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# Lansing School District Strategic Plan for a K-12 School District Chemical and Resource Management System

## Project History

Nationwide, public K-12 school districts are being asked to meet increasing educational demands with diminishing financial resources. At the same time, high-profile hazardous material incidents in schools have made improved chemical management a top priority for leaders of school districts, state agencies, and the US EPA. While cleaning out years of accumulated laboratory chemicals is an urgent need, it is recognized that a long term management system is needed to ensure that the problem does not recur in the future.

The US EPA, with technical support from General Motors, sponsored a pilot project to evaluate options for addressing these needs for Lansing School District and others.

This strategic plan outlines the process and infrastructure needs for a best-in-class chemical and resources management (“CRM”) system at Lansing. The plan also identifies two options for designing and implementing such a system.

## Lansing School District Background

Lansing is a large urban school district covering 55 square miles in Lansing, Michigan. The District has 16,270 students and approximately 2,800 employees housed in 40 facilities: 27 elementary schools, four middle schools, two specialty schools, three high schools, one vehicle maintenance facility, one physical plant warehouse, and two administration buildings.

These locations include four high school chemistry labs. As a result of past clean-out efforts, recent renovation of science lab facilities, and a hazardous materials disposal grant from the State of Michigan, most “legacy” chemicals were removed from District facilities by September 2005.

The District’s Energy Manager will be available to support CRM system development on a part-time basis.

## Results from Baseline Analysis

To prepare the baseline analysis, CSP and the District assessed the total amount spent on chemicals and waste services in the 2003-2004 school year, and evaluated the associated management systems.

## Current Chemical and Waste Spending

The baseline analysis determined the following current chemical purchase costs:

<b>Chemical Purchases</b>	<b>\$227,000</b>
<b>Classroom Chemicals</b>	<b>\$12,000</b>
<b>Facility Management Chemicals</b>	<b>\$215,000</b>
Carpentry	\$21,000
Custodial	\$97,000
Mechanical	\$61,000
Transportation Services	\$12,000
Food Service	\$18,000
Grounds	\$6,000

The baseline analysis determined the following current waste disposal costs:

<b>Waste Disposal</b>	<b>\$102,000</b>
Trash	\$95,000
Hazardous Waste	~\$7,000

## Existing Chemical and Waste Management Systems

The District had limited formal chemical and waste management systems in place at the time. Chemical selection, approval, purchasing, tracking, inventory management and training generally occurred on an ad hoc basis. Actual waste and recycling volumes were not tracked, so the extent of potential savings was unknown. Recycling activities were limited and ad hoc, and no formal efforts had been made to reduce waste through “upstream” management.

Additional information on current District policies and processes are included in Appendix A.

## Lansing CRM Objectives

Through interviews with Lansing teachers and administrators, the following CRM program objectives were identified. The overarching goal is to increase student safety and optimize district management.

### Chemical Management Objectives

- Minimize amount and toxicity of chemicals entering District facilities
- Prevent stockpiles of unused chemicals from accumulating in labs and other locations
- Ensure teachers and staff have knowledge and equipment necessary to maintain a safe school environment and achieve regulatory compliance
- Develop a detailed tracking, reporting, and invoicing system

## Resource Management Objectives

- Seek continuous improvement in District resource use and assist implementation of resource efficiency innovations (reduce, reuse, recycle or compost)
- Optimize current garbage hauling and disposal service
- Coordinate periodic disposal of special and hazardous waste
- Provide detailed tracking, reporting, and invoicing of chemicals and waste

In addition, the system must be stable, operating independently of any given individual, and maintainable over time and staff turnover. Finally, the system should encourage continuous improvement in all phases of the chemical and waste lifecycle, lower purchase and management costs, and improve safety (e.g., through streamlined logistics, ordering, and inventory management; reduction in quantity of chemicals used; and identification of less toxic alternatives).

## CRM Program Scope and Requirements

The following types of chemicals and waste (at all District facilities), are to be included in the CRM program:

### Chemicals

- Classroom/laboratory
- Maintenance
- Custodial
- Grounds keeping
- Vehicle maintenance

### Waste

- Solid non-hazardous waste (MSW)
- Hazardous waste
- Special waste
- E-waste

A CRM system should address the following lifecycle stages: procurement, receiving, inventory, internal distribution, use, waste storage and collection, and treatment/disposal/reuse. In order to track chemicals, such a chemical management system needs to be supported by a chemical information system.

### Procurement

Chemical procurement is a decentralized process with many individuals and departments independently ordering chemicals through multiple procurement pathways – credit cards, purchase orders, and small purchase orders. The lack of “gatekeeping” makes it impossible to know the type

and amount of chemicals stored in various locations. In order to comply with regulations, chemical tracking is required.

**Requirements:**

- Develop procurement strategy to supply high quality and low cost chemicals
- Achieve leveraged purchasing
- Provide order processing and efficient purchasing through a centralized process
- Enable oversight and control of the types of chemicals purchased and used in District facilities (e.g., implement a gate-keeping system)
- Minimize amount and toxicity of chemicals entering District facilities

**Receipt, Inventory and Delivery**

While centralized chemical purchasing can facilitate better gate-keeping and cost tracking, it does not necessarily result in tracking of a chemical once it enters district facilities. Tracking is important to maintain compliance with regulations and ensuring the highest level of safety and environmental stewardship. In designing an internal chemical distribution system, key principles of cost and safety need to be taken into consideration. Lansing should minimize the number of vehicles and people who handle the chemicals to lower risk and cost.

**Requirements:**

- Minimize inventory storage space, eliminate unnecessary storage near students (e.g., utilize a centralized chemical “pharmacy” and just in time delivery to users, if necessary)
- Prevent any stockpiles of old or unused chemicals (e.g., establish procedures to ensure chemicals are not left behind when a science teacher leaves; assist in managing inventories related to janitorial, facility, and maintenance chemicals)
- Track all chemicals on site from receipt through inventory and final disposal (e.g., use of centralized receiving, data systems)
- Perform regular inventory audits and data system reconciliation

**Use**

Given the decentralized nature and the diversity of chemical use, it is impossible to devise one solution for chemical use reduction applicable to all chemical users. However, education and outreach programs can be developed to reduce chemical use and toxicity. Green chemistry and micro-scale lab techniques should be utilized to encourage source reduction.

**Requirements:**

- Provide education and outreach to promote chemical use minimization and green chemistry
- Use micro-scale equipment and experiments where possible

## **Waste Collection and Management**

In addition to regular solid waste streams, the District must coordinate disposal of occasional waste streams such as used computers/e-waste and low-volume hazardous waste on a periodic basis. All chemical waste accumulated should be collected and transported to a centralized facility for waste determination, labeling, pick-up by a contracted provider.

The following hierarchy should be followed in managing all District waste streams: 1) eliminate or reduce at the source; 2) reuse, return, or sell; 3) recycle or compost; 4) dispose. The management system should include exchange to encourage reuse and reduce waste.

### **Requirements:**

- Optimize current garbage hauling and disposal service
- Coordinate periodic disposal of special/hazardous waste
- Implement “upstream” and “downstream” waste and cost minimization activities (reduce, reuse, recycle)
- Improve current recycling rates
- Promote chemical exchange

## **Environment, Health and Safety**

Any CRM system must provide all information and tools needed to meet regulatory requirements and ensure student and staff safety.

### **Requirements:**

- Maintain compliance with local, state, and federal environmental and safety regulations
- Ensure teachers and staff have training and equipment necessary to ensure safe transport, handling, storage, and disposal of hazardous materials
- Track chemical acquisition and storage locations for regulatory reporting
- Provide on-line access to Material Safety Data Sheets (MSDSs)
- Train science teachers and maintenance staff in safe handling and emergency response
- Facilitate emergency response and governmental/notices for chemical emergencies

## **Data Management**

The above-mentioned activities and requirements can be greatly facilitated with a well-designed chemical information system and an up-to-date chemical inventory database.

### **Requirements:**

- Provide detailed chemical and waste tracking, reporting, and invoicing
- Maintain inventory information and generate data for regulatory reporting
- Provide a District-wide platform for sharing chemical information and facilitate chemical exchange among chemical users and EH&S personnel
- Satisfy data needs for specific chemical management regulations

- Increase reporting efficiency
- Develop metrics for tracking program performance

## CRM System Implementation Alternatives

Outlined above are the elements Lansing specified as important in a CRM system. The next question considered was whether to take an “internal” or “external” course of action in implementing such a system.

### Option 1: Internal Enhancement

It is possible that Lansing could dedicate more, or acquire new, internal resources to implement a program meeting the needs outlined above. Fully evaluating this option would involve the following activities.

<b>Option 1: Evaluate an internally managed system</b>
<b>Establish a team</b> <ul style="list-style-type: none"><li>▪ Members should include users, facilities, EH&amp;S, purchasing, computer services, and legal</li></ul>
<b>Estimate staff needs to support a chemical management system</b> <ul style="list-style-type: none"><li>▪ Estimate staff resources needed to begin proper implementation and project needs out five years</li><li>▪ Consider education and outreach activities needed to educate all relevant departments about the policies and procedures</li></ul>
<b>Consider options for an information management system</b> <ul style="list-style-type: none"><li>▪ Discuss options for internal development of a system</li><li>▪ Begin investigating off-the-shelf software options</li><li>▪ Develop cost estimates for each approach</li></ul>

### Option 2: External Service Provider

Alternatively, Lansing could contract with an external provider to oversee both Chemical Management Services (“CMS”) and Resource Management Services (“RMS”). CMS typically involves a long-term contract for provision of chemicals and assistance with associated management services (e.g., chemical tracking, regulatory compliance). RMS Providers not only haul waste and recycled goods, but also help adjust upstream activities (e.g., procurement decisions, recycling campaigns) to reduce the amount of material entering the waste stream.

As expected, the District’s chemical consumption is much lower than traditional, industrial CMS customers. CSP and the District therefore evaluated current resource management activities to determine if they could be combined with chemical management activities to provide enough costs from which a supplier could drive savings that would cover CRM program costs.

The following steps would be needed to fully assess this option:

<b>Option 2: Solicit proposals for an externally managed system</b>
<b>Establish a team</b> <ul style="list-style-type: none"><li>▪ Members should include users, facilities, EH&amp;S, purchasing, computer services, and legal</li></ul>
<b>Draft RFP</b> <ul style="list-style-type: none"><li>▪ Use RFP template provided by CSP and combine with standard District RFP language</li><li>▪ Consider potential metrics and possible compensation structure</li><li>▪ Gain consensus on text</li><li>▪ Review and finalize RFP</li></ul>
<b>Distribute RFP</b> <ul style="list-style-type: none"><li>▪ Identify prospective bidders including both local and national service providers</li><li>▪ Provide onsite bidders briefing</li><li>▪ Respond to supplier inquiries regarding the RFP and distribute the inquiries along with the answers to all potential bidders</li></ul>
<b>Proposal evaluation</b> <ul style="list-style-type: none"><li>▪ Conduct a review and written assessment of proposals</li><li>▪ Develop scoring/evaluation system</li><li>▪ Conduct a benefits analysis under different proposals</li><li>▪ Down-select proposals and conduct interviews with candidate providers</li><li>▪ Get sign-off from District officials</li><li>▪ Negotiate final contract</li></ul>

## Conclusion and Recommendations

There are several compelling reasons to consider using an external provider to develop and manage Lansing's CRM system.

1. The District must meet its primary mission of student education with constrained financial resources. CRM Providers can typically provide at least a basic level of services on a no-fee, budget-neutral basis. That is, total spending on chemical and waste products/services will not increase over current levels, except for changes in volume driven by the District.
2. Evaluating and developing internal CRM capacity would require significant resources. An external provider could be the driving force behind implementing management systems and services that address these needs (independently of staff turn over).
3. An external provider could also help reduce the amount of chemical inventory on-site. Managing several receiving areas and stockrooms poses a risk and liability to Lansing. In other CMS programs, the inventory is managed off-site and delivered as needed to users.

For these reasons, CSP recommends developing an RFP to determine the ability of external CRM service providers to serve Lansing on a budget-neutral basis.

## APPENDIX A: Current CRM Practices at Lansing

### Procurement

The six Directors of the Custodial, Mechanical, Carpentry, Groundskeeping, Food Service, and Transportation Maintenance Departments order most chemicals directly from approximately 12 local vendors. In addition, the head custodians at each of the 40 District facilities can place orders directly with the sanitation products supplier. Most orders occur over the telephone or online.

Orders over \$250 must be made on an individual or blanket purchase order issued by the Procurement Department. Orders below \$250 are created by each Department office and recorded in a Small Purchase Order Log.

The types of chemicals purchased are very consistent, with very few new types purchased each year.

### Delivery

The majority of chemicals are delivered to the District Service Center, where they are held in inventory. Delivery to District facilities is made by several delivery trucks which make daily or weekly runs.

In addition, sanitation supplies are delivered directly to custodians at all district buildings and cafeteria managers at nine schools. Teaching supplies are delivered directly to teachers at 35 schools.

At each facility, chemicals are stored in custodial storerooms, boiler rooms, and class storerooms. There are currently 48 science laboratories with dedicated chemical storage spaces.

### Use

Chemicals are applied and used by the following District employees:

- Teachers: 52 secondary science teachers
- Custodial: 130 school custodians
- Mechanical: 23 mechanics
- Carpentry: 9 carpenters
- Groundskeeping: 13 groundskeepers
- Food Service: 92 cafeteria staff
- Transportation: 6 mechanics

The primary uses of chemicals are for maintenance of the following District assets:

- 10 swimming pools
- 10 varsity competition fields; 10 full size gymnasiums
- 80 buses and 71 trucks/ vans/distribution vehicles
- 48 science labs

- 9 cafeterias
- 35+ boiler systems

### Collection / Disposal

Used chemicals are picked up on an as needed basis and transported to the District Service Center. The District works with the local health department for disposal of some waste.

In addition, the parts washer solvent vendor and oil vendor make periodic pickups of used chemicals from the Vehicle Maintenance Center and Hill Vocational auto shop.

In the past, there has been no procedure in place for scheduled removal of chemicals from science classrooms. All chemicals which the current teachers did not wish to keep were disposed from schools in bulk clean-outs completed in 2004 and 2005.

### Environment, Health, and Safety

The District's Director of Public Safety is responsible for environment, health, and safety issues and Emergency Preparedness. An Emergency Response plan is kept in each school building. In 2003-2004, a safety video and some additional training resulted from a Federal Homeland Security Grant. All new employees and substitute employees are required to attend a session on emergency procedures. The district is planning chemical hygiene and safety training for the 2005-2006 school year.

### Data Management

Chemical spending and usage data is maintained in the Purchase Order system and individual spreadsheets maintained by some Department Directors.

### Current Resource Management Practices

Waste disposal services are centrally contracted for all District facilities via a competitive bidding process.

Solid waste containers are picked up on the schedule shown below.

Building	Containers / Vol. (cu yards)	Scheduled Pickup	Vol./Week (cu yards)
Administration Building	8	M, T, W, Th, F	40
Service Center	8, 4, 8, 6	M, W, F	78
Vehicle Maintenance Center	6, 4	M, W, F	30
Everett HS	8, 8, 8	M, T, W, Th, F	120
Everett Stadium	8	M, F	16
Eastern HS	8, 6	M, T, W, Th, F	70
Sexton HS	8, 8, 8	M, T, W, Th, F	120
Hill Vocational Center	8, 8, 8	M, T, W, Th, F	120
Gardner MS	8	M, T, W, Th, F	40
Pattengill MS	8	M, T, W, Th, F	40
<b>(Continued)</b>			

<b>Building (Continued)</b>	<b>Containers / Vol. (cu yards)</b>	<b>Scheduled Pickup</b>	<b>Vol./Week (cu yards)</b>
Otto MS	8,8	M,T,W,Th,F	80
Dwight Rich MS	8	M,T,W,Th,F	40
Attwood	8	M,W,F	24
Allen	8	M,W,F	24
Averill	8	M,W,F	24
Beekman	8	M,W,F	24
Bingham	8	M,W,F	24
Cumberland	6	M,W,F	18
Cavanah	6	M,W,F	18
Elmhurst	8	M,W,F	24
Fairview	6	M,W,F	18
Forestview	8	M,W,F	24
Gier Park	8	M,W,F	24
Grand River	6	M,W,F	18
Gunnisonville	6	M,W,F	18
Harley Franks	6	M,W,F	18
Holmes St.	6	M,W,F	18
Kendon	6	M,W,F	18
Lewton	8	M,W,F	24
Lyons	8	M,W,F	24
Maple Grove	6	M,W,F	18
Maplewood	6	M,W,F	18
Moores Park	8	M,W,F	24
Mount Hope	8	M,W,F	24
North	8	M,W,F	24
Pleasant View	6	M,W,F	18
Post Oak	6	M,W,F	18
Reo	8	M,W,F	24
Riddle	6	M,W,F	18
Sheridan Road	8	M,W,F	24
Verlinden	6	M,W,F	18
Wainwright	8	M,W,F	24
Walnut	8	M,W,F	24
Wexford	6	M,W,F	18
Willow	6	M,W,F	18
Wood Ck.	6	M,W,F	18
		<b>Weekly Total</b>	<b>1,460</b>

White paper to be recycled is picked up on-request from 16 District buildings by the solid waste vendor.

Hazardous and special waste is picked up on an occasional, as needed basis from various District locations.