J2. Operations and Maintenance V. 3

Current Washington policy. Washington currently provides classified and clerical staff at the rate of 16.67 staff for every 1,000 FTE, or one classified staff per every 60 student FTEs. This allocation is designed to cover both site and central office classified staff. Our goal is to identify classified staff by both position (secretary, custodian, maintenance or grounds worker, etc.) and location (school and central office). This section addresses school level custodial and district level maintenance and grounds keeping staff, resource typically expended under operations and maintenance.

The Evidence: Operations and maintenance can reasonably be treated as three functions, school level custodial functions, district level maintenance functions and district level groundskeepers. Each is discussed below.

Custodians: Today, most school districts across the United States rely on a relatively simple model for custodial staffing. The model can be summarized as:

[(Actual Students + Actual Inside Building Square Footage)/2 x (8) hours]. Cafeterias/multipurpose rooms, lockers and shower cleaning as well as food services related activities are generally considered extra responsibilities and not included in the formula. Custodial workers' duties are time-sensitive, are structured and varied. Zureich (1998) estimates the time devoted to various custodial duties:

- Daily duties (sweep and vacuum classroom floors; empty trash can and pencil sharpeners in each classroom; clean one sink with faucet; and, security of room), which take approximately 12 minutes per classroom.

- Weekly duties (dust reachable surfaces; dust chalk trays and clean doors; clean student desk tops; clean sink counters and spots on floors; and, dust chalk/white boards and trays), each of which adds 5 minutes a day per classroom.

- In addition to these services, non-cleaning services (approximately 145 minutes per day) provided by custodians include: opening school (checking for

vandalism, safety and maintenance concerns), playground and field inspection, miscellaneous duties (teacher/site-manager requests, activity set-ups, repairing furniture and equipment, ordering and delivering supplies), and putting up the Flag and PE equipment.

A formula that takes into consideration these cleaning and non-cleaning duties has been developed and updated by Nelli (2006). The formula takes into account teachers, students, classrooms and Gross Square Feet (GSF) in the school. The formula is:

- 1 Custodian for every 13 teachers, plus
- 1 Custodian for every 325 students, plus
- 1 Custodian for every 13 classrooms, plus
- 1 Custodian for every 18,000 Gross Square Feet (GSF), and
- The total is divided by 4.

The formula provides a numeric equivalent of the number of custodians needed at prototypical schools. The advantage of using all four factors in estimating the number of custodians needed is it will accommodate growth or decline in enrollment and continue to provide the school with adequate coverage for custodial services over time.

To show how this formula translates into a per pupil cost for custodial services, we have assumed prototypical schools of 432 K-5 elementary students, 450 6-8 middle school students and 600 9-12 high school students. Assuming a roughly equal number of students per grade, and using the pupil teacher ratios of 15:1 for grades K-3 and 25:1 for grades 4-12, we use the Washington school facility standards to estimate the number of custodians and cost of custodial supplies at each prototypical school and then convert those figures into per pupil cost estimates. For this exercise, we use a prototypical district with two 432 student elementary schools and one middle and high school.

Table xx summarizes the custodial computations for this prototypical school district. Column 2 displays the enrollment of each school. Column 3 indicates the number of classrooms that enrollment generates at the pupil teacher ratios described above. Column 4 provides the number of teachers at each school relying on both the core and specialist teachers generated through the Evidence Based model. Using Washington Facility standards of 90 square feet per pupil for elementary schools, 117 square feet for middle school students and 130 square feet for high school students, column 5 displays the gross square footage of the prototypical schools in the district. The number of custodians in each school is displayed in Column 6. In addition, we recommend an additional half time custodian for the high school to accommodate the higher number of after school and evening activities that typically occur at high schools.

Table xx
Prototypical District Custodial Computations

1	2	3	4	5	6
School Type	**Enrollment**	**Classrooms**	**Teachers**	**Gross Square Feet**	**Custodians**
Elementary	432	26	30	38,880	1.95
Elementary	432	26	30	38,880	1.95
Middle	450	18	22	52,650	1.84
High School	600	24	32	78,000	2.62

Using the figures in Table xx, and rounding up to the nearest full FTE personnel count suggests that the prototypical school district developed here would require 9 custodians – 2 at each elementary school, two at the middle school and three at the high school. We also assume that a tenth custodian would be needed to provide services to a central office building. Using the average national salary for custodians of $25,595,

adjusted by the ratio of teacher salaries in Washington to the National average of 97.2 percent (NEA, 2005) amounts to an average custodian salary of $24,878.34. If we apply the classified benefit rate of 12.22 percent plus $582.47 for health benefits, the total compensation for custodians would be $28,501. Ten custodians would generate a total personnel cost of $285,009 or $148.91 per pupil for the prototype district.

Maintenance Workers: Maintenance workers function at the district level, rather than at individual schools. Core tasks provided by maintenance workers include preventative maintenance, routine maintenance and emergency response activities. Individual maintenance worker accomplishment associated with core tasks are: (a) HVAC systems, HVAC equipment, and kitchen equipment; (b) Electrical systems, electrical equipment; (c) Plumbing systems, plumbing equipment; and, (d) Structural work, carpentry and general maintenance/repairs of buildings and equipment (Zureich, 1998).

Zureich (1998) recommends a formula for maintenance worker FTEs incorporated into the funding model for instructional facilities as follows:

[(# of Buildings in District) x 1.1 + (GSF/60,000 SqFt) x 1.2 + (ADM/1,000) x 1.3 + General Fund Revenue/5,000,000) x 1.2] / 4 = Total number of Maintenance Workers needed.

Since we have not yet estimated the total costs of an adequate funding system, we can only provide an example of how this formula would be applied to the prototypical district in this example. For the purpose of this estimate, we have assumed that per pupil revenues would amount to $7,500 per FTE student. Using the formula above generates the following estimates:

Factor	Result
Buildings in district (including central office)	5.50
GSF/60,000 x 1.2 (central office = 20,000 sq. ft.	4.17
ADM/1,000 x 1.3	2.49
General Fund Revenue / 5,000,000	3.45
Total Divided by 4 = number of Maint. Workers	3.90

Using the average national salary for maintenance personnel of $35,000, adjusted by the ratio of teacher salaries in Washington to the National average of 97.2 percent (NEA, 2005) amounts to an average maintenance salary of $34,020. With benefits, the estimated salary of a maintenance worker would be $38,760, and the cost of 3.90 maintenance workers would be $151,162.88 or $78.98 per pupil.

Maintenance and Custodial supplies are estimated at $0.55 per gross square foot. This includes or a total of $125,625 or $65.64 per FTE pupil.

Grounds Maintenance: The typical goals of a school grounds maintenance program are generally to provide safe, attractive, and economical grounds maintenance (Mutter, Davida, August 1996). This too is a district level function. A theoretic example of a work crew's responsibility at various school levels in acres and days per year is expressed in the following table which uses the prototypical schools described above:

Facility Type	Crew Members	Site Acres	Days	Factor
Elementary School	3 Groundskeepers	16	62 days = [31 acre site hours x 16 acres / 8 hrs per day]	1.0
Middle School	3 Groundskeepers	24	93 days = [31 acre site hours x 24 acres / 8 hrs per day]	1.5
High School	3 Groundskeepers	40	155 days = [31 acre site hours x 40 acres / 8 hrs per day]	2.5

These factors can be used for the prototypical Washington school district to estimate the total number of Grounds staff needed grounds keeping as follows:

School	Acres	Days	Factor	Total Days
Elementary	16	62	1	62.0
Elementary	16	62	1	62.0
Middle	24	93	1.5	139.5
High school	40	155	2.5	387.5
Total Days Required				651.0
Number of FTE at 220 days per FTE				3.0
Total needed to include admin. Building				4.0

Using the average national salary for grounds workers of $29,894, adjusted by the ratio of teacher salaries in Washington to the National average of 97.2 percent (NEA, 2005) amounts to an average grounds worker salary of $29,013. When benefits are included, this represents an average cost of compensation of $33,141 or $132,546 for three groundskeepers in the prototypical district. This amounts to $65.64 per pupil.

Using these estimates, the prototypical model would generate the following resources for Operations and Maintenance.

Category	Number of staff	Total personal costs ($)	Costs per pupil ($)
Custodial	10.0	285,009	148.91
Maintenance	3.9	151,163	78.98
Grounds	4.0	132,564	69.26
Supplies and Materials		125,626	65.64
Total	17.9	694,362	362.78