

Office of Superintendent of Public Instruction

Facilities Maintenance & Operations

Classified Adequacy Staffing Report

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EXECUTIVE SUMMARY

The OSPI staff, acting as a Work Group for Facilities Maintenance and Operations convened three expert groups to analyze the staffing needs of schools and districts. Expert groups included:

- A team of architects who have designed Washington schools and understand their space requirements;
- A team of facilities maintenance and grounds professionals with expertise in preventive maintenance of building systems (i.e. heating, ventilation and air conditioning (HVAC); electrical; and plumbing) and school grounds; and
- A team of operations professionals with expertise in daily cleaning and routine facilities maintenance requirements.

In practice, facility maintenance crews include skilled craftsmen and women who conduct scheduled inspections and services, and who repair and replace building system components. Operations staff members include custodians, grounds workers, and general maintenance crews who respond to emergent and routine maintenance needs.

For the purposes of reporting the findings of this analysis in the context of Washington state's prototypical school model, the Work Group summarized these roles into two slightly different categories; facilities maintenance and grounds, and custodians. In the prototypical school model, facilities maintenance and grounds staff provide districtwide support while custodians are building based staff.

The work of the Expert Groups informed the Facilities Maintenance and Operations Work Group, and provided the information needed to assess the adequacy of current funding for facilities maintenance and operations staff. The resulting staffing recommendations are based on carefully crafted assumptions about the space required to deliver state-funded education programs, and the staff needed to adequately maintain those spaces.

To achieve the level of school facility maintenance required to support state-funded education programs, the Expert Groups recommend that funding be provided for:

- 3.186, 3.454, and 4.512 FTE custodians at the prototypical elementary, middle and high schools respectively; and
- 4.719 FTE district-wide support facilities, maintenance and grounds staff per 1000 students.

The Expert Group of maintenance and grounds professional also identified the central office support and supervision staff required to facilitate and monitor the work of maintenance and grounds crews. These staff types funded out of districts allocations for central office administration, but are highlighted here because their work is integrally related to facilities maintenance and operations. The Expert Group recommended that funding be provided for:

- 0.130 FTE central office maintenance support staff per 1000 students, and

- 0.130 FTE for central office maintenance supervision per 1000 students.

Finally, the Expert Group of maintenance and grounds professionals also made recommendation about the number of districtwide support warehouse workers, laborers, and mechanics needed to support the prototypical district. The Expert Group recommends that funding be provided for:

- 0.571 FTE districtwide support warehouse workers, laborers, and mechanics per 1000 students.

Funding formula Technical Working Group Response

The Funding Formula Technical Working group (FFTWG) had an opportunity to review the findings in this report and upon doing so made two recommendations. First, the FFTWG recommended that the custodial staffing recommendation at the prototypical elementary school should also be calculated to reflect the increased need for staff that will occur once class sizes in grades K-3 are reduced to 17 students in accordance with SHB 2776 Chapters 236, laws of 2010. The Work Group for facilities maintenance determined that if class sizes are reduced the custodial staff requirement will increase from 3.189 to 3.524 staff per prototypical elementary school.

Additionally, the FFTWG recommended that districts should receive funding for districtwide facilities security staff as part of their allocation for warehouse, laborers and mechanics. The classified staff adequacy work group for student and staff safety has since identified a need for .15 FTE facility security staff per 1000 students to ensure that school facilities are patrolled and monitored after hours, weekends and holidays—times when school building staff are off duty.

INTRODUCTION TO FACILITIES MAINTENANCE AND OPERATIONS

Definition

Facility maintenance and operations is the continuous process of service provision required to maintain a facility and its campus over the course of its useful life. These services include daily cleaning; routine maintenance; and preventive and emergent maintenance of major building systems (i.e. heating, ventilation and air conditioning, electrical, plumbing, etc.) Facilities maintenance also includes the upkeep of school grounds.¹

The goals of facility maintenance and operations are to:

- Maintain a safe and healthy learning and working environment for students and staff;
- Maximize building efficiency; and
- Protect the State's and local district's capital investments.

Why does maintenance matter?

The condition of a school has a direct effect on student achievement and teacher performance. A 2003 study found that the quality grade teachers assigned to their school facility has a greater effect on the average teacher's decision to stay in the profession than the quality grade they assigned to their salary.ⁱ There is also a growing body of research that documents the effect of factors such as air quality, lighting, noise and the condition of furniture and lockers on student achievement.ⁱⁱ Poor indoor air quality is known to cause "sick building syndrome" which can lead to higher absenteeism, lowering student performance.ⁱⁱⁱ Conversely, well maintained and well ventilated buildings can bolster students' comfort, concentration, and success.

Protecting capital investments

In the last 17 years, the State and local school districts have invested \$19.6 billion in new construction and modernization projects – an average investment of \$1.1 billion per year. In addition, an average of \$42 million per year of federal and other funds were invested in capital projects in the same period.

In the past, there has not been a link between what the State and districts invest in school facilities, and the operational investments they make to maintain those facilities. However, in the 2010 supplemental capital budget, the legislature provided OSPI with \$250,000 to develop a K-12 facility inventory and condition evaluation system. The legislature sought to:

- Encourage school districts to invest in activities that extend the useful life of school district facilities so as to preserve these assets, and

¹ State support for grounds maintenance does not include funding for the upkeep of athletic fields or other facilities that are used for extra-curricular activities; they are funded by local district resources, and are therefore not included in this analysis.

- Develop an information system that will provide better data about school districts' use of state funds for maintenance and operations, and to monitor facilities' conditions.^{iv}

The legislature acknowledged that adequate maintenance of school facilities is a priority, and that districts must receive sufficient funding to cover these costs.

Health and safety: rising standards

Washington state law requires school districts to ensure that all school buildings are properly heated, lighted, ventilated and maintained in a clean and sanitary condition. In addition districts must maintain, repair, furnish and insure their school buildings.^v In order to meet their obligations, school districts must carry out both routine and preventative maintenance.

In support of state law, the Washington State Board of Health has recently adopted a new set of rules regarding the maintenance of school facilities. The rules establish a more modern minimum environmental health and safety standard for school facilities to be maintained to in order to promote healthy and safe school environments. These rules will require most districts in the stat to invest significantly more staff time and material into facilities maintenance, and therefore, implementation of these rules is dependent on a commitment of resources from the Legislature sufficient to allow districts to achieve the standard of care stipulated in the rules^{vi}.

What staff are involved, and what do they do?

Operational maintenance

Operational maintenance includes the work of custodians, grounds workers, and general maintenance crews who do the daily work of cleaning and routine maintenance. In addition to these daily, routine tasks, operational maintenance includes responding to calls for emergency repairs, patching holes, replacing light bulbs and repairing furniture and fixtures.

Custodians clean, sanitize and remove trash. They also perform a variety of non-cleaning tasks such as opening the school, checking for vandalism, identifying safety and maintenance needs, inspecting playgrounds and fields, responding to teachers' and principals' requests, setting up for special activities and events, ordering and delivering supplies, and putting up the flag and PE equipment.

Grounds workers mow, trim, irrigate and otherwise care for school grounds.

Infrastructure maintenance

Infrastructure maintenance includes the preventive building system maintenance required to maximize the useful life of building systems such as heating and ventilation, roofs, and electrical systems. Infrastructure maintenance also includes scheduled inspections and services, and system component repairs and replacements.

Over the course of a building's life cycle, operational maintenance costs (i.e. cleaning and routine maintenance) are relatively stable from year to year, but the annual cost of infrastructure maintenance can vary widely depending on the age and condition of a building and its component systems.

HISTORY OF FUNDING RECOMMENDATIONS

In the past five years, various commissions, task forces, and new legislative acts have made recommendations about funding for facilities maintenance and operations. However, recommendations have differed as to whether allocations for maintenance, grounds and custodial staff should be provided for each prototypical school or for school districts as a whole.

2006: Washington Learns

The K-12 Advisory Committee of Washington Learns recommended that each prototypical school receive a per pupil allocation for custodial staff, and that school districts receive a per pupil allocation for grounds and maintenance staff. The suggested allocations were:

- Custodians, \$182
- Maintenance workers, \$77
- Groundskeepers \$55
- Maintenance and operations supplies \$39.

These allocations translate into a staffing recommendation of 6.772 school level custodians and 3.278 district-wide groundskeepers and maintenance workers per 1,000 students.

2009: Basic Education Finance Task Force

This task force recommended that state funding be provided for 4 maintenance/cleaning staff at each prototypical elementary, middle and high school. In addition, the task force recommended that schools receive \$130 - \$150 per pupil for facilities maintenance supplies. (The exact amount is not known, because funding for facilities maintenance and supplies were combined with other categories.)

2009: ESHB 2261

This legislation requires that the minimum allocation for each prototypical school shall include an allocation for custodians, warehouse, maintenance, laborer, and professional and technical education support employees. It also stipulates that the minimum allocation for each school district will include an allocation per annual average FTE student for materials, supplies and operating costs, including building level costs for maintenance, custodial work, security, and central office administration.

2010: Quality Education Council

In January, 2010, the QEC recommended that the legislature fund all classified staff at the 2009-10 operating budget level, based on 17.021 classified staff per 1,000 students. The QEC also recommended that within this classified staff ratio, districts should receive funding for 1.657, 1.942, and 2.965 FTE custodians at the prototypical elementary, middle and high school, respectively. In addition, the QEC recommended that school districts receive an allocation for 1.813 FTE for district-wide support facilities, maintenance and grounds staff per 1,000 FTE students.

2010: SHB 2776

This legislation calls for a minimum allocation for staff at the prototypical elementary, middle and high school to include an allocation for 1.657, 1.942 and 2.965 FTE custodians, respectively. In addition, each school district is to receive 1.813 staff per 1,000 FTE students for district-wide support services related to facilities maintenance.

SHB 2776 also stipulates that in fiscal year 2011 districts will receive \$73.27 per pupil for facilities maintenance supplies. Funding for facilities maintenance related materials, supplies and operating costs will be increased in the 2011-13 biennium as specified by the omnibus appropriations act, and in the 2015-16 school year, districts will receive \$153.18 per pupil, adjusted for inflation from the 2007-08 school year.

2017-18 Funding Recommendations

Table 1. Recommended Facility Maintenance and Operations FTEs & MSOC

		Staff per 1,000 Students*	Elementary (400)	Middle (432)	High (600)	Amount per Student for Supplies
1	Washington Learns	3.278	1.85	1.92	3.0	\$39
2	Finance Task Force	-	4.0	4.0	4.0	\$130-150
3	QEC	-	-	-	-	\$153.18
4	SHB 2776**	-	-	-	-	\$153.18

* Represents the allocation for district wide support maintenance and grounds staff while school level allocations are provided for custodial staff.

** SHB 2776 stipulates that funding for MSOC should be enhance to reflect 2007-08 actual expenditure levels, adjusted for inflation, beginning in the 2015-06 school year.

2008-09 Baseline Funding Values

Table2. Funded Facility Maintenance and Operations FTEs & MSOC

		Staff per 1,000 Students	Elementary (400)	Middle (432)	High (600)	Amount per Student for Supplies
1	QEC*	1.813	1.657	1.942	2.965	\$73.27
2	SHB 2776	1.813	1.657	1.942	2.965	\$73.27
3	District Practice	2.001	1.988	2.157	2.981	\$153.18

*QEC staffing recommendations were based on maintaining the state's operating budget funding level for classified staff at 17.021 staff per 1000 students.

WHAT DO WE KNOW ABOUT FACILITY MAINTENANCE AND OPERATIONS IN WASHINGTON STATE?

Inventory

OSPI estimates that the 295 local school districts in the state maintain roughly 2,050 school sites. These sites include an estimated 140 million square feet of instructional space,^{vii} valued at an estimated \$28 billion.

This count of square feet, and corresponding value does not include all of facilities that districts are responsible for maintaining. By definition, instructional space excludes non-permanent facilities (i.e. portables); central administration facilities, stadiums and grandstands, bus garages, warehouse space, or other spaces that are not directly related to instructions.

At the State level, we do not currently capture data on non-instructional space or grounds acreage; however, OSPI is in the process of developing a building condition inventory system that will do so with funds appropriated by the legislature in the 2010 supplemental capital budget.

Current State and Local Funding for Facilities Maintenance and Operations

Funding for facilities maintenance and operations is allocated to districts as part of their classified staff allocation and their allocation for non-employee related cost (NERC). Districts do not receive a specific allocation for facilities maintenance.

In 2008-09, districts received funding for 6.272 facilities maintenance, grounds and custodians staff per 1,000 students – the equivalent 37 % of the total state allocation for classified staff. In that same year, local districts paid for an additional 0.698 facilities maintenance staff per 1,000 students, for a total of 6.970 maintenance and operations staff per 1,000 students in basic education programs.

In the 2008-09 school year districts received allocations in the amount of \$517.91 per-pupil for NERC. Of that total allocation, \$73.27 was provided for facilities maintenance and operations supplies. In contrast, districts spent an average of \$153.18 per pupil on facilities maintenance supplies in that same year.

At 2008-09 funding levels, the general apportionment allocation for facilities maintenance and operations covered 60 percent of total maintenance expenditures, and districts paid for the remaining 40 percent with local funds. Even at these enhanced spending levels, evidence suggests that districts are not able to make sufficient investments in preventive maintenance.

Evidence of the Current Under-Investment in Facilities Maintenance and Operations

In January 2009, the Office of Superintendent of Public Instruction conducted a survey of districts to identify the outstanding need for school repairs. One hundred and seventy-nine districts identified a need for school repairs totaling \$1.8 billion, or roughly \$16 per instructional square foot.

Staff Time Required for Adequate Maintenance

The U.S. Department of Education establishes benchmarks for how many building square feet can be assigned to one properly supplied custodian in an 8 hour shift in order to meet specified levels of cleanliness.^{viii} This scale specifies benchmarks for:

- 1) Spotless cleaning – 10,000 to 11,000 square feet
- 2) Intensive cleaning – 18,000 to 20,000 square feet
- 3) Cleaning required to ensure the health and comfort of building users – 28,000 to 31,000 square feet
- 4) Cleaning not generally acceptable for a school environment – 45,000 to 50,000 square feet
- 5) Cleaning that is not considered healthy – 85,000 to 90,000 square feet

As of 2007, the average custodial staff person in Washington state was responsible for maintaining 28,172 square feet per shift, and custodial staff responsibilities ranged from a high of 76,948 sq. ft. to a low of 17,197 sq. ft. per shift in 2007.^{ix} This is clear evidence that there are insufficient resources dedicated to facilities maintenance in many districts.

The State average operations staff-to-square feet ratio ranks Washington school's cleanliness at a level 3; the minimum acceptable level for a school environment. It would take an average decrease of more than 8,000 sq. ft. per staff to bring schools up to a Level 2 – the intensive cleaning standard.

METHODOLOGY USED TO DETERMINE CLASSIFIED STAFF ADEQUACY

To determine what constitutes adequate levels of custodial staffing at prototypical schools, and district-wide maintenance and grounds workers, the OSPI staff attempted to compare private industry standards for facility maintenance and operations with current state school funding. However, this proved difficult.

Challenges with comparing state funding with industry standards

State funding for maintenance and operations is generated differently than the expected cost of annual maintenance is calculated in industry settings. In addition, the OSPI staff could not identify the standard of maintenance of school facilities that should be expected, given current funding for maintenance and operations, in the absence of state level facility inventory data. The specific challenges staff identified include:

- Industry standards are based on costs per square foot rather than costs per pupil.
- There is no identified per pupil square footage requirement for basic education upon which to base assumptions about total maintainable square footage.
- Currently, state level data only captures square footage for instructional space, and does not include all spaces that districts are responsible for maintaining.

- There is currently no data available on total site acreage for use in the comparison between current funding for grounds maintenance and industry standards.

Guiding Questions

In order to ensure that districts receive funding for an adequate number of school level custodians and district-wide support facility maintenance and grounds staff, funding for these staff must be tied to assumptions about square footage, standards of maintenance, and the staffing required to achieve those standards. In order to tie funding for facilities maintenance and operations to industry standards, the Work Group identified key questions that the Quality Education Council and or the Legislature must answer:

- What are the basic square footage requirements for the prototypical elementary, middle, and high school? What are the basic square footage requirements for district-wide and central administration support spaces?
- What operational and infrastructure maintenance activities are required in an adequate maintenance plan?
- What are appropriate levels of service for operational and infrastructure maintenance?
- How much time does it take to implement an adequate maintenance plan at given levels of service, over a given area?
- How does current funding for both facility maintenance staff and related materials and supplies compare to the funding required to achieve a given standard of facility maintenance? What will it require in additional resources to achieve that standard?

Work Plan

OSPI staff, acting as a Work Group for Facilities Maintenance and Operations, identified specific tasks to help inform the Quality Education Council's recommendation for classified facilities maintenance and operations staff. The Work Group's goals were to answer the guiding questions listed above. To do this, the Work Group assembled three groups of technical experts. Expert groups consisted of architects who design schools; maintenance and grounds professionals; and operations/custodial professionals. The Work Group provided each expert group with a specific task and list of assumptions to guide their work.

Table 3 summarizes the assumptions that guided the work of the three groups of technical experts. All assumptions are salient in the analysis conducted by the Work Group. However, the table highlights those assumptions that were most relevant to the discussions of each expert group. To generate this list of guiding assumptions, the Work Group considered:

- The descriptions of the prototypical school given in ESHB 2261 codified as RCW 28A.150.260;
- The baseline funding values adopted in SHB 2776 (2010);

- The need to isolate the space and staff required to deliver state-funded education programs from those spaces and staff required to support extracurricular activities that should be supported by local funds; and
- Federal mandates that require space, and therefore have an impact on maintenance staffing needs.

Table 3. Guiding Assumptions				
Prototypical Schools	Architects	Maintenance	Grounds	Operations
Elementary School - 400 FTE (400 head count)	x	x	x	x
Middle School - 432 FTE (436 head count)	x	x	x	x
High School - 600 FTE (642 head count)	x	x	x	x
Permanent space	x	x	x	x
Self-contained school	x	x	x	x
1-Story building	x	x		x
50-Year building	x	x		x
Meets current codes	x	x	x	x
Class sizes reflect current basic education funding ^x	x			
School Sites	Architects	Maintenance	Grounds	Operations
Elementary School - 10 Acres			x	
Middle School - 15 Acres			x	
High School - 17 Acres			x	
Central Administration & District Wide Support Facilities	Architects	Maintenance	Grounds	Operations
Prototypical District - 1432 FTE (1478 head count)	x	x		
Permanent space	x	x		
Self-contained school	x	x		
1-Story building	x	x		
50-Year building	x	x		
Meets current codes	x	x		
Include Space for:				
– District Offices	x			
– Capital Projects	x			
– Maintenance	x			
– Food Service	x			
– Transportation	x			
Staffing	Architects	Maintenance	Grounds	Operations
Staffing is in-house (non-contracted services)		x	x	x
1 FTE is equivalent to a 260-day employee		x	x	x
Recommendations are based on the current regulatory environment		x	x	x
Scope of Work	Architects	Maintenance	Grounds	Operations
Maintenance of extra-curricular sports and athletic fields are supported by local levy dollars			x	
No intense turf program			x	
Cleaning activities include only those in support of the state-funded education programs				x

Scope of Work	Architects	Maintenance	Grounds	Operations
Custodial staff will have responsibility for only those outdoor areas adjacent to the building				x
Food service staff clean cafeteria tables, service and food preparation areas				x

Architects’ Task

To gauge the specific needs of schools and districts for facilities maintenance, grounds maintenance, and operations staff, OSPI convened a team of architects with expertise in designing schools for local districts. The Work Group provided the architects with a list of specific assumptions to use regarding the type of educational program to be delivered, and the number of students and staff to consider in the process of designing prototypical elementary, middle, and high schools, and the central administration and district-wide support spaces required to deliver state-funded education programs.

Architects were asked to design prototypical schools, central administration and district-wide support facilities.

Prototypical school sizes are outlined in RCW 28A.150.260, and are represented in terms of FTE students. In contrast, architects build for head count. The Work Group used actual historical enrollment data and Washington’s Caseload Forecast Council’s K-12 Long Range Projection Data for October 2006 through October 2009 to determine the relationship between student FTE and head count. To capture the difference between FTE and head count, the Work Group inflated FTE numbers at the middle and high school levels by 1% and 7% respectively. The resulting prototypical school sizes are referenced in Table 3.

After reviewing the guiding assumptions for the prototypes, the architects began to “build” them, space by space. They first established the spaces that occupy the largest portion of the school facility– the basic, general education classrooms. The number of these classrooms was calculated by dividing the prototypical school size by the funded class size at each of the prototypical school levels (as identified in SHB 2776) and then dividing that amount by the classroom utility rate to factor in the additional classrooms needed to allow for teacher planning time in their own rooms.

Table 4 demonstrates the calculation used to determine the total number of basic and specialty classrooms needed in each school.

Table 4. Methodology for Calculating Total Classrooms

	Prototype Student HC		General Education Class Size		Classroom Utility Rate	Basic, General Education Classrooms
Elementary*	400	<i>divided by</i>	26.410	<i>divided by</i>	84.5%	18
Middle	436	<i>divided by</i>	28.530	<i>divided by</i>	80.0%	19
High	642	<i>divided by</i>	28.740	<i>divided by</i>	80.0%	30

* The Elementary General Education Class Size is an average of Grades K-3 at 25.23, Grade 4 at 27 and Grades 5-6 at 27.

Other spaces typically designed for elementary, middle and high schools were then added. As each prototype was built, there was agreement to a “no trade-off” assumption for the spaces. As an example, music rooms were built into the elementary prototype, rather than assuming music would be taught on a stage or in a common area.

Finally, building materials are an important factor in the time it takes to maintain or to clean a building. The building materials categories assumed for the prototype were based on the 19 categories of materials listed on OSPI’s Building Condition Evaluation Form (BCE). The BCE is a tool used to assess a school district’s facilities’ condition during the planning processes of the School Construction Assistance Program (SCAP). The BCE assesses the condition of existing facilities’ major systems, subsystems and components. The Criteria the Work Group used when suggesting the materials for the purposes of this exercise included sustainability, maintainability, cleanability (can the material be cleaned with ease), efficiency (how much time is required to cleaning/maintenance the material), cost-effectiveness and durability.

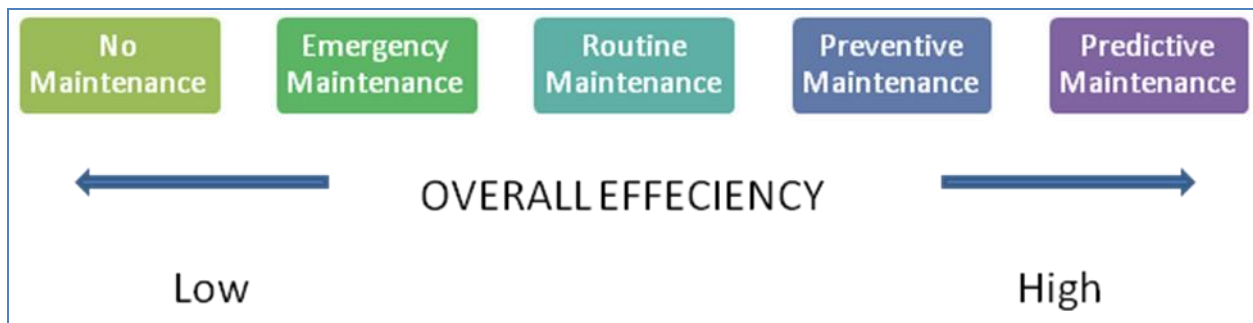
Facilities maintenance and grounds Professionals’ task

Facilities maintenance and grounds professionals were asked to identify the staff required to adequately maintain the prototypical schools and central administration and district-wide support facilities designed by the architects.

The first step in the process of identifying maintenance staffing needs was to clearly define *adequate* building system and grounds maintenance in reference to state-funded education programs. The National Center for Education Statistics (NCES) outlines a maintenance spectrum depicted in Figure 1^{xi}.

Maintenance and grounds professionals were asked to identify the staff required to maintain the prototypical schools and central administration and district-wide support facilities

FIGURE 1. THE MAINTENANCE SPECTRUM



NCES identifies five categories of maintenance:

- **Emergency (or response) maintenance** – the elevator breaks on the warmest day of the year, or the water main breaks and floods the lunchroom.
- **Routine maintenance** – maintenance required at the at the end of a piece of equipment’s useful life
- **Preventive maintenance** – scheduled maintenance of a piece of equipment.
- **Predictive Maintenance** – cutting edge of facility management; uses sophisticated computer software to forecast the failure of equipment based on age, user demand, and performance measures.

The National Center for Education Statistics^{xii} notes, and the facilities maintenance and grounds professionals agreed, that as an institution’s maintenance program moves along the maintenance spectrum, that institution increases overall efficiency and reduces the incidence of building system failures. The facilities maintenance professionals agreed that an adequate maintenance program should be founded on preventive maintenance. This level of service allows for good stewardship of facilities; balances facility maintenance requirements with other school funding needs; and provides maintenance staff an opportunity to do some long-range facility planning without fully adopting the predictive level of maintenance.

Once the facilities maintenance and grounds professionals agreed on an adequate level of facility maintenance, they identified specific tasks required in a preventive maintenance program, and estimates for the FTE staff time required by various facility maintenance trades to complete those tasks in the prototypical school district.

To identify adequate staffing levels for each maintenance trade, the facilities maintenance and grounds professional created a formula that takes into account their district’s square footage, the staff they would require in their district to achieve a preventive maintenance standard, and the ratio of their district’s size to the size of the prototypical school district. Table 5 illustrates how this formula was used to arrive at recommended maintenance staff FTEs using one participating district as an example.

Table 5. Methodology for Calculating Facilities Maintenance FTEs

Participating School District	Prototypical District Total Square Footage		Participating District Square Footage*	Prototype to District Ratio
Spokane	309,535	<i>divided by</i>	4,000,000	7.70%

*Estimated Square Footage

Level of Service – Grounds. The facility maintenance and grounds professionals went through the same process of identifying an adequate level of grounds maintenance before beginning to discuss staffing needs. To inform their conversations, the maintenance and grounds professionals referenced the three levels of grounds maintenance service that Whitestone Research establishes for school facilities in their 2009-10 facility operations cost reference. The three levels are standard, medium and high and are described in Table 6.

Table 6. Levels of Service for Grounds Maintenance

Level of Service	Description
Low	Mow once every 2 weeks, fertilize every 26 weeks, clean and trim walks every 4 weeks.
Medium	Mow once per week, fertilize every 13 weeks, clean and trim walks every 2 weeks.
High	Mow six times per month, fertilize every 8 weeks, clean and trim walks once per week.

Given the guiding assumptions regarding the scope of work required for grounds workers, the facilities maintenance and grounds professionals identified a medium level of service as adequate for state funded education programs. In addition to the tasks outlined by Whitestone, the facility maintenance and grounds professionals identified several other tasks that they would expect to be completed as part of a medium level grounds maintenance program. Table 7 expands upon the description that Whitestone provides, and includes additional tasks associated with a Medium Level of grounds maintenance and the frequency with which they should be completed as described by the facilities maintenance and grounds professionals.

Table 7. Medium Level of Service – Grounds Maintenance Tasks and Frequencies

Task	Frequency
Cleaning and trimming walks	Every 2 weeks
Conducting hazardous tree inspections	Annually
Controlling for weeds	Twice per year
Fertilizing	Every 13 weeks
Following Integrated Pest Management Practices (IPM)	On-going
Maintaining and repairing irrigation systems	As needed
Maintaining and repairing grounds equipment	As needed
Maintaining parking lots	As needed

Making fence repairs	As needed
Mowing Lawns	Once per week
Replacing site lighting	As needed
Responding to inclement weather related needs	As-needed

Facilities operations (custodial) professionals’ task

Operations professionals were asked to identify the tasks required to adequately maintain the facilities from an operations perspective, taking in to account the guiding assumptions, materials, spaces, and their associated sites. In addition, the professionals were asked to estimate the time it would take for properly equipped custodial staff to complete the tasks that they identified.

Although custodians are solely identified at the school level in the new prototype, the Work Group asked the operations professionals to identify the operations staff that would be required in order to maintain the defined central administration and district-wide support facilities given that districts are required to maintain those facilities in practice.

Operations professionals were asked to identify the cleaning and non-cleaning tasks required in order to adequately maintain the prototypical schools from an operations perspective

Before beginning to discuss custodial staffing levels for the prototypical schools, the operations experts identified an appropriate level of cleaning for school facilities given the guiding assumptions. The operations experts used the National Center for Education Statistics’ five-tiered system of expectations for cleanliness as a scale to describe the cleanliness to be expected in a school facility, given the square footage assigned to each custodian. The NCES’ tiered system does not establish a standard; it reflects a set of general expectations to aid in facility planning. There are gaps between the recommended bands of square feet per staff, so determining whether 25,000 square feet per staff equates to Level 2 or Level 3 cleanliness is somewhat subjective, and can be influenced by the actual circumstances contributing to the expectations of custodians – types of flooring, wall covers, number of windows, etc.

Despite the limitations of the NCES’ tiered list, the operations professionals generally agreed that a Level 2, or 18,000 – 20,000 square feet per staff, is an appropriate level of service for state-funded school facilities. The facility operations professionals described the Level 2 cleaning as work that will extend the life of the school building, allow for cleaning that keeps indoor air quality high (routine dusting, vacuum filter changes, etc.), and meets the varying cleanliness requirements of all programs for students in grades K-12.

The facilities operations professionals began their discussion of required staffing to achieve a Level 2 cleaning standard by identifying two categories of work and two categories of workers within the operations/custodial category. The work was divided by cleaning and non-cleaning custodial tasks. The workers performing the custodial tasks are day custodians, sometimes referred to as the head

custodians because they typically have supervisory responsibilities, and shift custodians who typically work at night, and whose primary role is cleaning.

The representative school districts felt they were currently cleaning at between Levels 3-5 at the current classified staffing levels. Table 8 describes the cleaning tasks that are required and the frequency with which they are to be completed in order to achieve a level 2 standard of cleaning.

Table 8. Level 2 - Custodial Cleaning Tasks and Frequencies				
Basic Classrooms	Daily	2-3 Times per Week	Weekly	As Needed
Check and replace light bulbs	x			
Clean door windows inside and out		x		
Clean entrance windows inside and out	x			
Clean sinks and wipe countertops	x			
Clean under wheeled equipment	x			
Dust (white boards, chalk boards, surfaces)		x		
Empty Trash	x			
Remove marks or graffiti				x
Replace towels and paper products	x			
Spot clean carpets	x			
Sweep and mop hard surfaces – removal of black marks	x			
Vacuum area rugs (if allowed)	x			
Vacuum carpets, including edge vacuuming	x			
Wash trash cans		x		
Wash outside windows				x
Wash walls				x
Wipe down and sanitize light switches, pencil sharpeners, door handles		x		
Special Classrooms (Art, Gym, Music, Library, etc.)	Daily	2-3 Times per Week	Weekly	As Needed
<i>Treat same as basic classrooms if used daily</i>				
Common Areas	Daily	2-3 Times per Week	Weekly	As Needed
Restrooms	x			
Clean and sanitize from top to bottom				
Locker Rooms	x			
Clean and sanitize from top to bottom				
Clean and sanitize showers from top to bottom				
Disinfect floors				
Multi Purpose Room/Cafeteria	x			
Clean floors				
Empty trash				
Air Vents			x	

In addition to identifying cleaning task required at Level 2, the facility operations professionals described the non-cleaning tasks required of custodians (primarily day/head custodians) and estimated times required to complete those tasks.

Finally, using the individual space definitions and sizes established by the architects for the prototypical schools as a template, the facilities operations/custodial professionals determined the amount of time (in minutes) required of custodial staff to achieve a Level 2 standard. The operations professionals also identified the time required by custodial staff to complete the list of identified non-cleaning custodial tasks.

KEY FINDINGS, CONSIDERATIONS, AND ANALYSIS

Each of the technical expert teams provided OSPI with comprehensive data and founded recommendations which can inform the QEC and the Legislature as they make final decisions about adequate classified staffing levels. The four key findings are:

Finding #1 – Architects identified sizes for prototypical schools, district-wide support facilities, central administration buildings and their associated sites and building materials that represent what is required to support state-funded education programs.

Finding #2 – Facilities maintenance professionals identified that 6.510 FTE classified facility maintenance staff are required to maintain a prototypical school district enrolling 1,432 FTE students and sized at 309,535 square feet.

Finding #3 – Grounds maintenance professionals identified that 1.450 FTE district-wide support grounds crew are required to support a prototypical school district enrolling 1432 FTE students situated on 36.92 acres.

Finding #4 – Facilities Operations professionals identified that 11.152 FTE custodians are required to support the prototypical elementary, middle and high schools enrolling a total of 1,432 FTE students.

Finding #1 – Architects identified sizes for prototypical schools, district-wide support facilities, central administration buildings and their associated sites along with to building materials that represent what is required to deliver state-funded education programs.

Table 9 summarizes the architects' work to identify sizes for the prototypical schools and related support facilities. The total building space for the three prototypical schools is 298,648 square feet, and their maintainable grounds total 35.14 acres. Maintainable acreage is calculated as the site size minus the building square feet.

Table 9. Prototypical School, District-Wide Support and Central Administration Building Sizes

	FTE	HC	Square Footage	Acreage*
Elementary	400	400	72,446	8.34
Middle	432	436	90,712	12.92
High	600	642	122,385	14.19
Sub-Total Prototypical Schools	1,432	1,478	285,543	35.45
District-Wide Support Facilities				
Maintenance			4,718	0.18
Warehouse			1,721	0.04
Transportation			6,836	0.86
Food Service			2,785	0.12
Central Administration			7,932	0.27
Sub-Total Support Areas			23,992	1.47
Total Prototypical School District	1,432	1,478	309,535	36.92

*Acreages exclude the building footprint.

Building space and site sizes for district-wide support and central administrations facilities were based on the space needed to carry out essential district functions identified in the guiding assumptions. The total building space for district-wide support and central administrations facilities is 23,992 square feet, and their maintainable grounds total 1.47 acres.

Considerations

Total square footage calculation

Total square footage was calculated as the total space that facilities, maintenance and operations crews are required to maintain, as opposed to the American Institute of Architect’s (AIA) calculation used for the School Construction Assistance Program. The calculation used to determine maintainable square feet starts with the AIA calculation as a base and adds space for overhangs around the school perimeter, entry canopies, and outdoor play sheds. These spaces are typically not included in square footage counts, but are maintained by facilities maintenance and operations staff. If these spaces were excluded, the resulting school sizes would be 63,982; 80,408; and 108,891 square feet at the elementary, middle, and high school levels. This difference is particularly important to note at the elementary school level, as it is large in comparison to what has historically been built. The architects felt that at this size, school personnel needs for storage and flexibility of space would serve the needs of K-6 grade students, and eliminate the need for any portable facilities on the school site.

School sites

For the prototypical school sites, the acreages are based solely on those recommended in the state School Construction Assistance Program (SCAP) rules (WAC 392-342-020). The architects agreed that since extracurricular athletic fields are excluded from the analysis, the acreages recommended for the SCAP are adequate to support the prototypical schools that they identified. The SCAP recommends site sizes of 10, 15, and 17 acres at elementary, middle and high schools, respectively.

Space allocation

As is noted in the guiding assumptions, all schools were assumed to be self-contained facilities. For example, full kitchens were assumed in each school as opposed to a scenario where a district chooses to have a large central kitchen and smaller serving kitchens within schools. The architects acknowledged that as districts get larger, they may choose to centralize their food service. However, they agreed that allocating space for kitchens to each school helps to ensure that districts will receive sufficient funds to support the maintenance of either option.

The impact of class size reduction on space assumptions

The number of basic general-education classrooms in each school was determined as a function of the current state-funded class size. As the legislature adopts recommendations to reduce the state-funded class sizes, assumptions regarding the space required to deliver state-funded education programs should be re-evaluated to determine whether the space assumptions outlined in this report still meet program requirements.

Finding #2 – Facilities maintenance professionals identified that 6.510 FTE classified facility maintenance staff are required to maintain a prototypical school district enrolling 1,432 FTE students and sized at 309,535 square feet.

Table 10 demonstrates how the facilities maintenance and grounds experts used the formula described in Table 5 to identify the staffing required in each maintenance trade to achieve a preventive maintenance standard. In this example, the maintenance and grounds professionals identified the number of FTE carpenters they needed in their own school districts, and adjusted that value by the ratio of the prototypical school district's square footage to their own districts square footage in order to arrive at a recommendation for the number of FTE carpenters in the prototypical school district.

Table 10. Example: Maintenance Trade FTE Calculation

Participating School Districts	FTE Carpenter Needed		Prototype to District Ratio	FTE Carpenter per Prototypical District
Bethel	10.000	<i>multiplied by</i>	11.50%	1.150
Evergreen (Clark)	11.200	<i>multiplied by</i>	10.30%	1.154
Snoqualmie Valley	3.300	<i>multiplied by</i>	35.20%	1.161
Spokane	14.900	<i>multiplied by</i>	7.70%	1.147

Considerations

Relationship to other categories of classified staffing

Within the 6.510 FTE, there are categories of staffing that are typically part of the Facilities Maintenance departments within school districts, but that are identified in a separate category of staffing in the prototype. This staff includes Warehouse Workers along with maintenance supervision and support

staff. Warehouse workers are identified in the prototype as part of district-wide support Warehouse, Laborers, and Mechanics; and maintenance supervision and support staff are identified as part of central administration. Among these staff, the most significant in terms of FTE is the category of Warehouse Worker. In this analysis, it is the second largest percentage of the total recommended maintenance FTE at 14%. While not significant in terms of number, supervision and support staff are critical to facilitating the work of maintenance staff, and should be provided for through some mechanism; be it through funding for central administration or maintenance and operations.

Facilities maintenance work that must be contracted

There are certain facilities maintenance tasks that must be performed by outside contractors because they require specialized certifications or skills. These include work like elevator maintenance, fire protection systems maintenance and environmental assessments and testing. It is assumed that these always have been and will continue to be paid for by allocations for maintenance, supplies and operating costs (MSOC).

Regulatory requirements, inspections, fees, permits and taxes

The facilities maintenance recommendations are based on the current regulatory environment. New requirements will require a review of the classified staffing levels and the supporting maintenance, supplies and operation costs.

Finding #3 – Grounds maintenance professionals identified that 1.450 FTE district-wide support grounds crew are required to support a prototypical school district enrolling 1432 FTE students situated on 36.92 acres.

Considerations

Relationship to other categories of classified staffing

Within the 1.450 FTE, the facilities maintenance and grounds experts identified .250FTE for a mechanic whose time is often needed in support of grounds maintenance for small engine and grounds equipment maintenance and repair. Mechanics, however, like the category of warehouse workers identified in the maintenance staffing recommendation, are part of the district-wide support warehouse, laborers and mechanics category identified separately from facilities maintenance staff in the prototype.

Extra-curricular activities have a significant impact on the work of grounds maintenance staff

The grounds maintenance professionals reported that maintaining extra-curricular athletic fields can add an additional 40-50% of staff time or acreages to the work load of grounds crew. For example, sand fields are often used for varsity athletic fields because they promote better drainage, but they are not necessary for basic use. Sand, unlike soil, does not have adequate nutrients to support the turf without significant fertilization and watering which results in a higher level of required maintenance.

Caring for extracurricular athletic fields requires a significant amount of staff time and resources in excess of those provided by the state. Given that these recommendations only address the staffing

required to support state-funded educational activities, the recommendations for grounds maintenance staff included in this report do not show a significant increase over the levels at which districts are currently staffing with state and local funds. At these staffing levels however, the medium level of grounds maintenance can only be achieved if the extra-curricular and competitive athletic requirements for grounds maintenance staff are adequately funded by other sources.

Grounds Compliances

To provide a consistent medium level of service, the grounds maintenance professionals assumed a number of activities into the General Grounds category. Some of the activities may require specialized skills or certifications to complete the work: storm water management, integrated pest management with certified applicators, water testing on school district-owned wells, and arborists.

Emergencies

To provide a consistent medium level of service, the grounds maintenance professionals assumed that an average of one day per week (52 days per year) is required to respond to emergencies. This could include activities like snow removal or storm debris clean-up.

Finding #4 – Facilities Operations professionals identified that a sum of 11.152 FTE custodians are required to support the prototypes elementary, middle and high schools enrolling a total of 1,432 FTE students.

After going through the process of identifying the custodial staffing needed at each of the prototypical schools, the operations staff revisited the parameters of the Level 2 standard to assess whether the staffing they had identified was adequate. Table 11 summarizes the square footage per FTE in relation to NCES’ Level 2 range. At the custodial staffing levels that the operations professionals identified, operation professionals felt that districts could achieve a Level 2 cleaning standard.

Table 11. Facilities Operations/Custodial Professionals Recommendation Meets the Level 2 Standard			
	Elementary	Middle	High
Square Footage Per Prototype (AIA Standard for Count)	63,982	80,408	108,891
Square Footage Per Custodial FTE	20,082	23,279	24,133
Square Footage at a Level 2 Standard	18,000-20,000		

Operations experts also identified the custodial staff required to support district-wide support and central administration facilities, despite the fact that custodial staff are only identified at the school level in the prototypical school funding model. Operations experts based their recommendation for these district-wide support and central administration custodial staff on the average space allocated to each FTE custodian at three prototypical schools. The resulting need to support these spaces is 1.066 FTE custodians and the resulting recommendation is summarized in Table 12.

Table 12. Facilities Operations/Custodial Needs in District-Wide Support and Central Administration Buildings

Square Footage for District-Wide Support and Central Administration Buildings	23,992
Custodial FTE at Prototypical School Square Footage per FTE	1.066

Considerations

Day Custodian Calculation

It was assumed there would be a Head Custodian assigned to each prototypical school. This person works in both a supervisory and cleaning support role. Given the head custodian’s administrative responsibility, these staff members typically do not bear as much cleaning responsibility as the shift custodian. The method used to establish custodial staffing needs took this into account.

Mandatory Break

The operations/custodial FTE were calculated from the “bottom-up” minute by minute. Paid breaks during an 8-hour shift were accounted for to determine accurate FTE numbers. There is 30 minutes of paid break time within an 8-hour shift; or 6.25% of the shift.

Facility Use

Custodians are often charged with managing facility use by both the outside community and extra-curricular program groups. This use creates a challenge for staff to complete both the tasks required by state-funded program, and to meet the needs of other users. For the purpose of this analysis, use was limited to state-funded programs, but questions surrounding facility use and the custodial staff needed to support that use still need to be explored.

RECOMMENDATIONS

To achieve the level of school facility maintenance required to support state-funded education programs, the Expert Groups recommend that funding be provided for:

- 3.186, 3.454, and 4.512 FTE custodians at the prototypical elementary, middle and high schools respectively; and
- 4.719 FTE district-wide support facilities, maintenance and grounds staff per 1000 students.

The Expert Group of maintenance and grounds professional also identified the central office support staff and supervision required to facilitate and oversee the work of maintenance and grounds crews. These staff members are funded out of districts allocations for central office administration, but are highlighted here because their work is integrally related to facilities maintenance and operations. The Expert Group recommended that funding be provided for:

- 0.130 FTE central office maintenance support staff per 1000 students, and
- 0.130 FTE for central office maintenance supervision per 1000 students.

Finally, the Expert Group of maintenance and grounds professionals also made recommendation about the number of districtwide support warehouse workers, laborers, and mechanics needed to support the prototypical district. The Expert Group recommends that funding be provided for:

- 0.571 FTE districtwide support warehouse workers, laborers, and mechanics per 1000 students.

FUNDING FORMULA TECHNICAL WORKING GROUP RESPONSE

The FFTWG had an opportunity to review and make comment about the work of the facility maintenance and operations Expert Groups. Upon review, the FFTWG made the following recommendations.

- 1. Given that the Legislature has expressed intent to begin lower class size in grades K-3 to 17 students in the 2011-13 biennium, adequate custodial staffing at the elementary school should be calculated to reflect not only the current funded class size but also those that will be funded in the 2011-13 biennium.**

The Work Group determined that if class sizes were reduced to 17 in grades K-3 the custodial staff requirement in elementary schools will increase from 3.186 to 3.524 staff per prototypical school.

- 2. Funding for distictwide facilities security staff should be provided for as part of districts allocation for warehouse, laborers, mechanics, *and facilities security.***

The Classified Staff Adequacy work group for student and staff security identified a need for .15 FTE districtwide facilities security staff per 1000 students to provide central office security and to ensure

that all school facilities are patrolled and monitored after hours, weekends and holidays. Assumptions about these staff are not included in calculations for school level security staff as those assumptions are driven by the student and staff security needs associated with the school year and day. This addition makes the total recommended allocation for warehouse, laborers, mechanics, *and facility security* .721 FTE staff per 1000 students.

ADDITIONAL CONSIDERATIONS FOR IMPROVED DATA COLLECTION, FUNDING AND OTHER IMPLICATIONS

Continuing to determine funding adequacy

The scope of this analysis was limited to the data that OSPI staff had available to them regarding school district's facilities inventories. As the new school facilities condition inventory becomes operational and districts begin to report more accurate data, this analysis should be repeated to gauge the adequacy of the recommended staffing levels in the context of districts' actual inventories.

Districtwide support facilities operations/custodial staff

There are custodial requirements for districtwide support and central administration buildings. The classified staff needed to support these facilities should be identified and funded as part of districts allocations for central administration in order to help ensure that these facilities are also adequately maintained.

Appendix A – Supplemental Data Tables

Expert Recommendation for Facilities Maintenance Adequate Classified Staffing		
Trade/Staffing Category	Annual FTE	%
Carpenter	1.150	18%
Plumber	0.480	7%
Electrician	0.860	13%
Painter	0.480	7%
HVAC Technician	0.950	15%
Locksmith	0.240	4%
Glazier	0.110	1%
Roofer	0.100	1%
General Maintenance	0.570	9%
Resource Conservation Managers	0.240	4%
Warehouse Worker	0.570	9%
Foreman/Lead	0.380	6%
Supervision	0.190	3%
Support Staff	0.190	3%
Total Facilities Maintenance FTE (District-Wide Support)	6.510	100%
Staff per 1000 Students	4.543	

Expert Recommendation for Grounds Maintenance Adequate Classified Staffing		
Trade/Staffing Category	Annual FTE	% of Time
General Grounds	1.200	82.8%
Mechanic	0.250	17.2%
Total Grounds Maintenance FTE (District-Wide Support)	1.450	100%
Staff per 1000 Students	1.013	
Total Prototypical School District Acreage	36.92	
Total Acres per Grounds Maintenance FTE	25.46	

Methodology Used to Calculate Grounds Maintenance FTEs				
Participating School Districts	Total Acres per FTE (includes extra-curricular)		Grounds Estimated as Extra-Curricular	Estimated Acres Per FTE (excludes extra-curricular)
Bethel	46.0	<i>multiplied by</i>	45.0%	20.70
Evergreen (Clark)	68.0	<i>multiplied by</i>	45.0%	30.60
Snoqualmie Valley	51.0	<i>multiplied by</i>	45.0%	22.95
Spokane	66.0	<i>multiplied by</i>	45.0%	29.70
Average Acres per FTE Excluding Extra-Curricular	25.99			
Total Acres Per Prototypical Grounds Maintenance FTE				25.46

Expert Recommendation for Facilities Operations/Custodial Adequate Classified Staffing			
	Elementary	Middle	High
Day Custodian			
Cleaning	0.388	0.346	0.238
Non-Cleaning	0.445	0.479	0.552
Mandatory Break	0.052	0.052	0.049
Sub-Total Day Custodian FTE	0.885	0.877	0.840
Shift Custodian			
Cleaning	2.052	2.290	3.301
Non-Cleaning	0.114	0.135	0.155
Mandatory Break	0.135	0.152	0.216
Sub Total Shift Custodian FTE	2.301	2.577	3.672
Total All Custodial FTE by Prototypical School	3.186	3.454	4.512
Summary of All Three Prototype's Custodial FTE			11.152

Outline of Operations/Custodial Tasks					
Tasks	Elementary	Middle	High	Total	%
Cleaning	2.440	2.636	3.539	8.615	77.3
Raise/Lower the Flag	0.021	0.021	0.021	0.063	0.6
Boiler Run/Check Building Heat	0.021	0.031	0.042	0.094	0.8
Security Check/Open & Close Building	0.063	0.104	0.146	0.313	2.8
Inventory/Order Supplies	0.013	0.013	0.013	0.038	0.3
Food Service Unloading	0.003	0.003	0.003	0.009	0.1
Check/Respond E-Mail	0.056	0.056	0.056	0.168	1.5
Work Orders	0.014	0.022	0.029	0.065	0.6
Facility Use	0.029	0.029	0.043	0.101	0.9
Staff Requests	0.168	0.168	0.168	0.505	4.5
Minor Repairs/Replacements	0.029	0.043	0.043	0.115	1.0
Playground Safety Checks	0.022	-	-	0.022	0.2
Emergencies/Sick Students	0.043	0.043	0.043	0.130	1.2
Weather Management	0.038	0.038	0.038	0.113	1.0
Supervision	0.039	0.043	0.063	0.145	1.3
Mandatory Break	0.187	0.204	0.265	0.656	5.9
Total Facilities Operations/Custodial FTE	3.186	3.454	4.512	11.152	

ⁱ Schneider, M. (2003). Linking School Facilities Conditions to Teacher Satisfaction and Success. A publication of the National Clearinghouse for Educational Facilities. Available at: <http://www.edfacilities.org/pubs/teachersurvey.pdf>.

ⁱⁱ Buckley, J., Schneider, M., & Shang, Y. (2004). The Effects of School Facility Quality on Teacher Retention in Urban School Districts. A publication of the National Clearinghouse for Educational Facilities. Available at: <http://www.edfacilities.org/pubs/teacherretention.pdf>

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- ⁱⁱⁱ See: Environmental Protection Agency document at: <http://www.epa.gov/iaq/pubs/sbs.html>
- ^{iv} ESHB 2836 Section 5006(4)
- ^v Source: RCW 28A.335.010
- ^{vi} WAC 246-366A - Environmental health and safety standards for primary and secondary schools
- ^{vii} Instructional space is defined in WAC 392-343-019.
- ^{viii} U.S. Department of Education, National Center for Education Statistics, National Forum on Education Statistics. *Facilities Information Management: A guide for State and Local Education Agencies*, NCES 2003-400, prepared by the Education Facilities Data Task Force. Washington, DC: 2003.
- ^{ix} Moberly, D. (2007) Study of School Deficiency Repair Grant and Facilities Maintenance Operations in Washington School Districts. Available at:
<http://www.k12.wa.us/SchFacilities/Publications/pubdocs/FacilitiesMaintenanceInWASchools.pdf>
- ^x Baseline as stipulated in SHB2776
- ^{xi} Adapted from U.S. Department of Education, 2003
- ^{xii} *ibid.*