



United States Department of Transportation
Federal Transit Administration



FTA ESMS Training and Assistance

October 1, 2015 – September 30, 2017

cota.vt.edu/ems

esmsINSTITUTE
environmental & sustainability management system



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The report summarizes Federal Transit Administration's (FTA) environmental and sustainability management system (ESMS) training and assistance project. This report includes the results of a two-year effort to advance international environmental management standard ISO 14001:2015 in public transit agencies in the United States.

Participation included:

- 🌱 Federal Transit Administration (FTA)
- 🌱 Virginia Tech's Center for Organizational and Technological Advancement (COTA)
- 🌱 Five transit agencies
 - Los Angeles County Metropolitan Transportation Authority (LA Metro)
 - Maryland Transit Administration (MTA)
 - San Francisco Bay Area Rapid Transit District (BART)
 - Southwest Ohio Regional Transit Authority (SORTA)
 - Tri-County Metropolitan Transportation District of Oregon (TriMet)

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

FTA's focus was threefold:

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

ESMS training and assistance participants included FTA grantees from throughout the United States. 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, two participating transit agencies have declared their intent to submit their ESMS for ISO 14001 certification.





Acknowledgements

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FTA, Virginia Tech, and the participants would like to thank Cris Liban of LA Metro in Los Angeles, California, for his generous support of FTA's Round 5 ESMS Institute. Chris is a graduate of Round 2 of FTA's ESMS Institute and participated with his LA Metro team in the current round of training. He generously donated his time, expertise, and enthusiasm to the effort to continue proactive ESMS education for his fellow transit agencies.

Federal Transit Administration

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FTA Participating Transit Agencies

- Los Angeles County Metropolitan Transportation Authority (LA Metro)
- Maryland Transit Administration (MTA)
- San Francisco Bay Area Rapid Transit District (BART)
- Southwest Ohio Regional Transit Authority (SORTA)
- Tri-County Metropolitan Transportation District of Oregon (TriMet)

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In 2015, the Federal Transit Administration (FTA) invited transit agencies throughout the United States to apply for the FTA sponsored training and assistance for implementing an ISO 14001:2015 based Environmental Management System (ESMS). FTA's initiative of ESMS 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 and Sustainability Management System (ESMS) is a set of processes and practices which enables an organization to reduce its environmental impacts and increase its operating efficiency. Organizations with an ISO 14001 ESMS 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 ESMS 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 14001:2015 standard served as the foundation of ESMS training. FTA left the option of ISO 14001:2015 certification to the discretion of the individual agencies.

How Were Teams Selected?

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

- ✔ Organizational commitment by transit agency leadership to ESMS 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 ESMS implementation.

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

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





Virginia Tech – COTA 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:

- ✓ Baseline Environmental Reviews at each agency;
- ✓ Three, three-day workshops spaced approximately three months apart;
- ✓ Web-based ESMS library with Word documents that included both templates and completed documents of previously certified ISO 14001 transit agencies;
- ✓ Transit agency guest instructor at each workshop who had successfully implemented ISO 14001 based ESMS;
- ✓ Quarterly team conference calls between workshops;
- ✓ Senior Management conference calls;
- ✓ ESMS gap audit by qualified ISO 14001 Lead Auditor at each agency's home location; and
- ✓ One concluding formal ESMS audit at each agency's home location.

Benefits to Transit Agencies in Adopting an ESMS

Benefits of implementing an ESMS were reported by each participating transit agency and are documented in individual case studies following this section. Both environmental and business benefits that have been reported from previous rounds of training have included the following:

Environmental benefits included:

- ✓ Reduction in the number, type and severity of compliance incidents;
- ✓ Improved relationships with state and federal regulators;
- ✓ Pollution and waste quantity reductions;
- ✓ Recovered resources; and
- ✓ Mitigation of identified environmental aspects and associated impacts to include reduction of air emissions and reduction of amount of oil in waste water and storm water.

Business benefits reported by transit agencies included:

- ✓ Enhanced public image with system users and the general public;
- ✓ Reduced regulatory oversight;





- ✓ Improved employee awareness and efficiency of potential environmental aspects and impacts associated with work activities (operations);
- ✓ Reduced environmental risks (impacts);
- ✓ Identification of opportunities to address aspects;
- ✓ Greater focus on management of risks associated with interested parties, issues, compliance obligations, aspects/impacts;
- ✓ Improved internal and external communications and cooperation through training and outreach;
- ✓ Increased senior management (leadership) awareness of environmental issues;
- ✓ Reinforcement of environmental processes currently in place;
- ✓ Proactive management systems for environmental issues;
- ✓ Captured employee knowledge (“organizational knowledge”) prior to retirements;
- ✓ Documented cost savings by way of implementing new operational controls (SOPs) related to identified environmental risks;
- ✓ Promoted confidence of the public, customers and other stakeholders (interested parties) that transit agency personnel were aware, trained and competent in relationship to environmental obligations;
- ✓ Institutionalization of best practices in, and permanent improvements of, on-time performance;
- ✓ Increased fuel economy; and
- ✓ Documented information developed, implemented, and utilized including procedures, work instructions, charts, and checklists.

Cost Savings

Cost savings and avoidances are identified in each agency case study.

FTA ESMS Training and Assistance Program

Baseline Environmental Reviews

COTA, a US EPA Public Entity ESMS Local Resource (PEER) Center, began Round 5 training and technical assistance effort in March 2016 with a one-day visit to each participating agency. Meetings with executive management and the initial core ESMS team 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:

- ✓ Physical improvements (anticipated as well as ongoing);
- ✓ Facility fenceline;
- ✓ Aspects and associated impacts unique to each facility to include, but not limited to site storm water runoff, hazardous waste disposition, water and energy usage, recycling efforts, waste management, and fuel storage;
- ✓ Compliance requirements including environmental permitting.





A summary report of the environmental findings for each transit agency was prepared and distributed 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 Workshops 1 through 3. The report began to document the agency's interested parties, issues, aspects, risks and objectives associated with its activities, products and services.

ESMS Training Workshops

Three, three-day workshops were held over a seven month period at Virginia Tech's training facility in Roanoke, Virginia.

Workshop # 1: May 17-19, 2016

Workshop # 2: August 9-11, 2016

Workshop # 3: November 1-3, 2016

Five transit teams, carefully chosen by FTA from their pool of applicants, traveled to The Hotel Roanoke & Conference Center, a Virginia Tech-owned teaching facility, in Roanoke, Virginia, for each of the three workshops.

All clauses of the ISO 14001:2015 standard were addressed over the course of the ESMS Institute; with approximately one-third of the clauses presented at each workshop. The instructional concept for the three workshops was to introduce the newly adopted ISO 14001:2015 standard requirements and to provide tools (e.g., transit work products, templates, sample procedures, and documented information) to assist in development of an ESMS. Teams returned to their locality for a three-month period to implement what they learned.

The ISO 14001:2015 implementation strategy included selecting agency-specific interested parties, issues, risks, opportunities, objectives, operational controls. Each team had access to an online ESMS library, which included a comprehensive set of documented information and tools for developing an ISO 14001:2015 ESMS. The ESMS library included detailed sample ESMS procedures for each clause of ISO 14001:2015 which were easily modified to meet specific user needs. Additionally, the library contained Best Management Practices from transit agencies participating in previous FTA ESMS Institutes.

Training in Roanoke, Virginia was supported by regular conference calls with ESMS teams, Virginia Tech, and the FTA project manager. Conference calls helped to identify issues teams were 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:

- 🌱 Schedule and hold regular agency ESMS meetings between workshops to insure completion of homework;





- ✱ Maintain meeting minutes to document decision making;
- ✱ Regularly brief senior management on the progress of their ESMS;
- ✱ Complete assigned workshop homework prior to returning to the next workshop;
- ✱ Be available to discuss homework review comments completed by ESMS instructors. All homework review comments were forwarded to and discussed with each participating team prior to the start of the next workshop. This pattern was adhered to throughout each of the three workshops.

Post Workshop Activities

Workshop 3 final homework assignments were to be completed by the end of December 2016. COTA then scheduled a one-day site visit to each agency to conduct an ISO 14001:2015 Gap Analysis. Approximately three months later, COTA returned to each transit agency to conduct a formal two-day ISO 14001:2015 ESMS Final Audit. This enabled a certified ISO 14001 auditor to verify and document systematically the degree to which each transit agency has an ESMS in place in conformance with the ISO 14001:2015, legal-, customer-, and agency-specific requirements. Final scoring from the COTA ESMS Audit for each agency is provided at the end of each case study.

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

- ✱ Profile of the transit agency;
- ✱ Fenceline description;
- ✱ Core team;
- ✱ Key drivers for adopting an ESMS;
- ✱ Significant aspects and impacts;
- ✱ Objectives;
- ✱ Benefits of adopting an ESMS;
- ✱ Resources committed to the development of ESMS;
- ✱ Cost savings and avoidances;
- ✱ Next steps; and
- ✱ Management commitment.





What is an ESMS?

An Environmental Management System (ESMS) is a set of processes and practices that enables an organization to reduce its environmental aspects and associated impacts and increase its operating efficiency. Organizations with an ESMS report being able to more effectively manage their environmental obligations. Additionally, organizations report enhanced ability to analyze, control and reduce risks associated with interested parties, issues, compliance obligations, aspects and objectives in order to operate with greater effectiveness.

Additional benefits include cost savings over time, reduced insurance premiums, and improved internal and external communications with interested parties. An ESMS integrates the environmental ethic into the strategic direction of the organization. Business operations and environmental stewardship become part of the daily organizational culture.

An ESMS is appropriate for organizations of varying size in public and private sectors. From start to finish, a two-year timeframe is suggested for the ESMS implementation process. FTA realized that agencies could not dedicate their ESMS 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 seven clauses of the recently adopted ISO 14001:2015 International Standard. General overviews of the seven clauses are as follows:

- 🌱 **Context of Organization** (Clause 4) The organization must understand the organization and its context; understand the needs and expectations of interested parties; determine the scope of the ESMS.
- 🌱 **Leadership** (Clause 5) Specify the actions in which top management are personally involved with and directs the organization. Leadership includes developing and implementing environmental policy, a set of principles stated as commitments in which top management outlines the long-term direction of the organization to support and enhance its environmental performance. The policy enables the organization to set its objectives and take actions to achieve the intended outcomes of the ESMS. Leadership establishes and assigns organizational roles, responsibilities, and authorities. Persons assigned these roles should have sufficient access to top management in order to ensure their participation.
- 🌱 **Planning** (Clause 6) The organization must identify environmental aspects/attributes of transit-related products, activities, and services and determine those aspects that could have a significant impact on the environment. Teams must establish criteria for evaluating risk and take action to address risks and opportunities associated with aspects. The organization must determine, at a detailed level, the compliance obligations applicable to its environmental aspects. Environmental objectives must also be established and measured in line with transit policy, significant environmental aspects, and the needs and expectations of interested parties.





- 🌱 **Support** (Clause 7) Resources, competence, awareness, communication are part of the Support clause. Teams, and all personnel working on behalf of the agency, must ensure that current and future employees are trained, continually updated and informed, and capable of carrying out their environmental responsibilities. Teams must also ensure effective internal and external communication takes place in regards to environmental management matters. Documented information must be maintained on grantee ESMS and related documents. This information (documents and records) must also be controlled.
- 🌱 **Operation** (Clause 8) Teams must identify, plan and manage operations and activities associated with identified environmental aspects. Emergency Preparedness and Response procedures will be developed and implemented for potential incidents/accidents/emergencies.
- 🌱 **Performance Evaluation** (Clause 9) Teams must monitor key processes, track performance, analyze and evaluate effectiveness and track continual improvement through compliance audits, internal audits, and management review.
- 🌱 **Improvement** (Clause 10) Improvement shall be documented through the identification of nonconformities, development of corrective actions to address nonconformities, and review of the effectiveness of those actions.

Four Phases of ESMS

Most Environmental Management Systems are built on the “Plan, Do, Check, Act” model. This model leads to continual improvement based upon:

PLAN (Clauses 4-7)

Planning: Identifying interested parties, issues, policy, aspects/impacts, risks/opportunities, objectives, resources

DO (Clause 8)

Implementing: Operations, emergency preparedness and response, and operational controls framework

CHECK (Clause 9)

Analyzing, evaluating, monitoring, measuring, internal audit compliance audit, management review, and corrective action

ACT (Clause 10)

Reviewing, including progress reviews and acting to make needed changes, nonconformity, corrective action, and continuous improvement.





Keys to Successful Implementation

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

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

- 🌱 **Senior Management Representative:** This person should be a member of the leadership team with the authority to ensure the core team has access to the resources and support of the organization. The Senior Management Representative attends workshops to learn the management system.
- 🌱 **Top Management Representative:** This person is a top management representative within the organization and has the authority and responsibility to ensure that the ESMS is fully implemented through the FTA Institute. This team member will participate in homework review as well as the three 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 during 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.





- 🌱 **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 ESMS;
 - Effective communication skills;
 - Ability to work with top management; and
 - Ability to keep the core team on schedule and on task.

Senior Management Support/Team Conference Calls: The interest and support of senior management is critical to the success of ESMS implementation. FTA required a formal commitment by senior management to participate in team calls and homework review prior to returning to workshops 2 and 3.

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

ESMS Ongoing Assessment Audits: Virginia Tech's homework reviews auditing the progress of the ESMS was without question indispensable in ensuring ongoing progress of the ESMS. The result of assessments drives the continual improvement effort that serves as the centerpiece of ESMS. The institute offers homework review assessments, a gap audit, approximately three months after Workshop 3, and then a formal ISO 14001 ESMS audit approximately three months after the gap audit. Homework reviews are conducted remotely by Virginia Tech instructors and reviewed during team calls. Audits are conducted at the transit facility home location.

Management Review: As a condition of participation, FTA required involvement by Senior Management. FTA believes that senior management leadership participation in management review is a crucial factor in the success of the participating agencies.



**Los Angeles County Metropolitan
Transportation Authority (LA Metro)
Los Angeles, California**



CASE STUDY



Profile

Metro serves as the transportation planner and coordinator, designer, builder and operator for one of the country's largest, most populous metropolitan areas. Metro consists of:

- 🌿 Metro Rail: Over 100 miles of light rail and subway lines in L.A. County.
- 🌿 Metro Bus: The Metro bus system, plus funding for over one dozen municipal bus companies.
- 🌿 Highways and HOV Lanes: Carpools, vanpools and express buses.
- 🌿 Metro Access: Dial-a-ride services for the elderly and disabled.
- 🌿 Metro FSP (Freeway Service Patrol): A system of contracted tow trucks for servicing disabled vehicles on the freeways.
- 🌿 Call Boxes: A countywide system of cellular call-boxes for emergency use in the freeway and highway system.
- 🌿 Bikeways: A system of bikeways for commuter and recreational purposes in L.A. County.
- 🌿 Bikeshare: In 2016, Metro began operation of a bikeshare program, and is expanding to three additional parts of the County during 2017.
- 🌿 Bike and Pedestrian Program: A countywide program that allocates resources to build and sustain bike and pedestrian access to transit system.
- 🌿 Transportation Enhancement Program: A countywide program that allocates resources to improve transportation infrastructure to maximize infrastructure and improve transportation connectivity.
- 🌿 Regional Integration of Intelligent Transportation Systems (RIITS): A countywide program that allocates resources and coordinates integration of technology and communication systems to maximize travel efficiency on highways and streets.
- 🌿 Smart Streets: Synchronized signals, ramp metering and communication in order to keep traffic flowing.
- 🌿 TDM (Transportation Demand Management): includes rideshare, flexible work hours, telecommunicating and transit voucher programs.



Metro is headquartered in the One Gateway Plaza, Los Angeles California and serves a population of approximately 10 million people in all of Los Angeles County through our growing bus and rail system. By itself, Metro operates within 1,433 square miles of service area.





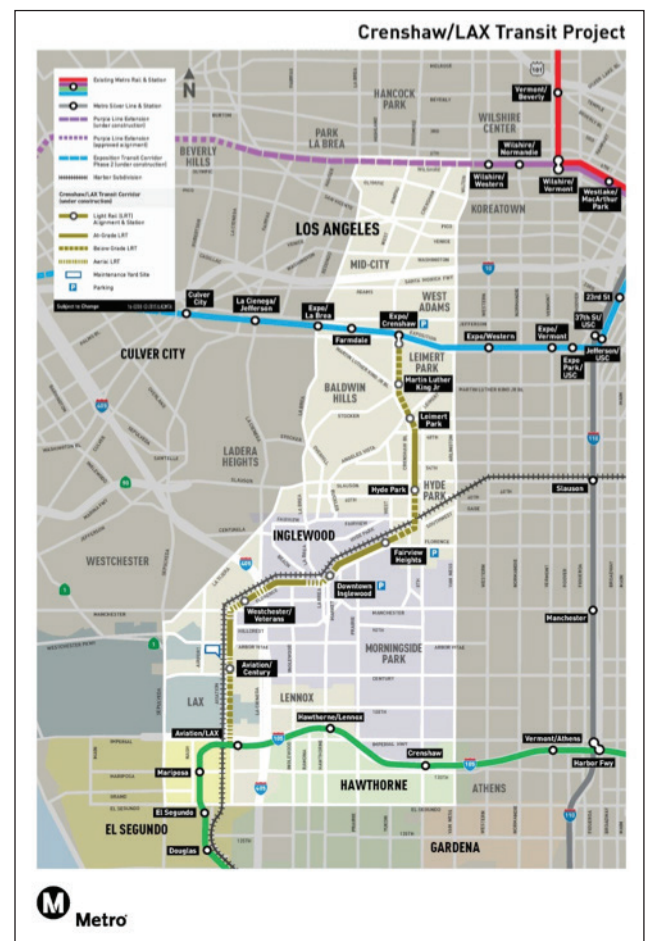
LA Metro Case Study

Metro has more than 2,200 buses, all of them propelled by compressed fossil natural gas. This is the largest in the nation. Our system also includes eight fixed guideways, six (Red, Purple, Green, Blue, Expo, Gold) are rail, and two are dedicated busways (Silver and Orange Lines). As of June 2017, our average bus and rail weekday boardings totaled 1,275,622.

Metro has a balanced budget of \$6.1 billion for FY 2018 and three rail lines under construction. Two Metro Rail projects — the Metro Expo Line extension to Santa Monica and the Metro Gold Line Foothill extension to Azusa – opened in spring 2016 improving mobility and connectivity within Los Angeles County.

Fenceline

The Crenshaw/LAX Transit Project is one of 12 transit projects funded by Measure R, the half-cent sales tax approved by Los Angeles County voters in 2008. The Crenshaw/LAX Transit Project will serve the Crenshaw District, Inglewood, Westchester and surrounding area with eight stations (one aerial, four at-grade, and three underground). Six staging yards support the project. The area under construction totals approximately 50 acres, and project construction utilizes a workforce of 450 employees and contractors.





Core Team

The Core Team consists of one member representing agency-wide environmental compliance (ESMS Implementation Coordinator), one member representing project-level environmental compliance, and the third member is the Contractor's representative for environmental compliance.

Additional staff and contractors attend Core Team meetings based on the significant aspects or other emerging environmental compliance issues, and emergency response activities. The Core Team meets twice a month, and the project's ESMS Implementation Coordinator reports progress to the ESMS Administrator monthly, and to the Administrative Team quarterly. Pictured are: back row – Cris Liban and Edgardo Gilleria; front row: Faridal Mutalib, Erika Wilder and Aldon Bordenave



This Core Team works with the agency's existing Environmental Management System (that is focused on reducing operational issues). An EMS Administrator and an EMS Administration Team oversees all of the agency's EMS efforts.



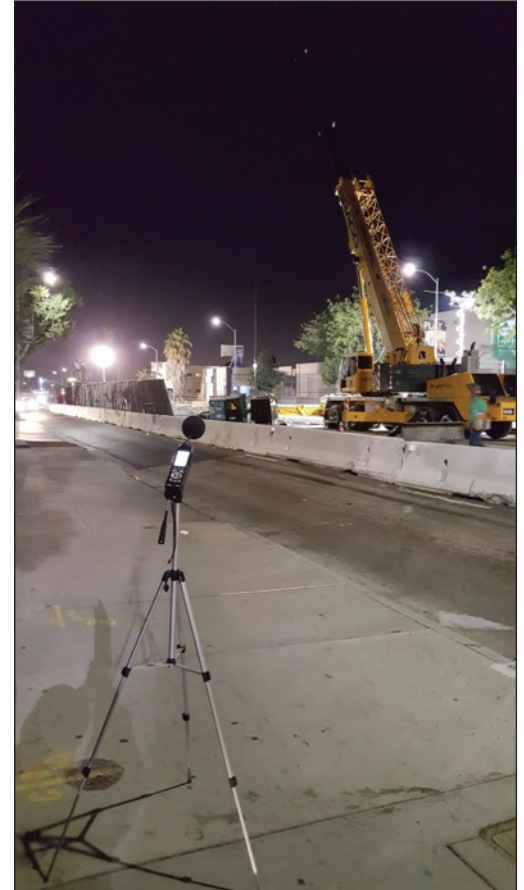


Key Drivers for Adopting an ESMS

Metro is responsible for complying 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;
- 🌱 California Hazardous Waste Control Laws;
- 🌱 California Health and Safety Code, Division 20;
- 🌱 California Code of Regulations, Title 22, Division 4.5;
- 🌱 California Code of Regulations, Title 23;
- 🌱 California Code of regulations, Title 8, section 5192 – Emergency Response to Hazardous Materials;
- 🌱 California Health and Safety Code, Chapter 6.95, section 25500 et al – Hazardous Materials Business Plan; and
- 🌱 South Coast Air Quality Management District (AQMD) rules.

Metro's participation in the fifth FTA ESMS Training and Assistance Program reinforces our ability to implement environmental controls and compliance on our construction projects to accomplish desired results.





Significant Aspects and Impacts

The Core Team identified seven capital construction contract specifications that Metro uses to control and influence environmental aspects:

- ✔ Temporary environmental controls;
- ✔ Water pollution controls;
- ✔ Noise and vibration;
- ✔ Lead and asbestos work;
- ✔ Waste management;
- ✔ Green construction policy; and
- ✔ Sustainability plans.

These specifications are included in Metro's bid packages and contract documents, and are implemented similarly across all Capital Construction Projects. Other controls and influences to environmental aspects for capital project construction come from project-specific agency requirements. For the Crenshaw/LAX Transit Project, Metro and the FTA prepared a joint EIR/EIS document that included an assessment of environmental effects from the project, a public participation process (which includes other state and federal agencies), and a list of required actions Metro and its contractor must take to mitigate adverse effects. Using the contract specifications and the project-specific mitigation measures, a total of 79 activities were evaluated by the Core Team as environmental aspects to be scored for significance.





Objectives

Metro has committed to the following actions through its Environmental Policy:

- ✔ Comply with all environmental, federal, state, and local laws and regulations, and other requirements;
- ✔ Restore the environment by providing mitigation and corrective action and by monitoring to ensure that environmental commitments are implemented;
- ✔ Improve our 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 for 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 our 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 our efforts to protect the environment and educate the public about the environmental benefits of our transit system;
- ✔ Build relationships with our contractors, vendors, consultants, and transit partners during planning, design, construction, operation and procurement to protect and enhance the environment;
- ✔ Consider alternative solutions such as promoting and tapping renewable energy sources to address energy and environmental challenges;
- ✔ Maintain an EMS with environmental objectives and targets that are measurable, meaningful, understandable, and support continual improvement; and
- ✔ Communicate the goals and progress of this Policy and the ESMS to Board members, officers, employees and the public.





The objectives and targets associated with our significant aspects will be consistent with our Environmental Policy and will meet all of Metro's compliance obligations. Action Plans are opened to manage each environmental objective and target that is identified as a significant aspect.

Benefits of Adopting an ESMS

To date, the primary benefit of developing the Construction EMS has been bringing together team members from both Metro's operations side and the capital construction teams. The exchange of ideas, the identification of construction issues affecting operations, and the sharing of implementation best practices, has been invaluable to all involved. The EMS has also provided a more robust framework in the planning, construction, and operations of current and future projects and infrastructure. LA Metro's visionary implementation and embrace of EMS principles has reduced the agency's environmental liabilities, created value-creating projects, and increased cost-savings and revenue generating opportunities agency-wide. Specific to construction efforts, the collective efforts of the agency and its contractor to succeed in this pilot has strengthened each of the parties' partnerships and collaboration towards the accomplishment of mutual goals.

Resources

From the period covering March 2016 through June 2017, the number of hours and costs associated with the development and fenceline implementation of LA Metro's ESMS program are:

LA Metro hours = 1,177 hours

LA Metro costs = \$177,842

Cost Savings and Avoidance

In construction, the monetary costs of non-compliance are borne by the contractor. However, the public perception of contractor non-compliance is borne by Metro. Because of a half-cent sales tax the voters of Los Angeles County entrusted to us in November 2016, it is important to spend money wisely, and also to safely and effectively manage the construction and maintenance of Metro's transit system.

For the Construction EMS, the Core Team identified significant aspects upon which Metro has been receiving feedback; in particular, dust control and sediment control. By raising awareness of the issues and setting environmental objectives to reduce environmental impact, the team's approach to controlling dust and sediment will result in community benefits and the sharing of best practices with other construction projects.





Metro has 16 bus/rail maintenance facilities covered under its multi-site ISO 14001:2015 certificate, and has recently undergone certification audits to add two rail facilities, a bus facility, plus this EMS “Construction Facility” to the certificate. We expect this investment into a systematic approach to managing environmental aspects will result in strong processes, well-trained teams, a reduced risk of major environmental upset, and also provide a mechanism to disseminate lessons learned and information relating to changes in environmental regulatory requirements.

Metro annually reports metrics associated with the implementation of our Green Construction Policy as well as the implementation of our Sustainability Plan. The 2017 report provides a monetized value of up to \$400,000 for the implementation of our Green Construction Policy. The Sustainability Plan implementation metrics provide information on the benefits of our current commitment to an overarching sustainability strategy in all of our construction projects. The Green Construction Policy and the Sustainability Plan implementation are “Other” requirements that are incorporated into this Construction EMS.

Next Steps

- Continue to modify and improve the Construction EMS implementation to make it user-friendly to Metro and its construction contractors; and
- Begin implementation of Construction EMS on three additional major capital construction projects.

Management Commitment

On April 16, 2009, the Metro Board approved the Environmental Policy which formalizes Metro’s “commitment to protecting the environment using sustainable principles and practices in our Planning, Construction, Operations, and Procurement Departments.” This policy illustrates our leadership in maximizing our environmental efforts and its benefits for Los Angeles County through transportation.

LA Metro has an Executive Officer, Environmental Compliance and Sustainability, who ensures the uniform implementation of the Environmental Management System and its principles across the agency.

Contact Information

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FINAL AUDIT

The facility's **overall score** at the Final Audit was **based on determining process realization and process results**. In terms of scoring, effectiveness levels are based on planned activities and planned results. Effectiveness is indicated on a scale of 1 to 3, with 90 being the highest possible score which may be achieved. The scoring is based on the following criteria:

- 1 The process is not determined and planned activities not realized; and the process is not delivering the planned results and appropriate action is not being taken. (Planned activities not realized-planned results not achieved)
- 2 The process is determined but planned activities not fully realized; and the process is not delivering the planned results but appropriate action is being taken. (Planned activities not fully realized- planned results not fully achieved; but appropriate action is being taken)
- 3 The process is determined and planned activities fully realized; and the process is delivering the planned results. (Planned activities fully realized; planned results are achieved)

	ISO 14001:2015 Clause	Score
4 Context of the organization		
4.1	Understanding the organization and its context	3
4.2	Understanding the needs and expectations of interested parties	3
4.3	Determining the scope of the environmental management system	3
4.4	Environmental management system	2
5 Leadership		
5.1	Leadership and commitment	3
5.2	Environmental policy	3
5.3	Organizational roles, responsibilities and authorities	3
6 Planning		
6.1.1	Actions to address risks and opportunities - General	3
6.1.2	Environmental aspects	3
6.1.3	Compliance obligations	2
6.1.4	Planning action	3
6.2.1	Environmental objectives	3
6.2.2	Planning actions to achieve environmental objectives	3
7 Support		
7.1	Resources	3
7.2	Competence	3
7.3	Awareness	3
7.4.1	Communication - General	3
7.4.2	Internal communication	3
7.4.3	External communication	3
7.5.1	Documented Information – General	3
7.5.2	Creating and updating	3
7.5.3	Control of documented information	3
8 Operation		
8.1	Operational planning and control	3
8.2	Emergency preparedness and response	2
9 Performance evaluation		
9.1.1	Monitoring, measurement, analysis and evaluation - General	2
9.1.2	Evaluation of compliance	2
9.2	Internal audit program	3
9.3	Management Review	3
10 Improvement		
10.2	Nonconformity and corrective action	3
10.3	Continual improvement	3
Total Score		85 out of 90



Maryland Transit Administration (MTA)

Baltimore, Maryland



CASE STUDY



Profile

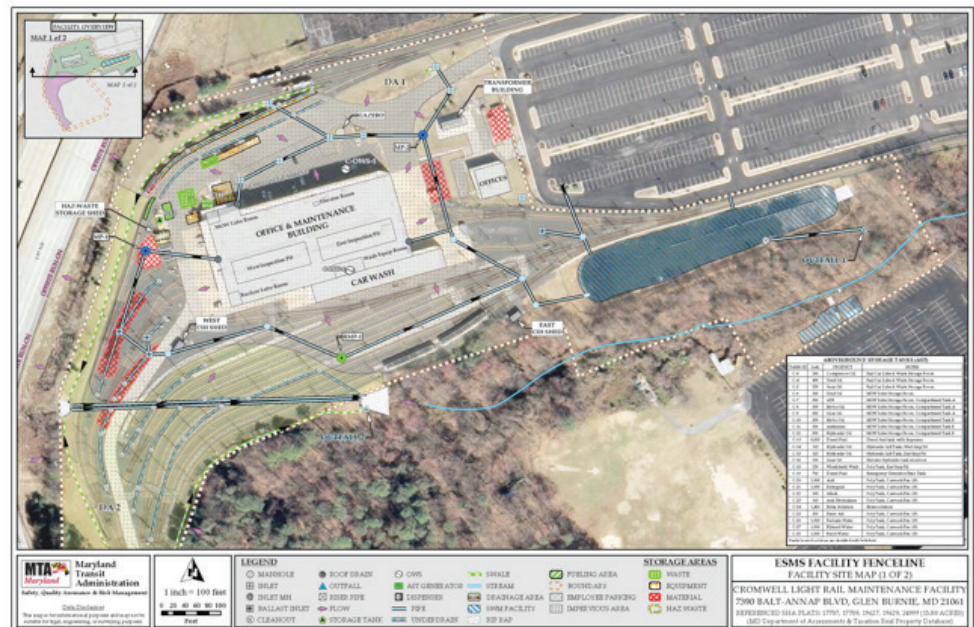
The Maryland Transit Administration (MTA) is a Transportation Business Unit of the Maryland Department of Transportation which operates a comprehensive transit system throughout the Baltimore Metropolitan Area. The MTA services include Light Rail, Bus Lines, Metro Subway, the MARC Train, and Commuter Bus. MTA's Light Rail line operates as three overlapping routes covering 37 route-miles and serving 33 stations. MTA has a fleet of 53 articulated light rail vehicles and operates up to 33 vehicles during peak hours. Light Rail service is provided 6 a.m. to 11 p.m. Monday through Friday, 7 a.m. to 11 p.m. Saturday, and 11 a.m. to 7 p.m. on Sunday. Light Rail operates at 10 to 30 minute intervals, depending on the station.

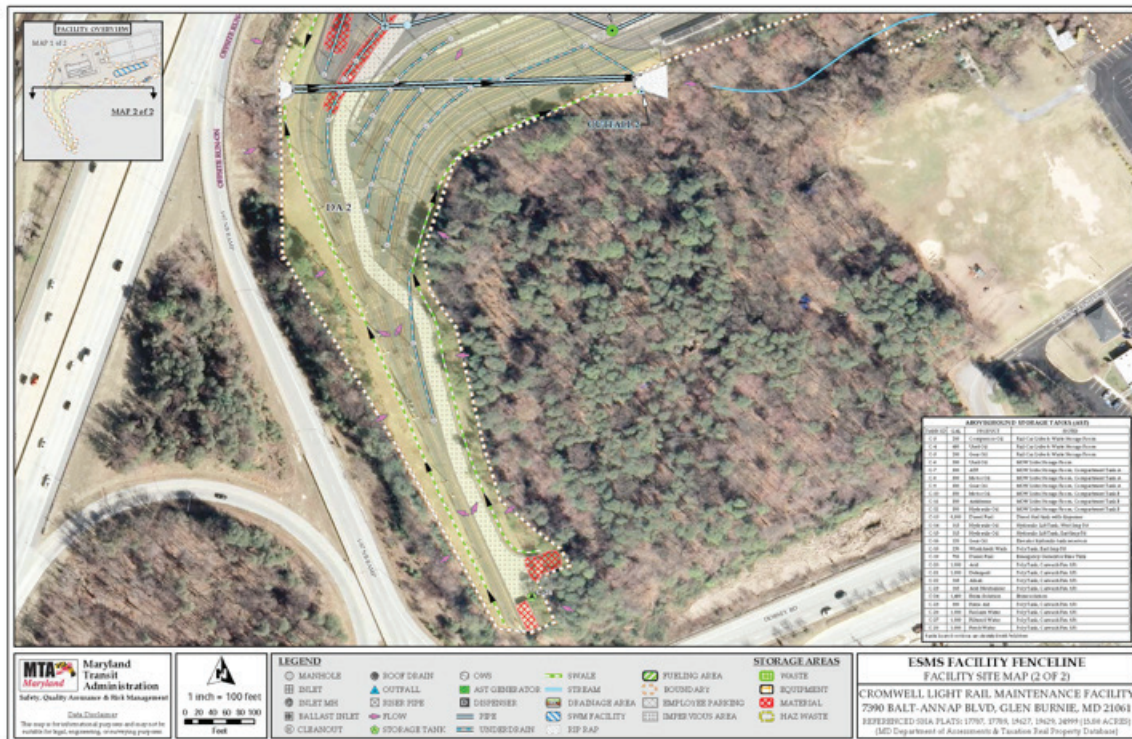


The Cromwell Maintenance Facility is part of the comprehensive Light Rail system and is used primarily for rail car maintenance and washing. The facility Standard Industrial Classification Code is 4111 - Local and Highway Passenger Transportation. Industrial activities at the facility include fuel dispensing, rail car maintenance, MOW (maintenance of way) heavy truck and equipment maintenance, rail car washing, vehicle and equipment storage, loading/unloading, and bulk storage of fuels in exterior aboveground storage tanks (ASTs).

Fenceline

The Cromwell Light Rail Maintenance Facility is located at 7390 Baltimore-Annapolis Boulevard in Glen Burnie, Maryland. The facility sits on a 15.8 acre parcel of land located in a predominantly urban environment. Interstate 97 borders the facility to the northwest and west, beyond which are commercial properties. To the south and southeast of the property are an





undeveloped wooded area as well as a church and school. Properties used for commercial and light industry activities are located to the north of the facility. To the east of the facility is the MTA Light Rail commuter parking lot and station.

Products stored at the facility include antifreeze, oil and lubricants, used oil, diesel fuel, parts cleaner, windshield washer fluid, soap, salt, alkalines, and acids. The facility has 20 ASTs for storing hazardous materials and used petroleum products generated as a result of maintenance activities. The facility has no underground storage tanks.

Anne Arundel County supplies public water and provides collection of sanitary waste. There are MTA-owned storm sewer inlets and manholes, as well as trench drains on the facility. Potential pollutant sources associated with materials and activities that may be exposed to stormwater runoff include outdoor vehicle and equipment storage, outdoor ASTs and fuel dispensing, outdoor materials storage, and loading/unloading activities. Pollutants of concern include diesel fuel, and hydraulic oil.





ESMS Core Team

The Core Team is responsible for providing leadership, facilitating involvement, and fostering cooperation in developing, implementing, and maintaining Cromwell's Environmental and Sustainability Management System (ESMS). The team is multi-disciplined and comprised of members from various departments throughout the MTA. Team members were strategically selected based on their experience with sustainability efforts and ability to influence operations at Cromwell.

The team consists of the following members (from left to right):

- ✔ **Sean Adgerson**, Deputy Chief Operating Officer (not pictured)
- ✔ **Kelly Lyles**, Senior Advisor, Environmental Planning Division
- ✔ **Ginger Dadds**, TMDL Program Manager, Office of Engineering & Construction
- ✔ **Casey Keener**, Hazardous Waste & Environmental Compliance, KCI Technologies
- ✔ **Lauren Molesworth**, Environmental Analyst, Environmental Planning Division
- ✔ **Toby Johnson**, Chief, Architecture & Sustainability, Office of Engineering & Construction
- ✔ **Robert Frazier**, Environmental Program Manager, Office of Safety, Quality Assurance & Risk Management
- ✔ **Charles Johnson**, ESMS, The SEMCAS Group





Key Drivers for Adopting an ESMS

The Governor of Maryland's vision is for the State to be a national leader in environmental protection and sustainability practices. Accordingly, Maryland has issued an Executive Order that requires State agencies to reduce energy and water consumption. Additionally, the Maryland Department of Transportation (MDOT) administers several environmental and sustainability policies and initiatives. Furthermore, MTA must comply with several federal, state, and local laws and regulations enforced by various environmental agencies.

The development and implementation of an ESMS at Cromwell supports the Governor's vision, helps comply with MDOT's policies, and is consistent with MTA's commitment to the environment. The ESMS will also help to ensure that MTA meets its compliance obligations. The ESMS will facilitate a good rapport with regulatory agencies as it will help demonstrate MTA's commitment to the protection of natural resources and promoting stewardship in environmental management. An additional driver for adopting an ESMS is to maintain environmental and sustainability issues as a priority and promote awareness and support for compliance activities.

MTA is using the ESMS to add focus on sustainability. MTA has been developing plans to reduce energy and water consumption (and costs), adapt for sea level rise and flooding, and many other criteria independent of the ESMS. The ESMS provides a foundation to implement these plans across MTA.

MTA's diversity of services, as well as planning for the future transit needs of a major metropolitan area, make the implementation of an ESMS at Cromwell an important part of MTA's operations. The development and implementation of an ESMS at Cromwell provides MTA with a formal system for measuring and managing the aspects of MTA operations and processes that interact with the environment. An ESMS will be implemented at Cromwell to ensure that environmental and sustainability considerations are built into the existing management framework, and that these considerations become part of the way operations at Cromwell are performed.





Significant Aspects and Impacts

The ESMS Core Team in conjunction with Cromwell supervisors and staff conducted a site survey of operations, reviewed work activities and identified and ranked environmental aspects at Cromwell. The team generated a list of 51 environmental aspects and performed a rating based on the criteria below:

- 🌱 Frequency/probability of occurrence
- 🌱 Regulatory requirements
- 🌱 Severity of environmental effect of aspect
- 🌱 Community concerns
- 🌱 Operational controls

Aspects rated 12 or above (out of 20) were considered significant. A total of 25 aspects were deemed significant. However, based on existing on-going efforts, regulatory risk factors, and available funding, only the five (5) significant aspects listed below are being addressed in the first phase. The other significant aspects will be addressed in subsequent phases.



Aspect	Process/Activity	Impact	
AST Management	Exterior stationary; exterior mobile	Waste management (SW/ UW/HW)	Soil, groundwater, surface water
		Stormwater management	
Exterior Materials Storage	Exterior storage of materials for routine activities, exterior bulk storage of fluids/oils	Stormwater management	Soil, groundwater, surface water
Fuel Dispensing	Exterior stationary; exterior mobile	Waste management (SW/UW/HW)	Soil, groundwater, surface water
		Stormwater management	
Spills/Releases	Equipment storage	Stormwater	Soils, groundwater, surface water
Water Consumption	Routine facility activities/operations	Water treatment, Safe Drinking Water Act	Groundwater, surface water





Objectives and Action Plans

To further prioritize the Cromwell Light Rail Maintenance Facility's significant aspects and translate the stated goals of MTA's Environmental Policy into action, the Core Team set out to develop objectives and specific action plans around each of the five identified significant aspects. Each action plan outlines specific tasks to achieve the stated environmental objectives. These objectives and associated tasks are outlined in the table below.

Aspect	Objective	Tasks
ASTs Management	Establish a tank management program to address all deficiencies and ensure compliance with newly enacted regulations.	Perform ASTs Baseline Assessment.
		Prioritize ASTs repairs.
		Review and update current standard operating procedures (SOPs).
		Review training procedures.
		Establish a routine inspection, testing and routine preventative maintenance (PM) program.
Exterior Materials Storage	Establish internal procedures to avoid deficiencies in regards to all applicable compliance obligations	Review and update current standard operating procedures (SOPs).
		Review training procedures.
		Review facility operations for additional items which require control.
		Review applicable compliance obligations and infrastructure for adequate control measures and additional operational BMPs.
Fuel Dispensing	Prevent the spill and release of fuels from dispensing activities into the surrounding soil, groundwater and surface water.	Review and update current standard operating procedures (SOPs).
		Review training procedures.
		Establish a routine inspection and routine preventative maintenance (PM) program.
		Review facility infrastructure for adequate control measures.
Spills and Releases	Prevent spills and releases of oils, fuels, and hazardous substances into the surrounding soil, groundwater and surface water.	Review and update current standard operating procedures (SOPs).
		Review training procedures.
		Review facility infrastructure for adequate control measures and availability and adequacy of spill kits/equipment and if equipment is adequately sized to handle the quantity and types of material stored at the facility.
Water Consumption	Reduce water consumption from domestic, industrial and landscaping activities.	Review water consumption documentation.
		Evaluate facility functions for water saving opportunities.
		MTA is developing a water consumption reduction goal based out of their energy consumption plan





Benefits of Adopting an ESMS

There are many potential benefits associated with adopting an ESMS at the Cromwell facility. Benefits that are or may be significant to MTA include:

- ✔ Integrated Environmental Policy into the MTA Mission
- ✔ Reduced environmental compliance incidents
- ✔ Improved state and federal regulator relationships
- ✔ Reduced waste and pollution
- ✔ Increased fuel economy
- ✔ Enhanced public image
- ✔ Improved internal and external communications
- ✔ Improved employee awareness of potential environmental impacts of work activities
- ✔ Sustainable transportation service and business practices that reduce costs and resource usage
- ✔ Increased staff productivity and safety
- ✔ Transit and Regional Leadership
- ✔ Compliance monitoring through use of the MTA Geographic Information System (GIS)

Resources

From the period covering March 2016 through June 2017, the number of hours and costs associated with the development and fenceline implementation of MTA's ESMS are:

MTA hours = 1,343

MTA costs = \$106,391

Cost Savings and Avoidance

An ESMS is an organized method of addressing MTA's environmental obligations. Many of these obligations are regulatory. Having an organized system of compliance saves time and money when permitting authorities like the U.S. Environmental Protection Agency (EPA) and Maryland Department of Environment (MDE) to inspect or when we prepare annual reports on required activities.

In a system as large as MTA, it can be easy to lose track of inspections, compliance activities and even training. The ESMS provides a framework for performing, recording and tracking these activities, reducing response time and potential for incidents and fines.

MTA has already spent time and resources complying with an EPA consent decree. This decree cost the MTA \$2.7 million in direct expenses. The indirect cost of labor to comply has not been tracked, but this is an additional cost. By using an organized system of requirements, training,





inspection and maintenance, this could have been avoided. MTA has worked to remain in compliance since initially developing an ESMS for the Cromwell facility in 2009. By taking this ESMS system wide, we can increase awareness, improve compliance and continue to improve our operations to avoid negative regulatory actions in the future.

Next Steps

The Core Team in conjunction with Cromwell supervisors and maintenance staff will perform the following actions to keep the ESMS development and implementation process moving forward:

- **Plan**
 - Develop procedures which will form the framework for the ESMS.
- **Do**
 - Continue to provide general ESMS awareness training to new employees; as well as, provide ESMS-specific training and detailed explanations on roles and responsibilities to Cromwell supervisors and maintenance staff (as the ESMS program develops).
 - Provide guidance and assistance to procurement staff as they review and revise procurement policies and practices to meet the requirements of the ESMS.
 - Implement procedures which are the framework for the ESMS.
- **Check**
 - Measure, monitor and control the significant aspects.
 - Track progress of objectives and action plans.
 - Continue to perform internal audits of the developed processes.
 - Prepare for the ISO 14001 certification audit. Due to the change in Senior Leadership at the MTA, the team is consulting with Acting Leadership on the path forward.
- **Act**
 - Expand the ESMS program to other Light Rail maintenance facilities after the ESMS is implemented at Cromwell (Cromwell was selected as the pilot facility).





Management Commitment

The Maryland Department of Transportation Maryland Transit Administration (MDOT MTA) is a customer-driven organization that delivers safe, efficient and reliable transit solutions with world-class customer service. MDOT MTA's policy is to conduct our mission in a manner that is protective of human health, safety and the environment, while efficiently managing the public resources that support our operations.

Through its Environmental Policy and Environmental and Sustainability Management System (ESMS), MDOT MTA commits to:

- Promote and support innovative solutions, including public-private efforts that protect the environment and maintain sustainable process improvement.
- Introduce environmental protection, pollution prevention and sustainable processes in the early planning stages of new programs, transit facilities and in all work conducted on MDOT MTA properties.
- Comply with applicable federal, state, and local environmental regulations and policies with regularly scheduled internal assessments.
- Evaluate the effectiveness of MDOT MTA's environmental management program through application and review of the ESMS to ensure that established objectives and targets are met.
- Promote a spirit of collaboration, cooperation and responsiveness both internally and with federal, state and local regulators.
- Implement and maintain MDOT MTA's environmental policy through effective communication with our employees and stakeholders.
- Implement proactive, sound and fiscally responsible environmental stewardship and sustainable practices.

"We at MDOT MTA have a responsibility to preserve our environment for future generations. The Environmental and Sustainability Management System will be a powerful tool in moving our agency forward in a holistic manner and is aligned with the Hogan Administration's directive of making Maryland the national leader in environmental protection and sustainability practices."

– Mr. Kevin B. Quinn, Administrator, MDOT Maryland Transit Administration

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410/454-7317





FINAL AUDIT

The facility's **overall score** at the Final Audit was **based on determining process realization and process results**. In terms of scoring, effectiveness levels are based on planned activities and planned results. Effectiveness is indicated on a scale of 1 to 3, with 90 being the highest possible score which may be achieved. The scoring is based on the following criteria:

- 1 The process is not determined and planned activities not realized; and the process is not delivering the planned results and appropriate action is not being taken. (Planned activities not realized-planned results not achieved)
- 2 The process is determined but planned activities not fully realized; and the process is not delivering the planned results but appropriate action is being taken. (Planned activities not fully realized- planned results not fully achieved; but appropriate action is being taken)
- 3 The process is determined and planned activities fully realized; and the process is delivering the planned results. (Planned activities fully realized; planned results are achieved)

	ISO 14001:2015 Clause	Score
4 Context of the organization		
4.1	Understanding the organization and its context	3
4.2	Understanding the needs and expectations of interested parties	3
4.3	Determining the scope of the environmental management system	2
4.4	Environmental management system	2.5
5 Leadership		
5.1	Leadership and commitment	3
5.2	Environmental policy	3
5.3	Organizational roles, responsibilities and authorities	2.75
6 Planning		
6.1.1	Actions to address risks and opportunities - General	2
6.1.2	Environmental aspects	3
6.1.3	Compliance obligations	2.5
6.1.4	Planning action	3
6.2.1	Environmental objectives	2
6.2.2	Planning actions to achieve environmental objectives	3
7 Support		
7.1	Resources	3
7.2	Competence	3
7.3	Awareness	3
7.4.1	Communication - General	3
7.4.2	Internal communication	3
7.4.3	External communication	3
7.5.1	Documented Information – General	3
7.5.2	Creating and updating	2
7.5.3	Control of documented information	2
8 Operation		
8.1	Operational planning and control	2.5
8.2	Emergency preparedness and response	2
9 Performance evaluation		
9.1.1	Monitoring, measurement, analysis and evaluation - General	2.5
9.1.2	Evaluation of compliance	2
9.2	Internal audit program	2.5
9.3	Management Review	2.5
10 Improvement		
10.2	Nonconformity and corrective action	3
10.3	Continual improvement	2.5
	Total Score	79.25 out of 90



**San Francisco Bay Area
Rapid Transit District (BART)
Oakland, California**



CASE STUDY



Profile

As the fifth-busiest heavy rail rapid transit system in the United States, BART enables over 400,000 daily riders to access many of the region's prime destinations for work, school and recreation. BART meets the diverse needs of people from different parts of the region, enabling them to interact and share space. In so doing, BART plays a critical role in reinforcing the Bay Area's identity as one region. From the opening of service to the present day, BART has enhanced quality of life in the Bay Area by providing a rapid and reliable alternative to the car and fostering a lifestyle that enables all people to conveniently live, work, and play in different cities.

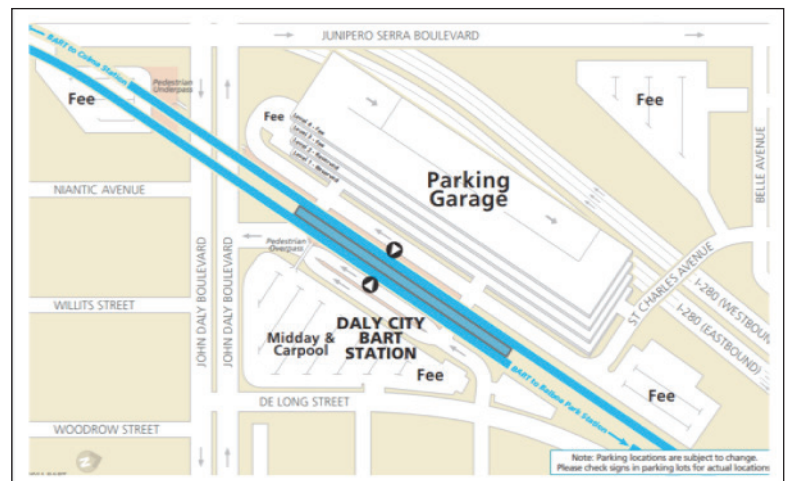


BART began operating in 1972 with 28 route miles of track serving 12 stations. It carried 100,000 people during its first week of revenue service. Today, BART comprises 104 route miles of track serving 44 stations in 21 cities and 4 counties.

Fenceline

The physical scope of the ESMS shall include the Daly City passenger station located on 500 John Daly Blvd, Daly City, CA 94014. The scope includes the parking facilities.

Daly City station was first opened in 1973. The station has approximately 2068 parking spaces and transit connections with SamTrans, Muni, and SFSU-BART Shuttle. There are also bike racks and 24 electronic bike lockers. The station is regarded as an intermodal/auto reliant station. Daly City is an elevated station featuring three main tracks with an island and side platform.





In FY2016, the average weekday exits in Daly City station were 9,813 (Ranking the 11th busiest BART station).

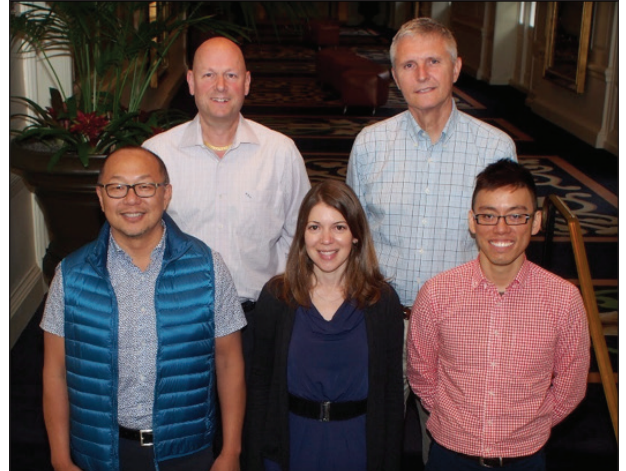
The organizational boundary includes all employees that operate at the station full time. This includes the station agents only.

Core Team

The District carefully selected an effective and influential team to ensure an integrated and enduring ESMS. The team comprises champions from Sustainability, District Architect Office, Internal Audit, Maintenance & Engineering, and Stations Planning.

The following are the selected team members:
Clockwise from the top left:

- 🌱 **Greg Lombardi**, Assistant Chief Maintenance and Engineering Officer
- 🌱 **Harold Keiner**, Internal Audit Manager
- 🌱 **Norman Wong**, Environmental Engineer
- 🌱 **Holly Gordon**, Sustainability Group Manager
- 🌱 **Tim Chan**, Manager of Planning





Key Drivers for Adopting an ESMS

The District is fully committed to sustainability and the environment. The Board of Directors adopted a Sustainability Policy in 2002 (revised and readopted in 2017) which emphasize BART's commitment to resource efficiency within the District's management and operations and reinforce the District's essential role in promoting regional sustainability. In addition, BART is an original signatory of the APTA Sustainability Commitment.

In 2016, the District formed a sustainability group in order to further its commitment to sustainability and formalize the program. ESMS presented an opportunity to guide the District in establishing implementation, monitoring, outreach, and other best practices.

Significant Aspects and Impacts

GHG/Energy

The BART system is largely powered by electricity, which accounts for 94% of total energy use. After labor, electricity is BART's second largest individual operating expense. BART trains are powered by electricity and are by far the single largest source of energy demand in the system, consuming 71% of total electrical power.

Activities

Station lighting
Elevator
Escalator
Fare gates
Communication systems

Objectives

- 🌱 Work to conserve water, reduce GHG footprint, save energy, reduce waste generation, and adapt to climate changes. BART's efforts will align with its sustainability policy and follow best practices on sustainability from the transit industry.
- 🌱 Implement ESMS encompassing process-related actions that will lead to a robust, transparent, and effective sustainability program.





Benefits of Adopting an ESMS

Use of the ESMS is furthering the District goals in sustainability. BART recognizes the many benefits of an ESMS including:

- ✔ Pollution prevention
- ✔ Resource conservation
- ✔ Increased efficiency
- ✔ Enhanced employee awareness of environmental issues
- ✔ Improved collaboration between departments
- ✔ Enhanced accountability and transparency

Resources

For the period covering March 2016 through June 2017, the number of hours and costs associated with the implementation of BART's ESMS are:

BART hours = 1,070

BART costs = \$148,250

Cost Savings and Avoidance

Development of the ESMS has given the organization valuable tools for program and facility management. Cost savings and avoidance are difficult to quantify because the benefits are achieved through efficiency of clear procedures for implementation and corrective response. The team has also observed enhanced accountability and transparency of activities.

Next Steps

BART will continue to examine opportunities to apply ESMS principles in the organization. The team will continue to refine ESMS processes with regard to the sustainability program and its implementation to maximize efficiency and benefit.





Management Commitment

“Participating in the FTA ESMS Training and Technical Assistant Program is helping to educate the next generation of BART staff who will be responsible for the future integration of sustainability in the District. Since 2002, the District’s Sustainability Policy has directed the organization to seek ways to reduce impacts to the environment. The Sustainability Policy was updated in 2017, and reflects the District’s commitment to the environment has led to a myriad of initiatives. A few of those initiatives include a more efficient rail car fleet, energy-efficient lighting upgrades, recycling of car wash water, measurement of our GHG emissions, PV solar installations, and climate adaptation vulnerability assessment. The District has accomplished this without a formal program in place, but wants to proceed with a more structured approach to sustainability.”



-Val Menotti, Chief Planning and Development Officer

Contact Information

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FINAL AUDIT

This assessment for BART is unique in that it is a remote desktop audit to provide status on their progress to date. This final remote desktop audit indicates conforming practices; as well as areas in need of improvement towards the goal of a partially developed and implemented ESMS focusing on one (1) significant aspect (Electricity). This is **NOT** a full system audit, instead it is an audit of a specific scope focusing on one aspect. It is the intention of BART to continue to develop and implement a system that speaks to their sustainability goals. This assessment is in line with the principle of continual improvement. This audit is but a snapshot in time. The results are based on sampling a representative sample of the organization's ESMS documented information.

The facility's **overall score** at the Final Audit was **based on determining process realization and process results**. In terms of scoring, effectiveness levels are based on planned activities and planned results. Effectiveness is indicated on a scale of 1 to 3, with 90 being the highest possible score which may be achieved. The scoring is based on the following criteria:

- 1 The process is not determined and planned activities not realized; and the process is not delivering the planned results and appropriate action is not being taken. (Planned activities not realized-planned results not achieved)
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- 3 The process is determined and planned activities fully realized; and the process is delivering the planned results. (Planned activities fully realized; planned results are achieved)

	ISO 14001:2015 Clause	Score
4 Context of the organization		
4.1	Understanding the organization and its context	2
4.2	Understanding the needs and expectations of interested parties	2
4.3	Determining the scope of the environmental management system	2
4.4	Environmental management system	2
5 Leadership		
5.1	Leadership and commitment	2
5.2	Environmental policy	1
5.3	Organizational roles, responsibilities and authorities	2
6 Planning		
6.1.1	Actions to address risks and opportunities - General	2
6.1.2	Environmental aspects	2
6.1.3	Compliance obligations	2
6.1.4	Planning action	1
6.2.1	Environmental objectives	2
6.2.2	Planning actions to achieve environmental objectives	2
7 Support		
7.1	Resources	2
7.2	Competence	1
7.3	Awareness	2
7.4.1	Communication - General	2
7.4.2	Internal communication	2
7.4.3	External communication	2
7.5.1	Documented Information – General	2
7.5.2	Creating and updating	2
7.5.3	Control of documented information	2





8 Operation		
8.1	Operational planning and control	1
8.2	Emergency preparedness and response	1
9 Performance evaluation		
9.1.1	Monitoring, measurement, analysis and evaluation - General	1
9.1.2	Evaluation of compliance	1
9.2	Internal audit program	1
9.3	Management Review	1
10 Improvement		
10.2	Nonconformity and corrective action	1
10.3	Continual improvement	2
Total Score		50 out of 90



**Southwest Ohio Regional
Transit Authority (SORTA)
Cincinnati, Ohio**



CASE STUDY



Profile

Metro is Southwest Ohio's fixed-route bus service, which serves Hamilton County residents in addition to providing commuter routes from Clermont, Butler and Warren counties into Cincinnati. Metro is a non-profit, tax-funded public service of the Southwest Ohio Regional Transit Authority, providing about 15 million rides per year in the Greater Cincinnati area.

- ✔ Metro's service area – 252 square miles
- ✔ 16 million passenger trips per year
- ✔ 11.2 million vehicle miles traveled per year
- ✔ 358 buses dispatched out of two operating garages
- ✔ 47 routes
- ✔ More than 6,000 bus stops
- ✔ 900 employees
- ✔ Also operate Access, paratransit service for people with disabilities and the Cincinnati Streetcar, that recently opened in September 2016



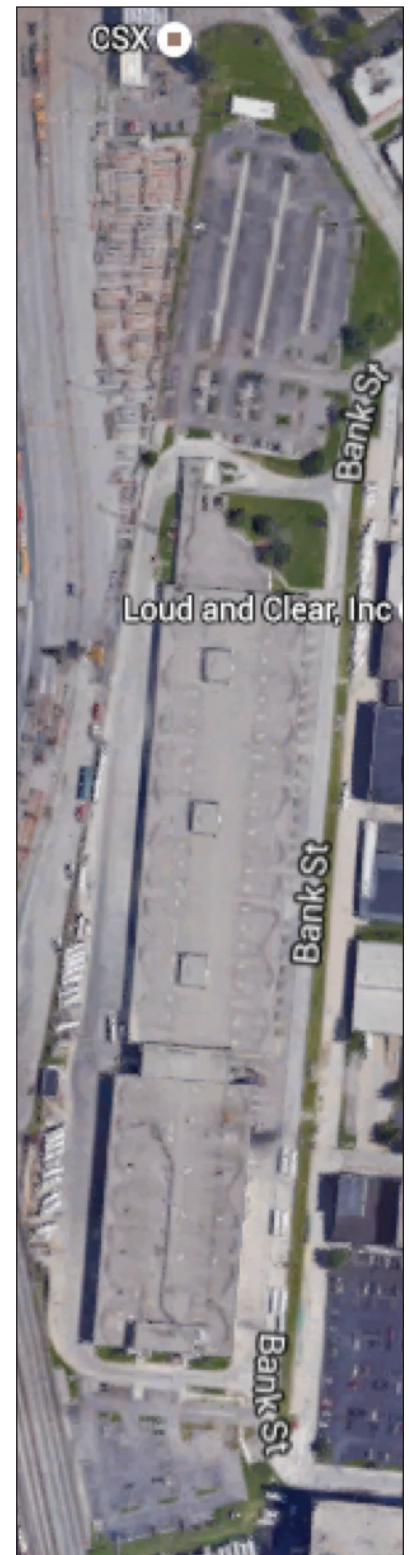


Fenceline

The Metro Queensgate garage is the largest garage facility for Metro buses in the Cincinnati region. Its workforce operates three shifts for 24/7 coverage. More than 180 maintenance employees are responsible for taking care of the fleet of 358 buses, the facility and warehouse.

The facility is located on approximately 14 parcels of land and approximately 6 acres is under roof. Fenceline neighbors include the US Postal Service Bulk Mail Center and the CSX Railyard.

The Queensgate garage is located one mile north of the Ohio River.





Core Team

- ✔ **Kim Lahman**, Outreach & Sustainability Manager
- ✔ **Judy Ross**, Buyer
- ✔ **Paul Williams**, Facilities & Grounds Manager
- ✔ **Jack Wilson**, Fleet & Facilities Director



Key Drivers for Adoption an ESMS

Sustainability has been gaining interest and popularity world-wide over the past decade. As environmental awareness increases, economic uncertainty continues, and gas prices fluctuate, there is increasing pressure on businesses to use resources more efficiently and make informed comprehensive decisions that take into account environmental factors. SORTA's executive leadership has recognized sustainability is about the ongoing capacity to endure. While SORTA has taken steps in the past to become environmentally friendly, the leadership has set higher goals for sustainability and has included it in its strategic plan. SORTA has become a signatory to APTA's Sustainability Initiative and has received the Bronze level recognition.





Significant Aspects and Impacts

Activity/Product/Service: Filling, Storing and Removing Used Oils from vehicles. Stored in UST. Oil is burned for heat.

Aspect: **Used Oil**

Impact: Air, soil, surface water and groundwater pollutant if discharged.



Activity/Product/Service: Lubricant Engine Oil (SAE 30) – stored in UST. Transmission, Air Compressor, Differential and Hydraulic

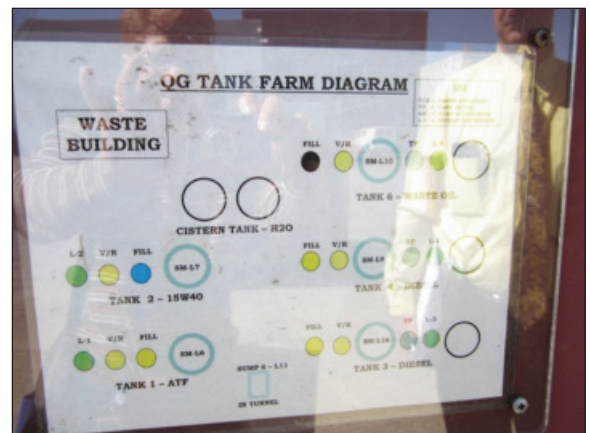
Aspect: **Fresh Oil**

Impacts: Air, soil, surface water and groundwater pollutant if discharged.

Activity/Product/Service: Fuel for fleet, stored in UST

Aspect: **Diesel**

Impacts: Air, soil, surface water and groundwater pollutant if discharged.





Activity/Product/Service: Replacing Fluorescent Bulb as needed and replacing Light Ballasts. Bulbs are stored for shipments as universal waste.

Aspect: **Used Lamps/Ballasts**

Impacts: Hazardous waste from breakage. Air, soil, surface and ground water pollution associated with landfill.



Activity/Product/Service: Used as coolant in revenue and non-revenue vehicles.

Aspect: **Antifreeze**

Impacts: Air, soil, surface water and groundwater pollutant if discharged.



Activity/Product/Service: Changing New and Used Tires –Tires leased. Changed as needed.

Aspect: **Used Tires (Revenue/Non-Revenue)**

Impacts: Air, soil and groundwater pollutant associated with landfills.





Objectives

- Reduce /eliminate used oil discharges, fresh oil and diesel discharges by implementing/ updating Spill Prevention, Control and Countermeasure (SPCC) plan.
- Develop procedures and practices to proactively mitigate environmental impacts by implementing a formal ESMS system and best management practices.
- Protection of the environment and the prevention of pollution by implementing a formal ESMS System.

Benefits of adopting an ESMS

- Reduce the environmental impact and improve efficiency of operations.
- Help to identify cost savings with greater emphasis on resource, waste and energy management.
- Ensure legislative awareness and compliance.
- Promote greater understanding of the value of agency-wide participation, cooperation and support, through outreach activities, creation and update of procedures for new and current employees.

Resources

From March 2016 through June 2017, the estimated hours and costs associated with the implementation of SORTA's ESMS are:

SORTA Hours = 1,375.5

SORTA Costs = \$46,407

Cost Savings and Avoidance

At the present, it is too early for SORTA to analyze cost savings.





Next Steps

The Core Team has identified a “Support Team” to assist in implementing the ESMS. The support team is represented by the following:

- 🌱 Director of Fleet & Facilities
- 🌱 Tech Ops Manager
- 🌱 Queensgate Fleet Manager
- 🌱 Facility Manager
- 🌱 Bond Hill Fleet Manager
- 🌱 Industrial Safety Specialist

The Core Team also plans to continue the outreach of education and training of employees on our significant aspects and impacts.





Management Commitment



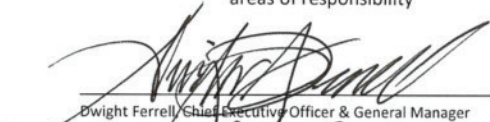
June 20, 2017

Environmental & Sustainability Management System

Leadership and Commitment Pledge

Top management shall demonstrate leadership and commitment with respect to the environmental management system by:

- Taking accountability for the effectiveness of the environmental management system
- Ensuring that the environmental policy and environmental objectives are established and are compatible with the strategic direction and the context of the organization
- Ensuring the integration of the environmental management system requirements into the organization's business processes
- Ensuring that the appropriate resources needed for the environmental management system are available
- Communicating the importance of effective environmental management and of conforming to the environmental management system requirements
- Ensuring that the environmental management system achieves its intended outcomes
- Directing and supporting employees to contribute to the effectiveness of the environmental management system
- Promoting continual improvement
- Supporting other relevant management roles to demonstrate leadership as it applies to their areas of responsibility


Dwight Ferrell, Chief Executive Officer & General Manager


Darryl Haley, Executive Vice President/Deputy General Manager


David Riposo, Senior Vice President Finance/Chief Financial Officer


Sallie Hivers, Vice President External Affairs


Donna Adkins, Chief of Staff


Carla McHale, Interim Vice President of Human Resources

Contact Name

Judy Ross, Buyer
jross@go-metro.com
513/632.7625





FINAL AUDIT

The facility's **overall score** at the Final Audit was **based on determining process realization and process results**. In terms of scoring, effectiveness levels are based on planned activities and planned results. Effectiveness is indicated on a scale of 1 to 3, with 90 being the highest possible score which may be achieved. The scoring is based on the following criteria:

- 1 The process is not determined and planned activities not realized; and the process is not delivering the planned results and appropriate action is not being taken. (Planned activities not realized-planned results not achieved)
- 2 The process is determined but planned activities not fully realized; and the process is not delivering the planned results but appropriate action is being taken. (Planned activities not fully realized- planned results not fully achieved; but appropriate action is being taken)
- 3 The process is determined and planned activities fully realized; and the process is delivering the planned results. (Planned activities fully realized; planned results are achieved)

	ISO 14001:2015 Clause	Score
4 Context of the organization		
4.1	Understanding the organization and its context	3
4.2	Understanding the needs and expectations of interested parties	3
4.3	Determining the scope of the environmental management system	3
4.4	Environmental management system	2
5 Leadership		
5.1	Leadership and commitment	2.5
5.2	Environmental policy	3
5.3	Organizational roles, responsibilities and authorities	3
6 Planning		
6.1.1	Actions to address risks and opportunities - General	3
6.1.2	Environmental aspects	3
6.1.3	Compliance obligations	2
6.1.4	Planning action	2
6.2.1	Environmental objectives	2
6.2.2	Planning actions to achieve environmental objectives	1
7 Support		
7.1	Resources	2
7.2	Competence	2
7.3	Awareness	2.5
7.4.1	Communication - General	3
7.4.2	Internal communication	3
7.4.3	External communication	3
7.5.1	Documented Information – General	2
7.5.2	Creating and updating	2.5
7.5.3	Control of documented information	2
8 Operation		
8.1	Operational planning and control	3
8.2	Emergency preparedness and response	1
9 Performance evaluation		
9.1.1	Monitoring, measurement, analysis and evaluation - General	1
9.1.2	Evaluation of compliance	2.5
9.2	Internal audit program	1
9.3	Management Review	2
10 Improvement		
10.2	Nonconformity and corrective action	2
10.3	Continual improvement	2
Total Score		69 out of 90



Tri-County Metropolitan Transportation District of Oregon (TriMet) Portland, Oregon



CASE STUDY



Profile

TriMet provides bus, light rail and commuter rail service in the Portland, Oregon, region. Our transportation options connect people with their community while easing congestion and reducing air pollution- making our region a better place to live. TriMet has a long-standing interest in and track record of planning and implementing strategies that reduce its carbon footprint, improve its management of sustainability processes, and deliver high quality public transit service that builds livable communities. The ESMS ISO 14001 Standard program will guide TriMet in creating a set of management processes and procedures to analyze, control and reduce the environmental impact of our activities, products and services, and operate with greater efficiency and control.



- 101 million trips a year
- 315,000 weekday trips
- 60 million trips by bus
- 40 million trips by light rail
- 457,000 trips by commuter rail
- Max, WES and Buses eliminate 200,000 car trips





Fenceline



The Elmonica facility is located at 16250 SW Jenkins Rd. Beaverton, Oregon. The maintenance facility was completed in 1998. The facility is situated on 18 acres and includes a 70,000 square foot shop building. There are 168 management, administrative staff, maintenance and operator staff working out of Elmonica.

The maintenance facility includes: eight work bays, wash bay, blowdown pit, LRV interior and exterior cleaning, maintenance, repair and dispatch for daily service. The entirety of the light rail fleet is housed at Ruby Junction and Elmonica. Elmonica facility does not have any underground storage for hazardous materials.

TriMet activities, products and services at Elmonica include:

- Light rail vehicle inspection
- Repair
- Light rail wash
- Component exchange
- HVAC unit repair of entire fleet
- Landscape crews
- Plant mechanics
- Wayside cleaners





Core Team

As of the writing of this report, the Core Team members have changed. The initial pilot project team is pictured and set out below.

- 🌱 **Harry Saporta**, Executive Director Safety, Security and Environmental Services (not pictured)
- 🌱 **Bob Hastings**, Agency Architect
- 🌱 **Stephanie Colleran**, Manager Environmental Services
- 🌱 **Adam Haynes**, Field Outreach & Community Relations
- 🌱 **Karen Jorgenson**, Project Control Specialist
- 🌱 **Jonathan Tillman**, Manager Facility Services
- 🌱 **Neil Cohn**, Construction Quality Assurance Coordinator (not pictured)



Key Drivers for Adopting an ESMS

TriMet's own sustainability policy is grounded in a long-standing commitment to provide complete and quality public transportation services that complement and are integrated with the community. TriMet's transit system aspires to be a truly attractive transportation option and which fosters compact, livable communities; this is the essence of sustainability for any public transit provider.

TriMet's sustainability policy is used as a guide for the agency's green design and construction practices, and to fulfill its mission to construct community- and earth-friendly projects. TriMet is committed to being an environmental leader. This commitment means that we will strive to go beyond environmental compliance in the design and construction of our projects. Our goal is to minimize negative impacts to air, water, and land while choosing sustainable materials and construction practices.



Eco-roofs help lower urban air temperatures.

TriMet also aims to increase awareness of environmental issues among agency employees and the public. We strive to do this through building positive relationships with all stakeholders and demonstrating the environmental and social relevance in transit projects.





TriMet's Sustainability Policy is as follows:

TriMet is committed to advancing the social, economic and environmental sustainability of the Portland metropolitan region and has adopted the following mission to guide its policies and practices:

TriMet provides viable transportation options to support regional livability goals by building and operating a safe, attractive, easy-to-use transit system that ensures transit equity, promotes human and ecosystem health and facilitates the use of other transportation alternatives in our community.

To fulfill this mission, TriMet pursues continuous improvement in three main areas.

Providing Quality Transit Service - As a key player in the regional transportation arena, TriMet strives to provide residents and visitors with viable transportation options. When people use transit, the entire region benefits socially, economically and environmentally. Regional livability and quality of life improve with better air quality, decreased traffic congestion and increased individual mobility for all.



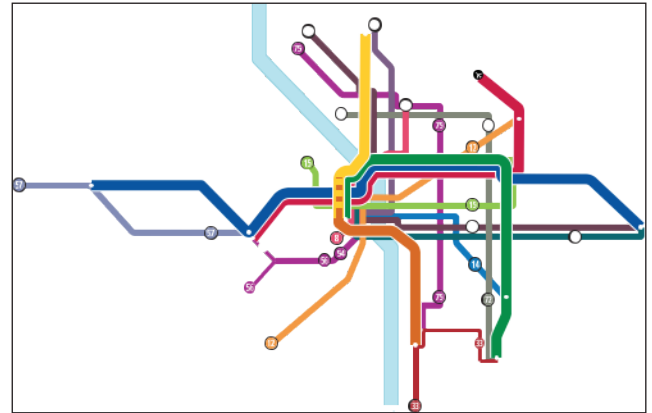
Constructing Community- and Earth- Friendly Projects - As TriMet grows its transit system to meet the increasing transportation needs of the community, it works closely with its regional partners to tie land use and transportation together to limit the region's ecological footprint. Each project offers the opportunity to make community- and earth-friendly use of space. Through carefully selecting products, incorporating green design principles and analyzing the impact of its construction choices, TriMet can ensure projects built today support a healthy community tomorrow.





Incorporating Sustainability into Daily Operations

- TriMet's basic operation and maintenance of heavy passenger vehicles presents many sustainability challenges on a daily basis. These challenges present opportunities to continually examine ways to minimize social and environmental impact and find innovative solutions to common operations issues. TriMet is in a unique position to experiment with community-friendly and earth-friendly products, services and techniques and to encourage industry partners to explore workable solutions.



To gauge its progress towards sustainability, TriMet considers to what extent its services:

- Promote human and ecosystem health by improving air quality, addressing global warming and encouraging healthy lifestyles;
- Are affordable, attractive and efficient, while offering a safer choice of transportation mode and supporting a healthy regional economy;
- Limit emissions and waste by continually reducing the resources used, using renewable resources when possible, and finding alternatives to hazardous or nonrenewable resources.
- Support equity of access to transit and the social and economic opportunities it provides, while avoiding disproportionate harm to members of our community in terms of environmental quality.

Significant Aspects and Impacts

This ESMS will only focus on the aspects deemed significant within the fenceline of the Elmonica Facility. Significance will be determined using a ranking system that will take into account the triple bottom line elements of sustainability and Agency priorities. This ESMS will establish a baseline for utilizing the ISO 14001 methodology at the Elmonica Facility with potential future expansion into our TriMet facilities.

Significant aspects are:

- Chemicals - reduction of hazards and migrate to less caustic products
- Electricity to reduce overall use by 5%
- Natural Gas to reduce overall use by 5%





Objectives

Aspect	Objectives	Tasks
Chemicals	<ul style="list-style-type: none"> • Update internal online SDS database to comply with OSHA requirements regarding SDS, July 2019 • Identify chemicals that have not been through the environmental and safety review, July 2019 • Identify which chemicals have environmentally responsible alternatives, July 2019 • Confirm standard operating procedures regarding chemical procurement and handling are in place, January 2018 	<ul style="list-style-type: none"> • Review online SDS database • Inventory chemicals to identify those that have not been through review • Implement pilot project to test new products for effectiveness • Implement staff training by January 2018 • Maintenance to include chemical action items or corrective actions(e.g. training, storage, spills, handling, use and disposal) on the staff meetings template
Electricity	<ul style="list-style-type: none"> • Conduct audit to identify potential building systems improvements at Elmonica by November 2017 • Create an energy conservation action plan to reduce electricity usage • Conduct isolated monitoring of consumption for Elmonica building • Implement staff training by June 2018 	<ul style="list-style-type: none"> • Procure energy auditor • Design and implement the conservation plan that will reduce electricity usage • Define baseline electricity consumption data for gross meter and sub-meters measurement on a quarterly basis • Analyze energy use projections with actual 'before and after' consumption to determine change/progress toward Objective. Create and display YTD usage trending graph • Update the staff of the conservation action plan at monthly meetings
Natural Gas	<ul style="list-style-type: none"> • Conduct audit to identify potential building systems improvements at Elmonica by November 2017 • Create an energy conservation action plan to reduce natural gas usage • Conduct isolated monitoring of consumption for Elmonica building • Implement staff training by June 2018 	<ul style="list-style-type: none"> • Procure energy auditor • Design and implement the conservation plan that will reduce natural gas usage • Define baseline electricity consumption data for gross meter and sub-meters measurement on a quarterly basis • Analyze natural gas use projections with actual "before and after" consumption to determine change/progress toward Objective. Create and display YTD usage trending graph • Update the staff of the conservation action plan at monthly meetings





Benefits of adopting an ESMS

- ✓ Cost savings from reduced energy/gas use
- ✓ Resource conservation
- ✓ Improved environmental compliance
- ✓ Increased awareness of chemical use
- ✓ Created a framework to be implemented at other facilities
- ✓ Increased operating efficiency
- ✓ Employee collaboration across agency divisions
- ✓ Reduced operating costs
- ✓ Enhanced document controls and document management
- ✓ Reinforced image with the public
- ✓ Employee awareness of environmental issues and responsibilities
- ✓ Ensures that all local, state and federal regulations are met

Resources

From the period covering March 2016 through June 2017, the number of hours and costs associated with the development and fenceline implementation of TriMet's ESMS are:

TriMet hours = 2,059

TriMet Costs = \$85,933.72

Cost Savings and Avoidances

While TriMet has not been able to measure cost savings and avoidance from our current significant aspects due to the program being in its pilot project stage, TriMet will use past and current billing data as a baseline. We anticipate that by focusing on the aspects chosen, substantial cost savings will accrue over time. Our initial target(s) should realize cost savings through reductions in:

- ✓ Chemicals
- ✓ Natural Gas Consumption
- ✓ Electricity Consumption

TriMet has a solid foundation for quantifying cost reduction efforts and plan to continue monitoring and measuring our programs and processes to bi-annual savings and avoidance more directly.





Next Steps

TriMet's next steps focus on continual improvement and system management in order to verify the benefits of an ESMS pilot project. As the ESMS Core Team continues its momentum to refine its processes, sustainability efforts will continue to broaden throughout TriMet recognizing that this is a long-term commitment for continual and ongoing improvements. The TriMet Team anticipates pursuing implementation of ISO 14001 methodologies starting 2018.

TriMet is committed to implementing a pilot ESMS program to include:

- ✓ Agency-wide ESMS communication, awareness and training campaign
- ✓ Attend monthly safety meetings
- ✓ Communicate to management on a quarterly basis
- ✓ Develop and implement a training program to support the ESMS aspects
- ✓ Leverage the energy audit findings to create a facility energy improvements Capital project
- ✓ Pursue and complete Objectives and Targets

Management Commitment

"This opportunity to develop a pilot program of the Environmental & Sustainability Management System (ESMS) allows TriMet to analyze our current efforts within the agency, and identify and plan for improvements to our current practices. The benefits of an ESMS will allow TriMet to create a set of management processes and procedures that analyze, control, and reduce the environmental impact of our activities, products and services, and operate with a greater efficiency and control. By adopting an ESMS pilot project at the Elmonica Facility will assure our employees, regulatory authorities, and our community that its operations and services are safe, and will advance environmental goals within the Portland metropolitan region."



An ESMS will help TriMet develop and establish an ongoing program to mitigate risks of environmental threats, as well as opportunities for mitigation. Through the ESMS process goals and objectives have been identified with a variety of environmental and sustainability programs. The ESMS pilot project will inform across the agency regulatory compliance obligations, and how they can inter-relate. TriMet will monitor and measure progress in achieving annual or capital project goals and objectives. Additionally, the ESMS pilot project shall be reviewed by TriMet to chart its progress, and make any needed improvements. Finally, the ESMS will greatly contribute to TriMet's staff awareness and competency of environmental and sustainability practices."

-Neil McFarlane, TriMet General Manager

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FINAL AUDIT

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4.2	Understanding the needs and expectations of interested parties	3
4.3	Determining the scope of the environmental management system	3
4.4	Environmental management system	2
5 Leadership		
5.1	Leadership and commitment	2
5.2	Environmental policy	2.5
5.3	Organizational roles, responsibilities and authorities	2.5
6 Planning		
6.1.1	Actions to address risks and opportunities - General	2.5
6.1.2	Environmental aspects	2.5
6.1.3	Compliance obligations	2.5
6.1.4	Planning action	2
6.2.1	Environmental objectives	2.5
6.2.2	Planning actions to achieve environmental objectives	2.5
7 Support		
7.1	Resources	2.5
7.2	Competence	1
7.3	Awareness	2
7.4.1	Communication - General	2.5
7.4.2	Internal communication	2.5
7.4.3	External communication	2
7.5.1	Documented Information – General	2.5
7.5.2	Creating and updating	2
7.5.3	Control of documented information	2
8 Operation		
8.1	Operational planning and control	1.5
8.2	Emergency preparedness and response	1.5
9 Performance evaluation		
9.1.1	Monitoring, measurement, analysis and evaluation - General	2
9.1.2	Evaluation of compliance	1
9.2	Internal audit program	2
9.3	Management Review	2.5
10 Improvement		
10.2	Nonconformity and corrective action	1
10.3	Continual improvement	2.5
	Total Score	65.5 out of 90

