

## *Chapter 4*

# *Facilities Use and Management*

This chapter addresses the facilities use and management as reviewed by the Office of Educational Quality & Accountability and is divided into the following sections:

- A. Facilities Planning and Construction
- B. Maintenance and Custodial Operations
- C. Energy Management
- D. Safety and Security

Facilities use and management includes the planning, construction, and maintenance of buildings, the safety of students and staff using those buildings, and the security of facilities before, during, and after school hours. More specifically, this area includes the following:

- planning and designing facilities to meet educational standards and to provide a physical framework that enhances learning conditions;
- properly maintaining and cleaning facilities so that teaching and learning can take place in a healthy and clean environment;
- ensuring that the facilities are safe when students and teachers are present;
- creating proper safeguards to ensure the security of the facilities during and after school hours; and
- having safety plans in the event of a crisis or natural disaster so that students and staff members are protected.

### **A. *FACILITIES PLANNING AND CONSTRUCTION***

Well-planned facilities are based upon the educational program and on accurate student enrollment projections. The design process should have input from stakeholders including administrators, principals, teachers, security specialists, parents, students, and the maintenance and operations staff. The selection of building materials, interior finishes, hardware, mechanical, electrical, and plumbing systems, and other major building components should be made by applying life cycle cost analyses for an optimum total cost of construction, operations, and maintenance.

This, coupled with the functional need of providing the best physical learning space possible for students, should lead a district to recognize the absolute necessity of developing, presenting, and implementing a long-range facilities master plan. Failure to implement a long-range facilities master plan will eventually lead to dissatisfaction and facility concerns.

Having a long-range facilities master plan will ensure that building projects are prioritized, begun, and completed following a studied, developed, and logical process. As administrators, faculty, staff, and school board members change, having a long-range facilities master plan will add stability and cohesiveness to the district's construction, use, and management of facilities.

A school district's long-range facilities master plan is a compilation of district policies, information, and statistical data that provide a basis for providing educational facilities to meet the changing needs of a community. A valuable resource in developing a quality long-range facilities master plan can be obtained from the Association for Learning Environments (A4LE), formerly CEFPI.<sup>1</sup> Effective long-range school facilities master planning incorporates the following elements:

- **Facility Capacity:** Districts establish the capacity of each school facility by setting standards that govern student/teacher ratios and the amount of square feet required per student in a classroom. These standards deal with the minimum size of core facilities, such as classrooms, gyms, cafeterias, and libraries, so that schools do not overload these facilities or overuse portable classrooms.

In 2008, the Oklahoma State Department of Education (SDE) published the second edition of *Planning for Education: Space Guidelines for Planning Educational Facilities*.<sup>2</sup> The guidelines were developed to assist local school boards, school administrators, architects, engineers, and planners in planning and designing educational facilities. The guidelines arrange space information by the major activities of instructional spaces, auxiliary spaces, and service and structure spaces for the various grade ranges. They also provide suggested methods of calculating preliminary net and gross square footage for school buildings by grade and major activity. Another excellent resource for facility construction is *An Administrator's Guide to School Construction Projects*, also published by SDE.<sup>3</sup>

- **Facility Inventory:** An accurate facility inventory is an essential tool in managing the use of school facilities. The inventory identifies the use and size of each room, which enables planners to accurately set the capacity of each school. Modifications to schools are noted in the inventory so it can be kept up to date.
- **Enrollment Projections:** Effective planning requires accurate enrollment projections at least five years into the future (**Appendix E**). Accurate projections require planners to examine district demographics and track any new construction activity in the district. Many school planners work in coordination with county and city planners to track growth patterns.
- **Capital improvement program:** Effective planning requires the district to anticipate its future needs and balance these against expected resources. A capital improvement program charts future improvements to school facilities and identifies funding sources for them. An

---

<sup>1</sup> Council of Educational Facility Planners International. (2004). *Creating connections: The CEFPI guide for educational facility planning*. Can be purchased at <http://creatingconnections.a4le.org/>

<sup>2</sup> <http://digitalprairie.ok.gov/cdm/singleitem/collection/stgovpub/id/9456/rec/4>

<sup>3</sup> <http://sde.ok.gov/sde/sites/ok.gov.sde/files/CI-AdministratorsGuide.pdf>

effective planning process involves the community at large, identifies district goals and objectives, and prioritizes projects based upon those goals and objectives.

- **Facilities Maintenance Plan:** School facility planning necessitates identifying links between facilities maintenance and facilities construction and renovation. Capital outlay for school construction is generally a more palatable proposition for taxpayers and public officials when a school system demonstrates that existing facilities receive appropriate care and maintenance. Good plans include short- and long-term objectives, budgets, and timelines – all of which demonstrate organizational commitment to facilities maintenance.

#### FINDING 4-1

The district has a facilities improvement plan which encompasses the three phases of the bond recently passed, but this does not include a life cycle planning document for existing facilities and equipment. The district lacks a long-range facilities master plan.

Facilities planning, by necessity, involves an assessment of the current condition of buildings and structures to provide a baseline from which a facilities master plan can be developed. The current condition would include an assessment of the facilities and their student capacity, a realistic enrollment projection, and a defined concept for construction and development for at least a ten-year window into the future. In addition to The CEFPI Guide for Educational Facility Planning<sup>4</sup>, the Seattle [Washington] Public Schools' 2012 Facilities Master Plan is a superb example of a well thought out and researched plan.<sup>5</sup>

#### RECOMMENDATION

**Establish a long-range facility planning committee and develop a long-range facilities master plan that includes life cycle planning of all equipment.**

There are two steps that are vital for continuing the process for developing a long-range facilities master plan. First, the district must take stock of what it currently has in the way of all facilities, with a detailed analysis of the condition of each of its facilities. Second, an accurate and realistic student enrollment projection will be necessary to weigh against the capacity of facilities. For the facilities assessment, it may be necessary to contract with an engineering firm that can assess not only the soundness of a facility's structures, but also the remaining longevity of a facility's mechanical, electrical, and plumbing systems.

To identify trends and prepare for adequate facilities, equipment, and teachers, there are several methods in use for projecting enrollment. Some of the most commonly-used models are average percentage annual increase, cohort survival, linear regression, and student-per-housing unit. It is important to understand that all enrollment projection models can provide only estimates of future student enrollment. The district may use the enrollment projections provided by the state, but for a more complete set of projections that also predict lower grade enrollments by utilizing birth records, the district may choose to contract with a company that specializes in school

<sup>4</sup> Council of Educational Facility Planners International. (2004). *Creating connections: The CEFPI guide for educational facility planning*. Contact <http://creatingconnections.a4le.org/> to purchase a copy.

<sup>5</sup> <https://www.seattleschools.org/cms/one.aspx?portalId=627&pageId=18257>

enrollment projections.

**FISCAL IMPACT**

The cost to hire a consulting firm to conduct the facilities assessment could range from \$3,000 to \$50,000. This estimate is based upon the consulting team’s experience in the field. The cost to hire a consultant to conduct a demographic study and produce 10-year enrollment projections for all grades could range up to \$6,000. This estimate is from one of the consulting team’s partner companies that routinely perform this kind of work.

Recommendation	2017-18	2018-19	2019-20	2020-21	2021-22
Prepare enrollment projections.	(\$6,000)	\$0	\$0	\$0	\$0
Conduct a facilities assessment.	(\$30,000)	\$0	\$0	\$0	\$0
<b>Total</b>	<b>(\$36,000)</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>

**FINDING 4-2**

The district lacks design standards and educational specifications. Without standards and specifications, the district runs the risk of constructing overly expensive schools in the future, or constructing new schools that are not appropriately comparable, which could raise concerns about equity. Without such standards, the district may have inconsistencies in the final design and construction of renovations and new facilities. This could result in inequities between facilities and systems and potential operational cost inefficiencies.

Many districts in the United States have developed design and construction standards as part of their overall long-range facility master plans. These standards typically include requirements to use specified types of building materials for similar spaces such as carpet for certain types of classrooms, vinyl composition tile for science labs, etc. Oklahoma has promulgated numerous facility guidelines and standards for the construction of educational facilities; this includes minimum square footage guidelines for classroom sizes in elementary and secondary schools.

Desirable elements in design standards include:

- minimum square footage and/or dimensions for primary programmed building spaces such as classrooms, computer labs, science labs, instrumental music, vocal music, vocational classrooms and shops, physical education spaces, libraries, restrooms, kitchen, and dining areas;
- number of students each space is designed to accommodate;
- secondary spaces to be included in the overall building design such as workrooms, administration areas, counselor and nursing areas, student commons, mechanical rooms, service closets, custodial closets, store rooms, etc.;
- types of wall, floor, and ceiling material to be used in the various programmed spaces;



- 
- furniture and equipment to be furnished by the district such as desks, chairs, tables, computers, printers/copy machines, and interactive whiteboards;
  - fixtures, furniture, and equipment to be furnished in construction contract such as upper and lower cabinets and countertops;
  - specific HVAC, plumbing, and electrical requirements, such as electrical outlets and sinks, for various programmed spaces;
  - technology requirements to include number of computers, printers, data, and voice networking;
  - acoustical requirements, especially for music rooms and gymnasiums;
  - space adjacency, such as science prep rooms directly adjacent to science labs, and art labs with window exposures to the north;
  - material manufacturers and model numbers that are approved for use in the district for door hardware, plumbing fixtures, HVAC equipment, lighting fixtures, communication systems, and security systems; and
  - general requirements such as total number of student, staff, and visitor parking spaces, bus driveway and canopy requirements, and special needs access requirements.

Districts that develop and establish these various types of standards for design, construction, and educational specifications are better able to provide equitable school facilities across the district. “Educational specifications” is a term referencing the programming of spaces needed to support the educational programs and curriculum to be taught within a school facility. Cost efficiencies can be achieved using standard types of materials and systems. By standardizing the various building materials and components, maintenance and custodial staff members can be more effective in the performance of their duties since they are familiar with the maintenance, operational, and cleaning requirements of these systems and materials.

A source of design guidelines for planning new school facilities is published by the Collaborative for High Performance Schools (CHPS).<sup>6</sup> School districts can become members of CHPS free of charge.

## RECOMMENDATION

**Include design standards and educational specifications such as programmatic square footages within published guidelines for square footage per student in planning for new educational facilities and later construction renovation projects.**

Moving forward, the long-range facilities master planning committee should address development of district-wide design standards and educational specifications. As part of the

---

<sup>6</sup> <http://www.chps.net/dev/Drupal/node>

development of a long-range facilities master plan, the district should contact other districts to obtain sample educational specifications that address programmatic square footage allocations for building spaces. This would enable the district to have a base program to build from in meeting with teachers, administrators, and architects when designing new facilities or additions and renovations to existing facilities. This will also assist the district in comparing their existing facilities to determine what improvements are needed to bring these buildings up to the agreed-upon programmatic square footages.

### **FISCAL IMPACT**

This recommendation can be implemented with existing resources.

### **FINDING 4-3**

During several reviews it was noted that some of these districts had not created a comprehensive database of critical information for each of its facilities. The maintenance director maintains most of the building plans that are available. Staff does not maintain facility records that would enable leaders to effectively develop and maintain a long-range facilities master plan. Not having this critical information, districts are at risk for incurring additional costs related to future renovations/additions projects. In addition, districts could have increased maintenance costs due to lack of information on warranties, operations, and maintenance manuals.

A basic facilities database would include:

- building year built, dates of major renovations, and square footages;
- building construction and renovation history with a description of work performed and associated costs;
- work order history;
- furniture and playground equipment inventory;
- parking data;
- room utilization chart;
- schematics and building systems; and
- warranty history and data for building components and equipment for HVAC, electrical, and plumbing systems.

As an example, one district developed a standard format for compiling historical records for each facility within the district. This critical information is inserted into three-ring binders and tabbed in an organized format in 15 sections. Each of the sections contains various types of information including spreadsheets, photographs, etc. to document the history and condition of each of the

district's facilities (**Exhibit 4-1**). A similar gathering of documents could be maintained electronically as well.

**Exhibit 4-1**  
**Sample Format of Facility Historical Records Maintained in a School District**

1. **Executive Summary on Facility Needs:** An overall executive summary of the facility, along with recent recommendations/analysis performed.
2. **Facility Analysis – Interior and Exterior:** A principal's facility review form that lists the various facility functions and key design elements, along with a rating from 1-5 (low to high) for each with a comment section.
3. **Photo Analysis of School Site:** Photographs of the school site, buildings, etc.
4. **Demographics:** Enrollment projections for campus.
5. **Parking:** Spreadsheet that includes: enrollment data; total staff; total number of visitor and handicap spaces; number of special events; and number of cars on adjacent streets.
6. **Playground:** Assessment sheet that includes: listing of playground equipment; brand name and model number; type of materials; year installed; cost; condition of equipment; type of fill material and border; comments; and recommendation section.
7. **Furniture:** An inventory of the building's standard classrooms that includes: type of furniture and equipment; quantity; age; condition; and estimated replacement costs.
8. **Facility History:** Copies of floor plans from original construction and additions; year of construction; square footage; and modular classroom locations.
9. **History – Bond & Building Fund:** Spreadsheet that includes: the history of past bond issue projects; year of bond issue; project description; and estimated costs.
10. **Work Order History:** Printouts of work order history for the facility.
11. **Current Room Utilization:** Spreadsheet that includes: total number of classrooms; how each is used; by room analysis of student occupancy per hour/per day; and a comments section.
12. **Security Cameras:** Spreadsheet that includes: quantity of existing cameras; future new cameras; locations and/or descriptions; and floor plan indicating locations.
13. **HVAC/Painting:** Spreadsheet that itemizes for HVAC/Electrical/Plumbing Systems: year installed; last major replacement/upgrade; number of repairs over a three-year period; and the next scheduled replacement year. Painting projects listing includes: year of last painting; area last painted; cost of painting project; and the next scheduled repainting.
14. **Roofing:** Spreadsheet that includes: age of roof; year of last roof or roof section update; repair history over three-year period; and the next scheduled replacement.
15. **Insurance Analysis:** Analysis performed by the district's insurance carrier as to the buildings history, size, type of construction, and replacement cost analysis.

*Source: Office of Educational Quality and Accountability, Archived Exhibit*

## RECOMMENDATION

### Develop a comprehensive database to maintain accurate records of all facilities and properties.

By maintaining facility records in an organized format such as this, a district would be able to update information efficiently when facility repairs, upgrades, etc., are performed. A comprehensive facilities database would enable the district to be more effective in developing, maintaining, and updating the district's long-range facilities master plan.

The maintenance director should compile all available facility records in an organized format and then determine what data remain to be developed. This database will help the district maintain and update its long-range facilities master plan.

## FISCAL IMPACT

This recommendation can be implemented with existing resources.

## FINDING 4-4

The district maintains copies of plans and specifications for most existing facilities in flat plan files and bookshelves in the maintenance center. These documents have not been scanned to electronic media nor stored in a fire-rated plan file or archive room, creating a significant risk to critical facilities documentation. The district indicated that staff had scanned some documents, but did not have time to finish. The plan files that are being used to store these documents are typical of a design office but are not fire-rated.

Ideally, most large school districts will provide a centrally located plan room for the storage and archiving of all facility documents which include original drawings, prints, specifications, maintenance and operating manuals, warranties, material samples, etc. The plan room is typically located in the maintenance department office so that the information is available for ready reference by the personnel that maintain, clean, and manage the facilities of the district and also for use in an emergency. These rooms are also usually protected by fire rated walls to minimize damage that could occur in the event of a fire.

For example, Edmond Public Schools maintains copies of plans and specifications for all existing facilities within a tornado-rated safe room (**Exhibit 1-28**). This room is well organized and sized to handle the current and future needs of the district. As a certified safe room, it is designed to withstand up to 250 mph winds from a tornado, which also provides for a safe place for maintenance personnel to gather during an extreme weather event while also protecting critical facility information.

**Exhibit 1-28**  
**EPS New Service Center Document Archive Room, 2013**



*Source: OEQA Archived Exhibit*

## **RECOMMENDATION**

**Protect critical facilities documentation by purchasing fire rated plan files, constructing a fire-rated archive room and creating an electronic backup of facilities documents.**

The district should:

- construct a fire-rated archive room at the maintenance center;
- purchase fire-rated cabinets to store original plans and specifications; and
- contract with a third party to scan all critical facility documents, if necessary.

The district should have existing staff scan all remaining documents so that they can be stored electronically on district servers. If this is not possible, the district could contract with a document scanning service provider to perform these services. The district should also consult with an architect to develop a plan and cost estimates to construct a fire-rated archive room within an existing district facility.

Currently, the district has a total of six flat plan files that are stored in the maintenance center (**Exhibit 1-29**). These files are not fire-rated, nor are they located in a fire-rated space.

**Exhibit 1-29  
Existing Flat Plan Files in Maintenance Center**



*Source: OEQA Archived Exhibit*

The district should consider completing the scanning of all remaining existing documents so that they can be stored electronically on servers for this critical facility documentation with its existing technology staff and equipment resources whenever possible. If this is not possible, the district could contract with a document scanning service provider to perform these services. The district should also consult with an architect to develop a plan and cost estimates to construct a fire rated archive room within an existing district facility.

**FISCAL IMPACT**

Construction of a fire-rated archive room could be incorporated into the scope of work of a future construction project funded from any existing available bonds. Until the construction can be completed the district should protect its plans by purchasing fire-rated vertical plan files. The consulting team estimates the district would need to purchase a total of four fire rated vertical plan files, at a cost of \$4,963 each.<sup>7</sup>

Recommendation	2019-20	2020-21	2021-22	2022-2023	2023-24
Purchase four 30” x 42” fire-rated vertical plan file cabinets to protect existing facility data and plans.	(\$19,852)	\$0	\$0	\$0	\$0

<sup>7</sup> [www.schwabfiles.com/flat-plan-file-cat.html](http://www.schwabfiles.com/flat-plan-file-cat.html)

## **B. MAINTENANCE AND CUSTODIAL OPERATIONS**

The objective in maintaining and cleaning school facilities is to provide safe and cost-effective buildings, a sound educational environment, increased longevity of buildings and equipment, and the protection of school property. The maintenance and cleaning of the facilities must be accomplished in an efficient and effective manner in order to provide a safe and secure environment that supports the educational program and reflects proper stewardship for district resources.

Efficiencies and economies of maintenance and cleaning are critical to ensure that resources for direct instruction are maximized. However, extreme actions to reduce the cost of maintenance and cleaning can result in higher than acceptable costs of repair and replacement in the years to come. Consequently, a balance must be achieved between reasonable economies and unreasonable cost-cutting.

### ***Maintenance***

The proper maintenance of facilities is critical to ensuring support for an effective instructional program. Research has shown that appropriate heating and cooling levels, building and room appearances, the condition of restrooms and other facilities, as well as occupant safety, all impact how students and staff members can carry out their respective responsibilities.

Ineffective or inadequate maintenance provisions have proven to lead to increased costs of facility operations by shortening the useful life span of equipment and buildings. Many school districts have adopted rigorous preventive maintenance programs. They maintain a record of the performance of equipment and the costs of regular maintenance to measure the effectiveness of these programs.

### **FINDING 4-5**

The district utilizes a simple maintenance work order system. It lacks equipment history and reporting capabilities. The district used an online form builder (Frevvo) to create the work order form. Work orders are submitted by all who have access to the forms homepage, are reviewed by a supervisor, and if approved, are forwarded to the maintenance director for job assignment. Often the work order form is not used. It was reported to the consulting team that frequently a phone call to the maintenance director was needed to get a job accomplished. The form builder has no memory, generates no reports, and provides no feedback to the work order originator.

In addition, the district has no viable preventive maintenance program. Other than changing filters periodically, maintenance personnel are not tasked to perform preventive maintenance in accordance with standing orders, manufacturer's recommendations, or best engineering practices. Without a preventive maintenance program, it is impossible to schedule maintenance activities to prevent equipment breakdowns. A strong preventive maintenance program is essential to the smooth operation of any facility.

---

The importance of using a computerized maintenance management system (CMMS) in a school district cannot be overemphasized. A fully implemented CMMS allows for standardization of all information and assessments of equipment reliability and performance using measures such as:

- Down Time (DT);
- Mean Time Between Failures (MTBF);
- Mean Time to Repair (MTTR); and
- Life Cycle Cost (LCC).

A CMMS can be used to identify training needs based upon failures due to user error, and track maintenance staff performance. A CMMS minimizes equipment downtime because it improves maintenance practices and aids maintenance staff in responding faster.

In the National Center for Education Statistics (NCES) publication *Planning Guide for Maintaining School Facilities*, Chapter 5 contains an excellent discussion as to why preventive maintenance is so important. Included in the guide are topics such as maintenance check lists, preventive maintenance, job descriptions, employee training, managing supplies, and employee evaluations:

Under the guise of “saving money”, many school districts (and other organizations for that matter) practice what is known as “breakdown maintenance”- a maintenance program in which nothing is done to a piece of equipment until it breaks down. And then, after the equipment breaks, the least expensive repair option is used to return the equipment to service. While this may sound like a cost-saving approach to maintenance, precisely the opposite is true.

Breakdown maintenance defers repairs and allows damage to accumulate, compounding an organization’s problems. On the other hand, regularly scheduled equipment maintenance not only prevents sudden and unexpected equipment failure, but also reduces the overall life-cycle cost of the building.

Maintenance entails much more than just fixing broken equipment. In fact, a well-designed facility management system generally encompasses four categories of maintenance: emergency (or response) maintenance, routine maintenance, preventive maintenance, and predictive maintenance. The one everyone dreads is emergency maintenance (the air conditioner fails on the warmest day of the year or the main water line breaks and floods the lunchroom). When the pencil sharpener in Room 12 finally needs to be replaced, that is routine maintenance. Preventive maintenance is the scheduled maintenance of a piece of equipment (such as the replacement of air conditioner filters every 10 weeks or the semiannual inspection of the water fountains). Finally, now the forefront of facility management is predictive maintenance, which uses

sophisticated computer software to forecast the failure of equipment based on age, user demand, and performance measures.”<sup>8</sup>

A complete maintenance program involves the following elements:

- timely attention to emergency and corrective maintenance conditions. Emergency and corrective maintenance occur when equipment fails, typically requiring more time and resources to correct than preventive maintenance;
- a preventive maintenance program to keep equipment running at peak efficiencies, to avoid equipment breakdowns, and prevent minor problems from escalating into major ones; and
- a long-range plan to address HVAC, mechanical, electrical, plumbing, and low voltage systems and/or component replacements required at the end of their expected useful life. The plan will typically indicate the current age of the components, what year to expect replacements to be needed, and anticipated costs using a Consumer Price Index multiplier or estimated inflation rate.

As an example, Spring Independent School District (SISD) in Texas developed a comprehensive preventive maintenance program that includes the maintenance schedules shown in **Exhibit 4-24**. This schedule could be modified to meet the needs of Oklahoma school districts.

---

<sup>8</sup> <https://nces.ed.gov/pubs2003/maintenance/chapter5.asp>

**Exhibit 4-3**  
**SISD Preventive Maintenance Program Schedule**

Preventive Maintenance Activity	Activity Frequency
Clean A/C unit filters	Bi-monthly
Change A/C unit filters	3 to 12 week intervals
Clean chiller condenser coils	Bi-annually
Clean fan coil and air handler evaporator coils	Annually
Clean ice machine condenser coils	Every 4 months
Inspect and capacity test chillers	Annually
Change chiller compressor oil and cores	Every 2 years
Check chemical levels in closed loop chilled and hot water piping	Monthly
Clean grease traps	Every 3 months
Inspect and test boilers	Annually
Check roofs, downspouts, and gutters	Monthly, repair as needed – 20-year roof warranty
Inspect exterior lighting	Semi-annually
Inspect elementary play gym lighting	Annually
Inspect and clean gym gas heaters	Annually
Inspect playground equipment	Monthly, repair as needed
Clean fire alarm system smoke detectors	Semi-annually
Inspect all interior and exterior bleachers	Annually, repair as needed
Clean, tighten, and lubricate roll out bleachers	Annually
Check exterior building and concrete caulking	Annually – 8-year replacement
Stripe exterior parking lots	Annually
Check condition of asphalt parking lots	Annually – 12-year replacement
Check carpet	15-year replacement
Check vinyl composition tile floors	20-year replacement
Spray wash exterior soffits and building	Every 2 years or as needed
Replace glass and Plexiglas	As needed
Paint interior of facilities	Every 5 years
Paint exterior of facilities	Every 8 years
Perform general facility inspections	Annually

*Source: OEQA Archived Exhibit*

## RECOMMENDATION

**Implement a CMMS that allows for work order entry, historical equipment records, report generation, and a preventive maintenance program that addresses not only filters, but life safety inspections and tests, and equipment preventive maintenance inspections and tests based upon law, manufacturer’s recommendations, and best engineering practices.**

The district should decide whether to procure an off-the-shelf CMMS or develop a program in-house. Given the size and internal resources, it is logical that a district would look to an off-the-shelf CMMS for a maintenance management and preventive maintenance system. Once the CMMS has been procured, staff should input data into the system such as equipment type, manufacturer and location, preventive maintenance requirements and frequencies, and other details required by the system. Staff should also account for life safety equipment, with location

of device and required tests and maintenance as stipulated by the state fire marshal and local authority having jurisdiction.

The maintenance director should develop the preventive maintenance system structure. As noted in *The Real Cost of Deferred Maintenance*:

Facilities problems in rural schools that aren't addressed may seem to disappear but they don't go away—like molds and mildew they just multiply out of sight. Poor conditions can affect the health and safety of everyone who uses the facility, damage the morale of students and teachers, and impair their ability to teach and learn, and threaten the facility itself.

Proper maintenance of rural schools is vital not only because facilities are often old, and have suffered deferred maintenance for years or even decades, but because the consequences of improper and inadequate maintenance are so serious. If a leak in the roof isn't repaired, it can—like the leak in the fabled dike in Holland—wash away the entire structure. If the district doesn't allocate funds to fix such leaks, or do other necessary preventive work and if state policies are predisposed to new construction, deferring maintenance may force the closure of a good rural school. Therefore, a thorough program of preventive maintenance with regularly scheduled inspections is critical.<sup>9</sup>

## FISCAL IMPACT

The consulting team has worked with one CMMS vendor, SchoolDude, for pricing in several Oklahoma school districts. Based upon a quotation for a sample district from SchoolDude, after the first year setup cost of \$7,735, continuation of the maintenance management and preventive maintenance modules would cost approximately \$3,320 per year.

Recommendation	2019-20	2020-21	2021-22	2022-2023	2023-24
SchoolDude Maintenance Essential Pro (includes maintenance management and preventive maintenance modules)	(\$3,320)	(\$3,320)	(\$3,320)	(\$3,320)	(\$3,320)
Quick Start Cost	(\$1,915)	\$0	\$0	\$0	\$0
PM Scheduling/Tasking	(\$2,500)	\$0	\$0	\$0	\$0
<b>Total</b>	<b>(\$7,735)</b>	<b>(\$3,320)</b>	<b>(\$3,320)</b>	<b>(\$3,320)</b>	<b>(\$3,320)</b>

<sup>9</sup> Lawrence, B. K. (2003). *Save a penny, lose a school: The real cost of deferred maintenance*. The Rural School and Community Trust. Downloaded November 2016 from [http://www.ruraledu.org/user\\_uploads/file/Save\\_a\\_Penny\\_Lose\\_a.pdf](http://www.ruraledu.org/user_uploads/file/Save_a_Penny_Lose_a.pdf)

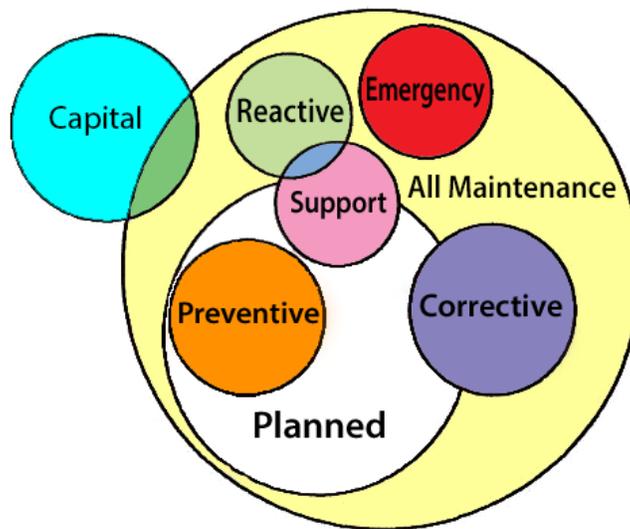
**FINDING 4-6**

Many Public Schools do not employ sufficient maintenance personnel to maintain its facilities. The district employs 3.0 FTE maintenance technicians, including the maintenance director. One technician works full-time at mowing during the grass growing season, leaving 2.0 FTE technicians to maintain 347,992 square feet of facilities.

The APPA standard for maintenance is one FTE for approximately 45,000 square feet of facilities. With 347,992 square feet of facilities to maintain, a district should have approximately 7.5 FTE maintenance staff. For districts with newer buildings, the need for maintenance might be less than the standard.

However, maintenance in a school is not merely replacing equipment when it quits working. There are various types of maintenance that should be performed to ensure the continued safe and efficient operation of equipment and systems, as well as reducing replacement costs. Becker (2011) wrote that maintenance can be depicted using a Venn diagram (**Exhibit 4-25**).

**Exhibit 4-25  
Overlap and Interrelationships in Types of Maintenance**



*Source: APPA Operational Guidelines for Educational Facilities: Maintenance, February 2011*

As Becker stated:

The large circle represents all maintenance activities that the operations and maintenance staff may perform in a year. The next smaller circle, entirely within maintenance, is planned work. These include preventive or predictive maintenance and some corrective work – those tasks that customers request that have some time requirements associated

with them and are not fully within the facilities operation’s control to schedule. Finally, hanging off to the side and trying to be part of maintenance, is capital work.<sup>10</sup>

The older a building, the more corrective maintenance it will require and all buildings, regardless of age, require regular preventive maintenance.

## RECOMMENDATION

### Increase maintenance staffing to sufficiently maintain the district’s facilities for optimal operation and functionality.

The suggested staffing formula and existing district conditions point to a shortage of designated maintenance staff in the district. The district should hire three additional maintenance technicians to help ensure that preventive and corrective maintenance tasks are completed in a timely fashion. However, to provide adequate training of newly hired technicians, the district should hire these positions over a series of years. Hiring the additional technicians over the next five school years will allow for better integration and will lessen the impact on operations and maintenance funds.

## FISCAL IMPACT

The lowest maintenance salary and benefits from the support staff list for the district is approximately \$30,000. A proposed phased-in hiring plan is shown below.

Recommendation	2017-18	2018-19	2019-20	2020-21	2021-22
Hire 3.0 FTE maintenance technicians.	\$0	(\$30,000)	(\$60,000)	(\$60,000)	(\$90,000)

## FINDING 4-7

The district has numerous equipment and facilities deficiencies. By not maintaining facilities, the district is faced with increased expenditures in later years as the facilities continue to deteriorate and equipment continues to fail.

During site visits, the consulting team noted any number of problems in a district’s buildings and structures. Problems noted include structural, life safety, and general safety items. A list of maintenance items that should be addressed was developed based upon the walk-through and interviews with district and school personnel. This list is summarized in **Exhibit 4-26**. An “X” in a column means that the facility had a problem or need. Only those facilities visited by the consulting team are listed.

<sup>10</sup> Becker, T. J., (2011) What constitutes maintenance? *Operational Guidelines for Educational Facilities: Maintenance*, second edition (July/August), pp.14-15.

**Exhibit 4-26**  
**Summary of a Sample District’s Maintenance and Facility Needs**

Building Name	Site <sup>11</sup>	Life Safety <sup>12</sup>	ADA <sup>13</sup>	HVAC <sup>14</sup>	Plumbing/ Water Leaks <sup>15</sup>	Electrical <sup>16</sup>	Misc. Finishes/ Other <sup>17</sup>
Administration Building		X					
High School		X			X		X
Middle School		X			X		
Primary School		X			X		
Intermediate School	X	X			X	X	X
ECC		X		X			X
Event Center		X			X		
Maintenance/Warehouse	X						X

*Source: OEQA Archived Exhibit*

A properly staffed and well-organized maintenance department, with the tools necessary to maintain equipment and facilities, should be able to effectively and efficiently maintain any commercial facility. Inspection, documentation, and accurate record keeping are also essential to facility maintenance. Numerous facility assessment tools are available to aid the maintenance staff with inspecting and documenting deficiencies. A safe school checklist can be found at <http://www.ncef.org/content/safe-schools-0>.

## RECOMMENDATION

### Conduct an inspection of all facilities, document all deficiencies, and correct them.

The maintenance director should conduct a complete facility inspection, documenting each general safety, life safety, and facility problem. Each problem should be prioritized as:

- 1 – life safety;
- 2 – general safety;
- 3 – facility urgent; and
- 4 – facility routine.

<sup>11</sup> Site refers to degraded conditions of the land on which the district buildings are situated

<sup>12</sup> Life Safety refers to maintenance conditions that do not conform with the Life Safety Code (NFPA 110)

<sup>13</sup> ADA refers to conditions that do not conform with the accessibility code

<sup>14</sup> HVAC refers to issues with heating, ventilation, or air-conditioning systems

<sup>15</sup> Plumbing/Water Leaks refers to plumbing problems or water leaks, which could come from plumbing or roofing systems

<sup>16</sup> Electrical refers to issues that do not conform with the National Electric Code

<sup>17</sup> Misc. Finishes/Other refers to wall systems, flooring systems or roofing systems that exhibit conditions that should be corrected

Problems should then be categorized as:

- 1 – in-house capable;
- 2 – contractor assist; and
- 3 – bond fund required.

Once all problems have been prioritized and categorized, work should begin on correcting deficiencies, with life safety – in-house capable and contractor assist coming first, followed by general safety – in-house capable and contractor assist coming second. The safety of building occupants must always be the first concern.

### **FISCAL IMPACT**

This recommendation can be implemented with existing resources.

### ***Custodial Operations***

Safe, clean, and sanitary facilities are essential elements of the education environment. School systems across the United States use different means to address these elements. Typically, school boards either contract out (outsource) custodial services or organize a comprehensive in-house program with staff to provide custodial services. Personnel will be employed by either the outsourced company or the school board.

Management responsibility, if the program is in-house, may reside partially or wholly with the central office, the individual school, or maintenance department. Determining the desired structure usually involves several criteria, including minimizing costs to the school district, improving services to schools, and reducing (or increasing) the span of control of district or school-based administrators.

### **FINDING 4-8**

Most Public Schools employ enough custodians, based upon national standards, to expect its facilities to be cleaned to an acceptable level. However, some districts struggle to find and retain quality custodial hires and may operate below appropriate standard levels.

Studies conducted by APPA demonstrate that one custodian should be capable of cleaning between 20,000 and 30,000 square feet of school facilities to achieve level 2 or level 3 standard of cleanliness, respectively. The levels of cleanliness in the APPA standard are shown in **Exhibit 4-33**.

### Exhibit 4-33

#### Appearance Factors and the Five Levels of Clean

##### **Level 1— Orderly Spotlessness**

- Floors and base moldings shine and/or are bright and clean; colors are fresh. There is no buildup in corners or along walls.
- All vertical and horizontal surfaces have a freshly cleaned or polished appearance and have no accumulation of dust, dirt, marks, streaks, smudges, or fingerprints.
- Lights all work and fixtures are clean.
- Washroom and shower fixtures and tile gleam, and are odor-free. Supplies are adequate.
- Trash containers and pencil sharpeners hold only daily waste, are clean and odor-free.

##### **Level 2 — Ordinary Tidiness**

- Floors and base moldings shine and/or are bright and clean. There is no buildup in corners or along walls, but there can be up to two days' worth of dust, dirt, stains, or streaks.
- All vertical and horizontal surfaces are clean, but marks, dust, smudges, and fingerprints are noticeable upon close observation. Lights all work and fixtures are clean.
- Washroom and shower fixtures and tile gleam, and are odor-free. Supplies are adequate.
- Trash containers and pencil sharpeners hold only daily waste, are clean and odor-free.

##### **Level 3 — Casual Inattention**

- Floors are swept or vacuumed clean, but upon close observation there can be stains. A buildup of dirt and/or floor finish in corners and along walls can be seen.
- There are dull spots and/or matted carpet in walking lanes. There are streaks or splashes on base molding.
- All vertical and horizontal surfaces have obvious dust, dirt, marks, smudges, and fingerprints. Lamps all work and fixtures are clean.
- Trash containers and pencil sharpeners hold only daily waste, are clean and odor-free.

##### **Level 4 — Moderate Dinginess**

- Floors are swept or vacuumed clean, but are dull, dingy, and stained. There is an obvious buildup of dirt and/or floor finish in corners and along walls.
- There is a dull path and/or obviously matted carpet in the walking lanes. Base molding is dull and dingy with streaks or splashes.
- All vertical and horizontal surfaces have conspicuous dust, dirt, smudges, fingerprints, and marks.
- Lamp fixtures are dirty and some (up to 5 percent) lamps are burned out.
- Trash containers and pencil sharpeners have old trash and shavings. They are stained and marked.
- Trash containers smell sour.

##### **Level 5 — Unkempt Neglect**

- Floors and carpets are dull, dirty, dingy, scuffed, and/or matted. There is a conspicuous buildup of old dirt and/or floor finish in corners and along walls. Base molding is dirty, stained, and streaked. Gum, stains, dirt, dust balls, and trash are broadcast.
- All vertical and horizontal surfaces have major accumulations of dust, dirt, smudges, and fingerprints, all of which will be difficult to remove. Lack of attention is obvious.
- Light fixtures are dirty with dust balls and flies. Many lamps (more than 5 percent) are burned out.
- Trash containers and pencil sharpeners overflow. They are stained and marked. Trash containers smell sour.

Source: Fichter, G., (2011). *Maintenance of buildings, operational guidelines for educational facilities: Custodial. APPA, third edition, pp. 72-73.*

A district with a student enrollment of 1,700 and has 347,992 square feet of facilities should expect to have approximately 17 custodians to keep a ‘Level 2 Clean’ when applying the APPA standards of cleanliness. **Exhibit 4-41**, which shows a sample district’s schools’ staffing compared to a standards-based recommendation of 23,000 square feet per custodian.

**Exhibit 2-41**  
**Comparison of Current Custodial Staffing to Proposed Standard**

Building	Facility Square Feet	Staffing Assignments	23,000 Ft <sup>2</sup> /Custodian Standard	Recommended Staffing Adjustments
High School A	261,443	11.5	11.5	0
High School B	250,668	11.0	11.0	0
Middle School A	193,000	9.0	8.0	(1)
Middle School B	181,808	8.0	8.0	0
Elementary School A	177,906	7.0	8.0	1
Elementary School B	210,000	7.0	9.0	2
<b>Total</b>	<b>1,274,825</b>	<b>53.5</b>	<b>55.5</b>	<b>2</b>

*Source: OEQA Archived Exhibit*

In one district the consulting team observed cleanliness in most areas of the district’s facilities as per APPA standards. Classrooms typically were at a level 3 standard of cleanliness and school hallways were near a level 3. The cafeterias and kitchen areas were between a level 3 and level 2 standard of cleanliness. The administration building was at a level 2 standard of cleanliness. However, perception of cleanliness varied among survey respondents.

Surveys conducted by the consulting team for this district revealed that 39 percent of high school students *agreed* that the high school was clean, but 39 percent of high school students did not agree. Seventy-three percent of parents *agreed* that their child’s school was clean, and 71 percent of staff *agreed* that the district’s facilities were kept clean (**Exhibit 4-34**).

**Exhibit 4-34**  
**Sample Survey Responses Regarding School Facility Maintenance**

Survey Group	Survey Statement	Agree	No Opinion	Disagree
Students	My school is clean.	39%	21%	39%
Parents	My child’s school is clean.	73%	6%	8%
Staff	The district’s facilities are kept clean.	71%	8%	14%

*Source: OEQA Sample of an Archived Survey*

## RECOMMENDATION

**Employ the proper number of custodians to maintain school facilities at an acceptable level of cleanliness based upon national standards.**

The consulting team found that when buildings were being maintained in an acceptable manner, as evidenced by district surveys and consulting team observations that 23,000 square feet per custodian was sufficient. This standard could meet cleaning expectations of any district as evidenced by satisfaction levels indicated from sample surveys.

#### **FINDING 4-9**

There are no formal training programs for the maintenance and custodial personnel in some districts. This could lead to improper use of tools, equipment, and cleaning chemicals and also compromise employee safety.

Maintenance and custodial personnel are eligible to attend certain annually scheduled professional development programs at the beginning of the school year. However, these programs are general in nature and are not focused specifically around these support positions.

Employees are hired, in part, based on their existing skills or they learn from their fellow employees on the job. Tools, equipment, and cleaning chemicals used by these employees can be costly and dangerous. Proper training is essential to safety and cost savings.

An in-house training program can be used to train staff on such topics as certification for maintenance trades personnel, OSHA certification, safety, cleaning techniques, work efficiency, custodial cleaning standards, etc. By conducting training in-house, the costs of travel, meals, lodging, and program registration would be avoided, and the cost of the hours not worked due to training would be kept at a minimum. Purchase or rental of training films and slide presentations, as well as fees for occasional outside trainers, may reduce the cost savings, but the total savings will be significant enough within only a few years to pay for implementation of such a program.

#### **RECOMMENDATION**

**Conduct regular in-house formal training for maintenance and custodial staff by bringing training materials and possibly trainers to the district.**

Maintenance and custodial training programs are available from a variety of private and public sources. The following sample from the Internet illustrates the many different types of training materials available:

- <http://www.schoolfacilities.com/> - This site features articles, products, and training program listings, plus an eNewsletter that covers current trends in building maintenance, school construction, school design, indoor air quality issues, etc.
- <http://nces.ed.gov/pubs2003/maintenance/chapter1.asp> - This site displays a complete Planning Guide for Maintaining School Facilities. It is available free of charge.
- <http://www.trainingservicesassoc.com/coursedescript.htm> - Training Services Association provides in-house training courses, including courses on facilities maintenance.
- [http://www.edfacilities.org/rl/custodial\\_staffing.cfm](http://www.edfacilities.org/rl/custodial_staffing.cfm) - This Web site of the National

---

Clearinghouse for Educational Facilities (NCEF) contains a resource list of links, books, and journal articles on custodial staffing guidelines, needs assessment, training, and procedures for K-12 school buildings and colleges.

- <http://www.trainingservicesassoc.com/coursedesc.htm> - Training Services Association provides in-house training courses, including custodial services.
- <http://www.cleaningconsultants.com/> - This site contains an on-line store containing books, videos, reports, and software titles specifically for the cleaning industry. These products contain information on subjects such as basic cleaning, housekeeping, window washing, janitorial services, custodial maintenance, bidding, estimating, etc.

The above training program sources are listed as examples. The district should conduct his own search by asking for information from his peers and from the Internet. It is important to know that many maintenance and custodial training programs sponsored by product manufacturers or service providers may be biased in the direction of these products or services and do not provide a balanced, professional view of the role of these services in facilities operations. Unbiased and non-proprietary training programs usually require a nominal fee, as they are not underwritten by an industry or corporation.

### **FISCAL IMPACT**

The costs of this recommendation include the cost of renting or buying training materials, and the occasional outside trainer or other specific training opportunities that may be applicable. While some materials and trainers are offered at no charge, such offers are often laced with heavy bias toward a particular product or service and should be used with caution.

Districts should investigate options to coordinate the training with other nearby public school districts to potentially share in the cost to conduct such programs. A budget amount should be established utilizing existing funds based upon the results of the training options developed.

### **FINDING 4-10**

It was noted that some districts did not have or did not follow board policy as it relates to rental fees and community usage of their facilities. As a result, districts were incurring additional costs and potential damage to facilities because of no on-site supervision of such events by the district.

There were no basic charges or cost reimbursements for the use of equipment and equipment operators stipulated in the board policy. This results in additional wear and tear on school district property that is not reimbursed to the district resulting in increased costs. Some districts had adopted rental fee schedules, but many were outdated, including one that was created in 1990. In some cases there was no evidence that the fee rates had been increased to offset continual increased cost for utility usage related to lighting, heating, and air-conditioning, for the rented space and/or building.

One district example, the director of Athletics was responsible for managing the use of school property by any outside groups by opening and closing the facility, but yet, was not scheduling a

custodian to be on the school grounds as stipulated in that district’s board policy. This situation resulted in no supervision by a school district employee thereby increasing the risk of additional costs to the district, due to possible damage to the facilities and improper operation of school property made available for use by the outside group. The Athletic Director indicated to the review team that the district charged \$250 for the rental of the middle school gymnasium and \$350 for the rental of the main gymnasium which was not consistent with rental fees stipulated in the board policy.

## RECOMMENDATION

**Districts should reevaluate the actual cost to operate buildings; develop a new rental fee schedule based upon such cost data; recommend revisions to the board policy for approval and adoption by the Board of Education; and comply with such adopted policy.**

Superintendents should review the utility costs expended for each facility for the last fiscal year and also determine the total number of hours the facility was open during the fiscal year to calculate the average cost per hour for the utility costs for the building. In addition, the local utility companies should be contacted to obtain information about any proposed rate modifications that may be projected for the upcoming fiscal year. Based upon this data, a new projected hourly rate can be calculated for the new fiscal year that should be used for the utility cost reimbursement for rentals of any district facility.

Districts should always utilize existing custodial personnel to be present when facilities are being rented and used by outside groups. The district should utilize the highest hourly rate currently being paid to any custodian and calculate the overtime rate as the basis for charging an hourly rate for any facility rentals. Most districts will also establish a policy when security services would also be needed to be present during certain types of facility rentals. The cost of this service should also be added to the rental rate reimbursement calculation.

The superintendent should revise the existing policy to incorporate the new rental rate structure. In addition, a more formal rental agreement should be developed by the district’s legal counsel so the district will be better protected to address the risks associated to the use of the facilities by outside groups such as damage reimbursement, deposits, payment terms and conditions, etc, that are deemed appropriate. This new revised hourly rental rate structure and policy revisions should be submitted to the Board of Education for approval and adoption as board policy.

## FISCAL IMPACT

This recommendation can be implemented with existing resources.

### C. ENERGY MANAGEMENT

General energy consumption can be one of the most expensive operational areas for a school district. Due to the large infrastructure required for education, schools use large quantities of electricity, water, and natural gas. Implementing an energy management program can assist in reducing a school district’s operational costs associated with otherwise excessive utility use.

Energy management programs can be implemented in a wide variety of ways, from hiring full-time energy managers to sending out simple shut-down reminders before school dismissal or before a break. One of the most beneficial practices of energy management is the recording of monthly utility bills and the communication of usage and costs to the general staff. Tracking utility use can give a bird's eye view of how much each school is spending on its utilities compared to other schools. The energy manager can then target the most expensive utilities and work to reduce consumption. This communication helps foster awareness of the expenses of running a school and brings attention to energy conservation measures by both students and staff.

The American Society for Hospital Engineers (ASHE) has developed a list of ten components necessary for a successful energy management program. Although this list was originally intended for hospital organizations, they are applicable to all energy management programs. As recommended by ASHE, the items to consider are:

1. Measure/benchmark current energy consumption.
2. Develop an energy use profile.
3. Complete a greenhouse gas emissions inventory.
4. Build teams, get leadership support, and assign dedicated resources.
5. Set targets/goals.
6. Develop strategic action plans for improvement.
7. Consider adopting a strategic energy management plan.
8. Implement projects.
9. Track, measure, and report.
10. Train, educate, and celebrate.

The Association of School Business Officials (ASBO), in their publication *Planning Guide for Maintaining School Facilities*<sup>18</sup> suggests that the following guidelines will help a school system accomplish more efficient energy management:

1. Establish an energy policy with specific goals and objectives.
2. Assign someone to be responsible for the district's energy management program and give this energy manager access to top-level administrators.
3. Monitor each building's energy use.
4. Conduct energy audits in all buildings to identify energy inefficient units.

---

<sup>18</sup> Available at <http://nces.ed.gov/pubs2003/2003347.pdf>

5. Institute performance contracting (i.e., contracts requiring desired results rather than simply a list of needed products) when replacing older, energy inefficient equipment.
6. Reward employees of schools or buildings that decrease their energy use.
7. Install energy efficient equipment including power factor correction units, electronic ballasts, high-efficiency lamps, set-back thermostats, and variable-speed drives for large motors and pumps.
8. Install motion detectors that turn lights on when a room is occupied and off when the room is unoccupied.

Additional information about energy management can be found through the National Clearinghouse for Educational Facilities' Energy Page<sup>19</sup> which provides a list of links, books, and journal articles on various methods of heating, cooling, and maintaining new and retrofitted K-12 school buildings and grounds.

#### **FINDING 4-11**

Districts have not formally adopted a board policy for an energy management program (EMP). Without such a program, such districts run the risk of costly energy inefficiencies, taking unnecessary budget dollars from instructional activities.

Per the review team's interview with staff, the teachers are encouraged to monitor the thermostat temperature settings; however, no formal plan is in place for recommended procedures for temperature settings for implementation at district facilities. In addition, there is no central control system to monitor or override these classroom temperature settings since the thermostats installed are not programmable.

The U.S. Department of Energy determined that at least 25 percent of all energy consumed in a school facility is due to energy inefficiency. This inefficiency can be caused by:

- Dry transformers;
- Location of light switches;
- Hallway lights;
- Plug loads and personal appliances; and
- Phantom loads.
- EMP's are an effective method for reducing the inefficiencies associated with energy use. An EMP should contain the following elements:
  - Based on the board policy, a goal for the program and establish objectives;

---

<sup>19</sup> Available at <http://www.ncef.org/search/node/energy%20management>

- A responsible individual and means of implementing the program - an energy management team;
- A checklist for administrators, instructional personnel, and operators;
- Energy education materials for use by instructional personnel;
- Energy awareness training for all school personnel; and
- An evaluation instrument and means of celebrating success.

As an example, an Independent School District in Texas successfully adopted an energy management plan in November 2007. The EMP states at the outset:

Energy conservation is first a people concern, and then a technical concern. Administrators should take a serious look at how their building operates in terms of normal daily routines and activities. By designating thermostat settings and reducing equipment run time and lighting operations, all building administrators will be able to significantly contribute to the district program.

The plan's components are shown in **Exhibit 4-11**.

**Exhibit 4-11  
Sample School District Energy Management Plan Components**

Plan Section/Subcomponents
Introduction
Letter, Superintendent, DISD announcing EC support
District Standard Operating Procedures (SOP) <ol style="list-style-type: none"> <li>1. Requests for Building Modifications Pertaining to Energy-Related Matters.</li> <li>2. Standardized Temperature Settings for Water Heaters.</li> <li>3. Standardized Settings of all Thermostats</li> <li>4. Authorized Adjustment of Thermostats</li> <li>5. Startup Procedure for Air Conditioning and Heating Equipment</li> <li>6. Shutdown Procedure for Air Conditioning and Heating Equipment.</li> <li>7. Operation of Specific-Use Areas</li> <li>8. Obstruction of Supply Air Vents</li> <li>9. Elimination or Proper Use of Portable Electric Heaters</li> <li>10. Operation of Equipment During Non-Instructional Periods</li> <li>11. Schedule and Operation of After-Hour Events</li> <li>12. Proper Operation of Exterior Doors and Windows</li> <li>13. Proper use of Window Shading Devices</li> <li>14. Proper Operation of Interior Doors</li> <li>15. Operation of Interior Lights</li> <li>16. Area Lighting Controlled by Multiple Switching</li> <li>17. Lighting Procedures for Limited-Use Areas</li> <li>18. Ornamentation Lighting</li> <li>19. Exterior Lighting</li> <li>20. Incandescent Light Bulbs</li> <li>21. Lighting Used for Vending Machines</li> </ol>
Energy Saving Tips for the Classroom
Recommended Illumination Levels
Standard Operation Procedures for Custodial Personnel <ol style="list-style-type: none"> <li>1. Cleaning and Continual Upkeep of all Mechanical Rooms</li> <li>2. Light Fixture Inspection and Cleaning Program</li> <li>3. Replacement Procedure of Fluorescent Lights</li> <li>4. Supply and Return Air Vent Cleaning Program</li> </ol>
Daily Guidelines and Recommendations for Custodians.
Standard Operating Procedures for Food Service Personnel
Energy Saving Tips for the Kitchen/Cafeteria

*Source: Duncanville Independent School District Energy Management Plan adopted in November 2007*

Several school districts around the country use several techniques to keep energy costs down. The following are some examples of these conservation efforts:

- entering monthly energy bill data into a spreadsheet to maintain a history of expenditures and to use in detecting problems;
- performing building checks to see if lights are turned off, doors are closed, water faucets are not dripping, etc.;
- leaving “OOPS” notes reminding teachers or staff of the proper procedure, such as those shown in if problems are found during building checks;

- establishing set points for thermostats at 76 degrees in the summer and 69 degrees in the winter;
- purchasing set-back thermostats and programming them to turn down cooling or heating in advance of daily adjournment and over the weekends;
- setting water heaters or boilers at a maximum temperature of 140 degrees, except in areas requiring higher temperatures for sanitation purposes, such as kitchens; and
- replacing worn out and damaged equipment, windows, and lighting, as needed, with more energy efficient units.

## **RECOMMENDATION**

### **Develop a formal energy management program to be adopted by the district's Board of Education.**

Goals should be specific, realistic, and achievable, such as:

- Reduce energy consumption in each school facility by at least a (specified percentage) at the end of the (specific) school year and maintain the achieved level of consumption for five years after attainment;
- Establish energy awareness training for all school employees; and
- Obtain and make available energy education materials for all teachers for incorporation into their subject matter.

In developing this program, districts should adopt a set of energy guidelines for use in the design and construction of new and renovation of existing school facilities. Checklists should be developed for all segments of the school community for use on daily energy conservation actions and for special circumstances to control energy usage. Districts should also develop energy awareness training to support stated objectives. As the results of energy audits and facility/systems inspections, develop an "energy conservation project list" in conjunction with planned capital projects.

Other things to consider in developing the EMP include:

- Developing a means to evaluate the success of the overall program;
- Developing a means for recognition of success in the program both internally and externally;
- Informing the community that the EMP exists, what has been accomplished, and how they can reduce their own energy bills; and
- Regularly updating the program to reflect changing conditions, successes, and/or failures.

---

The maintenance director should inspect each space within each building, and generate a list of energy deficiencies which can then be integrated into a master maintenance list. Goals for an energy management program, as with any program, should be specific, realistic, and achievable:

- reducing energy consumption in each school facility by at least (a specified percentage) at the end of the (specific) school year and maintaining the achieved level of consumption for five years after attainment;
- establishing energy awareness training for all school employees; and
- obtaining and making available energy education materials, such as those offered by the U.S. Department of Energy,<sup>20</sup> for all teachers for incorporation into their subject matter.

Districts should also develop energy awareness training to support stated objectives. Because of energy audits and facility/systems inspections, districts should develop an “energy conservation project list” in conjunction with planned capital projects. Other things to consider in developing the EMP are as follows:

- developing a means to evaluate the success of the overall program;
- developing a means for recognition of success in the program both internally and externally;
- informing the community that the EMP exists, what has been accomplished, and how they can reduce their own energy bills; and
- regularly updating the program to reflect changing conditions, successes, and/or failures.

Typical areas on which most districts can concentrate:

- Replace incandescent bulbs with compact fluorescent (CFL) or light emitting diode (LED) bulbs. CFLs consume approximately one-third the energy of an incandescent bulb. LEDs consume even less.
- Determine whether personal electrical devices (refrigerators, coffee makers, microwaves ovens, portable heaters, etc.) are appropriate in the district and either charge staff an appropriate fee for using the district’s electrical power or remove personal electrical devices. (Note: all electrical devices, particularly refrigerators, add to the heat load within a space, thus requiring additional cooling in the warmer months.)
- Install low-flow aerators in handwashing sinks to minimize water use. Low-flow is defined as 0.5 to 1.0 gallons per minute (gpm). Currently some handwashing sinks observed by the consulting team either have no flow control (no aerator) or have aerators used in residential application (2.2 gpm standard). The Georgia Environmental Protection Division is recommending that commercial facilities install a super low-flow aerator of just 0.5 – 1.0

---

<sup>20</sup> <http://www1.eere.energy.gov/education/lessonplans/>

gpm to maximize water savings. Low-flow aerators are typically self-locking, and require a special wrench to remove, thus providing security from tampering.

- Retrofit T-12 light fixtures with energy-saving T-8 or T-5 bulbs and ballasts, or the new LED light systems. T-12 fluorescent tubes are no longer being manufactured and the fixtures should either be replaced or modified to accept the T-8 or T-5 bulbs. T-5 and T-8 lights offer several advantages, including that they consume less than 33 percent of the energy consumed by a T-12 light, with the same lumen output. T-5 and T-8 lights will last approximately 20 percent longer. T-5 and T-8 lights are now considered the industry standard in new construction and retrofit applications. Also available are LED replacement kits that the maintenance department technicians can install. They do not require a ballast and wire directly into the school's electrical supply.<sup>21</sup>
- Program replacement of single pane windows with efficient double pane thermal windows.
- Replace deteriorated insulation on water heater piping or install on piping where none currently exists.
- Consider building a vestibule at the front entrances of the schools that don't currently have one. When properly used, vestibules significantly reduce heat gain/loss which equates to energy savings. The American Society of Heating, Refrigerating and Air-Conditioning Engineers has developed standards for heating, ventilation, and the air conditioning of buildings (ASHRAE 90). This has caused California to adopt the following code concerning vestibules:

Vestibule doors at a building entrance would reduce the flow of unconditioned air into the conditioned space. Additionally, air trapped inside the vestibule would act as a buffer to the transfer of heat through the vestibule, thereby increasing the thermal resistance of the passageway.<sup>22</sup>

- Replace incandescent exit signs with LED exit signs (**Exhibit 4-51**). New LED exit signs are available with a life expectancy of ten years. Each exit sign replaced will pay for itself in energy savings in less than four years.

## FISCAL IMPACT

The exact fiscal impact of this recommendation would depend upon the specific energy management measures implemented. Estimates of the payback period and actual savings include the following:

- **Incandescent bulbs.** Replacing incandescent bulbs with Compact Fluorescent Lamps (CFL) will achieve energy savings of up to 35 percent over current consumption. Replacing incandescent bulbs with LED bulbs, though higher in initial cost, can save up to 70 percent

<sup>21</sup> The company LiteTronics offers retrofit products that can be seen at <http://www.litetronics.com/new-products/led-retrofit-2x2-and-2x4-2-tube.html>

<sup>22</sup> 2008 California Building Energy Efficiency Standards, found at <http://www.energy.ca.gov/title24/2008standards/index.html>

over current energy consumption. The consulting team calculated that replacing 50 incandescent bulbs with compact fluorescents would cost \$125 the first year and would save \$554 each subsequent year.

- **Low-flow Aerators.** In a typical school environment, a handwashing lavatory is used 25 times per day. Each handwashing lasts approximately 15-20 seconds. If one assumes a modest 15-second encounter, then each handwashing event at a lavatory with a 2.2 gpm aerator consumes 0.55 gallons of water. Multiplying this by the 25 encounters per day, one finds consumption of 13.75 gallons of water per day per lavatory. At a calculated cost of \$0.0083 per gallon<sup>23</sup>, the cost of handwashing in one sink is \$0.073 per day. If there are 150 sinks within the district then the spending would be \$10.93 per day. Monthly, this equates to \$218.60. By reducing the flow rate of the handwashing lavatories from 2.2 gpm to 1.0 gpm, the cost would be reduced to \$99.36, a savings of \$119.24 per month, or more than \$1,190 per year. If the aerators were replaced with super low-flow 0.5 gpm aerators, the savings would be even greater. Each replacement aerator costs approximately \$1.50. Replacing 150 aerators would cost \$225 initially.
- **T-5 or T-8 Light Fixtures.** Each existing four-bulb T-12 light fixture that is retrofitted with a new energy efficient T-8 ballast and three bulbs will consume one-third less energy while providing the same amount of light. The payback period for replacement will be approximately four to five years. T-5 light fixtures may also be considered for additional energy savings. The consulting team calculated that replacing 25 four-bulb T-12 fixtures with 25 four-bulb T-8 fixtures would initially cost \$1,050.00, with annual energy savings of \$327.50.
- **Double-pane windows.** The cost of each double-pane window that is properly caulked will be between \$150 and \$1,800 depending on the size of the window and the cost of labor to re-caulk or replace the window. As an example, replacing eight windows with 2' x 4' double-pane windows would cost \$528 per window, or \$4,224 for all eight. The savings to be realized will be in reduced costs of cooling in the summer and heating during the winter.
- **Vestibules.** The high school has a vestibule at the front entrance. The middle school, primary school and intermediate school do not have vestibules at their main entrances. The cost of each vestibule will depend upon the materials specified. The savings to be realized will be in reduced costs in cooling in the summer and heating in the winter. Assuming the use of similar materials at each school, with a steel full vision six-foot-wide double-door system with hardware, the cost per RSMMeans "Square Foot Costs", 2015, would be \$10,400 on average for each of the three enclosures, or a total of \$31,200 if installed in one year.
- **LED or LEC exit signs.** Replacing existing incandescent lit exit signs with the new energy-saving LED (light emitting diode) or LEC (light emitting capacitor) exit signs will achieve a payback period in energy savings in approximately two years. But the big advantage of LED and LEC over incandescent is that they will operate for ten years without maintenance and without having to replace bulbs. They only require mandatory monthly and annual tests. One

---

<sup>23</sup> Per gallon cost of water and sewer for the high school is \$0.0083 based on CPS invoices and payments.

LEC exit light retrofit kit costs approximately \$28 on Amazon<sup>24</sup>, fits most incandescent exit light fixtures and uses less than 1/5<sup>th</sup> watt of energy. A new LED exit light costs approximately \$18 on Amazon<sup>25</sup>. Compared to an incandescent exit sign which consumes 40 watts of power, an LED exit sign consumes 2 watts. Replacing 100 incandescent exit signs with LED exit signs would cost approximately \$1,800, with an energy savings of \$2,663 each year.

- **Waterless Urinals.** Replacing water-consuming urinals with new waterless urinals saves money in three ways: eliminates cost of water to flush the urinal, eliminates the cost of the sewer (based upon water used), and eliminates most maintenance costs in repair/replacement of flush-valves and other plumbing parts. The consulting team calculated by using the Purleve Waterless Urinal Cost Saving Calculator<sup>26</sup>, that with an initial outlay of \$13,500 to install 45 Enviroseal System waterless urinals, a minimal net savings of \$12,388 per year could be realized. The payback time for these 45 urinals is 13.1 months. (Note: prior to installing waterless urinals, the district should contact the authority having jurisdiction (AHJ) to inquire whether their use is approved. Some AHJs require urinals to have plumbed water.)

Recommendation	2019-20	2020-21	2021-22	2022-2023	2023-24
Replace incandescent bulbs with compact fluorescent bulbs	\$429	\$554	\$554	\$554	\$554
Replace 150 aerators in handwashing sinks	\$965	\$1,190	\$1,190	\$1,190	\$1,190
Replace T-12 lights with T-8 lights	(\$723)	\$327	\$327	\$327	\$327
Install eight 2' X 4' double insulated aluminum frame windows	(\$4,224)	\$?	\$?	\$?	\$?
Install three vestibules at school building entrances	(\$31,200)	\$?	\$?	\$?	\$?
Replace 100 incandescent exit signs with LED exit signs	\$863	\$2,663	\$2,663	\$2,663	\$2,663
Install 45 Enviroseal waterless urinals	\$4,288	\$12,388	\$12,388	\$12,388	\$12,388
<b>Total</b>	<b>(\$29,602)</b>	<b>\$17,122+</b>	<b>\$17,122+</b>	<b>\$17,122+</b>	<b>\$17,122+</b>

<sup>24</sup> <http://www.amazon.com/TCP-20714-Light-Retrofit-Adaptors/dp/B001DMMK8O>

<sup>25</sup> [http://www.amazon.com/eTopLighting-Emergency-Lighting-Battery-Back-up/dp/B005DN7DB8/ref=pd\\_sim\\_60\\_2?ie=UTF8&dpID=310Ovbn3aCL&dpSrc=sims&preST= AC UL160 SR1 60%2C160 &refRID=1G9CN7WSDN2HRNQ3SQ85](http://www.amazon.com/eTopLighting-Emergency-Lighting-Battery-Back-up/dp/B005DN7DB8/ref=pd_sim_60_2?ie=UTF8&dpID=310Ovbn3aCL&dpSrc=sims&preST= AC UL160 SR1 60%2C160 &refRID=1G9CN7WSDN2HRNQ3SQ85)

<sup>26</sup> <http://www.purleve.com/product-categories/enviroseal-flex-system/no-water-urinals-calculator/>

**FINDING 4-12**

Some districts do not have a computerized energy cost system to track utility usage and costs along with the performance of utility bill audits. As a result, the district may not be able to detect errors or increased consumption in billings from utility companies based upon adopted utility rate schedules.

These districts do not keep track of energy consumption or cost for water, gas, and electricity on a per campus and building basis. Tracking monthly utility usage and cost data at each meter at each building at each campus is very important as it can assist in evaluating where problems may exist in terms of consumption, such as an indication of a water main break, a HVAC roof top unit set manually to run 24 hours a day, or a malfunctioning meter. There are energy accounting software programs on the market such as School Dude's UtilityDirect<sup>27</sup> that allow districts to track their utility costs by meter, by building, by campus.

In most cases, these programs perform a utility bill audit function that compares the data that has been entered into the program to the utility company rate schedule and can flag the bill if there is an error in the calculation. This function alone can help uncover billing errors that would normally not be detected which can easily cover the cost of the software program.

**RECOMMENDATION**

**Districts should purchase one of the available energy accounting software programs.**

**FISCAL IMPACT**

The software manufacturer has published results from a typical cost/benefit analysis that results in reported savings of at least 5% of a district's annual utility expenditures.

**D. SAFETY AND SECURITY**

Today, more than ever, school districts are expected to provide a safe and secure environment for their students and staff. While districts are largely insulated from violent crime, it is incidents of violence at schools that draw national attention. School districts must take proactive measures in safety and security even in incident-free schools. Students, teachers, and other district employees deserve a safe school environment in which to work and learn.

In 2003, Homeland Security Presidential Directive-5 (HSPD-5) initiated the development of a National Incident Management System (NIMS) and requires its use by public sector agencies, including school districts. The intent of this system is to provide a common template and language for responding organizations to work together in preventing, preparing for, responding to, and recovering from incidents. As noted by FEMA, NIMS represents "a core set of doctrine,

---

<sup>27</sup> <http://www.schooldude.com/products/utility-direct/>

concepts, principles, terminology, and organizational processes that enables effective, efficient, and collaborative incident management.”

NIMS emphasizes that true preparedness requires a commitment to continuous review and improvement. Most districts understand the continuous nature of emergency management as well as the four phases that comprise the process circle (**Exhibit 4-52**).

**Exhibit 4-52**  
**Continuous Process of Emergency Management**



*Source: The Office of Safe and Drug Free Schools' Practical information on Crisis Planning: A Guide for Schools and Communities, January 2007*

The Oklahoma Commission on School Safety, which was created in response to the Newtown killings, submitted several recommendations to the Oklahoma Legislature. Based upon the commission’s recommendations, the Legislature passed four new laws. Among other things, the laws require schools to update their safety plans every year and have frequent “intruder drills,” with students taking cover while the doors are locked and the windows covered. The state also created a new Oklahoma School Security Institute to help schools keep their policies up to date.

The Oklahoma Department of Emergency Management (ODEM) reports that the state has had an increased number of earthquakes in recent years. Actions that the district can take regarding earthquakes, and teach to students, staff, and visitors are provided on the ODEM website.<sup>28</sup>

One element of safety that created much discussions throughout the state in 2013-14 was the lack of shelters in many districts. This topic of safety resulted from the May 20<sup>th</sup> tornado in Moore, Oklahoma that destroyed two elementary schools and killed seven students attending one of those schools. Since 1974, there have also been multiple tornadoes of varying strength that have touched down in many communities across the state.

<sup>28</sup> [https://www.ok.gov/OEM/Programs\\_&\\_Services/Preparedness/Preparedness\\_-\\_Earthquakes.html](https://www.ok.gov/OEM/Programs_&_Services/Preparedness/Preparedness_-_Earthquakes.html)

As reported in surveys, students and parents generally agree that facilities are secure from unwanted visitors and that the children feel safe. Of the sampled surveys less than half of the staff *agreed* that their district’s facilities were secure from unwanted visitors. (**Exhibit 4-54**). The staff’s perceptions were corroborated by the consulting team, which observed that most school buildings in the sample districts lacked security checks for visitors entering the buildings.

**Exhibit 4-54**  
**Sampling of Survey Responses Regarding Safety in the Schools**

Survey Group	Survey Statement	Agree	No Opinion	Disagree
Parents	My child feels safe and secure at school.	75%	18%	7%
Parents	The school buildings and grounds are safe and secure.	74%	11%	15%
Students	I feel safe and secure at school.	68%	10%	22%
Students	The school buildings and grounds are safe and secure.	63%	13%	24%
Staff	The district’s facilities are secure from unwanted visitors.	48%	16%	35%

*Source: OEQA Sampling of Archived District Surveys*

All districts have an anti-bullying policy, that is usually contained in the district policy manual. The policy cites the *School Safety and Bullying Prevention Act*, 70 OKLA. STAT. § 24-100.2 et seq., with a positive statement that “the district intends to comply with the act and expects students to refrain from bullying.”

A sampling of archived surveys administered to parents and students (**Exhibit 4-55**), indicated that less than half of parents and 43 percent of students *agreed* that bullying was a problem in their district. In districts that had a higher percentage of parents who agreed that bullying at school was a problem, also, provided more comments, in the open response as opposed to districts who had a lower percentage of parents who agreed that bullying was a problem.

**Exhibit 4-55**  
**Sampling of Survey Responses Regarding Bullying**

Survey Group	Survey Statement	Agree	No Opinion	Disagree
Parents	Bullying is a problem in this district.	36%	25%	39%
Students	Bullying is a problem in this district.	43%	18%	39%

*Source: OEQA Sampling of Archived District Surveys*

---

**FINDING 4-13**

Schools have safety problems of several types. During site visits, consulting teams have reviewed all districts' facilities for life safety, ADA, and general safety problems. A comprehensive list of safety deficiencies can be found in **Appendix H**. Examples that the consulting team found include:

- Several areas in the facilities do not have exit signs, and in other areas, the exit signs and/or the egress lights do not work.
- Several electrical closets throughout the facilities have materials stored directly in front of electrical circuit distribution panels.
- Fire extinguishers were found sitting on the floor during the site visit. Extinguishers are required to be mounted at least four inches above the finished floor to protect the extinguisher in case of flooding.
- Several closets and other spaces within the schools have unprotected incandescent bulbs installed. If an incandescent bulb is broken, the hot filament can spark a fire. Incandescent bulbs are not energy efficient, and if used, should always have some sort of a protective shield.
- Fire extinguisher cabinets in the high school are not labeled as such.
- One fire door leaf in the intermediate school has a slide bolt installed at the top of the door.
- All fire doors tested by the consulting team and the principal in the high school, and all fire doors in the middle school, failed to close and/or latch properly.

A widely-used facilities inspection tool is the Council of Educational Facility Planners International (CEFPI) Guide for School Facility Appraisal, 1998 Edition. Other facilities inspection guides are available, including the American Clearinghouse on Educational Facilities' Educational Facilities Vulnerability/Hazard Assessment Checklist that was published in 2011.<sup>29</sup>

**RECOMMENDATION**

**Conduct a safety inspection of all facilities, document all deficiencies, and correct deficiencies quickly.**

Superintendents should direct maintenance directors to conduct a safety inspection of all facilities, document all safety deficiencies, develop a prioritized work list, and correct safety deficiencies quickly. Beginning with the observations in a district's performance review report, districts' staff should record each deficiency that requires repair or remedy, provide for documented follow-up to correct deficiencies, and report on work progress. As part of the process, each deficiency should be categorized as to whether it can be corrected with existing

---

<sup>29</sup> <http://online.tarleton.edu/ACEF/VulnerabilityHazardChecklist/index.html#/2/>

funds or requires additional monies, whether the deficiency presents a life/safety hazard (and therefore should be corrected immediately), and whether delaying correction may result in greater expense later.

### **FISCAL IMPACT**

This recommendation can be implemented with existing resources.

### **FINDING 4-14**

Life safety components of district facilities are not being inspected in accordance with state codes. During the site visit the consulting team observed school personnel who were asked to perform monthly and annual inspections and tests of life safety components. In every case, the inspection or test was not conducted in accordance with the life safety codes.

Districts' Maintenance-Custodial Procedures manual requires custodians to test fire extinguishers monthly and provides the steps necessary for a complete inspection, with one exception: the heft test. Some of the custodial staff in the schools are conducting fire extinguisher inspections and signing the attached card; however, with the heft test being left out of the procedure's manual, custodians fail to perform the test and so, regrettably, none of the monthly inspections have been performed in accordance with the standard.

National Fire Protection Association (NFPA) regulation 10, 6.2.2 states that "...inspection... of fire extinguishers shall include a check of at least the following items: ...fullness determined by weighing or hefting for self-expelling-type extinguishers..." Additionally, the consulting team found numerous fire extinguishers that either had an outdated tag, demonstrating that it had not received the required annual inspection by the contractor, or was missing monthly inspection certifications by the custodians.

Most generally, Maintenance-Custodial Procedures manuals also require custodians to inspect emergency lighting monthly. The document contains the NFPA regulation 101, 7.9.3 requirement that the monthly test to be conducted "...for not less than 30 seconds..." But when the inspection was being conducted by the custodians, in every case, the test was performed for only one or two seconds. When questioned on the proper length of time for the test, the custodians answered that the test should last three or four seconds to show that the battery worked.

The Maintenance-Custodial Procedures manual does not mention any tests for fire door assemblies. NFPA regulation 80, 5.2.1 states that "Fire door assemblies shall be inspected and tested not less than annually, and a written record of the inspection shall be signed and kept for inspection by the AHJ [Authority Having Jurisdiction]". During site visits, numerous fire doors were tested in various schools, and a majority of the systems failed the test by either not closing as required or not latching as required.

Many districts maintain a comprehensive list of every life safety device, including information such as type of device, date of installation, date of last inspection, specific location of the device,

and any other appropriate comments. Some districts establish a numbering system such as FE-105-1 (Fire extinguisher – site 105 – unit #1) so that work orders and other discussions about that specific device can be facilitated. The complete information is then loaded into either an Excel spreadsheet or a district’s computerized maintenance management system for automatic preventive maintenance work order generation. Fire doors are required to be tested annually. However, many districts, because of the heavy use (and abuse) of fire doors in schools, require custodian or maintenance personnel to test the doors on a monthly basis.

## RECOMMENDATION

**Expand the program of life safety training, inspections, and proper documentation of those inspections, to include all steps in the inspection, and to increase the periodicity of fire door inspections.**

A district’s designated safety coordinator should inventory all life safety devices in the district. Create a labeling system for each type of device such as FE for fire extinguisher, FD for fire door, EL for emergency lighting, and so forth. Enter complete information for each device into a spreadsheet. Include in a Maintenance-Custodial Procedures manual the complete steps of a life safety inspection. Train custodians on the correct procedure for a life safety inspection.

## FISCAL IMPACT

This recommendation can be implemented with existing resources.

## FINDING 4-15

No one in the district is responsible for the following:

1. Ensuring that life safety equipment such as fire doors, fire and smoke boundaries, exit lights, emergency egress lights, and fire extinguishers are tested and inspected in accordance with national and international codes adopted by the state of Oklahoma
2. Ensuring safety training required by district policy, Oklahoma state rules and regulations, OSHA, and other federal regulations is conducted and documented; and
3. Conducting general safety and life safety inspections of all district facilities on an ongoing basis, and ensuring deficiencies noted are properly reported in the maintenance work order system with follow-up as appropriate.

## RECOMMENDATION

**Appoint one individual as the district safety program manager.**

A school safety coordinator or safety program manager is designated to specific duties and responsibilities. Duties include all aspects of school safety: security of the facilities, workplace safety for employees, OSHA requirements, life safety requirements, Emergency Planning and

Community Right-to-Know Act implementation, along with other federal, state and local rules and regulations.

One person should be designated as safety program manager for the district. This position should be dedicated solely to safety and should be full-time for larger districts. The district should provide the incumbent with the OSHA, life safety, and other safety training necessary to implement and coordinate a comprehensive district safety program.

### **FISCAL IMPACT**

This recommendation can be implemented with existing resources.

### **FINDING 4-16**

During site visits, consulting teams found a variety of health and safety items that had expired in addition to the wrong placements of safety items. Specific examples include the following:

- expired bottles of water in eye wash stations,
- Expired sterile bottled water in first aid kits for use in irrigating open wounds prior to applying sterile gauzes or bandages.
- Expired Saline solution (0.9 percent sodium chloride in sterile water) is found in first aid kits and eye wash stations.
- The small bottles of eye wash solution found in first aid kits and small eye wash stations are for irrigating the eyes to remove grit that may have gotten into them. These bottles of eye wash solution are not sufficient for cases when chemicals may have been splashed in the eyes.
- Automated External Defibrillators (AEDs) in the district have outdated pads and weak or outdated batteries.
- Some AEDs reviewed by the consulting team had pediatric pads that were outdated, and, when the wall mounted cabinets were opened, the batteries for the alarm failed to operate.
- In one case, the internal battery for the AED itself was out of date and was holding only a partial charge.
- Several first aid boxes contained items that had expired.

Dated health and safety items should be replaced on or before the expiration date. Using outdated health and safety items puts both the patient (staff, student, or visitor) and the district at risk in the event of an undesirable outcome.

Sudden cardiac arrest is one of the leading causes of death in the U.S. Many school districts have purchased and installed Automated External Defibrillator (AED) kits as the only effective treatment for restoring a regular heart rhythm during sudden cardiac arrest. AED kits contain

---

both adult-sized and child/infant-sized electrode pads and batteries that have shelf lives. It is important that they be maintained with up-to-date materials

### RECOMMENDATION

**Inspect all eyewash stations, first aid kits, and AED kits to remove out-of-date materials and replace them with fresh materials. The safety program manager should ensure that health and safety items that have expiration dates are contained in an inventory control system that includes periodic inspections and replacement of expiring items.**

Districts should develop a procedure of inventorying all first aid kits, eye wash stations (both portable and plumbed), and AED kits. The inventory should include the type of equipment, a list of contents and the expiration dates of all dated materials. This information should be entered into the preventive maintenance database for scheduling of preventive maintenance service and correcting any deficiencies that might be found. The database should include location of the item, date installed, and expiration date which will provide a higher level of organization, ensuring student and staff safety, as well as ensuring the district is compliant with safety regulations. The safety program manager should enlist the help of the school safety committees to monitor these items in their school and provide a clear method of reporting problems.

### FISCAL IMPACT

This recommendation can be implemented with existing resources.

### FINDING 4-17

The effectiveness of many districts' emergencies planning and response is not tested beyond fire, tornado, and intruders. Without an effective multi-hazard emergency plan, the district weakens its ability to manage real emergencies successfully, increasing the risk of personal injury and property damage.

Even though the oversight responsibility of safety and security is assigned to a central office administrator, assistance from campus personnel is required to achieve the overall safety and security objectives.

Other characteristics also inhibit the effectiveness of their emergency planning and procedures. The specific inhibiting characteristics include the following:

- Staff lacks the specific training needed to improve security awareness, threat assessment, all hazards emergency planning, mitigation, response, and recovery. Without this specific training, the students, staff, and facilities are more vulnerable to the consequences of natural, accidental, and created emergencies.
- Districts do not test the effectiveness of their emergency planning and response beyond fire and tornados.

Without developing performance standards for all hazards emergency drills to include conducting after-action reviews, developing corrective action plans based on the lessons learned from the drills, and hosting joint exercises with city and county emergency management personnel and first responders, the district's ability to manage real emergencies of varying type and scope successfully greatly decreases.

### **RECOMMENDATION**

**All district personnel should receive emergency management training and the emergency response plan should be routinely exercised beyond fire and tornado drills.**

The superintendent should ensure that all district personnel receive basic emergency management training and exercise their emergency response plans beyond fire and tornado drills. Emergency management training for school personnel can be obtained online from the Federal Emergency Management Administration (FEMA). The recommended FEMA independent study courses include the following:

- IS-100.a Introduction to Incident Command System
- IS-200.a ICS for Single Resources and Initial Action Incidents
- IS-362 Multi-Hazard Emergency Management for Schools

The online courses are located at: <http://training.fema.gov/IS/crslist.asp>. The superintendent should also host joint exercises with city and county emergency first responders and district personnel, conduct after-action reviews, and develop corrective action plans based on the lessons learned from the drills and exercises.

### **FISCAL IMPACT**

This recommendation could be implemented with existing resources.