• Install warning labels on all identified ACM</li> <li>• Develop work practices that identify strategies to prevent the disruption of ACM along with emergency response procedures in the event of an accidental disruption</li> <li>• Provide a graphic that informs employees of the presence of ACM</li> <li>• Provide employee awareness training</li> <li>• Develop phased abatement plan</li> <li>• Request &amp; obtain funding</li> <li>• Implement phased abatement</li> </ul>
<b>Hazardous &amp; Non-Hazardous Waste Management</b>	Reduce the amount of time waste is stored on-site, improve waste disposal record keeping and increase recycling of wastes where possible	Compile annual inventory of waste generated at the Berridge shop to develop a waste minimization strategy with options to reduce waste streams at the shop.	Completion of inventory by September 30, 2011 & updated annually thereafter.	<ul style="list-style-type: none"> <li>• Develop and manage centralized waste management contract</li> <li>• Manage contract performance quarterly or as required</li> <li>• Evaluate quantities and options to reduce the volume of waste</li> <li>• Remove accumulated waste within 60 days of generation</li> </ul>
<b>Fuel &amp; Bulk Storage</b>	Maintain regulatory compliance with all applicable codes & standards	Maintain incident-free storage record	Number of violations & incidents	<ul style="list-style-type: none"> <li>• Complete regulatory training for operating personnel</li> <li>• Develop routine inspection schedule that meets or exceeds regulatory requirements</li> <li>• Revise records management process</li> <li>• Review and revise bulk fuel delivery requirements</li> <li>• Conduct annual internal audit of record-keeping and physical infrastructure</li> </ul>
<b>Permit Compliance &amp; Record-Keeping</b>	Improve multi-media permit compliance and record-keeping	Continual improvement of & compliance with internal multi-media audits	Development & administration of internal multi-media audit	<ul style="list-style-type: none"> <li>• Maintain facility operating air permit</li> <li>• Complete annual emission statements and submit to regulatory bodies</li> <li>• Manage waste disposal and recycling records and provide electronic backup</li> <li>• Conduct weekly RCRA waste inspections and retain records for three years</li> <li>• Conduct monthly storage tank inspections and maintain records</li> <li>• Conduct inspections of oil water separators and maintain records as required</li> <li>• Update integrated spill control and emergency response plan</li> </ul>



ASPECT	OBJECTIVE	TARGET	PERFORMANCE INDICATOR	TASK ITEMS
<b>Hazardous Material Storage</b>	Enhance the process by which materials are purchased, stored, & used	<ul style="list-style-type: none"> <li>Hazmat: Reduce the number of Hazardous Materials and Chemicals used at Berridge Shop by 10%</li> <li>Spills: Maintain the number of reportable Spills to 0 per year.</li> </ul>	<ul style="list-style-type: none"> <li>Hazmat: Comparison of baseline list of hazardous materials &amp; associated quantities to the actual types &amp; quantities on property each year.</li> <li>Spills: Reportable events</li> </ul>	<ul style="list-style-type: none"> <li>Identify type and quantity of hazardous materials</li> <li>Determine which materials have potential for just-in-time delivery</li> <li>Develop vendor-managed inventory strategy</li> <li>Monitor quantities in storage to measure reduction in quantity</li> <li>Establish dedicated hazardous material storage locations to isolate exposure</li> <li>Develop work instructions and guidelines for supply chain and shop managers</li> <li>Develop routine inspection and audit process</li> <li>Provide employee training and awareness for use of proper PPE and handling of hazardous materials</li> </ul>
<b>Greenhouse Gas &amp; Criteria Air Pollutant Emissions</b>	Reduce carbon intensity and negative air quality impacts of operations	<ul style="list-style-type: none"> <li>GHG: 10% reduction in CO2-e</li> <li>Criteria: Maintenance of Operating Air Permit</li> </ul>	<ul style="list-style-type: none"> <li>GHG: Lbs CO2-e</li> <li>Air: Operating air permit level</li> </ul>	<ul style="list-style-type: none"> <li>Maintain synthetic minor air operating permit</li> <li>Conduct and maintain emissions inventory</li> <li>Develop comprehensive climate action plan with specific recommendations for Berridge Shop</li> <li>Incorporate air quality impacts into green procurement policies</li> <li>Evaluate potential for solar PV to be incorporated into roof replacement project</li> <li>Implement energy audit initiatives with emissions benefits</li> </ul>
<b>Water Consumption &amp; Pollutant Discharge</b>	Reduce consumption levels and likelihood of uncontrolled release of untreated waste water, chemicals, and untreated stormwater into the environment	<ul style="list-style-type: none"> <li>Consumption: 10% reduction</li> <li>Discharge: Conduct assessment of stormwater mitigation strategies</li> </ul>	<ul style="list-style-type: none"> <li>Consumption: Gallons</li> <li>Discharge: Completion of assessment</li> </ul>	<ul style="list-style-type: none"> <li>Establish baseline consumption level and inventory of usage at facility</li> <li>Encourage conservation among employees</li> <li>Evaluate feasibility of on-site stormwater management techniques to mitigate stormwater runoff</li> <li>Install more efficient water fixtures</li> <li>Implement cost-effective on-site stormwater management techniques</li> </ul>
<b>Energy Consumption</b>	Improve the energy efficiency of equipment and reduce energy demand	10% reduction	mmbtu	<ul style="list-style-type: none"> <li>Encourage conservation among employees</li> <li>Initiate GESA process for energy performance contract</li> <li>Select one ESCO to conduct an investment grade audit</li> <li>Design, select and construct energy conservation measures as identified through the audit</li> <li>Enter into 15 or 20-year performance period, where ESCOs are responsible for energy savings, as verified by a measurement and verification process.</li> </ul>



ASPECT	OBJECTIVE	TARGET	PERFORMANCE INDICATOR	TASK ITEMS
<b>Municipal Waste Management</b>	Reduce total quantities of landfilled municipal waste by implementing waste minimization strategies, such as recycling	20% diversion rate	Quantities (tons, cubic yards) of recycling divided by quantities of total waste	<ul style="list-style-type: none"> <li>• Develop waste management database to establish baseline and track progress</li> <li>• Spot new open-top containers to allow for separation of waste and recyclable materials</li> <li>• Implement comprehensive on-site, source separated recycling program</li> <li>• Provide recycling receptacles and totes to support program implementation</li> <li>• Develop signage and communications campaign to promote recycling</li> <li>• Create and implement green procurement policies</li> <li>• Develop standards for use of materials made with recycled products</li> <li>• Develop educational materials to increase contractor awareness of SEPTA's waste minimization and green procurement strategies</li> </ul>

## Benefits of Adopting an ESMS

On February 1, 2012, 12 months after the first training workshop, SEPTA officially adopted its ESMS. However, the benefits of participating in the training program had begun to accrue well before the official kickoff date. These benefits are listed below.

**Systems Change:** ISO 14001 is, above all else, a management system. Its core principles challenged team members to rethink the systems and processes behind SEPTA's existing environmental and sustainability-related programs, and in some cases, develop new ways of structuring those systems and processes to adhere to the higher standard established by the ESMS. The "plan-do-check-act" framework has sweeping implications for SEPTA's management philosophy. Among the most important implications is a framework for establishing goals with quantifiable targets and measuring progress based on performance indicators.

**Collaboration:** The ESMS served as a vehicle for collaboration among a wide variety of different business units with a role to play in the ESMS program. In many cases, the conversation was well-received, considered by managers as long-overdue. In some cases, managers saw the ESMS as an opportunity to pursue their own complementary initiatives, leveraging the ESMS as a point of integration with broader organizational initiatives. For example, the Information Technology Department is using ESMS as a beta test for its Microsoft SharePoint initiative, which will in turn streamline the document control and communication elements of the ESMS. Also, the Bridges & Buildings and System Safety Departments are considering using ESMS procedures and documents as templates for standardizing other management programs across the Authority.

**Accountability:** The ESMS served as a channel for renewed collaboration between functionally co-dependent departments and a window of opportunity to better delineate roles, responsibilities and authority among them. This allowed for the beginning of what the Oversight Team envisions as a long-term effort to clarify ownership of various activities, products, and services that could impact the



## Benefits of Adopting an ESMS

environment and to provide a mechanism of accountability for managing them in a responsible way.

**Awareness:** ESMS has brought environmental- and sustainability-related issues to the forefront of the organizational agenda. Before, a small subset of organizational managers and executives understood the importance of proactively mitigating environmental impacts. Few knew that SEPTA had a Sustainability Program. Through interdepartmental meetings, training workshops, and other communications efforts, ESMS has raised awareness across the organization of important environmental- and sustainability-related issues facing the Authority. Training has been an especially critical tool for educating employees on the importance of environmental stewardship and workplace safety.

**Indicator Reports:** The ESMS requirement to monitor and measure progress compelled the Oversight Team to create a template for publishing environmental and sustainability performance indicators. Monthly performance reports are now published for all employees on the SEPTA intranet. The template for these indicator reports is standard for all facilities, allowing SEPTA to use the report to make informed decisions about strategic investments. The format will also support scalability as the ESMS is implemented across the system.

**Case-Making:** ESMS is a framework for making the business case to invest environmental and sustainability initiatives that will both improve performance and provide a strong return on investment. The ESMS Oversight Team has been able to advance funding for solutions to long standing environmental- and sustainability-related issues, such as asbestos at Berridge Shop. In the past, SEPTA has just identified and abated the known asbestos containing materials on an as-needed basis in small quantities. ESMS has created a platform for articulating the reasons why surveying, managing, and abating asbestos are necessary and make good business sense. Oversight Team members believe the sole reason that funding was approved is ESMS.

**Compliance with Regulations:** The ESMS training program has served as a vehicle to advance compliance with environmental regulations. For example, the training program will absorb regulatory requirements to train employees on the Pennsylvania “Right to Know” law and “Asbestos Awareness”. As such, it will fulfill multiple objectives by satisfying competency & awareness requirements per the ISO 14001 standard as well as legal requirements per local, state, and federal regulations.

**Increased Staff Capacity:** The success of the ESMS – and, perhaps, the Oversight Team’s success in communicating its value – is manifest in the recent creation of a new environmental safety planner position to support day-to-day ESMS administration. The comprehensive nature of SEPTA’s pilot ESMS, coupled with the desire to implement the management system at additional facilities, warrant additional capacity to be dedicated to the program. The new planner will be responsible for the development, implementation, and maintenance of the ESMS and all of its related activities.

**Branding of Sustainability Program:** SEPTA’s internal and external communication reinforces the linkage between ESMS and the Sustainability Program. All forms

## BENEFITS OF ADOPTING AN ESMS

of internal communications, including posters, employee intranet resources, and training modules, are branded with the SEPTA Sustainability logo. External communications, via the SEPTA internet and annual report, have the same brand. The brand integration has helped to increase awareness among SEPTA employees and stakeholders that the ESMS is a vehicle for implementing broader corporate goals and objectives.

**Economic Value:** The ESMS has already begun to produce significant cost savings and new revenue through initiatives undertaken as part of the Action Plans to control significant aspects. These financial benefits are detailed in the Section entitled, Cost Savings & Avoidance.

### KEYS TO SUCCESS

**Executive Mandate:** The direction from General Manager Casey to participate in the FTA training program underscored a high-level of support for standardizing environmental management, which in turn added credence to Oversight Team efforts to advance programmatic initiatives. It also created an opportunity to engage senior management and further educate organizational leaders on the benefits of undertaking environmental and sustainability initiatives. In one specific example, the General Manager dedicated an hour of his time to film an ESMS General Awareness video that is now broadcast via SEPTA's internet. Recent briefings of the senior management team also reflect a growing appreciation of the value that ESMS offers to the broader goals and objectives of the organization.

**A Business Case:** SEPTA's Sustainability Program emphasizes that initiatives should be able to stand on their own financial merit. Given this principle, the Oversight Team developed a business case for implementing Action Plans to control significant aspects. Business cases were predicated on the financial merits of individual tasks associated with each action plan. For example, the Oversight Team calculated that an asbestos release resulting in shutting Berridge would cost approximately \$44,206 per day in labor and productivity. A comprehensive survey and abatement of the fence line would also avoid future emergency abatements costing \$8,000 to \$10,000 per incident, and any legal liabilities associated with operating a shop with asbestos on site. Quantifying the benefits of ESMS - in the form of revenue, cost savings and cost avoidance, helped to position ESMS as a benefit to SEPTA's bottom line financial condition.

**Dual Role of Management Representative:** The active role that the Management Representative (Jim Fox) played on the Oversight Team helped to leverage his direct connection to the ESMS development and implementation process as well as the senior management team. This unique "dual role" helped to maintain the executive mandate throughout the ESMS development and implementation process.

**A Globally Recognized System:** SEPTA employees recognize the ISO brand. The ISO 14001 standard added validity to the ESMS program and has given SEPTA's Sustainability Program an additional level of credibility with internal and external stakeholders, many of which have their own ISO-based programs and have a greater confidence in SEPTA's program as a result.

**Peer Agency Resources:** SEPTA participated in the third round of FTA's training program, and documents created during the first two rounds of agency participation in the program served as a template for SEPTA's own program. The ability to sample the work products allowed SEPTA to pick and choose elements of other agencies' programs that would work well in SEPTA's management context.

**Oversight Team Commitment and Continuity:** The Oversight Team was, from the beginning, a committed group of empowered planners and managers with a vested interest in the program's development, implementation, and ultimately its success. The Oversight Team's continuity remained intact even as one of its members transitioned out of leadership from his previous capacity. The team was able to seamlessly add new members to fill voids and provide new resources and insights as needed. Overall, the Oversight Team's commitment and continuity enabled it to serve as an effective champion throughout the development and implementation process.

**Documenting Resource Requirements:** The time-intensive nature of the ESMS development and implementation process required significant staff resources. The structured framework of the ESMS program provided an opportunity to document resources requirements, which in turn helped to make the case for hiring interns to support the Oversight Team.

**Expanding the Oversight Team:** The two interns ultimately hired to support the Oversight Team provided invaluable staffing capacity to the ESMS development and implementation process. In particular, ESMS interns were tasked with developing a comprehensive ESMS training program, which was rolled out while the rest of the ESMS program was being finalized. The ability to administrate both of these tasks accelerated adoption and allowed the Oversight Team to focus on the "big picture" of the program.

**Engaging Front-Line Employees:** The training program created by the ESMS interns created a structure through which the principles of ESMS would be reinforced to frontline employees on a monthly basis. The incentive for front-line employees to actively engage in ESMS and its ongoing implementation is in large part a function of its connection to broader issues that affect the employees themselves. The ESMS focused the communications and training program on relating the efforts to control the significant aspects at Berridge to each employee's personal well-being. For example, the seminar on asbestos awareness included a section on health and safety and was attended by SEPTA's Employee Wellness Coordinator.

**Ad Hoc Cross-Departmental Support:** SEPTA departments outside the Oversight Team provide crucial support to the Oversight Team on an as-needed basis. For example, the Corporate Communications Department has created a suite of communications materials to support program branding and messaging. Materials include a series of posters, a video, and internet resources. In another example, SEPTA's Internal Audit Department has participated in Oversight Team activities to get up-to-speed on the program and its components in preparation for conducting its own audit of the program pursuant to the ISO 14001 Standard. These ad hoc supportive activities are now formalized by the roles and responsibilities requirements pursuant to SEPTA's ESMS.

**Ensuring Scalability:** The ESMS for Berridge Shop was developed with an eye towards system-wide implementation. This planning principle shaped the design of many program components. For example, the training program is administered by way of a “Train-the-Trainer” program. On a quarterly basis, select on-site directors and managers are trained by the Oversight Team on the next quarter’s training topics. Directors and managers are responsible for administering monthly seminars. The train-the-trainer approach ensures scalability by decentralizing the burden of implementing the training program.

## Resources

SEPTA matched FTA funding for the training program by allocating internal resources for staff travel to and from training workshops in Roanoke, VA, as well as staff time associated with the ESMS development and implementation process.

**Staff Time:** SEPTA committed thousands of hours of staff time during the ESMS development and implementation process. In 2011, the Oversight Team logged more than 1,700 man-hours; hundreds of additional man-hours were logged by other SEPTA staff members providing support to the process and others participating in planning meetings and outreach activities. Staff time allocated to the program grew at an exponential rate as members were added to the Oversight Team and additional organizational activities were included under the ESMS framework.

TIME COMMITTED TO ESMS DEVELOPMENT & IMPLEMENTATION	2011				TOTAL HOURS
	Q1	Q2	Q3	Q4	
Oversight Team	314.5	267.8	373.5	797.5	1753.3
Cross-Departmental Support	7.5	23.0	41.0	203.0	274.5
Other Outreach Initiatives	36.8	36.0	29.5	38.0	140.3
<b>TOTAL HOURS</b>	<b>358.8</b>	<b>326.8</b>	<b>444.0</b>	<b>1038.5</b>	<b>2168.1</b>

## Cost Savings and Avoidance

The costs associated with SEPTA’s participation in the FTA training program are offset by the economic value of implementing its ESMS program. This economic value is manifest in revenues, cost savings, and cost avoidance associated with controlling significant environmental aspects at Berridge Shop. These sources of economic value, both actual and projected, are summarized below.

SIGNIFICANT ASPECT	ESTIMATED ECONOMIC VALUE	DESCRIPTION
Asbestos Management	\$53,206 Average Avoided Cost Per Emergency	<p><b>PLANNED ABATEMENT WILL ELIMINATE COSTLY EMERGENCIES</b></p> <ul style="list-style-type: none"> <li>A controlled contract is a cheaper method than ad hoc emergency abatements (\$20 per lineal foot compared to \$30, on average).</li> <li>Emergency abatements do little to address the fundamental cost of asbestos at the shop: lost productivity from an unanticipated release costs approximately \$35,456 per day in labor and \$8,750 per day in lost productivity (Total: \$44,206 per day); emergency abatements cost \$8,000 to \$10,000 per incident.</li> <li>A full, planned abatement is estimated to cost several hundred thousand dollars over four years and would permanently eliminate the risks associated with asbestos at the shop.</li> </ul>



SIGNIFICANT ASPECT	ESTIMATED ECONOMIC VALUE	DESCRIPTION
<b>Hazardous &amp; Non-Hazardous Waste Management</b>	<p><b>\$273,780</b> Actual Cost Savings + Revenue</p>	<p><b>NEW UNIVERSAL CONTRACT HAS SAVED MONEY &amp; GENERATED REVENUE</b></p> <ul style="list-style-type: none"> <li>A transition from ad hoc to centralized waste management has reduced shop waste disposal costs by 40%. Overall contract savings total approximately \$150,000 from economies of scale across the organization. Additional administrative savings from the consolidation of 90 to 120 small contracts total approximately \$46,500.</li> <li>Compliance with internal audits of waste regulations has improved across all facilities.</li> <li>Certain items, such as waste oil, also generate additional revenue. In fiscal year 2011, SEPTA received \$123,780 from waste oil recycling.</li> </ul>
<b>Fuel &amp; Bulk Storage</b>	<p><b>\$550,000</b> Average Avoided Cost of Tank Failure Event</p>	<p><b>PLANNING WILL REDUCE RISK OF COSTLY FAILURE</b></p> <ul style="list-style-type: none"> <li>The efficient inspection, maintenance and operation of bulk fuel and material storage systems will increase operational efficiency and reduce risk of spills.</li> <li>Storage system failures can result in remedial activities that range from \$100,000 to \$1,000,000 in cost and take years to complete, further adding cost by disrupting operations.</li> </ul>
<b>Permit Compliance &amp; Recordkeeping</b>	<p><b>\$678,106</b> Avoided Cost of Future Fine</p>	<p><b>ADMINISTRATIVE DEFICIENCIES HAVE PROVEN COSTLY</b></p> <ul style="list-style-type: none"> <li>SEPTA's 2008 Consent Agreement and Final Order from the U.S. Environmental Protection Agency (EPA) was a function of inadequate recordkeeping. Administrative violations at nine facilities resulted in a fine of \$678,106.</li> <li>The EPA violation illustrates the extent to which costly fines for lack of compliance with environmental regulations can be avoided in the future by improving record-keeping. The ESMS will focus on improving the administration of environmentally sensitive records, not just at Berridge but across the entire organization.</li> </ul>
<b>Hazardous Material Storage</b>	<p><b>\$5,500</b> Average Avoided Cost of Spill Event</p>	<p><b>MANAGED INVENTORY WILL INCREASE OPERATIONAL EFFICIENCY</b></p> <ul style="list-style-type: none"> <li>A "just-in-time"/vendor-managed inventory will eliminate costs associated with hoarding materials without increasing the risk of material shortages.</li> <li>Material hoarding increases the shop's exposure to damage and spills, which cost between \$1,000 and \$10,000 per event. SEPTA also could be subject to regulatory fines and penalties.</li> <li>By reducing the quantity of materials stored on property, Supply Chain Management will have an opportunity to better allocate resources and constrained space, producing direct cost savings through improved administrative efficiency.</li> </ul>
<b>Greenhouse Gas &amp; Criteria Air Pollutant Emissions</b>	<p>n/a</p>	<p><b>REDUCING AIR IMPACTS REDUCES COSTS</b></p> <ul style="list-style-type: none"> <li>The air permit at Berridge recently was dropped from a "Title 5" to a "Synthetic Minor" level. This lower level regulatory requirement is less administratively burdensome, thereby reducing the recordkeeping requirements and potential for regulatory fines.</li> <li>Greenhouse gases (GHG) can be reduced at Berridge with no upfront investment by strategically leveraging planned projects and energy markets. For example, Berridge's large, flat roof is scheduled to be replaced. The project could incorporate solar panels to provide a carbon-neutral alternative energy source to the facility. Through a power purchase agreement, SEPTA may be able to finance the project without a capital outlay. A planned energy audit (see "Energy Consumption") would make the project more cost effective by reducing energy load at the facility.</li> </ul>
<b>Water Use &amp; Pollutant Discharge</b>	<p><b>\$16,000</b> Projected Average Annual Cost Savings</p>	<p><b>REDUCING WATER CONSUMPTION &amp; STORMWATER RUNOFF REDUCES COSTS</b></p> <ul style="list-style-type: none"> <li>Berridge water consumption totals more than 2 million gallons per year (FY2011: \$18,092).</li> <li>As of 2011, the City of Philadelphia charges for stormwater runoff based on the extent of a property's impervious surface. The Berridge facility is nearly 100 percent impervious, resulting in an anticipated increase in Philadelphia Water Department (PWD) charges of \$45,956 (after a four-year phase-in of the new fee allocation methodology).</li> <li>As a whole, Berridge's \$64,048 annual water/stormwater fee is among the highest totals of any SEPTA facility. Opportunities exist to reduce both consumption and stormwater charges an estimated 20%-30% (\$12,800-\$19,200) through comprehensive retrofit strategy (see "Energy Consumption" for discussion).</li> </ul>

SIGNIFICANT ASPECT	ESTIMATED ECONOMIC VALUE	DESCRIPTION
Energy Use	\$275,000 Projected Average Annual Cost Savings	<p><b>ENERGY PERFORMANCE CONTRACT WOULD TRANSFORM FACILITY AT NO UPFRONT COST</b></p> <ul style="list-style-type: none"> <li>Berridge's energy profile totals approximately 50,000 mmbtu per year (FY2011: \$1.1 million)</li> <li>Electricity consumption at Berridge totals approximately 8 million kWh per year, the second most of any SEPTA facility.</li> <li>Pennsylvania's Guaranteed Energy Savings Act (GESA) enables public agencies in the Commonwealth to enter into performance-based contracts for energy cost savings. Capital projects are financed by a third party at no upfront cost, and repaid through energy savings that are verified and guaranteed to the agency. Conservative projections indicate SEPTA aging facility could see 20%-30% energy savings from a comprehensive retrofit approach. At 20%, SEPTA could finance more than \$3 million worth of capital upgrades at Berridge. This program can be replicated at all SEPTA facilities, stations, tunnels, and other energy-consuming infrastructure.</li> </ul>
Municipal Waste Management	\$2,466 Projected Annual Cost Savings + Revenue (Based on 6-Month Actuals)	<p><b>NEW BUSINESS MODEL HAS SAVED COSTS &amp; GENERATED REVENUE</b></p> <ul style="list-style-type: none"> <li>In 2011, SEPTA implemented a comprehensive source-separated recycling program. To capture a share of the economic value of recyclable commodities, SEPTA incorporated a revenue-sharing agreement into its new contract. The winning bidder, Waste Management, quoted a price per ton of \$64 for trash and a rebate per ton of \$41.33 for recyclables.</li> <li>SEPTA also purchased new compactors to support the recycling program at a price that actually reduced cost of compactor rentals on a lifecycle basis.</li> <li>Berridge was estimated to generate approximately 137 tons of municipal waste per year (actual data from the new program will be available in October 2012). After the first six months of the contract with Waste Management, municipal recycling at Berridge had generated \$1,233 in economic value through cost savings and new revenue.</li> </ul>
<b>TOTAL</b>	<b>\$1,854,058</b>	<b>PROJECTED ANNUAL ECONOMIC VALUE OF ESMS PROGRAM: COST AVOIDANCE, SAVINGS, &amp; NEW REVENUE</b>

## Next Steps

SEPTA's ESMS is designed for maintenance on an annual cycle. The official adoption of the ESMS on February 1, 2012, means that the first year of activities associated with the program will not be complete until January 2013. Until then, the focus of the Oversight Team will be to maintain the program within the Berridge fence line as established, and to make revisions to procedures and documents as part of the management review process scheduled for the end of the calendar year.

SEPTA is in the midst of a hiring process for an environmental safety planner whose job will be to steward the ESMS program. This planner will be responsible for creating a strategy for bringing the ESMS to scale across the SEPTA system. In the interim, SEPTA's goals for the program are to:

- Achieve ISO 14001 certification for the Berridge Shop sometime in 2013
- Achieve each of the nine targets by 2015 to control significant aspects as defined by the ESMS
- Maintain the certification at Berridge Shop in perpetuity
- Use the Berridge Shop template to implement an ISO-based ESMS at additional SEPTA locations
- Use the ESMS framework to improve environmental compliance and awareness in all departments and at all levels of the organization

## Management Commitment

SEPTA's participation in the FTA training program was a function of direction from General Manager Joseph M. Casey. The support of Casey and his senior management team was steadfast throughout the entire ESMS development and implementation process.

On April 15, 2011, key members of the senior management team, including the General Manager, signed off on SEPTA's first-ever Environmental Policy Statement. Jim Fox, ESMS Management Representative, has briefed the team on a quarterly basis as the program was being rolled out. Two weeks prior to program adoption, General Manager Casey participated in a filming of a General Awareness video to promote ESMS communications. The video is now shown to Berridge Shop employees, all new hires, and is available to the public on SEPTA's Sustainability Website:

Moving forward, the Oversight Team has committed to briefing senior management on the status of the ESMS on an annual basis. This meeting will be held pursuant to the management review element of the program and include a formal review of the ESMS internal audit.

General Manager Casey and his team remain committed to the program:

*“SEPTA is committed to reshaping the environmental vision for our region by taking a leadership role and advancing goals and objectives that address economic, social, and environmental sustainability issues. While the Authority’s Sustainability Plan concentrates largely on external customer and community initiatives, the Environmental & Sustainability Management System provides a framework to engage our employees in our environmental mission. By offering awareness, training, and a toolbox of management techniques we can inspire our employees to make a personal commitment to conduct SEPTA business in an environmentally and sustainably responsible way.”*



– Joseph M. Casey, General Manager SEPTA

### **For more information about SEPTA's ESMS program, please contact:**

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Detailed scoring on next page

## Final Audit

This section compares the percentage of requirements met, partially met and not met with respect to meeting the requirements of an EMS as specified in the ISO 14001:2004 standard. The following scores are the result of the EMS audit presented in this report:

Percent meeting all requirements <b>“Overall Score”</b>	95%
Percent of requirements <b>“Met”</b>	89%
Percent of requirements <b>“Partially Met”</b>	11%
Percent of requirements <b>“Not Met”</b>	0%

THE ISO 14001:2004 STANDARD ELEMENTS OF AN EMS		OVERALL SCORE (%)	MET (%)	PARTIALLY MET (%)	NOT MET (%)
4.1	General Requirements	100	100	0	0
4.2	Environmental Policy Requirements	95	90	10	0
4.3.1	Environmental Aspects Requirements	88	75	25	0
4.3.2	Legal and Other Requirements	83	67	33	0
4.3.3	Objectives, Targets and Programs Requirements	100	100	0	0
4.4.1	Resources, Roles, Responsibility and Authority	100	100	0	0
4.4.2	Competence, Training and Awareness	71	43	57	0
4.4.3	Communication	100	100	0	0
4.4.4	EMS Documentation	100	100	0	0
4.4.5	Control of Documents	94	89	11	0
4.4.6	Operational Control	88	75	25	0
4.4.7	Emergency Preparedness and Response	100	100	0	0
4.5.1	Monitoring and Measurement	100	100	0	0
4.5.2	Evaluation of Compliance	100	100	0	0
4.5.3	Nonconformity, Corrective Action and Preventive Action	100	100	0	0
4.5.4	Control of Records	100	100	0	0
4.5.5	Internal Audits	100	100	0	0
4.6	Management Review	83	67	33	0