HEALTHY GREEN SCHOOLS & COLLEGES

A HEALTHY SCHOOLS CAMPAIGN & GREEN SEAL PARTNERSHIP

GUIDANCE MANUAL: BUILDING SYSTEMS OPERATIONS AND MAINTENANCE

COPYRIGHT GREEN SEAL 2023©

www.HealthyGreenSchools.org

CONTENTS

How to Use This Guidance 5

Section 4: Building Systems Operations and Maintenance 7

4.1 Heating, Ventilation, and Air Conditioning (HVAC) Systems 7
- Criteria Type 7
- Points Available 7

4.1.1 HVAC System Maintenance 8
- Criteria Type 8
- Points Available 8
- Intent 8
- American Rescue Plan Funding Category 8
- Standard Requirements 8
- Documentation Needed 8
- Streamlined Documentation Options for Programs Certified to Green Seal, GS-42 9
- Submittal Templates Available for Use 9
- Implementation Tips 9
- External Resources 10

4.1.2 Assessing Ventilation 11
- Criteria Type 11
- Points Available 11
- Intent 11
- American Rescue Plan Funding Category 11
- Standard Requirements 11
- Documentation Needed 12
- Streamlined Documentation Options for Programs Certified to Green Seal, GS-42 13
- Submittal Templates Available for Use 13
- Implementation Tips 13
- External Resources 14

4.1.3 Air Filters 16
- Criteria Type 16
- Points Available 16
- Intent 16
- American Rescue Plan Funding Category 16
- Standard Requirements 16
- Documentation Needed 16
- Streamlined Documentation Options for Programs Certified to Green Seal, GS-42 16
- Submittal Templates Available for Use 16
- Implementation Tips 16
- External Resources 17

CONTENTS

4.1.4 Computerized Maintenance Management Systems 18
- Criteria Type 18
- Points Available 18
- Intent 18
- American Rescue Plan Funding Category 18
- Standard Requirements 18
- Documentation Needed 18
- Streamlined Documentation Options for Programs Certified to Green Seal, GS-42 18
- Submittal Templates Available for Use 18
- Implementation Tips 18
- External Resources 19

4.2 Water and Plumbing Systems 20
- Criteria Type 20
- Points Available 20

4.2.1 New Plumbing Installations 21
- Criteria Type 21
- Points Available 21
- Intent 21
- American Rescue Plan Funding Category 21
- Standard Requirements 21
- Documentation Needed 21
- Streamlined Documentation Options for Programs Certified to Green Seal, GS-42 21
- Submittal Templates Available for Use 21
- Implementation Tips 21
- External Resources 22

4.2.2 Potable Water Testing 23
- Criteria Type 23
- Points Available 23
- Intent 23
- American Rescue Plan Funding Category 23
- Standard Requirements 23
- Documentation Needed 23
- Streamlined Documentation Options for Programs Certified to Green Seal, GS-42 23
- Submittal Templates Available for Use 23
- Implementation Tips 23
- External Resources 24

CONTENTS

4.2.3 Water Quality Emergencies 25
- Criteria Type 25
- Points Available 25
- Intent 25
- American Rescue Plan Funding Category 25
- Standard Requirements 25
- Documentation Needed 25
- Streamlined Documentation Options for Programs Certified to Green Seal, GS-42 25
- Submittal Templates Available for Use 25
- Implementation Tips 25
- External Resources 27

4.2.4 Backflow and Drainage Maintenance 28
- Criteria Type 28
- Points Available 28
- Intent 28
- American Rescue Plan Funding Category 28
- Standard Requirements 28
- Documentation Needed 28
- Streamlined Documentation Options for Programs Certified to Green Seal, GS-42 28
- Submittal Templates Available for Use 28
- Implementation Tips 28
- External Resources 29

4.2.5 Cooling Towers 30
- Criteria Type 30
- Points Available 30
- Intent 30
- American Rescue Plan Funding Category 30
- Standard Requirements 30
- Documentation Needed 30
- Streamlined Documentation Options for Programs Certified to Green Seal, GS-42 30
- Submittal Templates Available for Use 30
- Implementation Tips 30
- External Resources 31

CONTENTS

4.2.6 Dormant Buildings 32
- Criteria Type 32
- Points Available 32
- Intent 32
- American Rescue Plan Funding Category 32
- Standard Requirements 32
- Documentation Needed 32
- Streamlined Documentation Options for Programs Certified to Green Seal, GS-42 32
- Submittal Templates Available for Use 32
- Implementation Tips 33
- External Resources 34

4.3 Sidewalk, Pavement, and Grounds Maintenance 35
- Criteria Type 35
- Points Available 35
- Intent 35
- American Rescue Plan Funding Category 35
- Standard Requirements 35
- Documentation Needed 36
- Streamlined Documentation Options for Programs Certified to Green Seal, GS-42 36
- Submittal Templates Available for Use 36
- Implementation Tips 36
- External Resources 38

HOW TO USE THIS GUIDANCE

This guidance manual is designed to help you meet the criteria of the Healthy Green Schools & Colleges Standard for K–12 School Districts and Higher Education Institutions. This manual includes all criteria from Section 2 of the standard. The manual does not replace the standard in defining the requirements for certification and does not guarantee certification.

Each subsection in this manual contains the following parts:

CRITERIA TYPE
A categorization of each criterion as either required or optional, or a combination of both.

POINTS AVAILABLE
For optional criteria, the number of points that can be earned toward a certification tier. All required criteria will show 0 available points.

INTENT
A brief statement of the purpose of the requirement and how it reduces impacts to human health and the environment.

AMERICAN RESCUE PLAN FUNDING CATEGORY
The section of H.R.1319, American Rescue Plan Act of 2021, under which funding for each criterion may be available through state education agencies.

STANDARD REQUIREMENTS
The complete standard requirements for each criterion, as found in the Healthy Green Schools & Colleges Standard for K–12 School Districts and Higher Education Institutions, dated September 22, 2022.

DOCUMENTATION NEEDED
The documentation required to verify compliance with each criterion. In general, documents consist of narrative explanations or descriptions, established policies, copies of purchasing orders or receipts, photographic evidence, or information provided in a template developed by Healthy Schools Campaign and Green Seal. Electronic documents (e.g., PDF, Word, JPEG, Excel, scanned originals) are preferable to paper copies.

STREAMLINED DOCUMENTATION OPTIONS FOR PROGRAMS CERTIFIED TO GREEN SEAL, GS-42
A reduced set of documentation necessary to demonstrate compliance with criteria for programs that meet an eligible scope for the Healthy Green Schools & Colleges Standard and are certified to Green Seal, GS-42, Standard for Commercial and Institutional Cleaning Services.

SUBMITTAL TEMPLATES AVAILABLE FOR USE

Documents developed by Healthy Schools Campaign and Green Seal to assist educational institutions in tracking data, collecting necessary documentation, and ensuring all necessary information is included in an institution's submission.

IMPLEMENTATION TIPS

Suggestions for how institutions can successfully implement the required and optional criteria, including special cases and considerations. This information can help institutions meet criteria within the standard but is not the only path to achievement and is not necessary to meet the required or optional criteria in the standard.

EXTERNAL RESOURCES

Links to referenced standards or resources within each criterion, as well as educational resources that may help participants successfully implement the criteria.

SECTION 4: BUILDING SYSTEMS OPERATIONS AND MAINTENANCE

4.1 Heating, Ventilation, and Air Conditioning (HVAC) Systems

Criteria Type

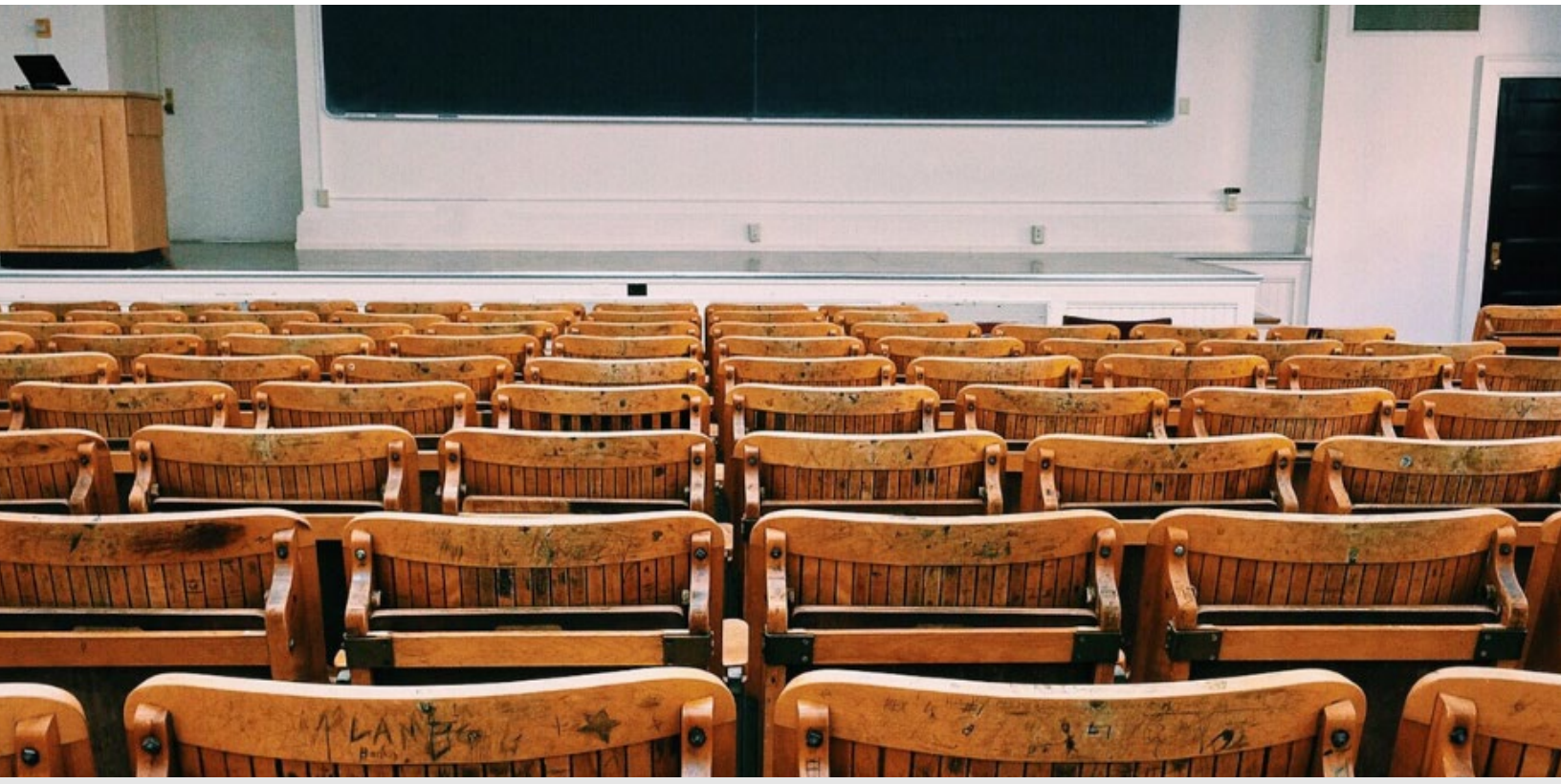
Section 4.1.1 is required for all projects. Sections 4.1.2–4.1.4 are optional for all projects.

Points Available

Up to 10 points available. Points are additive and awarded according to the following table.

Points for HVAC Operations and Maintenance Activities

Activity	Points
HVAC system maintenace	Required
Assessing ventilation	6
Air filters	2
Computerized Maintenance Management Systems (CMMS)	2



4.1.1 HVAC System Maintenance

Criteria Type
Required for all projects.

Points Available
0

Intent
To ensure the proactive and preventive maintenance of all installed HVAC systems, devices, and fixtures to maximize their usefulness and improve the indoor air quality of educational facilities.

American Rescue Plan Funding Category
HR 1319-18 (O)

Standard Requirements

In the Facility Operations and Maintenance Plan, create written HVAC system maintenance standard operating procedures that include, at minimum, the following requirements:

- At least quarterly and during the performance period, inspect HVAC systems, covering, at minimum, the items addressed in the ventilation checklist from U.S. EPA's Tools for Schools:
  - outdoor air intakes, including obstructions, pollutant sources, and airflow,
  - system cleanliness, including air filters, drain pans, coils, air handling units, unit ventilators, and mechanical rooms,
  - outdoor air supplies, including controls, clocks, timers, switches, control components, outdoor air dampers, freeze stats, mixed-air thermostats, economizers, and fans,
  - air distribution, including supply and return air pathways and pressurization in buildings,
  - exhaust systems, including exhaust fan operation, exhaust airflow, and exhaust ductwork, and
  - quantity of outdoor air, including outdoor air measurements and calculations and levels of outdoor air quantities.
- Establish a HVAC issue response plan that prioritizes issues based on their scope, urgency, and consequences for the safety, health, and wellness of building occupants. Implement the response plan during the performance period.
- Create an equipment replacement plan based on the expected lifetime of the equipment. Implement the replacement plan during the performance period.

Documentation Needed
Provide the following:

- HVAC system maintenance standard operating procedures,
- HVAC issue response plan,
- HVAC equipment replacement plan,
- HVAC system inspection reports from the performance period for the representative sample of buildings, and
- records from all buildings documenting any instances of implementing the HVAC issue response and equipment replacement plans during the performance period.

Streamlined Documentation Options for Programs Certified to Green Seal, GS-42
None.

Submittal Templates Available for Use
None.

Implementation Tips
Create a basic record of the mechanical systems within each building to allow for consistent information tracking of the type of mechanical system that exists in each building, where the system components are located, and estimates of the time and resources necessary for ongoing inspection and system maintenance. This approach also allows for continuity in inspections and system maintenance in the event of staffing changes or shortages and for expediting training and orientation to maintenance professionals for all buildings across the institution. Consider using Tabs II–IV on the U.S. Department of Energy's School Energy Assessment (SEA) Form to collect consistent facility information for all buildings across the institution.

Follow the instructions provided by the U.S. Environmental Protection Agency (EPA) in the *Background Information for Ventilation Checklist*, which includes details on how to inspect outdoor air intakes, air distribution, and exhaust systems; assess system cleanliness; inspect controls for outdoor air supply; measure the quantity of outdoor air; and measure airflow. The checklist is designed for individuals who are properly trained in mechanical systems and safety procedures. Ensure an adequate number of personnel are properly trained to inspect systems quarterly and address issues identified during the inspections.

HVAC maintenance generally relies on four factors to ensure the mechanical systems are operating properly:

- temperature,
- relative humidity,
- air movement, and
- airflow volume.

The U.S. EPA's *IAQ Reference Guide: Indoor Air Quality Tools for Schools* recommends prioritizing the purchase of the following pieces of equipment to conduct basic HVAC system monitoring:

- temperature, relative humidity, and chemical smoke device for indicating air movement,
- airflow volume measuring devices, and
- CO monitor.

When planning for inspections, consider whether activities need to be conducted indoors or outdoors, how the weather conditions may impact schedule and timing, and whether inspections can be conducted while students are in the classrooms. Tables 5-1 and 5-2 of the ASHRAE Standard Practice for Inspection and Maintenance of Commercial Buildings HVAC Systems describe the inspection and maintenance tasks and common corrective actions associated with air distribution systems and air handlers.

HVAC issues may be identified during inspections or by building staff, school personnel, or students. It is critical to first determine whether the issue threatens life or safety. If so, the issue must be addressed with the utmost urgency. When life or safety is not threatened, consider other factors for prioritizing HVAC issue resolution, such as the number of students impacted, the level of disruption experienced by the students (e.g., extreme heat or cold makes it difficult to focus on learning or has the potential to trigger medical emergencies for vulnerable students), or whether alternative arrangements can allow for learning continuity (e.g., students may be temporarily moved to another area of the building).

Before determining a response plan, it is important to diagnose the cause and understand the practical actions available to resolve the issue. For example, according to the U.S. EPA's *IAQ Reference Guide: Indoor Air Quality Tools for Schools*, resolving any IAQ issue can involve reducing emissions from pollutant sources, removing pollutants from the air by increasing ventilation or air cleaning, or both. To aid in diagnosing the cause, it says the following: "Problems related to sources can stem from improper material selection or application, allowing conditions that can increase biological contamination and dust accumulation, or source location. Ventilation problems stem from improper design, installation, operation, or maintenance of the ventilation system."

Communication is key when it comes to addressing HVAC issues. Sending regular, transparent communications to building staff, teachers and administrators, students, and parents regarding the nature of the issue, the impact the issue is causing within or throughout the building, the plan to rectify the issue, the timeline for resolving the issue, and any contingencies will help create and maintain trust that HVAC issues and their impacts on students, faculty, and staff are taken seriously.

External Resouces

- ASHRAE, *Standard Practice for Inspection and Maintenance of Commercial Building HVACSystems*, 2018, Tables 5-1 and 5-2, https://ashrae.org/File%20Library/Technical%20Resources/Bookstore/previews_2016639_pre.pdf
- ANSI/ASHRAE Standard 62.1-2019, Table 8-1, "Minimum Maintenance Activity and Frequency for Ventilation System Equipment and Associated Components," https://www.ashrae.org/technical-resources/bookstore/standards-62-1-62-2
- U.S. EPA, "*Ventilation Checklist from Indoor Air Quality Tools for Schools,*" https://www.epa.gov/iaq-schools/ventilation-checklist-indoor-air-quality-tools-schools
- U.S. EPA, *Background Information for Ventilation Checklist*, https://www.epa.gov/sites/default/files/2014-08/documents/ventchklstbkgd.pdf
- U.S. EPA, *IAQ Reference Guide: Indoor Air Quality Tools for Schools*, https://nepis.epa.gov/Exe/ZyPDF.cgi/P1009QR0.PDF?Dockey=P1009QR0.PDF
- U.S. EPA, *Making the Case for Preventive Maintenance and Proactive Indoor Air Quality Management: Value Proposition Worksheet,* https://www.epa.gov/sites/default/files/2017-11/documents/iaq-preventive_maintenance_value_prop_worksheet_final_draft_11.7.17.pdf
- U.S. EPA, "Framework for Effective School IAQ Management: 1. Provide Quality HVAC," https://www.epa.gov/iaq-schools/framework-effective-school-iaq-management#HVAC

4.1.2 Assessing Ventilation

Criteria Type
Optional for all projects.

Points Available
Up to 6 points available. Points are additive and awarded according to the following table.

Points for Restroom-Cleaning Activities

Activity	Points
Documenting current HVAC system performance	1
Exploring HVAC system modifications	2
Implementing HVAC system modifications	3

Intent
To ensure the proactive and preventive maintenance of all installed HVAC systems, devices, and fixtures to maximize their usefulness and improve the indoor air quality of educational facilities.

American Rescue Plan Funding Category
HR 1319-18 (O)

Standard Requirements Documentation Needed

4.1.2.1 Document Current HVAC System Performance (1 point)
For all buildings within the scope of the institution, assess each system and determine whether the existing performance of the system meets the outdoor air intake flow rates and minimum requirements of ANSI/ASHRAE Standard 62.1-2019 Ventilation for Acceptable Indoor Air Quality (or the version applicable to the institution's location), for all relevant occupancy categories addressed in ASHRAE 62.1. For occupancy categories not addressed in ASHRAE 62.1, document the referenced standard used to calculate outdoor air intake flow rates and determine whether the system meets those requirements.

4.1.2.2 Explore HVAC System Modifications (2 points)
Following the guidelines in the WELL Health and Safety Rating, SA1, Assess Ventilation, complete the following activities for all HVAC units within the scope of the institution. Have a qualified engineer assess the following:

- the extent to which the current mechanical system in each building can operate without recirculating air,
- the highest supply rate of outdoor air the system can provide,
- potential modifications to system controls to increase the supply of outdoor air (e.g., ventilating for longer hours, changing the setpoint for demand-controlled ventilation systems),
- whether and how any potential system modifications would affect the following:
  - energy consumption,
  - management of thermal comfort (e.g., higher ventilation leading to draft, recirculation elimination straining conditioning capacity), and
  - maintenance processes.

:

4.1.2.3 Implement HVAC System Modifications (3 points)
For all buildings within the scope of the institution, modify or maintain each outdoor air intake, supply air fan, and ventilation distribution system to meet the outdoor air intake flow rates and minimum requirements of ANSI/ASHRAE Standard 62.1-2019 Ventilation for Acceptable Indoor Air Quality (or the version applicable to the institution's location), for all occupancy categories addressed in ASHRAE 62.1. For occupancy categories not addressed in ASHRAE 62.1, document the referenced standard used to calculate outdoor air intake flow rates.

Where the existing HVAC system alone cannot achieve adequate ventilation and air exchange for the occupancy level because of physical constraints, use the engineering assessment of the highest supply rate of outdoor air the system can provide (Section 4.1.2.2) to supply the minimum setpoint, and not less than 10 cubic feet per minute of outdoor air per person. If necessary to achieve adequate ventilation and air exchange for the occupancy level, provide supplemental air-cleaning systems (e.g., stand-alone HEPA filtration units) for all classrooms and other areas of assembly.

Documentation Needed

4.1.2.1 Document Current HVAC System Performance

For each mechanical system in all buildings of the institution, provide the professional narrative from the qualified engineer that describes whether the performance of the system meets the outdoor air intake flow rates of ANSI/ASHRAE Standard 62.1-2019, Ventilation for Acceptable Indoor Air Quality (or the version applicable to the institution's location), for all relevant occupancy categories within each building.

Provide a summary table that lists all buildings across the institution, the date the mechanical system was assessed by a qualified engineer, occupancy categories assessed, and whether each space tested meets the outdoor air intake flow rates of ANSI/ASHRAE Standard 62.1-2019, Ventilation for Acceptable Indoor Air Quality.

4.1.2.2 Explore HVAC System Modifications

For each mechanical system in all buildings of the institution, provide the professional narrative from the qualified engineer that describes the following:

- the extent to which the current mechanical system can operate without recirculating air,
- the highest supply rate of outdoor air the mechanical system can provide,
- potential modifications to system controls to increase the supply of outdoor air, and
- whether and how any potential system modifications would affect the following:
  - energy consumption,
  - management of thermal comfort (e.g., higher ventilation leading to draft, recirculation elimination straining conditioning capacity),
  - maintenance processes, and
  - nonmechanical strategies necessary to improve outdoor air delivery if the current mechanical system requires capital improvements in order to achieve target outdoor air delivery rates.

Provide a summary table that lists all buildings across the institution, the date the mechanical system was assessed by a qualified engineer, the extent to which the current mechanical system can operate without recirculating air, the highest supply rate of outdoor air the mechanical system can provide, and potential modifications to system controls to increase the supply of outdoor air.

4.1.2.3 Implement HVAC System Modifications
For each mechanical system in all buildings of the institution, provide a summary table that lists the following:

- all buildings across the institution,
- identified mechanical system modifications,
- budget necessary to implement mechanical system modifications,
- whether the budget has been approved to implement mechanical system modifications,
- the estimated timeline for delivering mechanical system modifications,
- whether the modifications are completed, and
- the list of nonmechanical interventions used in this building.

For all completed modifications to outdoor air intakes, supply air fans, and ventilation distribution systems, provide inspection data from a qualified engineer demonstrating that the modifications meet the outdoor air intake flow rates of ANSI/ASHRAE Standard 62.1-2019, Ventilation for Acceptable Indoor Air Quality, for all relevant occupancy categories in the building or that the mechanical system provides not less than 10 cubic feet per minute of outdoor air per person.

Streamlined Documentation Options for Programs Certified to Green Seal, GS-42

None.

Submittal Templates Available for Use

None.

Implementation Tips

4.1.2.1 Document Current HVAC System Performance
Consider using Tabs II–IV on the U.S. Department of Energy's School Energy Assessment Form (SEA Form) to collect consistent facility information for all buildings across the institution and create a shared understanding of the mechanical systems in the buildings undergoing testing.

To determine current HVAC system performance, follow the process described in the Harvard T. H. Chan School of Public Health *5-Step Guide to Checking Ventilation Rates in Classrooms*, which includes information on basic equipment and material needs, instructions on how to measure classroom dimensions, a process to understand airflow in the space, four options to measure or estimate outdoor air ventilation rates, guidance on how to compare the test data against targets, and potential supplemental air cleaning strategies.

To determine targets, use Table 6-1: Occupancy Category Minimum Ventilation Rates for Breathing Zone and Table F-1: Minimum Outdoor and Primary Airflow Rates in ANSI/ASHRAE Standard 62.1-2019 Ventilation for Acceptable Indoor Air Quality.

4.1.2.2 Explore HVAC System Modifications
According to the U.S. EPA, when designing the ventilation system modifications, it is important to ensure that increased outdoor air intake rates do not negatively impact occupant comfort, heating coils do not freeze, and the cooling system can handle the increased enthalpy load.

A load analysis looks at how much heating and cooling a building needs to stay comfortable in the summer and warm in the winter and could help determine if the existing heating (or cooling) system has the capacity to meet the loads imposed by the restored or increased ventilation rates. The U.S. Department of Energy provides recommendations for how to calculate accurate heating and cooling loads.

The U.S. EPA provides several webinars that explore various ways to modify and maintain HVAC systems to reduce virus transition, improve indoor air quality, and enhance the learning environment:

- "Let's Clear the Air – Using Ventilation Practices to Promote Healthy IAQ in Schools," https://www.epa.gov/iaq-schools/forms/webinar-lets-clear-air-using-ventilation-practices-promote-healthy-iaq-schools
- "Meeting Current School Health Challenges and Beyond: New Tools to Assess and Address IAQ Health and Safety," https://www.epa.gov/iaq-schools/forms/webinar-meeting-current-school-health-challenges-and-beyond-new-tools-assess-and
- "Rooted in Research: Reducing Virus Transmission, Improving Ventilation and Promoting Healthy IAQ in Schools," https://www.epa.gov/iaq-schools/forms/webinar-rooted-research-reducing-virus-transmission-improving-ventilation-and
- "Ventilation and Virus Mitigation in Schools – Creating a Game Plan to Reduce COVID-19 Risk and Make Lasting Improvements to IAQ," https://www.epa.gov/iaq-schools/forms/webinar-ventilation-and-virus-mitigation-schools-creating-game-plan-reduce-covid

4.1.2.3 Implement HVAC System Modifications

When implementing HVAC system modifications, consider the following issues to appropriately scope and schedule the work:

- *Timing:* Schedule HVAC system modifications to provide the least disruption to learning while also gaining as much benefit as possible from improving ventilation and system performance.
- *Equity:* Regularly review and assess the HVAC problems and needs across the institution, and ensure that resources, maintenance, and modifications are scheduled in such a way that all students experience baseline ventilation, thermal comfort, and prompt fixes for basic issues.
- *Communications:* When implementing modifications, communications to students, parents, staff, and other building occupants are critical in order to set expectations, share any short-term impacts to learning or building operations while modifications are underway, and communicate continency plans as necessary.

External Resouces

- ANSI/ASHRAE Standard 62.1-2019, "Ventilation for Acceptable Indoor Air Quality," https://www.ashrae.org/technical-resources/bookstore/standards-62-1-62-2
- Harvard T. H. Chan School of Public Health, *5-Step Guide to Checking Ventilation Rates in Classrooms*, https://schools.forhealth.org/wp-content/uploads/sites/19/2020/08/Harvard-Healthy-Buildings-program-How-to-assess-classroom-ventilation-08-28-2020.pdf
- U.S. Department of Energy, Strategy Guideline: *Accurate Heating and Cooling Load Calculations*, https://www.nrel.gov/docs/fy11osti/51603.pdf
- U.S. EPA, M*aking the Case for Preventive Maintenance and Proactive Indoor Air Quality Management: Value Proposition Worksheet*, https://www.epa.gov/sites/default/files/2017-11/documents/iaq-preventive_maintenance_value_prop_worksheet_final_draft_11.7.17.pdfpromote-healthy-iaq-schools

- U.S. EPA, Webinar: “Let’s Clear the Air – Using Ventilation Practices to Promote Healthy IAQ in Schools,” https://www.epa.gov/iaq-schools/forms/webinar-lets-clear-air-using-ventilation-practices-promote-healthy-iaq-schools
- U.S. EPA, Webinar: “Meeting Current School Health Challenges and Beyond: New Tools to Assess and Address IAQ Health and Safety,” https://www.epa.gov/iaq-schools/forms/webinar-meeting-current-school-health-challenges-and-beyond-new-tools-assess-and
- U.S. EPA, Webinar: “Rooted in Research: Reducing Virus Transmission, Improving Ventilation and Promoting Healthy IAQ in Schools,” https://www.epa.gov/iaq-schools/forms/webinar-rooted-research-reducing-virus-transmission-improving-ventilation-and
- U.S. EPA, Webinar: “Ventilation and Virus Mitigation in Schools – Creating a Game Plan to Reduce COVID-19 Risk and Make Lasting Improvements to IAQ,” https://www.epa.gov/iaq-schools/forms/webinar-ventilation-and-virus-mitigation-schools-creating-game-plan-reduce-covid

4.1.3 Air Filters

Criteria Type
Optional for all projects.

Points Available
1 point available.

Intent
To optimize the performance of all HVAC systems, devices, and fixtures to maximize their usefulness and improve the indoor air quality of school facilities.

American Rescue Plan Funding Category
HR 1319-18 (O) and HR 1319-18 (P)

Standard Requirements
Use air filters labeled for minimum MERV-13 in all HVAC systems.

Documentation Needed
Provide a list of all HVAC systems across the institution, the size of filters required for the system, the MERV rating on filters, and receipts for all filters purchased during the performance period. If no filters were purchased during the performance period, provide photo evidence of the filters in use for a representative sample of buildings.

Streamlined Documentation Options for Programs Certified to Green Seal, GS-42
None.

Submittal Templates Available for Use
None.

Implementation Tips
According to the U.S. EPA, Minimum Efficiency Reporting Values (MERVs) report a filter's ability to capture larger particles between 0.3 and 10 microns. The higher the MERV rating, the better the filter is at trapping specific types of particles. MERV 13 filters trap average particle sizes at the following efficiencies:

- 0.30–1.0, greater than or equal to 50 percent,
- 1.0–3.0, greater than or equal to 85 percent, and
- 3.0–10.0, greater than or equal to 90 percent.

MERV ratings differ from high efficiency particulate air (HEPA) filters. According to the U.S. EPA, a HEPA filter is a type of pleated mechanical air filter, as defined by the U.S. Department of Energy. This type of air filter can theoretically remove at least 99.97 percent of dust, pollen, mold, bacteria, and any airborne particles with a size of 0.3 microns.

Refer to the specifications of each HVAC system to determine the size of air filter it requires and how often the filters should be replaced for optimal performance. Change MERV 13 filters every 30 to 90 days, depending on use and other factors such as humidity, weather patterns, events such as wildfire activity, and whether people with chronic allergies and asthma are present in the building.

External Resources

- U.S. EPA, "What Is a HEPA Filter?," https://www.epa.gov/indoor-air-quality-iaq/what-hepa-filter
- U.S. EPA, "What Is a MERV Rating?," https://www.epa.gov/indoor-air-quality-iaq/what-merv-rating
- U.S. EPA, "What Guidelines Are Available to Compare Air Cleaners?," https://www.epa.gov/indoor-air-quality-iaq/what-guidelines-are-available-compare-air-cleaners

4.1.4 Computerized Maintenance Management Systems

Criteria Type
Optional for all projects.

Points Available
2 points available.

Intent
To promote transparency and efficiency in protecting the health and safety of building occupants through building system maintenance and repairs.

American Rescue Plan Funding Category
HR 1319-18 (P)

Standard Requirements

Use a computerized maintenance management system (CMMS) for all maintenance operations.

Documentation Needed
Provide evidence of the use of a CMMS being implemented in all buildings across the institution. For any area or building not maintained through the CMMS, provide justification and a timeline for integrating the building or space into the CMMS.

Streamlined Documentation Options for Programs Certified to Green Seal, GS-42
None.

Submittal Templates Available for Use
None.

Implementation Tips
When considering the purchase and implementation of a CMMS, follow the National Center for Education Statistics' *Planning Guide for Maintaining School Facilities* to determine system requirements and select the most appropriate system for the institution.

According to the NCES' recommendations, the CMMS should have the following characteristics:

- network- or web-based software,
- compatibility with standard operating systems,
- add-on modules (such as incorporating the use of hand-held computers),
- ability to track assets and key systems, and
- accessible source codes so authorized staff can customize the system as necessary.

Look for the following system functional and utility characteristics:

- acknowledges the receipt of a work order,
- allows for establishing work priorities,
- allows the requesting party to track work order progress through completion,
- allows the requesting party to provide feedback on the quality and timeliness of the work,

- allows preventive maintenance work orders to be included, and
- allows labor and parts costs to be captured on a per-building or per-task basis.

At a minimum, the work order systems should account for these things:

- the date the request was received,
- the date the request was approved,
- a job tracking number,
- job status (e.g., received, assigned, ongoing, or completed),
- job priority (e.g., emergency, routine, or preventive),
- job location,
- entry user (the person requesting the work),
- job assignee,
- supply and labor costs for the job, and
- job completion date and time.

Staff from every building should have the ability to initiate a work request and determine its status.

External Resources

- National Center for Education Statistics, Planning Guide for Maintaining School Facilities, https://nces.ed.gov/pubs2003/2003347.pdf

4.2 Water and Plumbing Systems

Criteria Type
Section 4.2.1 is required for all projects. Sections 4.2.2-4.2.6 are optional for all projects.

Points Available
Up to 6 points available. Points are additive and awarded according to the following table.

Points for Floor Maintenance Activities

Activity	Points
New plumbing installations	Required
Potable water testing	1
Water quality emergencies	1
Backflow and drainage maintenance	1
Cooling towers	2
Dormant buildings	1

4.2.1 New Plumbing Installations

Criteria Type
Required for all projects.

Points Available
0

Intent
To reduce potential environmental and health hazards from water sources.

American Rescue Plan Funding Category
HR 1319-18 (O) and HR 1319-18 (P)

Standard Requirements

Establish a written maintenance plan that includes, at minimum, the following requirements:
- Ensure that any new plumbing is compliant with the Safe Drinking Water Act (NSF/ANSI 61 Annex G).
- Ensure that any solder used for plumbing that provides drinking water is of 95/5 composition.

Implement the maintenance plan during the performance period.

Documentation Needed
Provide relevant section of the Facility Operations and Maintenance Plan, as well as photos and purchasing evidence, for any new plumbing installations that occurred during the performance period.

Streamlined Documentation Options for Programs Certified to Green Seal, GS-42
None.

Submittal Templates Available for Use
None.

Implementation Tips
Plumbing is a critical component to be included within an institution's preventive maintenance program. This includes sprinkler systems, water fountains, sump pumps, lift pumps, steam traps, expansion joints, and drains.

According to NSF, the standard NSF/ANSI 61: Drinking Water System Components – Health Effects establishes minimum health-effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems. The standard covers specific materials or products that come into contact with drinking water, drinking water treatment chemicals, or both, such as the following:
- protective barrier materials (cements, paints, coatings),
- joining and sealing materials (gaskets, adhesives, lubricants),
- mechanical devices, including treatment products (water meters, valves, filters),
- pipes and related products (pipes, hoses, fittings),

- plumbing devices (faucets, drinking fountains),
- process media (filter media, ion exchange resins), and
- nonmetallic potable water materials.

Use the NSF Product Directory to find NSF certified drinking water system components.

External Resources

- NSF Certified Drinking Water System Components Product Directory, https://info.nsf.org/Certified/PwsComponents/index.asp?standard=061

4.2.2 Potable Water Testing

Criteria Type
Optional for all projects.

Points Available
1 point available.

Intent
To reduce potential environmental and health hazards from water sources.

American Rescue Plan Funding Category
HR 1319-18 (O) and HR 1319-18 (P)

Standard Requirements

Establish a potable water testing protocol that follows U.S. EPA 3Ts for Reducing Lead in Drinking Water Toolkit. Implement the water testing protocol in all buildings during the performance period. Provide justification for any deviations from the water testing protocol.

Documentation Needed
Provide the potable water testing plan and the results of potable water testing conducted during the performance period.

Streamlined Documentation Options for Programs Certified to Green Seal, GS-42
None.

Submittal Templates Available for Use
None.

Implementation Tips
The U.S. EPA's "3Ts for Reducing Lead in Drinking Water" includes three key steps:

- TRAINING school officials to raise awareness of the 3Ts program and summarize the potential causes and health effects of lead in drinking water,
- TESTING drinking water in schools to identify potential lead problems, and
- TAKING ACTION to reduce lead in drinking water.

Assemble a team charged with implementing the lead-testing protocol. These personnel should review the U.S. EPA's training modules to conduct quality testing and determine appropriate remediation activities when problems are uncovered:

- Module 1: Communicating the 3Ts
- Module 2: Learning about Lead in Drinking Water
- Module 3: Planning Your 3Ts Program
- Module 4: Developing a Sampling Plan
- Module 5: Conducting Sampling and Interpreting Results
- Module 6: Remediation and Establishing Routine Practices
- Module 7: Recordkeeping

In March 2023, the U.S. EPA and Department of Health and Human Services announced a joint commitment to encourage state and local governments to deploy available resources, including Bipartisan Infrastructure Law (BIL) funding, and take steps to identify and remediate the effects of lead on children. The BIL authorized increasing funding capacity to approximately $200 million over five years for the EPA Voluntary School and Child Care Lead Testing and Reduction Grant Program for lead remediation and compliance monitoring in addition to lead testing. The BIL further authorized increased funding of $500 million over five years for the EPA Reducing Lead in Drinking Water Grant Program to fund water infrastructure improvements such as lead service line replacements and facility remediation at early care and education (ECE) settings.

External Resources

- U.S. EPA, "3Ts for Reducing Lead in Drinking Water," https://www.epa.gov/ground-water-and-drinking-water/3ts-reducing-lead-drinking-water

4.2.3 Water Quality Emergencies

Criteria Type
Optional for all projects.

Points Available
1 point available.

Intent
To reduce potential environmental and health hazards from water sources.

American Rescue Plan Funding Category
HR 1319-18 (O) and HR 1319-18 (P)

Standard Requirements

Create a written action plan for emergency water quality problems. Implement the action plan as necessary during the performance period. Provide justification for any deviations from the written action plan.

Documentation Needed
Provide the water quality emergencies plan, a list of water quality emergencies that occurred during the performance period, actions taken to address the water quality emergency, the status of the water quality emergency, and a summary of any issues of noncompliance with the water quality action plan.

Streamlined Documentation Options for Programs Certified to Green Seal, GS-42
None.

Submittal Templates Available for Use
None.

Implementation Tips
When developing a plan for water quality emergencies, consider how they might come about, the steps necessary to address them as they occur, and alternative methods to maintain sufficient water for drinking, hand washing, food preparation, and toilet flushing.

Water quality emergency	Description	Potential action steps
Contamination of the water supply	One of the most serious water quality emergencies is contamination of the school's water supply. This can occur through a variety of means, such as a sewage leak, harmful bacteria, or chemicals making their way into the water supply. Contaminated water is particularly dangerous because it can lead to illness if consumed or used for washing hands or food.	• Notify the relevant local health department and water supply authority. • Communicate with all staff, students, and parents to provide information about the suspected contamination, actions taken so far, and any immediate actions required from them. • Implement temporary measures for access to safe water. • Conduct remediation activities.

Water quality emergency	Description	Potential action steps
Lead or other heavy metal poisoning	Older buildings, particularly those with aging pipes, may face the risk of lead or other heavy metals leaching into the water supply. These toxins can cause serious health issues, especially in children, who are more vulnerable to the effects of lead.	• Stop water usage and isolate the source of the lead or heavy metal. • Contact relevant authorities. • Conduct testing. • Notify building stakeholders. • Conduct remediation activities.
Boil-water advisories	In some cases, local water supplies might be affected by a situation that requires a temporary boil-water advisory. This might be due to a major pipe break, natural disaster, or other large-scale issue. During such advisories, the water is not safe to consume or use without boiling first, creating a significant inconvenience and potential risk.	• Notify building stakeholders. • Implement temporary measures for access to safe drinking water. • Implement alternative food preparation and hygiene practices. • Follow the CDC's guidance for schools and childcare facilities during a boil-water advisory.
Loss of water supply	Schools can face a water emergency if their supply is suddenly cut off due to an infrastructure failure or natural disaster. A lack of water can disrupt essential operations, from sanitation to food preparation, and could potentially necessitate temporary school closures.	• Notify the relevant local health department and water supply authority. • Communicate with all staff, students, and parents. • Implement temporary measures for access to safe water for drinking, hygiene, food preparation, etc. • Implement non-water-based hygiene measures (e.g., use of hand sanitizer, wet wipes). • Depending on the severity of the water loss, consider temporary school closure.
Waterborne disease outbreak	If the school's water supply becomes contaminated with pathogens that cause diseases, such as *E. coli, Giardia, or Cryptosporidium,* this is a serious situation. If not immediately addressed, it could potentially lead to a large-scale outbreak of illness among students and staff.	• Notify the relevant local health department and water supply authority. • Communicate with all staff, students, and parents. Provide as much information as possible about the disease, symptoms to watch for, steps being taken to handle the situation, and any recommended health actions. • Implement temporary measures for access to safe water for drinking, hygiene, food preparation, etc. • Implement non-water-based hygiene measures (e.g., use of hand sanitizer, wet wipes). • Implement any available disease control measures as recommended by the CDC or local health authority.

External Resources

- CDC, Guidelines for Schools and Childcare Facilities during a Boil Water Advisory, https://www.cdc.gov/healthywater/emergency/dwa-comm-toolbox/before/tools/Guidelines-for-Schools-Childcare-Facilities-508.pdf
- CDC, "Water Contamination and Diseases," https://www.cdc.gov/healthywater/drinking/contamination.html
- CDC, "Waterborne Disease Outbreak Investigation Toolkit," https://www.cdc.gov/healthywater/emergency/preparedness-resources/outbreak-response.html
- CDC, "Rural Water Supplies and Water Quality Issues," https://www.cdc.gov/nceh/publications/books/housing/cha08.htm

4.2.4 Backflow and Drainage Maintenance

Criteria Type
Optional for all projects.

Points Available
1 point available.

Intent
To reduce potential environmental and health hazards from water sources.

American Rescue Plan Funding Category
HR 1319-18 (O) and HR 1319-18 (P)

Standard Requirements
Establish a maintenance protocol for backflow preventers, floor drains, and air gaps. Implement the maintenance protocol during the performance period.

Documentation Needed
Provide the maintenance plan for backflow preventers, floor drains, and air gaps; evidence of implementing the maintenance protocol during the performance period (e.g., internal logs and records, photo evidence, or a list); and the status of all related outstanding maintenance issues.

Streamlined Documentation Options for Programs Certified to Green Seal, GS-42
None.

Submittal Templates Available for Use
None.

Implementation Tips
A maintenance protocol for backflow preventers, floor drains, and air gaps is crucial in preventing contamination and ensuring the safe operation of the building's water and plumbing systems. Consider including the following steps in the institution's maintenance plan:

1. *Regular inspection*: Determine the schedule for inspecting all components for signs of wear, damage, or malfunction. Consult manufacturer recommendations for the minimum maintenance scheduling.
2. *Test backflow preventers*: Backflow preventers should be tested regularly per the manufacturer's recommendations to ensure they are working properly and preventing any contamination of the potable water supply.
3. *Clean floor drains*: Floor drains should be regularly cleaned to prevent blockages and ensure that water can flow freely. This includes removing any visible debris and cleaning the grates.
4. *Maintain air gaps*: Air gaps, which prevent backflow, should be inspected to ensure they are not blocked or reduced. They should be kept free from any obstructions.
5. *Check seals and gaskets*: Regularly inspect the seals and gaskets on backflow preventers and floor drains for any signs of wear or damage. Replace as necessary.

6. *Professional servicing*: Schedule professional servicing for all components as recommended by manufacturers or local health and safety regulations.
7. *Drain flushing*: Determine a schedule for flushing floor drains with hot water to help remove buildup and prevent clogs.
8. *Recordkeeping*: Keep records of all inspections, cleanings, repairs, and replacements. This includes the date of service, who performed it, actions taken, and any further remediation necessary.
9. *Emergency response plan*: Determine actions in the event of a failure of any of these components, such as a backflow incident or a blocked drain. This includes who to contact, how to isolate the issue, and steps to prevent damage or contamination.

External Resources

- None.

4.2.5 Cooling Towers

Criteria Type
Optional for all projects.

Points Available
2 points available.

Intent
To reduce potential environmental and health hazards from water sources.

American Rescue Plan Funding Category
HR 1319-18 (O) and HR 1319-18 (P)

Standard Requirements

Establish a water treatment protocol for all cooling towers. During the performance period, conduct a one-time potable water analysis of all cooling towers governed by the institution. Measure at least the following control parameters, and limit cooling tower cycles to avoid exceeding any of the maximum allowable concentrations listed.

Maximum Allowable Concentrations for Cooling Tower Control Parameters

- Ca (as $CaCO_3$): 1,000 ppm
- Total alkalinity: 1,000 ppm
- SiO_2: 100 ppm
- Cl: 250 ppm
- Conductivity: 2000 µS/cm

Documentation Needed
Provide a list of all cooling towers governed by the institution and their locations, the results of the potable water analyses of all cooling towers conducted during the performance period, and modifications made to cooling tower cycles to avoid surpassing maximum allowable concentrations of cooling tower control parameters.

Streamlined Documentation Options for Programs Certified to Green Seal, GS-42
None.

Submittal Templates Available for Use
None.

Implementation Tips
Cooling towers are the most efficient way to remove heat from a system and make indoor environments more comfortable. They can experience corrosion, scale, and microbiological activity, which makes cooling tower water testing essential for their optimal function. Total dissolved solids (TDS), alkalinity, pH, and calcium all rise as the tower cycles increase. Corrosion can be caused by high levels of chlorides, leading to conditions that may result in the formation of bacteria and *Legionella*.

The U.S. Centers for Disease Control and Prevention (CDC) recommends the following strategies to maintain cooling towers and prevent the spread of *Legionella*:

- Follow manufacturer recommendations for cleaning and disinfection prior to commissioning, before startup, when idling, and after shutdown.
- Operate cooling tower systems at the lowest possible water temperature, and below the most favorable *Legionella* growth range (77–113°F, 25–45°C) if possible.
- Automate anticorrosion, antiscale, and disinfectant addition and monitoring.
- Monitor water parameters, such as disinfectant residual and pH, on a regular basis. Measurement frequency should be based on performance of the water management program or *Legionella* performance indicators for control. Adjust frequency according to the stability of performance indicator values. For example, the measurement frequency should be increased if there is a high degree of measurement variability.
- Flush low-flow pipe runs and dead legs at least weekly.
- Balance operating times among cooling towers to prevent stagnation when multiple cooling towers or cells exist.
- Implement automated blowdown (intentional discharge of system water and replacement with supply water) to maintain system water quality.
- Consider filtration to reduce the level of suspended solids in the cooling water based on system factors (e.g., cooling tower location, particle load).
- Perform an offline disinfection and cleaning at least annually.
- Monitor cooling towers for water service disruptions, and develop plans to respond accordingly.
- Consider testing for *Legionella* in accordance with the CDC's routine testing module.
- Maintain site-specific log sheets, test procedures, service reports, and test results on-site.

Consult the institution's suppliers and distributors about options for procuring cooling tower water testing kits and local professionals to assist with testing and cooling tower management as necessary.

External Resources

- CDC, "Controlling Legionella in Cooling Towers," https://www.cdc.gov/legionella/wmp/control-toolkit/cooling-towers.html
- CDC, "Routine Testing for Legionella," https://www.cdc.gov/legionella/wmp/control-toolkit/routine-testing.html
- U.S. Department of Energy, Federal Energy Management Program, "Best Management Practice #10: Cooling Tower Management," https://www.energy.gov/femp/best-management-practice-10-cooling-tower-management

4.2.6 Dormant Buildings

Criteria Type
Optional for all projects.

Points Available
1 point available.

Intent
To reduce potential environmental and health hazards from water sources.

American Rescue Plan Funding Category
HR 1319-18 (O) and HR 1319-18 (P)

Standard Requirements

Establish and implement a plan for short-term (weeks) and long-term (months) shutdowns of buildings. Include processes for reduced HVAC system use, periodic monitoring, and maintenance of appropriate humidity levels.

Establish processes compliant with guidelines from the CDC's "Reopening Buildings after Prolonged Shutdown or Reduced Operation," which covers assessments for at least the following hazards when preparing to reopen a building:

- Legionella (the cause of Legionnaires' disease),
- mold, and
- lead and copper contamination.

Implement the plan as necessary during the performance period. Provide justification for any deviations from the shutdown and reopening protocol.

Documentation Needed
Provide the short- and long-term building shutdown plans, including processes for reduced HVAC system use, periodic monitoring, maintenance of appropriate humidity levels, and hazard assessment for Legionella, mold, lead, and copper contamination. Provide a list of all buildings under short-term or longer-term shutdown during the performance period, internal records demonstrating their compliance with the building shutdown plan, and justification for any deviations from the plan.

Streamlined Documentation Options for Programs Certified to Green Seal, GS-42
None.

Submittal Templates Available for Use
None.

Implementation Tips

According to the U.S. Centers for Disease Control and Prevention (CDC), the definition of a prolonged period of shutdown can vary depending on a variety of factors:

- For *Legionella*, a "prolonged period" may be weeks or months, depending on plumbing-specific factors, disinfectant residuals, water heater temperature set points, water usage patterns, and preexisting *Legionella* colonization.
- For mold, a "prolonged period" may be days, weeks, or months, depending on building-specific factors, season, and weather variables.
- For lead and copper, a "prolonged period" may be hours, days, weeks, or months depending on plumbing and water-specific factors, the amount of time the water remains stagnant inside the pipes, whether there are protective scales or coatings present inside pipes that prevent metals from leaching into water, and the materials used to build the plumbing system.

Follow CDC guidance to create a reopening plan after short- or long-term shutdowns, using the following resources:

Reducing Legionella Risk When Reopening Buildings

- Develop a comprehensive water management program for the water system and all devices that use water.
- Ensure water heaters are properly maintained and the temperature is correctly set. Determine whether the system manufacturer recommends draining the water heater after a prolonged period of disuse. Ensure that all maintenance activities are carried out according to the manufacturer's instructions or by professionals.
- Flush the water system before reentry, running the water until it reaches its maximum temperature (ideally at or above 120°F).
- Clean any decorative water features as appropriate.
- Implement cooling tower shutdown and startup procedures, and conduct disinfecting procedures if slime, debris, or biofilm is noticed prior to reentry.
- Ensure all safety equipment, including fire sprinkler systems, eye wash stations, and safety showers, is clean and well maintained.
- Consider contacting the local water utility to learn about any recent disruptions in the water supply.

Reducing Mold Risk When Reopening Buildings

- Maintain indoor humidity as low as possible, not exceeding 50 percent, as measured with a humidity meter.
- After a prolonged shutdown and before occupants return, assess buildings for mold and excess moisture. NIOSH offers tools and instructions to assess dampness and mold in schools and general buildings. These tools can be used by building maintenance staff or industrial hygienists.
- After an assessment has confirmed that mold and moisture are not detected or remediation has been completed, operate the building HVAC system for at least 48 to 72 hours (known as a flush-out period) before occupants return. If odors are noticed, identify the source and conduct remediation as necessary. Continue flush-out process until no odors are present.
- After a building is reopened and occupied, conducting routine (e.g., weekly) checks of the HVAC system is recommended to ensure operating efficiency.

Lead and Copper in Building Water Systems with Low or No Water Use

Corrosion may occur during long periods of low or no water use, leading to potentially high levels of lead or other metals in the building's drinking water. Follow the U.S. EPA's recommendations for maintaining or restoring water quality in buildings with low or no use. This resource includes a checklist of steps to complete before flushing buildings, how to flush the buildings, and how to check water quality parameters to verify that fresh water is being flushed through the entire plumbing system.

External Resources

- CDC, "Reopening Buildings after Prolonged Shutdown or Reduced Operation," https://www.cdc.gov/nceh/ehs/water/legionella/building-water-system.html
- CDC, "Toolkit: Developing a Water Management Program to Reduce Legionella Growth and Spread in Buildings," https://www.cdc.gov/legionella/wmp/toolkit/index.html
- , "Information on Maintaining or Restoring Water Quality in Buildings with Low or No Use," https://www.epa.gov/coronavirus/information-maintaining-or-restoring-water-quality-buildings-low-or-no-use

4.3 Sidewalk, Pavement, and Grounds Maintenance

Criteria Type
Optional for all projects.

Points Available
Up to 4 points available. Points are additive and awarded according to the following table.

Points for Powered Equipment Maintenance Activities

Activity	Points
Site management plan	2
Hardscape and pavement maintenance	2

Intent
To protect students, staff, and faculty from environmental, health, and safety hazards on school grounds.

American Rescue Plan Funding Category
HR 1319-18 (O)

Standard Requirements

4.3.1 Site Management Plan (2 points)
At the institution level, create and implement a site management plan using the U.S. Green Building Council's Site Management Policy Template, which covers the following:

- goals and performance measurement,
- schedule for reassessment,
- quality assurance and quality control processes,
- roles and responsibilities, and
- standard operating procedures and implementation strategies for
  - maintenance equipment,
  - snow and ice removal,
  - erosion and sedimentation control,
  - addition of organic matter mulch to planting areas,
  - invasive and toxic species management,
  - fertilizer usage,
  - herbicide, pesticide, and fungicide usage and integrated pest management plan,
  - irrigation using automatic controlled systems,
  - irrigation management, and
  - storage of materials and equipment.

Ensure that site management workers and contractors are licensed.

4.3.2 Hardscape and Pavement Maintenance (2 points)
Include the following requirements in the site management plan:
- At least monthly, monitor the condition of entryways, sidewalks, parking areas, and roadways and inspect for damage and disrepair.
- As needed, replace cracked and sunken surfaces and fill potholes to reduce the potential for injuries.

Documentation Needed

4.3.1 Site Management Plan

Provide the site management plan, a list of all personnel who conduct site management activities, and evidence of their appropriate licensure. Choose a sample day and provide photo evidence documenting site management activities implemented during the performance period for a representative sample of buildings.

4.3.2 Hardscape and Pavement Maintenance

During the performance period, provide photo evidence of monthly monitoring of entryways, sidewalks, parking areas, and roadways in a representative sample of buildings; a list of all issues identified; and the status of rectifying hardscape and pavement issues.

Streamlined Documentation Options for Programs Certified to Green Seal, GS-42

None.

Submittal Templates Available for Use

None.

Implementation Tips

4.3.1 Site Management Plan

Refer to the U.S. Green Building Council's Site Management policy template, which covers the following:

- maintenance equipment,
- snow and ice removal,
- cleaning of the building exterior, sidewalks, pavement, and other impervious surfaces,
- erosion and sedimentation control,
- organic waste management,
- invasive and exotic species management,
- fertilizer usage,
- irrigation management, and
- storage of materials and equipment.

The document includes suggested goals, which are not necessary to meet the requirements of this criterion. The following table lists example goals and performance measurements in the template that may provide ideas for the grounds maintenance team to use as a starting point:

Operational element	Goal	Performance measurement unit
Maintenance equipment	Option 1: Limit turf area to 25% or less of the vegetated area.	Square feet of vegetated area
	Option 2: Use manual or electric-powered maintenance equipment 100% of the time.	Approximate equipment usage hours
	Option 3: Show and maintain a 50% reduction in hydrocarbon (HC) and nitrogen oxide (NOx) emissions and a 75% reduction in carbon monoxide (CO) emissions from baseline conditions.	Emissions per year in grams
Snow and ice removal	Use environmentally preferred deicers 100% of the time AND/OR establish reduced treatment areas equal to 50% of applicable paving area.	Weight AND/OR square feet of applicable paving area
Cleaning products	Use environmentally preferred cleaning products 80% of the time.	Cost
Erosion and sedimentation control	Implement erosion and sedimentation control measures 100% of the time.	- -
Organic waste management	Compost 100% of organic waste.	Weight
Organic waste management	Use organic fertilizers 100% of the time.	Weight

Follow the remainder of the template to assign roles and responsibilities and to develop standard operating procedures, schedules, and quality control processes.

4.3.2 Hardscape and Pavement Maintenance

During routine monitoring of grounds and building exterior, look for at least the following types of damage and disrepair to address:

- *Cracks and potholes*: These can form due to regular wear and tear, temperature fluctuations, or the freeze-thaw cycle. If not addressed, they pose tripping hazards and can cause vehicular damage.
- *Poor drainage*: Water accumulation due to clogged drains or inadequate sloping can cause slip hazards, damage surfaces, and potentially infiltrate the building.
- *Faded or missing signage and markings*: Over time, crosswalks, parking lot lines, directional arrows, and signage can fade, making navigation confusing and potentially unsafe.

- *Damaged curbs and ramps*: Damaged or crumbling curbs can be dangerous for pedestrians and drivers. Poorly maintained ramps can be especially problematic for those with mobility impairments.
- *Deteriorated entryways*: Worn-out mats, malfunctioning doors, cracked tiles, or loose handrails at building entryways can pose significant safety risks.
- *Exterior lighting damage*: Burned-out bulbs and broken fixtures can pose safety risks.

External Resources

- U.S. Green Building Council, Site Management Policy Template, https://www.usgbc.org/resources/v4-ssp-site-management-policy-template