School Siting Guidelines

United States
Environmental Protection
Agency

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Acronyms

ADA	Americans with Disabilities Act
AHERA	Asbestos Hazard Emergency Response Act
AQI	Air Quality Index
ASTM	American Society for Testing Materials
CDC	Centers for Disease Control and Prevention
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CHPAC	Children's Health Protection Advisory Committee
CHPS	Collaborative for High Performance Schools
DOD	Department of Defense
DOT	U.S. Department of Transportation
EISA	Energy Independence and Security Act
EPA	U.S. Environmental Protection Agency
ESA	Environmental Site Assessment
FUDS	Formerly Used Defense Sites
HAPs	Hazardous air pollutants
HealthySEAT	Healthy School Environments Assessment Tool
HEI	Health Effects Institute
HVAC	Heating, ventilating and air conditioning
IPM	Integrated pest management
LEA	Local education agency
LEED	Leadership in Energy and Environmental Design
LTSP	Long-term Stewardship Plan
NAAQS	National Ambient Air Quality Standards
NATA	National Air Toxic Assessment
NEI	National Emission Inventory
NIOSH	National Institute of Occupational Safety and Health
PCB	Polychlorinated biphenyl
QA/QC	Quality assurance and quality control
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act
SSC	School Siting Committee
USGBC	U.S. Green Building Council
VOCs	Volatile organic compounds

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1. About the School Siting Guidelines

In December 2007, Congress enacted the Energy Independence and Security Act (EISA).[1] Among the provisions included in the Act was a requirement that the U.S. Environmental Protection Agency (EPA) develop, in consultation with the Departments of Education and Health and Human Services, model guidelines for the siting of school facilities that take into account:

1. The special vulnerabilities of children to hazardous substances or pollution exposures in any case in which the potential for contamination at a potential school site exists;
2. The modes of transportation available to students and staff;
3. The efficient use of energy; and
4. The potential use of a school at the site as an emergency shelter.

In carrying out this statutory mandate, EPA has developed voluntary School Siting Guidelines that will encourage, inform and improve consideration of environmental factors in local school siting decision-making processes without infringing on local decision-making authority. EPA's overarching goal for the guidelines is to serve children, staff and the broader community by:

Supporting states, tribes, communities, local officials and the public in understanding and appropriately considering environmental and public health factors when making school siting decisions;

- Encouraging meaningful, broad and inclusive community involvement to ensure community understanding, input and engagement in school location selection;
- Encouraging comprehensive evaluation of prospective locations for their potential positive and negative impacts on the health and safety of children and school workers and on the environment;
- Identifying opportunities to promote environmental justice in how school siting decisions are made;
- Encouraging decision makers, where appropriate, to examine existing schools and the potential for renovation, upgrade, adaptation and expansion before concluding new school construction is warranted;
- Encouraging decision makers, where appropriate, to examine nearby environments in low-income, minority, indigenous and other overburdened communities;
- Demonstrating how well-located schools can allow more students, faculty and staff to walk, bike and/or use public transit to get to and from school;
- Identifying opportunities to serve multiple community purposes (e.g., emergency shelters, community centers, joint school and public libraries, gymnasiums, playing fields, theaters and community gardens) so that schools can become a hub for the whole community; and

[1] *Energy Independence and Security Act of 2007*, Public Law 110-140, HR6, 110th Cong., (December 19, 2007). Available at: www.govtrack.us/congress/bill.xpd?bill=h110-6.

- Encouraging decision makers to consider short- and long-term construction, transportation and operation and maintenance costs and benefits in design and construction decisions.

1.1. Who Should Use the Guidelines?

These voluntary guidelines are intended to assist local school districts, which will be referred to throughout these guidelines as the local education agency (LEA) (see Section 10), and community members in evaluating environmental factors to make the best possible school siting decisions. The special vulnerabilities of children and considerations for children's health underpin the recommendations contained in these guidelines, consistent with EISA, Subtitle E—Healthy High-Performance Schools, Section 502. While the guidelines are primarily intended to be used by LEAs in evaluating and selecting locations for K-12 schools, EPA believes that the recommendations in the guidelines represent a set of best practices that inform and improve evaluation and selection decisions for a wide range of settings where children spend time. Although there are many differences in how locations are chosen across the types of child-occupied facilities, the practices recommended within the guidelines may be applied, with appropriate adaptation, to a wide range of school-related institutions, including:

- K-12 public schools (including charter schools and schools in leased locations);
- K-12 private schools;
- K-12 schools operated by the Department of Defense or Department of the Interior's Bureau of Indian Education;
- Technical and vocational schools;
- Colleges and universities; and
- Pre-K and non-home child care, after care and early learning settings (e.g., Head Start and Early Head Start programs).

The guidelines are intended to be used prior to:

- Making a decision about whether to renovate the existing school, build a new school on the current site or build a new school on a new site;
- Acquisition of land for school facilities;
- Use of legacy property already owned by the LEA;
- Leasing of space in new or existing structures not owned by the LEA for use as a school; and/or
- Major repair, renovation or reuse of existing properties and structures already owned by the LEA for use as a school.

1.1.1. Evaluation of Hazards

Throughout these guidelines, references are made to chemical hazards, contaminants, toxic substances and other terms that identify chemicals and compounds that may pose risks to students, staff, parents and others. The use of any of these terms is not intended to be limited to a statutory or regulatory definition. The intent of these voluntary guidelines is to provide a process for the assessment of chemicals, compounds or other materials that pose a threat to anyone that spends time in the school environment at candidate locations for schools.

1.2. Limitations of the Guidelines

Decisions on school siting are complicated and in many instances will involve issues where there are scientific and technical uncertainties. Generally, state, tribal and local governments decide where to locate schools. With few exceptions (e.g., a school located on a Department of Defense base or funded and/or operated by the Bureau of Indian Education), the federal government does not have authority over school siting decisions.

While EPA does not have the statutory authority to control school siting decisions directly, it

administers federal environmental laws that may apply to or be relevant to location evaluation, including site assessment and cleanup. In many cases, states have similar authorities to address site cleanup, and some states and tribes also have additional authorities (e.g., certain land use authorities) that may be relevant to school location decisions. No single set of national guidelines can reflect the widely divergent situations and institutional relationships that exist throughout the education system in the United States. Because each state, tribe and community has or will develop their own location evaluation and selection procedures, the recommendations contained in EPA's School Siting Guidelines are designed to provide a general guide that should be adapted to local situations.

The guidelines are designed to support state, tribal and community decision makers in evaluating their existing school processes and policies to address environmental factors in school siting and construction decisions, especially when the presence of contamination may pose a threat to a safe learning environment. These guidelines do not impose legally binding requirements on EPA, states, tribes, local governments, LEAs or the regulated community, and may not apply to a particular situation based upon the circumstances. **These guidelines do not pre-empt, supersede or serve as a substitute for state, tribal or local school site or location selection policies or requirements.**

Economic, racial and ethnic segregation is a continuing challenge across the country. More diverse schools can provide educational as well as life attainment benefits to all school age children.[2] While community centered schools can be part of improved educational, economic, community and public health outcomes for children, families and neighborhoods, LEAs should balance these issues with meeting the goal of diverse school populations. Techniques are available to help achieve the multiple goals of diverse student populations and schools located within the communities they serve. The Resources page of the guidelines website (www.epa.gov/schools/siting/resources.html#Links_Technical_Assistance) contains information about techniques that have been identified to support these goals. While these issues are beyond the scope of these guidelines, the Resources page of the guidelines website also contains links to select studies on school segregation trends and causes. (www.epa.gov/schools/siting/resources.html#LINKS_Segregation)

It is beyond the scope of these guidelines to discuss the requirements of federal civil rights laws that apply to public school districts and may be relevant to school siting decisions. These civil rights laws include Title VI of the Civil Rights Act of 1964 (www.justice.gov/crt/cor/coord/titlevi.php), which prohibits discrimination on the basis of race, color or national origin in federally assisted programs or activities. EPA's regulations implementing Title VI prohibit both intentional discrimination and facially neutral policies and practices that result in discriminatory effects, including siting decisions.[3]

[2] Gary Orfield and Chungmei Lee, "Historic Reversals, Accelerating Resegregation, and the Need for New Integration Strategies," The Civil Rights Project, University of California Los Angeles, August 29, 2007. Available at: http://civilrightsproject.ucla.edu/research/k-12-education/integration-and-diversity/historic-reversals-accelerating-resegregation-and-the-need-for-new-integration-strategies-1/orfield-historic-reversals-accelerating.pdf.

[3] EPA's Office of Civil Rights and the Department of Education's Office for Civil Rights are available to provide technical assistance to districts concerning applicable civil rights laws. See agency regulations implementing Title VI, for example, EPA's Title VI regulations, 40 C.F.R. Part 7, and the U.S. Department of Education's Title VI regulations, 34 C.F.R. Part 100. The Title VI regulations prohibit, among other things, race, color or national origin discrimination in siting decisions. In addition to prohibiting discrimination in siting decisions, among other things, the civil rights laws establish other requirements relevant to the decision-making process, such as requirements pertaining to effective communication with limited English proficient persons and individuals with ties and requirements pertaining to access by individuals with disabilities. See U.S. Department of Justice regulations implementing Title II, 28 C.F.R. Part 35, and Title III, 28 C.F.R. Part 36, of the Americans with Disabilities Act, and U.S Department of Education's regulations implementing Section 504 of the Rehabilitation Act of 1973, 34 C.F.R. Part 104.

IMPORTANT: The School Siting Guidelines are NOT designed for retroactive application to previous school siting decisions. They are designed to inform and improve the consideration of environmental factors in the school siting decision-making process going forward. In developing these guidelines, EPA seeks to strengthen information exchange and cooperation between LEAs, state and tribal education agencies and their environmental counterparts to better serve school children, parents, staff and their communities in providing safe school environments. Many schools across the country may be located in proximity to one or more of the potential hazards discussed within the guidelines. Due to many factors that affect exposure to environmental hazards (such as those included in Exhibit 5) and based on the regulations and protective measures that can be applied, proximity of a school to nearby sources of environmental contaminants may not pose unacceptable risks. EPA recommends that districts periodically inspect existing schools for potential environmental health and safety risks using tools designed for that purpose such as EPA's Healthy School Environments Assessment Tool (HealthySEAT; www.epa.gov/schools/healthyseat/) or the National Institute for Occupational Safety and Health (NIOSH) Safety Checklist Program for Schools. (www.cdc.gov/niosh/docs/2004-101/) Where deficiencies are found, EPA recommends steps to reduce student and staff exposure to potential hazards be identified and implemented (see Section 9.13). Keeping children safe from environmental exposures at school does not end with site selection, or even materials selection during construction; the health of students and staff in schools is supported by an ongoing attention to commitment to healthy school environments. EPA has a considerable body of guidance and regulations that are specifically geared toward existing schools, which is available at www.epa.gov/schools.

1.3. Public Involvement in the Development of the Guidelines

In July 2009, EPA convened a special School Siting Task Group (Task Group) under the existing Children's Health Protection Advisory Committee (CHPAC) to provide early input to EPA on the content of the siting guidelines. (http://yosemite.epa.gov/ochp/ochpweb.nsf/content/whatwe_advisory.htm) The Task Group was composed of representatives from a wide range of national, state, tribal and local organizations. The Task Group was provided with an initial draft and provided comments (http://yosemite.epa.gov/ochp/ochpweb.nsf/content/CHPAC_Comments.htm#14) in April 2010 to EPA in the form of a letter from the CHPAC to Administrator Lisa Jackson (April 7, 2010) (http://yosemite.epa.gov/ochp/ochpweb.nsf/content/CHPAC_School_Siting_Letter_web.htm) and a report from the School Siting Task Group. (http://yosemite.epa.gov/ochp/ochpweb.nsf/content/CHPAC_SSTG_Report2.htm/$File/CHPAC_SSTG_Report2.pdf) EPA appreciates the work of the Task Group and the contributions made by all of its members. EPA incorporated many of the recommendations from the CHPAC letter and School Siting Task Group report into the guidelines.

In November 2010, EPA released the draft School Siting Guidelines for public comment. The comment period was open until February 2011. EPA considered these comments in revising the guidelines. A summary of the issues raised by the public commenters and EPA's responses can be found on the Public Involvement in the Development of the guidelines page. (www.epa.gov/schools/siting/development)

In addition, the guidelines have drawn from, and the Resources page of the guidelines website includes links to, numerous resources that have already been developed by state and local jurisdictions and other organizations. (See: www.epa.gov/schools/siting/resources)

1.4. Principles behind the Guidelines

1.4.1. Principle 1. Safe and healthy school environments are integral components of the education process

The overriding purpose of a school building is to provide a safe, healthy and supportive environment in which children can learn. Children spend nearly a third of their typical day in the school environment, where they may be exposed to a range of contaminants both indoors and out. Such exposures can impact health and learning and negatively impact school attendance. Student exposure to environmental hazards at school can arise from multiple pathways, which may differ between locations. Each location may have different underlying causes of potential exposure, such as site contamination, neighborhood emission sources or indoor air quality problems. (http://yosemite.epa.gov/ochp/ochpweb.nsf/frm chemicals)

Poor indoor air quality can contribute to illness resulting in absence from school and acute health symptoms that decrease performance while at school.[4] Poor indoor air quality may also directly reduce a person's ability to perform specific mental tasks requiring concentration, calculation or memory. Although children spend most of their school day inside the school building, they also spend time outdoors, such as during recess, physical education class, physical activity outside of class time and getting to and from school. Examples of contaminants that can be found in outdoor school environments include air pollution from motor vehicles, pesticides and industrial pollutants. Some of these pollutants also contribute to exposures within the indoor environment in schools.[5]

Children are more vulnerable to environmental exposures because their responses to toxic substances, both in severity and in the nature of the adverse effect, can differ markedly from those of adults.[6]

- Children breathe more air, drink more water and eat more food per kilogram of body weight than adults;
- Children's behaviors (e.g., hand to mouth contact) also make them more susceptible to environmental hazards, especially hazards in soil and dust;[7]
- Children experience periods of growth and development which can be adversely affected by exposures to toxic substances. The rapid development of a child's organ systems during embryonic, fetal and early newborn periods makes children vulnerable when exposed to environmental toxicants. The particular vulnerabilities of infants, preschool and young children may be of particular importance to consider where child care centers are integrated with or adjacent to elementary or other schools;
- Children with chronic illnesses such as asthma may experience increased vulnerability to

[4] U.S. Environmental Protection Agency, "Indoor Air Quality and Student Performance," U.S. Environmental Protection Agency, Washington, DC, EPA 402-F-00-009, August 2000.

[5] U.S. Environmental Protection Agency, "An Introduction to Indoor Air Quality (IAQ)," U.S. Environmental Protection Agency, Washington, DC. Last modified November 29, 2010. Available at: www.epa.gov/iaq/ia-intro.html.

[6] "Developmental Toxicity: Special Considerations Based on Age and Developmental State," in *Pediatric Environmental Health, 2nd Edition,* ed. Ruth A. Etzel and Sophie J. Balk, American Academy of Pediatrics Committee on Environmental Health (2003) 9-36.

[7] U.S. Environmental Protection Agency, "Child-Specific Exposure Factors Handbook (Final Report)," U.S. Environmental Protection Agency, National Center for Environmental Assessment, Office of Research and Development, Washington, DC, EPA/600/R-06/096F, September 2008. Available at: http://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=199243#Download.

environmental toxicants.[8] Asthma continues to be a significant problem among school age children; and

- There is potential for children who are actively engaged in structured and unstructured outdoor physical activity, including sports activities, to be disproportionately affected by outdoor air pollution because intake of air increases during periods of increased physical activity. Also, when mouth breathing occurs, the process of deposition in the upper respiratory tract is bypassed with direct deposition in the lungs of any environmental contaminants present in the air.

Research has confirmed that the quality of a school facility has an impact on students' experiences and ultimately on their educational achievement. Research on school building conditions and student outcomes finds a consistent relationship between poor facilities and poor performance: higher student achievement is associated with school facilities that are clean, in good repair and designed to support high academic standards, independent of student socioeconomic status.[9] (www.epa.gov/schools/siting/resources)

1.4.2. Principle 2. The environmental review process should be rigorous, thorough and well-documented, and include substantive and ongoing meaningful public involvement

Selecting sites where environmental reviews have recently been conducted and documented (within the past six months) or performing an environmental review on candidate locations is the only means of determining if there are any onsite or offsite environmental hazards that may pose a health risk to students and staff. If there are potential hazards associated with the preferred location, in addition to identifying the potential hazards, the LEA and the school siting committee (SSC) (see Section 3.3) with meaningful public involvement (see Section 3) can use the environmental review process (see Section 5) to determine what cleanup, mitigation and long-term stewardship should be implemented to ensure the safety and health of all school occupants.

A thorough and transparent environmental review process will help reduce the likelihood that natural hazards (e.g., flooding) or environmental hazards (e.g., site contamination) will be discovered after the school is located and operating, thus reducing potential adverse environmental and public health effects on children, legal and financial liability and/or public backlash. The rationale for choosing one location over another should be clearly articulated based on a robust review of candidate locations, especially if the environmental review is a deciding factor. Moreover, all engineering and scientific reporting must comply with applicable federal, state, tribal and local regulations.

Stakeholder groups such as parents, teachers and other school personnel, and nearby residents are most directly impacted by school siting decisions and should be fully engaged in the review and decision-making process. These guidelines provide important information and links throughout, especially in the Quick Guide to Environmental Issues (see Section 8) and on the Resources page of the guidelines website, to address the need for technical assistance and training to enable meaningful participation by parents and nearby residents, including minority and low-income populations. (www.epa.gov/schools/siting/resources)

State and tribal environmental regulatory agencies may play a central role in oversight and approval of the environmental review where contaminated sites are being considered (see Section 7). Their involvement is critical in any site

[8] World Health Organization, "The Physical School Environment: An Essential Component of a Health-Promoting School," The World Health Organization's Information Series on School Health Document No. 2 (2004). Available at: http://www.who.int/school_youth_health/media/en/physical_sch_environment_v2.pdf.

[9] M.J. Mendell and G.A. Heath, "Do indoor pollutants and thermal conditions in schools influence student performance? A critical review of the literature," *Indoor Air* (2005) 15:1. 27-52. Available at: http://onlinelibrary.wiley.com/doi/10.1111/j.1600-0668.2004.00320.x/full.

remediation and site management plans as well as ensuring the integrity of long-term stewardship plans (see Section 5.10), including any institutional and engineering controls (see Section 8.15) in place to prevent exposures, so they can be relied upon over the long term.

1.4.3. Principle 3. Schools should be located in environments that contribute to the livability, sustainability and public health of neighborhoods and communities

Investments in educational facilities represent one of the largest capital outlays that many states, tribes and local governments make. Decisions about the construction and renovation of schools will have important implications for communities beyond educational outcomes. Communities may choose to use these investments to meet multiple goals—education, health, environmental, economic, social and fiscal. Both the location and design of a school and its accessibility to residents outside of class hours, including residents with disabilities, play a major role in determining what benefits it provides to the community. Many communities that are re-evaluating their growth patterns and infrastructure investments are also assessing how and where they spend their education dollars. Integrating school planning with broader community plans, visions and goals can produce neighborhood-centered schools that offer high-quality educational programs while benefiting the environment, health and well-being in many ways.

National trends in school siting and size have largely followed the model of building new schools at the edges of communities on large, undeveloped parcels of land away from the neighborhoods and towns they serve. Average school size (in terms of student population per school) has steadily grown. According to the National Center for Education Statistics, the number of schools in the United States decreased from 262,000 in 1930 to 95,000 in 2004.[10] (http://nces.ed.gov/) Student population over the same period rose from 28 million to 54.5 million. This approach of constructing large schools on undeveloped locations often leads to underinvestment in the community core and existing facilities and increases public expenditures, vehicular travel, traffic congestion, pollution and loss of open space. Accordingly, many residents in older neighborhoods have lower access to public infrastructure and recreational locations, such as school playgrounds and athletic fields. Instead, schools should be a hub for the whole community, by providing public spaces for recreation and learning, extended hours before and after school and during the weekends and summer, and space for academic and non-academic services such as social services and activities that engage parents and the entire community. The National Trust for Historic Preservation's 2009 report "Helping Johnny Walk to School" outlines the benefits of retaining community centered schools.[11] It can be found here: www.preservationnation.org/issues/historic-schools/.

Encouraging physical activity

The location of a school and the school environment can influence levels of physical activity. Further, the American Academy of Pediatrics Committee on the Environment wrote in 2009, "The most universal opportunity for incidental physical activity among children is getting to and from school."[12] Many studies show that the distance between home and school is the

[10] U.S. Department of Education Institute of Educational Sciences, "National Center for Educational Statistics Fast Facts." (Accessed on September 16, 2011) Available at: http://nces.ed.gov/fastfacts/display.asp?id=84.

[11] Renee Kuhlman, "Helping Johnny Walk to School: Policy Recommendations for Removing Barriers to Community-Centered Schools," National Trust for Historic Preservation (2010). Available at: www.preservationnation.org/issues/historic-schools/helping-johnny-walk-to-school/helping-johnny-walk-to-school.pdf.

[12] American Academy of Pediatrics Committee on Environmental Health, "The Built Environment: Designing Communities to Promote Physical Activity in Children." *Pediatrics* (June 2009) 123:6. 1593. Online article available at: http://aappolicy.aappublications.org/cgi/content/full/pediatrics;123/6/1591.

strongest predictor of whether students walk or bike to school.[13] The U.S. Department of Transportation reports that the number of students ages 5 to 18 who walk or bike to school has declined dramatically over the past few decades, from 41 percent in 1969 to only 13 percent in 2001.[14] This has coincided with a sharp increase in obesity rates among children. According to the Centers for Disease Control and Prevention (CDC), the prevalence of obesity among children ages 6 to 11 nearly tripled in the past three decades, increasing from 6.5 percent in 1976 – 1980 to 19.6 percent in 2007 – 2008. The rate among adolescents ages 12 to 19 more than tripled, increasing from 6.5 percent to 18.1 percent over the same period.[15]

Obesity rates and associated chronic disease rates are substantially higher in minority populations. Yet, these communities often lack access to opportunities for physical activity and to affordable and nutritious food.[16] Well-sited schools within these neighborhoods combined with Safe Routes to Schools[17] (see Section 4.3.4) efforts and reinvestment in infrastructure that increases pedestrian and bike safety can increase the opportunity for incidental physical activity and may help address this environmental inequity and health disparity. Numerous studies have shown that when schools are within an easy walking or biking distance of residential areas and the routes to school are safe, students increase their participation in physical activity.[18] (www.epa.gov/schools/siting/resources) In a study of adolescents, 100 percent of students who walked both to and from school met the recommended levels of 60 or more minutes of moderate to vigorous physical activity on weekdays.[19] Community centered schools that encourage daily physical activity lead to better health for children, for example better cardiovascular fitness, and healthier communities and may reduce risk of obesity and chronic disease.[20]

School siting that supports walking or biking to school can also contribute to academic achievement. The 2010 CDC report, "The Association between School-based Physical Activity, including Physical Education, and Academic Performance" (www.cdc.gov/healthyyouth/health_and_academics/pdf/pape_executive_summary.pdf), synthesized the scientific literature examining indicators of cognitive skills and attitudes, academic behaviors and academic achievement. The report found substantial evidence that physical activity can help improve academic achievement, including grades and standardized test scores. The review suggests that physical activity can have an impact on cognitive skills and attitudes and academic behavior, all of which are important components of improved academic performance. These include enhanced

[13] Safe Routes to School National Partnership, "The Influence of the Built Environment on Travel Behaviors." (Accessed on September 16, 2011) Available at: www.saferoutespartnership.org/mediacenter/research/231317.

[14] U.S. Department of Health and Human Services at Centers for Disease Control and Prevention, "Kids Walk-to-School: Then and Now—Barriers and Solutions," Last modified February 25, 2008. Available at: www.cdc.gov/nccdphp/dnpa/kidswalk/then_and_now.htm.

[15] Cynthia Ogden and Margaret Carroll, "Prevalence of Obesity Among Children and Adolescents: United States, Trends 1963-1965 Through 2007-2008," National Center for Health Statistics Health E-Stat Centers for Disease Control and Prevention. Last modified June 4, 2010. Available at: www.cdc.gov/nchs/data/hestat/obesity_child_07_08/obesity_child_07_08.htm.

[16] Centers for Disease Control and Prevention, "CDC Health Disparities and Inequalities Report—United States, 2011," *Morbidity and Mortality Weekly Report* (January 14, 2011) 60 (Suppl). Available at: www.cdc.gov/mmwr/pdf/other/su6001.pdf.

[17] Safe Routes to School National Partnership, "Impact of Physical Activity on Obesity and Health." (Accessed on September 16, 2011) Available at: www.saferoutespartnership.org/mediacenter/research/230339.

[18] Active Living Research, "Walking and Biking to School, Physical Activity and Health Outcomes," Research Brief (May 2009). Available at: www.activelivingresearch.org/files/ALR_Brief_ActiveTransport.pdf.

[19] Leslie M. Alexander, Jo Inchley, Joanna Todd, Dorothy Currie, Ashley R. Cooper and Candace Currie, "The broader impact of walking to school among adolescents: seven day accelerometry based study," *British Medical Journal* (2005) 331:7524. 1061–1062. Available at: www.ncbi.nlm.nih.gov/pmc/articles/PMC1283187/

[20] American Academy of Pediatrics Committee on Environmental Health, "The Built Environment: Designing Communities to Promote Physical Activity in Children," *Pediatrics* (June 2009) 123:6. 1591-1598. Online article available at: http://aappolicy.aappublications.org/cgi/content/full/pediatrics;123/6/1591.

concentration and attention as well as improved classroom behavior.[21]

Reducing environmental impacts on air, water and land

The location of a school affects the environment in complex ways. Locating schools in the neighborhoods they serve, reusing infrastructure and renovating buildings conserve energy and resources. Integrating schools into neighborhoods instead of building them on undeveloped land on the fringe of the community preserves the natural environment, including farmland, fields and wildlife habitat. By using existing buildings, roads, parking lots and other infrastructure, communities can avoid building more impervious paved surfaces, which in turn reduces contaminated water runoff into nearby lakes, rivers and streams. Appropriate consideration of a school's potential environmental impact can help to preserve and nourish the natural and human resources of a community.

As noted earlier, the percentage of children that walk or bike to school dropped from 41 percent in 1969 to about 13 percent in 2001. Bus ridership has remained relatively stable during the same period, with about 55 percent of students riding a school bus in 2004.[22] This means that the proportion of children arriving at school in privately owned vehicles has increased—a change that has implications for overall traffic and emissions. Increases in traffic can raise emissions of numerous pollutants, including criteria air pollutants, air toxics and greenhouse gases. In addition, traffic congestion around schools decreases child safety. Data from the 2001 National Household Transportation Survey show that the distance a child lives from school influences the choice of whether to walk, bike, ride a bus or get a ride in a car. For trips of less than ¼ of a mile, walking or biking is the dominant mode. For trips of ¼ to ½ a mile, private automobiles account for about half the trips to and from school. At a distance of 1 mile and beyond, the majority of the trips are by private automobile.[23]

Additionally, schools that apply integrated site and building design practices incorporating green principles and standards (See: www.epa.gov/schools/siting/resources)—such as those from the Collaborative for High Performance Schools (CHPS) (www.chps.net/dev/Drupal/node) and the EPA's ENERGY STAR program (www.energystar.gov/k-12)—improve educational opportunities through use of the building and practices as teaching tools; improve energy, material and resource efficiency; improve indoor environmental quality; and help create models of sustainable neighborhoods.

1.4.4. Principle 4. The school siting process should consider the environmental health and safety of the entire community, including disadvantaged and underserved populations

A growing body of research suggests that minority and low-income children are more likely to attend schools that are in poor condition or have received inadequate maintenance due to lack of resources.[24] Studies also highlight the disproportionate percentage of minority and low-income children that are exposed to multiple environmental hazards in close proximity to the schools they attend.[25] These environmental

[21] Centers for Disease Control and Prevention, "The Association Between School-Based Physical Activity, Including Physical Education, and Academic Performance," U.S. Department of Health and Human Services (April 2010). Available at: www.cdc.gov/healthyyouth/health_and_academics/pdf/pape_executive_summary.pdf.

[22] Safe Routes to School National Partnership, "National Statistics on School Transportation, Safe Routes to School: Creative and Safe Solutions to School Bus Cuts." (Accessed on September 16, 2011) Available at: www.saferoutespartnership.org/media/file/school_bus_cuts_national_stats_FINAL.pdf.

[23] U.S. Department of Transportation Federal Highway Administration, "National Household Travel Survey," NHTS Brief (January 2008). Available at: www.saferoutespartnership.org/media/file/Travel_To_School.pdf.

[24] Daria E. Neal, "Healthy Schools: A Major Front in the Fight for Environmental Justice." *Lewis & Clark Law School's Environmental Law Online* (n.d.) 38:2 (Accessed on September 16, 2011) Available at: www.elawreview.org/elaw/382/healthy_schools_a_major_front.html.

[25] David Salvesen, Peter Zambito, and Dylan McDonnell, "Safe Schools: Identifying Potential Threats to the Health and Safety of Schoolchildren in North Carolina," Center for Sustainable Community Design Institute for the Environment, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina (November 2010). Available at: www.ie.unc.edu/cscd/pdf/Safe_Schools_Final_Report.pdf.

hazards range from exposures to outdoor air toxics to various exposures that originate within the school boundaries. Minority and low-income children may be even more at risk from these environmental hazards given the presence of other factors, such as poor nutrition, lack of access to health care and pre-existing health conditions. The adverse health effects from these exposures may result in both short-term effects, such as poor school performance due to increased absenteeism, and possible long-term effects, such as the development of a serious learning disability, respiratory illness or other disease.

Policies that encourage the renovation of existing schools, with appropriate mitigation of environmental hazards if necessary and the siting of new facilities within existing neighborhoods can contribute to solving multiple challenges in older communities. Conversely, policies that discourage renovating existing schools or siting schools within the community can lead to a disinvestment in the community that may contribute to physical, social and economic decline in the community. Siting schools in the communities they serve—particularly in urban areas where disinvestment in neighborhoods has led to chronic environmental, economic and public health disparities—can be part of a revitalization strategy aimed at a wide range of improved community outcomes. School grounds can provide important play and recreational space for children.[26] Research shows that in inner-city neighborhoods, children are more likely to be physically active when there is a safe, easily accessible play space such as a schoolyard than when their neighborhood does not have a similar space.[27] Because these facilities are located within walking distance, families and children are more likely to use them.[28] School locations that are accessible by walking or biking make it easier for families without cars to be part of their children's school community and helps to reduce transportation expenses. Rates of auto ownership are lower among low-income and minority populations and being closer to the school makes it easier for parents to be involved in the school community.[29] The benefits of locating schools in the communities they serve should be considered, especially in cases where the school will be serving disadvantaged or underserved populations.

When renovation or new construction of school facilities in existing communities is paired with a joint-use program—using the location for K-12 education as well as an adult vocational training center in the evenings, for instance—communities benefit. Joint use schools can also include public libraries, amenities such as swimming pools and gyms, public health centers, and counseling clinics. Co-locating these uses leverages public and private dollars more efficiently, reuses existing infrastructure and contributes to the vibrancy of existing communities. Joint use agreements can be used to address LEA or community concerns about costs, vandalism, security, maintenance and liability in the event of injury. For more on joint use and joint use agreements see the Center for Cities and Schools (http://citiesandschools.berkeley.edu/) and the National Policy and Legal Analysis Network to Prevent Childhood Obesity (www.nplanonline.org/nplan/joint-use) websites.

[26] Ad-Hoc Coalition for Healthy School Siting, "Revising CDE School Siting Policy Documents: How California's School Siting Policies Can Support a World-Class Educational System," Submitted to the California Department of Education by the Ad-Hoc Coalition for Healthy School Siting (January 31, 2008). Available at: http://citiesandschools.berkeley.edu/reports/School_Siting_Policy_Brief_013108.pdf.

[27] Thomas A. Farley et al., "Safe Play Spaces To Promote Physical Activity in Inner-City Children: Results from a Pilot Study of an Environmental Intervention," *American Journal of Public Health* (September 2007) 97:9. 1625-1631. Available at: www.njafter3.org/edu/docs/Reports_Safe-Places-to-Play-Report.pdf.

[28] National Policy and Legal Analysis Network to Prevent Childhood Obesity, "Healthy School Siting." (Accessed on September 16, 2011) Available at: www.nplanonline.org/nplan/healthy-school-siting.

[29] Adam Carasso and Signe-Mary McKernan, The Urban Institute, "The Balance Sheets of Low-Income Households: What We Know about Their Assets and Liabilities," Prepared for U.S. Department of Health and Human Services Office of the Assistant Secretary for Planning and Evaluation (November 2007). Available at: http://aspe.hhs.gov/hsp/07/PoorFinances/balance/index.shtml.

The renovation of an existing school or the siting of a new school facility on a previously developed site can reduce or eliminate expenses that might have otherwise been incurred—for new infrastructure like roads and sewers, separate locations for the different uses, and the costs of transporting children out of their neighborhood to the new facility.[30] It can also mean that a facility or site that was once seen as a blight or blemish on a community or neighborhood has been transformed into a community asset.[31] When prospective locations for schools are taken out of the discussion solely because they were previously used or are in disrepair, or when recent trends towards larger, dispersed, and auto- or bus-access only schools are followed, communities in most need of reinvestment can miss out on significant opportunities for catalytic investments.[32,33] Links to more information on disparities and environmental justice are provided in the Resources page of the guidelines website. (www.epa.gov/schools/siting/resources)

[30] National Trust for Historic Preservation, "Older and Historic Schools: Restoration vs. Replacement and the Role of a Feasibility Study," Last updated January 2010. Available at: www.preservationnation.org/issues/historic-schools/additional-resources//school_feasibility_study.pdf.

[31] Ariel H. Bierbaum, Jeffrey M. Vincent and Erika Tate, "Building Schools and Community," *Race, Poverty and the Environment* (Spring 2008) 15:1. Available at: http://urbanhabitat.org/files/15.Bierbaum.et_.al_.pdf.

[32] Renee Kuhlman, "Helping Johnny Walk to School: Policy Recommendations for Removing Barriers to Community-Centered Schools," National Trust for Historic Preservation (2010). Available at: www.preservationnation.org/issues/historic-schools/helping-johnny-walk-to-school/helping-johnny-walk-to-school.pdf.

[33] Constance E. Beaumont and Elizabeth G. Pianca, "Why Johnny Can't Walk to School: Historic Neighborhood Schools in the Age of Sprawl," 2nd ed. National Trust for Historic Preservation (October 2002). Available at: www.preservationnation.org/issues/historic-schools/additional-resources/schools_why_johnny_1.pdf.

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2. Overview of the School Siting Guidelines

2.1. Introduction

School buildings are fundamental components of the educational process, and children spend more time in school than in any other environment except their home. A well-located, thoughtfully designed, soundly built and efficiently operated school enhances the educational process by providing a safe and healthy environment for children, teachers and other staff and provides many opportunities to meet multiple community goals. These voluntary guidelines are intended to assist local school districts, which will be referred to throughout these guidelines as the local education agency (LEA) (see Section 10), and community members in evaluating environmental factors to make the best possible school siting decisions.

The guidelines are intended to be used prior to:

- Making a decision about whether to renovate the existing school, build a new school on the current site or build a new school on a new site;
- Acquisition of land for school facilities;
- Use of legacy property already owned by the LEA;
- Leasing of space in new or existing structures not owned by the LEA for use as a school; and/or
- Major repair, renovation or reuse of existing properties and structures already owned by the LEA for use as a school.

In developing the guidelines, the Environmental Protection Agency (EPA) focused on four underlying principles for addressing environmental factors in school siting decisions (described in detail in About the School Siting Guidelines):

1. Safe and healthy school environments are integral components of the education process (see Section 1.4.1);
2. The environmental review process should be rigorous, thorough and well-documented and include substantive and ongoing meaningful public involvement (see Section 1.4.2);
3. Schools should be located in environments that contribute to the livability, sustainability and public health of neighborhoods and communities (see Section 1.4.3); and
4. The school siting process should consider the environmental health and safety of the entire community, including disadvantaged and underserved populations (see Section 1.4.4).

2.2. Overview for Considering Environmental Factors in the School Siting Process

The decision about where to locate a school is fundamentally local in nature, although state, tribal and federal laws and programs often influence the decision-making process in both direct and indirect ways. For example, the presence of environmental contamination and threat of exposure of children and/or staff to unsafe levels of contaminants on school property may trigger the need for state and possibly federal involvement.

These guidelines present recommendations on evaluating the environmental and public health risks and benefits of potential locations as part of the school siting process. Examples of potential environmental and public health risks include onsite contamination, such as radon, volatile organic compounds or petroleum hydrocarbons in soil and ground water, or impacts from nearby sources of pollution, such as industrial facilities and transportation facilities (see Exhibit 6: Screening Potential Environmental, Public Health and Safety). Some examples of environmental and public health benefits include the location's proximity to residences where future students live (so students would be able to walk or bike to school) and the availability of public transportation to and from the site (see Exhibit 4: Desirable Environmental Attributes of Candidate Sites).

The siting process is complex and involves many considerations that extend beyond the scope of these guidelines, for example:

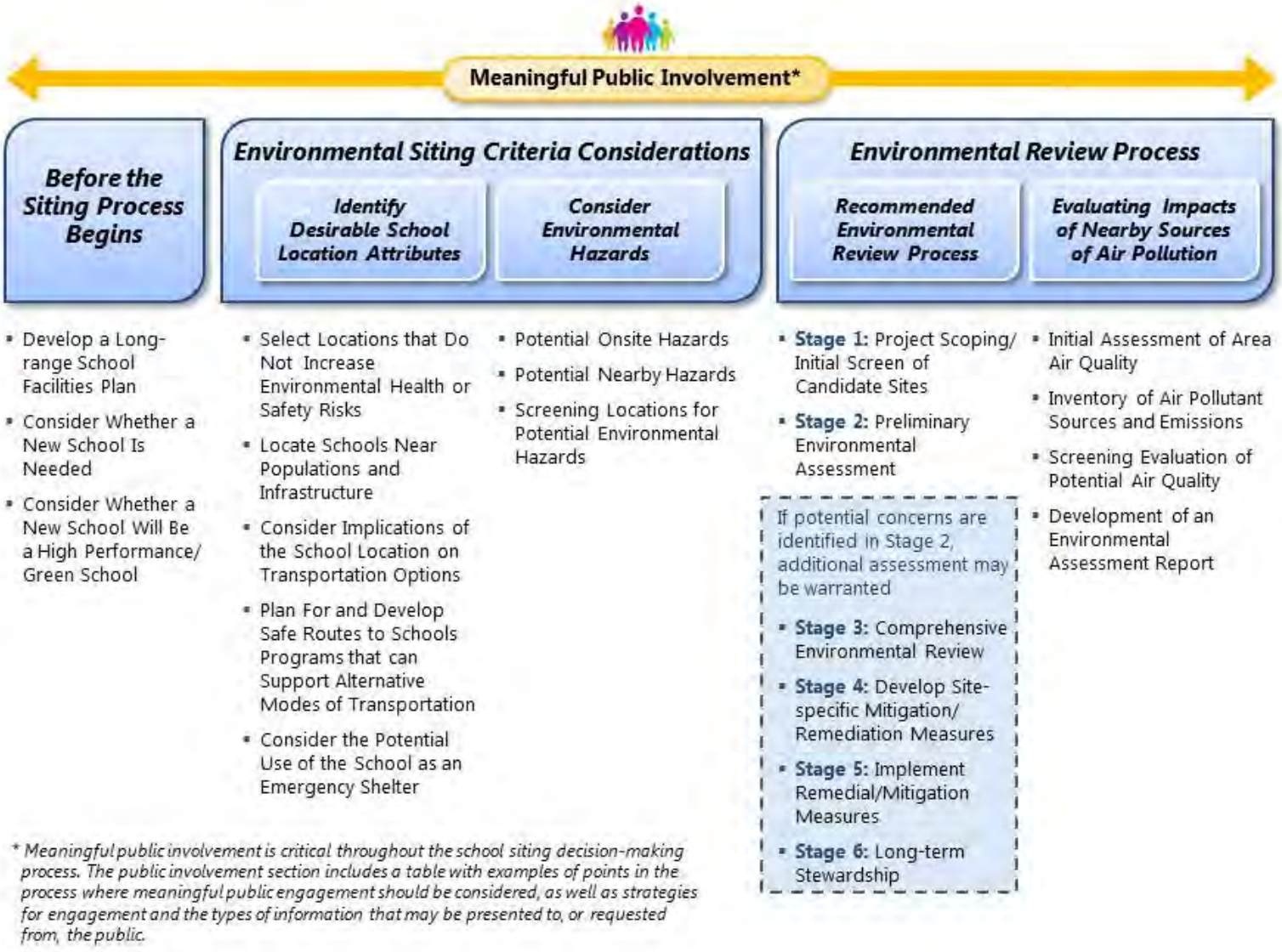
- Educational and extracurricular programs and services;
- Anticipated size and demographics of the student body;
- Needs of individuals with disabilities;
- Location size (acreage and facility space);
- Community partnerships and planned or potential commercial development in the community;
- Cost of land and location preparation;
- Availability of infrastructure (e.g., roads and utilities);
- Requirements that must be met to receive local, state and tribal funding assistance; and
- Economic impact to the community.

While these issues are beyond the scope of the guidelines, some resources related to these other considerations have been provided on the guidelines website. (www.epa.gov/schools/siting/resources)

Many LEAs develop long-range school facilities plans to help determine future facilities needs. These long-range plans provide the context within which the school siting decisions are made. To make informed decisions, the LEA should consider consulting with municipal officials on the community's plans for future land use and capital expenditures (often outlined in a comprehensive plan or similar document) (see Section 4.2.1).

Although the actual process to consider environmental factors in school siting decisions varies from community to community, Exhibit 1 gives a general picture of the issues that are addressed in the guidelines.

Exhibit 1: Overview of the Siting Guidelines



At the beginning and throughout the process of considering environmental factors in the school siting process it is essential for the LEA to involve the public by reaching out to stakeholders in the community, especially those most impacted by the decision to build a new school or renovate an existing school. Stakeholders can include parents, teachers, school personnel, school health council or team members, community and business leaders, and nearby residents. It is important to develop a communications plan (see Section 3.4) and to identify opportunities for meaningful public involvement (see Section 3) to ensure the public is engaged throughout the entire school siting process. It is also important to enhance the capacity of disadvantaged and other community members to participate in the process through facilitating access to technical information and assistance and providing access to information for individuals with disabilities and limited English proficiency. To ensure public involvement in consideration of environmental factors in school siting decisions, EPA recommends that the LEA establish a school siting committee (SSC) (see Section 3.3). This committee should generally consist of representatives of the LEA and its governing body, local government or tribal staff, and representatives from stakeholder groups that can help the LEA identify and evaluate potential school locations (both new and existing).

Before beginning the siting process, an initial decision should be made on whether a new school facility is needed. If the LEA, advised by the SSC, determines that a new facility is needed, the location will play an important role in determining whether the LEA's goals for the facility will be met (see Section 4.2.1).

It is critical for the LEA and the SSC with the community's input to identify environmental factors related to desirable school location attributes that can be used to prioritize potential new sites (see Section 4.3). Questions that can be asked to determine these characteristics include, but are not limited to:

- What environmental and public health criteria should be used to evaluate each potential location (see Section 4.4)?
- How can locations be avoided that are either on or in close proximity to land uses that may not be compatible with schools because of onsite and/or offsite pollution and/or safety hazards?
- How can prospective locations complement and leverage local and regional growth and development plans and strategies?
- What are the desirable cultural or historic preservation attributes that should be considered?
- What environmental justice considerations should be included in the desirable location attributes? (www.epa.gov/environmental justice)
- How will staff, students and community members get to the school?
- What are the potential impacts that the school might have on the environment?
- What attributes will allow the school to serve as an emergency shelter for the community?

Once potential locations have been identified (see Section 5.5) by the LEA and the SSC with the community's input, the LEA and the SSC should determine which potential locations best meet the stated desired environmental attributes. Questions that can be used to further evaluate potential locations include, but are not limited to:

- Which locations present the least risk of exposure to pollutants originating either onsite or offsite?
- Which locations have opportunities for shared or joint use of school facilities (such as a library, classrooms, physical activity facilities or a health clinic) or community facilities (such as an athletic center or park)?
- Which locations best fit with local, tribal, regional and state development plans?
- Which locations would give the most students additional physical activity opportunities by being able to walk or bike to school?

- Which locations would result in the lowest potential for negative impacts on the environment?

After deciding which locations best meet the desired positive environmental attributes, LEAs should conduct a preliminary environmental assessment (see Section 5.6) on these locations, which is the first stage in the environmental review process (see Section 5.3). EPA recommends consulting with state and tribal (see Section 7) environmental and education agencies during the environmental review process to ensure compliance with requirements and policies and to obtain technical assistance. Examples of topics the LEA, the SSC and the community can consider during the environmental review process include, but are not limited to:

- **The environmental history of each location**, which can include soliciting public input about the past use of each location;
- **Assessments of potential onsite environmental hazards** from contaminated soil and water at the site;
- **Assessments of potential offsite environmental hazards** from nearby sources;
- **The technical feasibility and the costs** associated with preventing or reducing environmental exposures, if present, from a short- and long-term perspective;
- **The environmental impact** of building or renovating a school on the site (e.g., loss to habitat or green space); and
- **Other physical characteristics** such as overall safety and proximity to noise and traffic.

Once the preliminary assessment has been conducted and the assessment reports have been reviewed by the public and the SSC, if no environmental concerns exist, a decision can be made to move forward with the preferred school location.

If potential environmental concerns are found in the preliminary assessment, EPA recommends performing a more comprehensive environmental review for the location found to have potential concerns (see Section 5.7). The comprehensive environmental review should determine if hazardous materials are present or if there is potential for a release of or exposures to a hazardous material or substance that could pose a health threat to children, staff or community members. This review could also assess the need for cleanup based on levels of contamination found and identify the cleanup standards that will be used. Once the comprehensive environmental review is completed and the public has been given the opportunity to comment, the LEA, the SSC and the community should have the information related to the school environment needed to make a final decision about where to locate the school. If there are onsite and/or offsite environmental hazards, site-specific remediation/mitigation measures and a long-term stewardship plan should be developed, reviewed by the public and implemented. (www.epa.gov/schools/siting/resources)

Cost Considerations for School Siting

During the siting process, the LEA will need to consider costs related to comparing desirable attributes of candidate sites, performing the assessments recommended in these guidelines and acquiring the site or structure. Some of these cost considerations include:

- Cost of land and location preparation;
- Short- and long-term construction or renovation costs;
- Transportation costs for students and staff; and
- Cost estimates for mitigating or reducing environmental risks and long-term stewardship of remediation measures.

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3. Meaningful Public Involvement

3.1. Overview

A meaningful public involvement process requires those administering the process to be familiar with and use good public involvement and risk communication practices.

Public involvement promotes civic engagement and builds public trust in school siting decisions. In 2003, the Environmental Protection Agency (EPA) updated the 1981 Public Participation Policy and issued its Public Involvement Policy. (www.epa.gov/publicinvolvement/policy2003/index) Its foundation is the seven basic steps to support effective public involvement:

1. Plan and budget;
2. Identify those to involve;
3. Consider providing assistance;
4. Provide information;
5. Conduct involvement;
6. Review and use input and provide feedback to the public; and
7. Evaluate involvement.

To help implement the steps, EPA developed a series of How-To brochures for effective public involvement (www.epa.gov/publicinvolvement/brochures/index) as resources on how to budget for, plan and evaluate public involvement, including "The Risk Communication Workbook." (www.epa.gov/nrmrl/pubs/625r05003/625r05003.pdf)

Seven Cardinal Rules for Risk Communication[34]

There are seven cardinal rules for risk communication that may be helpful when planning public involvement strategies:

1. Accept and involve the public as a legitimate partner;
2. Plan carefully and evaluate your efforts;
3. Listen to the public's specific concerns;
4. Be honest, frank and open;
5. Coordinate and collaborate with other credible sources;
6. Meet the needs of the media; and
7. Speak clearly and with compassion.

[34] U.S. Environmental Protection Agency, "Seven Cardinal Rules of Risk Communication," U.S. Environmental Protection Agency, Washington, DC, OPA-87-020, April 1988. (Accessed on September 16, 2011) Available at: www.epa.gov/care/library/7_cardinal_rules.pdf.

3.2. Establishing a Public Involvement Strategy

Providing meaningful public involvement throughout the school siting process is of critical importance and should be formalized prior to initiating school site selection. Stakeholder groups such as parents, representatives of students, teachers and other school personnel, and nearby residents are most directly impacted by school siting decisions. The community should be fully engaged throughout the siting process and fully informed of the presence of contaminants at or near school sites, of any remedial measures employed to eliminate exposure to such contaminants, and of testing results evaluating such measures over the long term. These groups also play a critical role in the initial site selection process. Documentation of contaminated sites can be housed in many different locations (e.g., federal, tribal or state environmental regulatory agency, local health or planning department, private property owner). This can make it difficult to find a complete record of the contamination history at the site. Efforts are underway to consolidate these different information sources through geospatial and Internet accessible methods. Currently members of the public can use EPA's MyEnvironment search application (www.epa.gov/myenvironment) to find a cross section of environmental information based on location. Additionally, members of the public can contribute to the information collection effort through their own recollections as neighbors or employees. The public should be engaged to help establish historical uses of potential school sites and adjacent sites and to assess the likelihood and possible presence of contamination. Because these groups may also have frequent contact with the site, they can significantly contribute to efforts to ensure compliance with site use restrictions as part of long-term site management plans. Finally, transparency and meaningful public involvement are essential to understanding decisions about risk tradeoffs and to building trust in the safety of specific school sites and the siting process in general.

A public involvement strategy includes proactive and meaningful approaches to encouraging informed public participation. The role of the public in facility planning and site selection should be established early in the school siting process to ensure effective collaboration and public participation. Key components for implementing a meaningful public participation strategy include:

- School siting committee (see Section 3.3);
- Communications plan (see Section 3.4);
- Consideration of community information accessibility issues (see Section 3.5);
- Technical assistance and training (see Section 3.6);
- Designation of opportunities for public input (see Section 3.7); and
- Budget for public involvement activities (see Section 3.7).

3.3. School Siting Committee

If not already in place, EPA recommends that local education agencies (LEAs) (see Section 10) establish a school siting committee (SSC) whose responsibilities include making recommendations to the LEA's governing body on sites for renovating existing buildings for educational purposes, building new schools and/or leasing space for new schools. SSC responsibilities would also include participating in the environmental review of potential sites and structures for existing and new use conversions. EPA recommends that the formation of the SSC be a publicly transparent process and that the SSC include:

- Representatives of the LEA and its governing body (such as elected school board members, facility, health and safety staff);
- Local government or tribal staff (such as city planners, government environmental health specialists, county auditors, parks and recreation department staff); and

- Representatives from stakeholder groups that reflect the demographics of the community, such as:
  - Parents of children likely to attend the school;
  - Teachers and school staff;
  - Public health organizations;
  - Community members and neighborhood groups;
  - Environmental advocacy and environmental justice groups;
  - Community planning organizations;
  - Locally based nonprofits;
  - Age-appropriate students;
  - Local businesses and trade/building associations;
  - Emergency planners and responders; and
  - Preservation organizations and agencies.

> ***Long-range School Facilities Plan***
>
> School siting decisions should be integrated with broader community planning efforts, including transportation, health care, libraries, parks and historic districts, to name a few. A long-range school facilities plan functions as a way for LEAs to identify important projections of long-term school and community needs such as student enrollment, operational costs and infrastructure to use in making school siting decisions. The LEA's long-range plan should be reviewed and commented on by the public, including other local public entities (e.g., municipalities, planning departments). More information on the long-range school facilities plan can be found in the Environmental Siting Criteria Considerations section (see Section 4).

LEAs should seek to avoid conflicts of interest in selecting committee members and should manage any conflicts transparently, as needed. It is recommended that the local school board, or a similar governing body, formalize the process of convening the SSC and develop language that clearly articulates the SSC's charge. EPA recommends that a neutral party help organize, administer and/or facilitate the work of the committee.

The SSC can play an integral role in making decisions about the most environmentally sound school location. One of the first responsibilities for an SSC can be contributing to the development of a plan for meaningful public engagement in the decision-making process, including ample time (e.g., 30 – 90 days) for public comment by members of the affected community. The SSC can also assist with other key steps in identification of environmentally desirable potential school locations, including:

- Establishing desirable location criteria;
- Identifying initial candidate locations, including the existing schools;
- Weighing the pros and cons of a community's experience with the existing location;
- Working with environmental professionals to review the suitability of candidate locations (see Section 10);
- Reviewing recommendations and reports from the environmental review process;
- Considering the suitability of potential school sites in light of the locations;
- Giving recommendations to the decision-making authority based on data and public input;
- Making formal presentations and providing reports to the LEA and general public;
- Providing the public with all of the appropriate data, a forum to express their opinion and/or to make a recommendation on the available options; and
- Facilitating public access to relevant technical and legal information through technical assistance and other measures.

SSC members should collaborate with LEAs and other local government agencies and stakeholders to ensure school siting decisions account for fiscal constraints and fit with the objectives of larger community and regional development plans. Community involvement in school facility assessment, planning, design and construction provides the community an opportunity to improve local schools, increase their suitability for community use and build and strengthen connections among community members. The Smart Growth Schools Report Card (www.smartgrowthschools.org/about.html), For Generations to Come: The Leadership Guide to Renewing Public Buildings (www.21csf.org/csf-home/Documents/Organizing_Manual.pdf) as well as other resources identified in the Resource page of the guidelines website (www.epa.gov/schools/siting/resources) can serve as useful tools to support collaboration and community involvement.

The SSC should be mindful of its members' knowledge and expertise to effectively participate in decision-making. The SSC should also ensure that its members effectively reach out to environmental justice and low-income communities, as well as other stakeholders, with technical assistance and/or training support to ensure that they have the necessary skills and knowledge to address relevant issues. (see links to Community Involvement and Training resources at www.epa.gov/schools/siting/resources)

Engineering and institutional controls, such as lead encapsulation systems, can be used to prevent exposure to contamination and typically require specialized expertise. The SSC should carefully evaluate if there is sufficient capacity at the LEA to safely operate engineering and institutional control systems or to undertake long-term stewardship tasks to prevent environmental exposures at schools. If the LEA staff do not have the expertise, EPA recommends that LEAs obtain training or support from a government environmental department and/or additional contracted technical services to effectively manage institutional and engineering controls.

3.4. Communications Plan

LEAs should develop a communications plan to ensure meaningful public involvement in school siting. The plan should include a schedule and methods of delivery of information to the public and identify ways for the public to participate throughout the school siting decision-making process. It is essential that the public receives timely notice about the LEA's plans for school facilities and critical decision points in the process. To ensure that key stakeholders receive such notice, LEAs should publicize the release of plans and reports, the commencement of public comment periods, and the dates of public hearings through written notices that are:

- **Composed in lay-accessible language** to communicate effectively with all stakeholders in the community, including non-English-speaking stakeholders and individuals with disabilities;
- **Published in newspapers of general circulation** within the LEA's jurisdiction (including foreign language newspapers for any non-English-speaking population);
- **Placed conspicuously in schools** within the LEA;
- **Delivered to each parent-teacher organization and each labor union** covered by a collective bargaining agreement within the LEA;
- **Delivered to businesses and residents** located within 1,000 feet of potential school locations;
- **Delivered to places of worship and community centers** within the LEA's jurisdiction;
- **Delivered to organizations representing neighborhoods** within potential catchment areas;
- **Provided to elected representatives** in jurisdiction areas; and
- **Disseminated on the Internet** through websites and social media (e.g., Facebook, Twitter, blogs).

Public comments received on plans and reports should be made available on all non-final actions, and the LEA, SSC and other governing bodies should be encouraged to provide responses to these comments.

LEAs and/or state or tribal environmental agencies should also establish and make public key contact persons, including local planning, public works, parks and recreation, and library directors, and create central information repositories (e.g., a project website and other centralized sources such as community libraries) for key documents and notices related to school siting and monitoring. For each ongoing school siting process, these repositories, including the website, should provide:

- Documents that are or have been subject to review and comments received on such documents;
- Relevant correspondence between LEAs and the state or tribal oversight agency, including any supplemental information provided as a result thereof;
- A timeline for the review process that specifically notes opportunities for public comment and public hearings;
- Copies of any public notices;
- Key school siting resources, including laws, regulations, guidance documents and appropriate agency contacts;
- For any schools where environmental remediation measures (see Section 5.8) are put in place and/or long-term stewardship plans (see Section 5.10) are implemented, copies of such measures or plans and the results of any monitoring results or reports generated under those measures or plans; and
- How the project supports the community's long-range plans.

3.5. Consideration of Community Information Accessibility Issues

A number of factors can impede effective communication in community settings, including a lack of trust between stakeholders and community members, a lack of easily accessible information related to decisions in languages spoken by local residents, socio-cultural differences, lack of access to electronic communication resources, limited access to scientific information and legal resources, and a lack of available time for meetings and review of documents.

These factors can be especially prominent in populations disproportionately burdened by environmental hazards as well as those vulnerable subgroups that are at particular risk to threats to human health and the environment. These include minorities, low-income and indigenous populations, children and people with disabilities. Although these factors can frequently be overcome, the LEA may need to enhance information delivery and communication methods and consider providing assistance to communities that are affected by a combination of any or all of these factors to ensure their meaningful and informed participation in the process.

Every effort should be made to provide information that will be accessible to the community. Some activities that should help make information more accessible include:

- **Seeking out community leaders** to obtain their views on how to best communicate and follow their advice;
- **Holding public meetings** that are convened at times and locations available and accessible to community members (provide the services of an interpreter for those who need it);
- **Publicizing meetings** and the availability of information;

- **Posting information** on the Internet and making it available in multiple languages, if needed, to reach all members of the community;
- **Meeting Internet accessibility standards** for making information on the Internet accessible to users with disabilities (e.g., for the federal government this would be 508 compliance); and
- **Organizing a community tour** of existing sites and/or potential and proposed locations. Addressing accessibility issues is important to ensure effective communication and community support for projects. In the end, community support will be critical to help gain support for school funding and siting decisions.

3.6. Technical Assistance and Training

A broad representation of stakeholder groups is important for meaningful public involvement. However, it should not be assumed all members of the SSC have the necessary skills and knowledge to fully participate on the SSC. Similarly, community members, particularly those affected by environmental injustice (e.g., minority and low-income populations, and tribes), may lack the resources to effectively address the scientific, technical and legal information presented during the school siting process. For these reasons, it is critical that all members of the SSC and the community have the opportunity to access technical assistance that provides a basis for common knowledge and understanding on factors that are critical in the school location decision, including public health, transportation options, environmental review, site review issues, site-specific mitigation/remediation strategies and legal considerations. Many federal agencies and non-profit organizations offer training at little to no cost and also have programs with funding available for various technical assistance resources. Examples of these programs and training opportunities can be found on the Resources page of the guidelines website under Technical Assistance and Capacity Building. (www.epa.gov/schools/siting/resources) Communities may also consider reaching out to local colleges and universities, state, tribal and local governments, or professional organizations for assistance and training on specific scientific or technical topics.

3.7. Designation of Opportunities for Meaningful Public Input and Budget for Public Involvement Activities

It is critical to budget time and resources for meaningful public involvement during the earliest stages of planning. The table below presents examples of points in the process where public engagement should be considered, as well as strategies for engagement and the types of information that may be presented to or requested from the public. SSCs should also consider including a public comment period and public hearings, when appropriate, to allow the public to seek clarification and provide input. Before finalizing its action, EPA encourages the LEA to respond to comments in writing.

EPA recommends that all properties or structures proposed for use as a school be carefully evaluated for potential environmental contaminants and potential exposures of children, staff and visitors *before* making final decisions to use a site or structure for a school. The site evaluation process should identify and evaluate all potential safety hazards and sources of environmental contamination that may be present at the site or which may migrate to the site from nearby sources.

Exhibit 2: Meaningful Public Involvement Points and Opportunities

Before the Siting Process Begins		
LEA Activity	*Description of Activity*	*Opportunities for Meaningful Public Involvement*
Develop Long-range School Facilities Plan *(see Section 4.2.1)*	A long-range school facilities plan functions as a way for local education agencies (LEAs) to identify important projections of long-term school and community needs such as student enrollment, operational costs and infrastructure to use in making school siting decisions.	▪ Review and comment on the long-range facilities plan
Establish School Siting Committee *(see Section 3.3)*	If not already in place, EPA recommends that LEAs establish a SSC whose responsibilities include making recommendations to the LEA's governing body on locations for building new schools, leasing space for new schools, and/or renovating or expanding existing schools, and considering environmental, public health and sustainable communities objectives (see Section 3.3).	▪ Provide nominations for stakeholder/community representatives on the SSC ▪ Request a community meet-and-greet with SSC representatives, once selected
Develop Communications Plan *(see Section 3.4)*	LEAs should develop a communications plan to ensure meaningful public involvement in school siting. The plan should include dates and methods of delivery of information to the public, and identify ways for the public to participate in school siting decisions. The plan should also ensure sufficient funds are allocated for meaningful public involvement activities in the school siting budget.	▪ Voice expectations for informed and meaningful involvement while addressing potential communications barriers and considerations for underrepresented community members, including translation services ▪ Provide recommendations for the location of an information repository and information delivery needs, and ensure that the communications plan and public involvement budget will meet these needs

Before the Siting Process Begins		
LEA Activity	*Description of Activity*	*Opportunities for Meaningful Public Involvement*
Provide Opportunities for Training and Technical Assistance (see links to resources at www.epa.gov/schools/siting/resources)	A broad representation of stakeholder groups is important for meaningful public involvement. However, it should not be assumed all members of the SSC have the necessary skills and knowledge to fully participate on the SSC. For these reasons, it is critical that all members of the SSC and the community have the opportunity to access technical assistance and/or training resources that provide a basis for common knowledge and understanding of factors that are critical in the school location decision, including public health, transportation options, environmental review, site review issues, site-specific mitigation/remediation strategies and legal considerations.	▪ Ensure that all community members (including the SSC) have the ability to access and utilize available independent technical assistance options and training resources ▪ This may be accomplished by inquiring about grant funding for technical assistance and/or the availability of low-cost or free online training resources ▪ Consider reaching out to local colleges and universities, state, tribal and local governments, or professional organizations for assistance and training on specific scientific or technical topics
Determine if a New School Facility is Needed (see Section 4.2.2)	LEAs should consider renovation, repair and/or expansion options before deciding to build a new school facility. "Old" and "obsolete" are not synonymous. Many existing schools can be retrofitted with new technologies to expand their useful life, possibly at a lower cost and lower environmental impact than new construction.	▪ Engage in discussions with the LEA and SSC regarding the pros and cons of using an existing school building versus building a new school facility. These discussions may include getting community input on the influence of the existing school on the well-being of the overall community, including disadvantaged/underserved, minority and low-income populations

Environmental Siting Criteria Considerations		
LEA Activity	*Description of Activity*	*Opportunities for Meaningful Public Involvement*
Evaluate Desirable Environmental Attributes of Candidate Locations and Appropriate Environmental Criteria *(see Section 4)*	The LEA, in concert with the SSC and with meaningful public involvement, should identify the criteria that will be used to evaluate both the present characteristics and the possible future characteristics of all locations being considered for use as a school. In addition, the SSC should weigh those location characteristics that may adversely affect the decision, including exposure to onsite contamination and offsite pollution.	▪ Discuss the characteristics of the community's preferred school site, including location (both proximity to students and other community buildings) and compatibility (space and accessibility) with student and staff activities ▪ Help to identify environmental or public health siting considerations (with a basis for common knowledge and understanding on factors that are critical in the school location decision), including public health, community health environmental review, site review issues and site-specific mitigation/remediation strategies, legal considerations as well as green building techniques that are important to the community ▪ Provide insight into key community characteristics that could influence the siting decision (e.g., demographics, income)

Environmental Review Process		
LEA Activity	*Description of Activity*	*Opportunities for Meaningful Public Involvement*
Project Scoping/Initial Screening of Candidate Site Locations *(see Section 5.5)*	This portion of the environmental review process begins when the LEA decides to proceed with a school facility project (ideally identified in a long-range school facility plan). This decision includes such considerations as the project size (number of students to be served), scope (type of school to be built) and target date for completion. At this point, the SSC should be tasked with identifying candidate sites for the school project and should plan to give the public an opportunity to comment on the preferred site that is selected.	▪ Review/comment on the screening criteria proposed by the LEA, as well as the top three sites proposed for preliminary environmental review ▪ Recommend additional sites for consideration that the community deems as candidates for preliminary environmental review ▪ Offer community knowledge regarding historic land use on candidate sites (e.g., the site was used for agricultural or industrial purposes in the past)
Preliminary Environmental Review *(see Section 5.6)*	The LEA should engage environmental professionals or professional firms to conduct the necessary environmental reviews for the project. The LEA should solicit public comment on the preliminary environmental assessment and proposed next steps based on review findings. A public comment period is recommended and may be required by the tribal or state regulatory agency, particularly if the preliminary review indicates that no further environmental review is necessary and no other methods of securing public comment are likely.	▪ Review/comment on each preliminary environmental review report as they become available and request LEA response to comments received ▪ Identify community needs for technical assistance to explain the technical/scientific information in the reports ▪ Request tours of candidate sites for community members/representatives, if possible ▪ Notify the LEA of the community's perspectives on the preferred site(s) and request a response to community recommendations ▪ Request changes to the public involvement plan (e.g., to extend the public comment period), if necessary

Environmental Review Process		
LEA Activity	*Description of Activity*	*Opportunities for Meaningful Public Involvement*
Comprehensive Environmental Review/Site Selection *(see Section 5.7)*	The purpose of the comprehensive environmental review is to gather and analyze data on environmental and public health hazards and impacts identified in the preliminary environmental review, and evaluate the risks posed to children's health, public health, and the environment based on the contamination or impacts found. The comprehensive environmental review also includes developing preliminary plans and cost estimates for mitigating or reducing risks. The environmental professional should prepare draft reports of onsite contamination, investigation results, offsite hazards and project environmental impacts. The LEA should release those drafts for public comment. The environmental professional should then prepare final drafts that take into account public comments. The final drafts should be subject to review and approval by the SSC and LEA.	▪ Review and comment on the draft versions of the comprehensive environmental review report ▪ Request a response to public comments from the LEA and review the resulting final draft of the comprehensive environmental review report ▪ Request and attend any scheduled public meetings to discuss project impacts ▪ If the final comprehensive environmental review report includes proposals for mitigation measures (e.g., additional sidewalks, enhanced filtration in the heating, ventilating and air conditioning system, institutional controls), review preliminary cost estimates and schedules of implementation for any remediation of onsite contamination and provide input on implications of the suitability of that site for a school

Environmental Review Process		
LEA Activity	*Description of Activity*	*Opportunities for Meaningful Public Involvement*

Develop Site-specific Mitigation/ Remediation (Cleanup) Measures *(see Section 5.8)*	If the LEA decides to proceed with a site where contamination will be cleaned up, a remedial action workplan should be developed and submitted to the state or tribal regulatory agency for approval, typically with the help of an environmental professional.
	The remedial action workplan should identify and recommend methods for cleaning up the site to contaminant levels that meet the applicable safety standards and should clearly describe the responsibilities and long-term environmental stewardship obligations of the LEA (or other responsible parties) for inspection, maintenance and reporting associated with any engineering or institutional control implemented as part of the cleanup. The remedial action workplan should also include a preliminary long-term stewardship plan (LTSP).
		▪ Participate in the public hearing on the draft remedial action workplan, which the LEA should conduct in the neighborhood or jurisdiction where the candidate site is located, at a time and location convenient for community residents, with interpretation services provided as needed
		▪ Review and comment on the draft remedial action workplan during the public comment period and request a response to comments from the LEA
		▪ Community input is important on remedial action workplan issues such as:
		  ▪ Sufficiency of remedial response
		  ▪ Timeline for remedial work
		  ▪ Cost estimates for remedial work
		  ▪ Effects of remedial actions on the community and daily life (traffic, noise, etc.)

Environmental Review Process		
LEA Activity	*Description of Activity*	*Opportunities for Meaningful Public Involvement*
Implement Remedial/ Mitigation Measures (see Section 5.8)	Prior to the onset of any school construction on the candidate site, EPA recommends that the remediation of the site, as defined in the remedial action workplan, be completed. If engineering or institutional controls are required as part of remediation, construction of those controls may begin following approval by the state or tribal environmental regulatory agency.	▪ Review and comment on documentation regarding the implementation of the plan and all final sampling results ▪ Any modifications to the remedial action workplan should also go through the appropriate public review processes ▪ Review and comment on the revised LTSP, which should detail specific engineering and institutional controls, if applicable (see Section 8.14) ▪ Suggest adding a public accountability/oversight plan to the LTSP to ensure long-term public and institutional memory of the LTSP through activities designed to promote awareness by students, staff and the community, including signage at the site and reporting measures
Long-term Maintenance and Monitoring (see Section 5.10)	LEAs should incorporate key components of the long-term stewardship plan into other facilities and operational plans and training materials for principals, facilities staff, groundskeepers and contractors. This plan describes in detail the specific manner in which institutional and engineering controls will be employed in the future, and by whom.	▪ Consider forming a public oversight committee to ensure that periodic reviews are conducted on the effectiveness of remedial measures and any engineering and institutional controls that are used at the site ▪ Provide the LEA and tribe or state with a list of community contacts to be notified if a problem arises. Ensure there is a contact person for the community to go to with concerns related to facility maintenance or monitoring

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4. Environmental Siting Criteria Considerations

4.1. Overview

School location plays an integral role in creating healthy, safe schools that support high quality education and promote sustainable and healthy communities. In order to reach these goals, the local education agency (LEA) (see Section 10), in concert with the school siting committee (SSC) (see Section 3.3) and with meaningful public involvement (see Section 3), should identify criteria that will be used to evaluate both the present characteristics and possible future characteristics of all locations being considered for the school. Characteristics of surrounding properties and current and planned zoning and land uses near the location should be evaluated. Careful assessment takes time, but the importance of school siting decisions justifies the attention and the need for sustained public involvement to ensure that the location meets the needs of the community and has community support.

This section includes information on the following general areas of consideration for deciding where to locate a school:

- Whether a new school is needed (see Section 4.2.2);
- Whether the new school will be a high performance/green school (see Section 4.2.3);
- Whether some candidate locations increase environmental health or safety risks (see Section 4.3.1);
- Implications of the school location for transportation options (see Section 4.3.3);
- Options for developing Safe Routes to School Programs that can support alternative modes of transportation (see Section 4.3.4); and
- The potential use of the school as an emergency shelter (see Section 4.3.5).

Balancing the many criteria and potentially conflicting characteristics of candidate locations can be very complex. For example, in most urban areas, potential school locations that are accessible to the community may have been previously used for other purposes that may present environmental hazards. Further, they may be located in proximity to sources of potential environmental health and safety concerns, such as highways, rail yards, a wide range of light and heavy industries and other facilities that, under ideal circumstances, would not be located near a school or other facilities used for children's care. Sites that have not previously been developed—often called greenfields (see Section 10)—are often not ideally located in terms of environmental impact and transportation options. Integrating community centered schools into existing residential neighborhoods often allows for better environmental, community, economic, educational and public health outcomes. These community centered schools allow children, faculty and staff to walk or bike to and from the school and use public transportation options, when available. These schools also often take advantage of previous investments in infrastructure and add to the vibrancy and vitality of a community.

Some candidate school locations may have real or perceived environmental challenges. While the prior uses and potential for onsite contamination and impacts from nearby sources for some candidate locations may be known, in other cases, determining these issues at candidate sites requires investigation. The challenges of potential environmental hazards associated with sites can be overcome in many, although not all instances. Technical assistance and oversight from state, tribal and local environmental, public health and planning agencies can help communities evaluate potential environmental and public health concerns at specific sites. A thorough evaluation of such concerns will help communities, LEAs, and local, tribal and state leaders choose locations that can achieve multiple objectives from school facility investments while minimizing potentially adverse environmental and health issues.

Assessing and balancing multiple potential risks and benefits while considering renovation or expansion of an existing facility or prospective new sites is not a simple task, and there is no single tool available to accomplish it. The following sections, Identify Desirable School Location Attributes (see Section 4.3), and Consider Environmental Hazards (see Section 4.4), highlight considerations that should be taken into account as local communities establish their own school siting criteria, and the Environmental Review Process section (see Section 5) of the guidelines describes a process for identifying and assessing environmental hazards.

4.2. Before the Siting Process Begins

4.2.1. Develop a Long-range School Facilities Plan

School siting decisions should be integrated with broader community planning efforts, including transportation, health care, libraries, parks and historic districts, to name a few. Many communities across the country use data-driven, community-based processes to create and implement comprehensive plans that set forward strategies and policies that support future growth and development.[35] Development of a long-range school facilities plan can help LEAs to identify important projections of long-term school and community needs such as student enrollment, operational costs and infrastructure to use in making school siting decisions. LEAs should engage with planning commissions, boards of supervisors and/or city councils from the outset to develop long-range school facilities plans that link to and complement comprehensive community plans. Through this linkage, the long-range school facilities plan would incorporate community growth and the school district at large in the school siting process, rather than considering the potential school locations in isolation from other important community planning issues.

EPA encourages LEAs to prepare a long-range school facilities plan that does the following:

- **Projects school district enrollments** for the foreseeable future (e.g., 5 – 20 years);
- **Identifies existing school infrastructure that may need to be improved or replaced**;
- **Establishes the need for additional instructional or multiuse space**, if any, based on projections;
- **Works with local authorities** to consider broader community needs such as emergency shelters, community meeting space, sports and recreation;
- **Develops a plan for meeting new space needs** that includes various approaches such as renovating or reconstructing school facilities on existing school grounds, constructing school buildings on newly acquired sites and leasing space in existing buildings;
- **Includes approximate dates** for opening new school facilities;

[35] San Diego Unified School District, "Long-Range Facility Master Plan." Available at: http://www.sandi.net/cms/lib/CA01001235/Centricity/Domain/82/Long_Range_Facilities_Master_Plan/Section_1/ALL_Section1.pdf.

- **Targets enrollment size by type of facility**; and
- **Factors in other local and regional planning cycles and potential funding** or resource streams, such as connections with existing or new street, park, residential or commercial infrastructure.

The LEA's long-range plan should be reviewed and commented on by the public, including other local public entities (e.g., municipalities, planning departments). Finally, the long-range plan should be approved by the LEA.

4.2.2. Consider Whether a New School Is Needed

The first criterion to consider is whether a new school is needed. Communities should consider renovation, repair and/or expansion options before deciding to build a new school. The terms "old" and "obsolete" are not synonymous. Many existing schools can be retrofitted with new technologies to expand their useful life, possibly at a lower cost and with fewer environmental impacts (e.g., energy savings, less impact on open space) than new construction. A school that is too small for an existing population may be expanded or may serve a narrower grade configuration or a special program. Using existing facilities offers other benefits that new construction often cannot. For example, many older school facilities were built at a time when schools were planned to serve as the focal point in a neighborhood not only for education but also for community events, libraries and open play fields. Continued use of existing schools can encourage physical activity because they are often located in the most walkable and bikeable parts of a community. Renovating existing neighborhood school facilities can provide an impetus for community revitalization, have an impact on neighboring property values, encourage investment in schools by community members, and preserve irreplaceable community assets.

It is important to consider both direct and indirect costs associated with building in a new location, such as the cost of site acquisition, transportation, traffic congestion, operation and maintenance, environmental cleanup, necessary infrastructure improvements and long-term monitoring and maintenance costs. In addition, renovation and/or expansion of an existing building can be part of a community revitalization effort or serve as an impetus for starting a broader revitalization effort. Siting policies that discourage renovation or expansion of existing schools and favor building larger new schools can contribute to disinvestment in existing neighborhoods. This disinvestment further contributes to the physical, social and economic decline seen in many neighborhoods where a large percentage of low-income, African-American and Hispanic or Latino students live.[36]

Consider taking the following actions to decide whether a new school is needed:

- **Evaluate the existing school's current facilities and potential facilities** (through renovation/rehabilitation) and the full costs of alternatives, including educational, fiscal, environmental and public health impacts.
- **Evaluate the school for health, environmental and safety risks** from both onsite and offsite sources of potential contamination.

  NOTE: The Environmental Protection Agency (EPA) recommends that districts periodically inspect existing schools for potential environmental health and safety risks using tools designed for that purpose such as EPA's Healthy School Environments Assessment Tool (HealthySEAT; www.epa.gov/schools/healthyseat/) or the NIOSH Safety Checklist Program for Schools. (www.cdc.gov/niosh/docs/2004-101/) Where deficiencies are found, EPA recommends identifying and implementing steps to reduce student and staff exposure to potential

[36] Ad-Hoc Coalition for Healthy School Siting, "Revising CDE School Siting Policy Documents: How California's School Siting Policies Can Support a World-Class Educational System," Submitted to the California Department of Education by the Ad-Hoc Coalition for Healthy School Siting (January 31, 2008). Available at: http://citiesandschools.berkeley.edu/reports/School_Siting_Policy_Brief_013108.pdf.

hazards, to the maximum extent practical (see Section 9.14).

- **Evaluate the physical characteristics of existing schools** for their potential to meet changing community needs. Is the school ideally located to serve residents of the community, including senior citizens?
- **Evaluate the effect on the educational and social development of the students in the community** of constructing a new building, renovating or expanding an existing facility or closing a school.
- **Evaluate the ongoing value of a school building as a public asset** and identify how the community in the immediate vicinity of the school will be affected by renovating the school, building a new school or closing the school. Is the school a treasured part of the town? Is the building a landmark that defines the neighborhood?
- **Conduct an analysis of school system operation savings and costs** that would be anticipated from renovating, building or closing a school.
- **Consider potential increases in transportation costs** that would come from moving the school to a new, more distant location, including infrastructure (additional buses, bus stops, street improvements, traffic signals, etc.), fuel, increased air pollutant emissions from buses and privately owned vehicles and traffic congestion.
- **Determine if the school is accessible to students, faculty and other employees with disabilities** (i.e., Americans with Disabilities Act (ADA) and Section 504 compliant). If not, what would be the cost of retrofitting an older inaccessible building so that it meets ADA and Section 504 requirements?
- **Evaluate stated preferences, goals and alternatives** within a community's comprehensive plan, projected capital investments in infrastructure and other strategic investment commitments.
- **Evaluate the capacity of existing infrastructure.** If you build a new school, will the facility be on public water and sewer? If the LEA expands an existing school on a well and septic system, can the septic field be expanded?
- **Consider opportunities to partner with other government services** (e.g., parks, health clinics and libraries) that can help promote wellness and active transportation choices.
- **Plan how to ensure the safety of the children in the existing school during renovation and construction.** If major renovation is undertaken or a new building is built on an existing site, there is the potential for significant disruption of construction and demolition materials. It is important that best management practices are used during renovation and construction to prevent exposure to these materials.

More information on renovating older and historic buildings, environmental cleanup and community planning can be found on the Resources page of the guidelines website. (www.epa.gov/schools/siting/resources.html#LINKS_community_planning)

4.2.3. Consider Whether the New School Will Be a High Performance/Green School

More than ever, technology, expertise and public support exist to allow communities to build superior learning environments that can support higher achievement and provide healthier learning environments while also saving energy, resources and significant amounts of money. Often referred to as healthy high performance schools or green schools (see Section 10), these are facilities that integrate all aspects of the design process starting with selection of the design team and the school location to design schools that meet multiple educational, environmental and community goals. The environmental goals of such facilities include energy and water efficiency, healthy indoor air, safer materials selection (including life-cycle cost consideration), and reduced environmental impact from the school. The technologies and practices used to achieve these goals are often integrated into the curriculum and other student learning opportunities.

LEAs can use elements from green rating systems, such as the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED; www.usgbc.org/DisplayPage.aspx?CategoryID=19) for Schools Rating System and the Collaborative for High Performance Schools. (CHPS; www.chps.net/dev/Drupal/node) Both LEED and CHPS rate schools based on sustainable site selection and development, indoor environmental quality, materials and resources, energy atmosphere, water efficiency and innovation. Because high performance/green schools are based on the principle of integrated design, in which all aspects of the school are designed with a clear understanding of how the various systems and decisions affect each other, the decision to build a green school or renovate an existing school to meet green standards should be made before establishing siting criteria.

To ensure that a new school is energy efficient, LEAs can design it to earn the ENERGY STAR (see www.energystar.gov/newbuildingdesign). Building orientation and shading strategies and renewable energy technologies, such as geothermal heat pumps, wind turbines and solar panels, can help increase energy efficiency and reduce greenhouse gas emissions. EPA encourages local governments and communities to investigate and, where appropriate, integrate healthy high performance school or green school principles into their location selection and school planning and operation processes. Links to more information on green building (www.epa.gov/greenbuilding) are available on the Resources page of the guidelines website. (www.epa.gov/schools/siting/resources)

The focus of these guidelines is on school siting, but there are many tools and resources available to ensure that school environments are healthy throughout the lifecycle of the school building. EPA has a considerable body of guidance and regulations that are specifically geared toward existing schools, which is available at www.epa.gov/schools. EPA recommends that districts periodically inspect existing schools for potential environmental health and safety risks from both onsite and nearby hazards using tools designed for that purpose. These include EPA's Healthy School Environments Assessment Tool (HealthySEAT; www.epa.gov/schools/healthyseat/) or the NIOSH Safety Checklist Program for Schools. (www.cdc.gov/niosh/docs/2004-101/) Where deficiencies are found, EPA recommends identifying and implementing steps to reduce student and staff exposure to potential hazards (see Section 9.14), to the maximum extent practical. In some cases, school specific improvements can reduce potential hazards; in other cases, such as widespread air pollution or water quality issues, a community wide approach may be called for.

4.3. Identify Desirable School Location Attributes

State and local policies and practices should support school locations that promote healthy people and healthy behaviors, including physical activity, healthy environments, and healthy communities. School siting decisions influence growth and development patterns and are influenced by these patterns. Many communities across the country are increasingly interested in ensuring that growth and development meet multiple community goals, including improving public health; supporting revitalization efforts; strengthening fiscal responsibility; increasing transportation choices; providing opportunities to live, work, play and attend school in convenient locations; and limiting emissions of greenhouse gases, criteria air pollutants and air toxics.

Selecting healthy, safe school locations in the neighborhoods of the students the schools serve helps meet many of these goals (see Exhibit 4: Desirable Attributes of Candidate Locations). Community centered schools encourage students to walk and bike between home, school and centers of community activity. In addition, locations that allow community access to school playgrounds and facilities encourage physical activity outside of school time. The location of schools in neighborhoods may allow more children to participate in after-school activities such as clubs, intramural and physical activity

clubs, interscholastic sports or activities sponsored by the community at local libraries, parks and community centers. As discussed in Principle 3 (see Section 1.4.3) in the About the Guidelines section (see Section 1), schools located within neighborhoods can also increase access to public transportation for students, faculty and staff in the neighborhood and in surrounding communities.[37,38]

4.3.1. Select Locations That Do Not Increase Environmental Health or Safety Risks

During the initial screen of candidate locations, the LEA and SSC should seek to avoid locations that are either on or are in close proximity to land uses that may be incompatible with schools, if acceptable alternative sites exist within the neighborhood(s) being served by the new school. These incompatible land uses may include contaminated sites that have not been remediated (i.e., cleaned up) to at least a residential use standard, clusters of industrial facilities, or other potential hazards identified in Exhibit 6: Screening Potential Environmental, Public Health and Safety. The section, Consider Environmental Hazards (see Section 4.4), describes some principles used to define environmental criteria and the typical environmental and safety issues that the school siting process should consider and address to ensure that the location chosen does not pose unacceptable environmental and public health risks.

If no alternative locations exist, it is critically important that the LEA and SSC fully explain the absence of alternatives in a transparent manner and fully engage the public in identifying and implementing both site-specific and community-wide exposure and risk reduction strategies to protect the health and safety of students and staff. The LEA and SSC should consult with regional planning authorities to be cognizant of future plans for development or facilities that may result in environmental or health threats to the school location (e.g., large industrial facilities). Exhibit 5: Factors Influencing Exposures and Potential Risks, introduces some potential mitigation options for potential environmental, safety and health hazards.

4.3.2. Locate Schools Near Populations and Infrastructure

Consider establishing clear goals and criteria to give preference to locations near existing populations and close to facilities and infrastructure that support school programs to minimize transportation and infrastructure costs and their related environmental, economic, public health and sustainability impacts. Additional school capacity and the location of new schools often influence the location of residential development.[39] School location is a critical aspect of quality community planning. Schools built on the fringes of communities can contribute to outward migration from city centers, which can cause disinvestment in existing neighborhoods and can hurt local economies. This phenomenon is particularly common when new school sites require the extension of infrastructure, making undeveloped areas more attractive for residential and commercial development.

Flexibility with respect to school size and site size allows communities to retain and upgrade (or replace on the same site, when necessary) existing schools. Smaller schools tend to be easier to locate near population centers, minimizing transportation needs and commuting exposures to traffic-related air pollution. Goals and criteria to

[37] Ariel H. Bierbaum, Jeffrey M. Vincent and Deborah L. McKoy, "Putting Schools on the Map: Linking Transit-Oriented Development, Families, and Schools in the San Francisco Bay Area," Center for Cities and Schools, Institute of Urban and Regional Development, University of California Berkeley (June 2010). Available at: http://citiesandschools.berkeley.edu/reports/Putting%20Schools%20on%20the%20Map_Final_Jul10_appendices.pdf.

[38] Ariel H. Bierbaum, Jeffrey M. Vincent and Deborah L. McKoy, "Linking Transit-Oriented Development, Families and Schools." *Community Investments* (Summer 2010) 22:2. 18-21. Available at: www.frbsf.org/publications/community/investments/1008/A_Bierbaum.pdf.

[39] Upper Grand District School Board, "Planning Department Frequently Asked Questions." (Accessed on September 16, 2011) Available at: http://www.ugdsb.on.ca/planning/article.aspx?id=4722.

give preference to locations near existing populations include:

- **Avoiding building schools in remote locations** that are not accessible by walking, biking and public transportation;
- **Maximizing proximity to program support facilities** such as community museums, theaters, libraries, program centers, recreational and enrichment activities and downtown commercial areas;
- **Developing joint use agreements** (see Section 10) to facilitate school access to community facilities and to allow community access to school facilities;
- **Considering proximity to other schools.** There may be local reasons to minimize or maximize distance between schools, such as the desire to promote diversity or reduce isolation in the LEA's schools; and
- **Avoiding locations that will require new infrastructure** such as roads, water/sewer or utilities.

Locating a school in the community it serves may result in proximity to pollution sources. Such situations should be addressed by considering information on associated hazards and the availability and effectiveness of mitigation options for addressing the environmental hazards, as well as the potential additional cost and time involved. Similar analyses for alternative options for locating the school should be made. With that information, communities should seek to balance the benefits of a community centered school with any potential environmental and public health risks.

4.3.3. Consider Implications of the School Location on Transportation Options

Transportation is a major factor in a school's overall environmental impact. Schools that offer more transportation choices can reduce the amount of land that is paved, reduce automobile and bus traffic and pollution and encourage walking or biking to school. Scientific literature on school travel shows clearly that the farther a school is from a child's residence, the less likely it is that the child will walk or bike to school, and that virtually no children walk over two miles to school.[40,41] Connecting a school to a network of sidewalks, bike paths and other infrastructure encourages physical activity by making walking or biking safe and enjoyable. It is also important to provide walking and biking routes that do not bring children close to large roads, highways and other major pollution sources (for both health and safety concerns). Site size, location and design all play a role in determining whether walking or biking will be an option for students. Locations that provide access for students and staff via public transit will also reduce vehicle use as well as potentially promote increased physical activity in getting to the transit stops from both home and school.

Transportation costs, either to the school district or to the families it serves, are also important to consider. For example, transportation costs to the district can include the cost to purchase, maintain and store buses; the cost of fuel and personnel; and the cost associated with an increase in school bus mileage. The costs to families may be direct (e.g., a fee for students to ride the bus) or indirect (e.g., transportation-related taxes and fuel costs associated with personally transporting their children to school). The siting process should also account for transportation cost externalities, such as the health implications of exposure to exhaust while riding the school bus or from idling vehicles. Low-income and minority families can be especially impacted by transportation costs since children may not have the option of being driven to school and often need to walk, bike, use the school bus or take public transportation. This reinforces the need to locate schools within reasonable distance and provide a safe biking and

[40] Lawrence Frank and Company, Inc., "Youth Travel to School: Community Design Relationships with Mode Choice, Vehicle Emissions, and Healthy Body Weight," Prepared for U.S. Environmental Protection Agency, Washington, DC, December 2008. Available at: www.epa.gov/smartgrowth/pdf/youth_travel.pdf.

[41] Noreen C. McDonald, "Active Transportation to School: Trends Among U.S. Schoolchildren, 1969-2001," *American Journal of Preventive Medicine* (2007) 32:6. 509-516. Available at: http://dot.ga.gov/localgovernment/FundingPrograms/srts/Documents/news/Trends_Among_US_School_Children.pdf.

walking environment for these populations. LEAs should also consider how these costs may change over the life of the school.

Communities should consider establishing goals and criteria to give preference to locations that will promote alternative modes of transportation, including walking or biking. Minimum acreage requirements, school funding formulas and building codes often favor construction of new schools over the renovation of existing neighborhood schools; however, giving preference to locations that will promote the use of public transportation, walking or biking or that require shorter driving distances will reduce transportation costs for local government, as well as parents and caregivers.[42] School consolidation policies should be carefully examined for their impact on school transportation and students' physical activity.

In new locations, schools can be designed to encourage integration with future developments by establishing street patterns, sidewalks and trail networks that support walking and biking as surrounding developments are constructed. This can happen both as part of the design and construction of the school campus and as a result of subdivision regulations guiding development within potential walking and biking distance from a school's boundary.

The SSC should assess walkability and bikeability of the area surrounding each school location under consideration and evaluate the potential long-term health effects of candidate locations on the students and staff.[43] A detailed example of how to assess the bikeability/walkability of candidate locations can be found in the "Active School Neighborhood Checklist" (www.epa.gov/schools/siting/resources.html#LINKS_cleanup_regulations_and_processes) developed in Arizona. The aim of the checklist is to provide decision makers with a quantitative tool for evaluating the potential long-term health impacts of candidate school locations on the children who will attend them. LEAs may also wish to consider conducting a health impact assessment that seeks to balance the health impacts of planning project alternatives, for example changes of transportation on air pollution and health risks. Information about health impact assessments can be found on the Resources page of the guidelines website. (www.epa.gov/schools/siting/resources.html#LINKS_health_impact_assesments)

By completing an assessment for proposed or existing school locations and comparing them, LEAs may find that one location is clearly preferable to others with regard to biking and walking potential and/or health impacts. LEAs should take the results of such assessments into consideration when selecting school locations or deciding whether to move from an existing location. If there is only one candidate location, it is still recommended that an assessment of walkability/bikeability be conducted.

If walking routes for a location are unsatisfactory, the school district should consider another location or work with the city or county to have safe walking routes installed before opening the school. New or renovated schools can act as an impetus for retrofitting or repairing sidewalk and bike trail networks in existing communities. Some localities may use different metrics and rules for determining walking/biking boundaries, and some may prioritize completion or repair of sidewalks and trail networks near school locations. Streets within realistic walking or biking distance of the location should include clear pedestrian pathways, bicycle routes, and speed control measures (e.g., traffic calming, design speeds).

[42] Renee Kuhlman, "Helping Johnny Walk to School: Policy Recommendations for Removing Barriers to Community-Centered Schools," National Trust for Historic Preservation (2010). Available at: www.preservationnation.org/issues/historic-schools/helping-johnny-walk-to-school/helping-johnny-walk-to-school.pdf.

[43] Safe Routes to School Program Arizona Department of Transportation, "Active School Neighborhood Checklist," Arizona Department of Transportation, ver. 14, August 6, 2010. Available at: http://www.adotenhancement.com/SafeRoutes/PDF/Documents_Active_School_Neighborhood_Checklist.pdf.

Commonly accepted maximum walking/biking distances are:

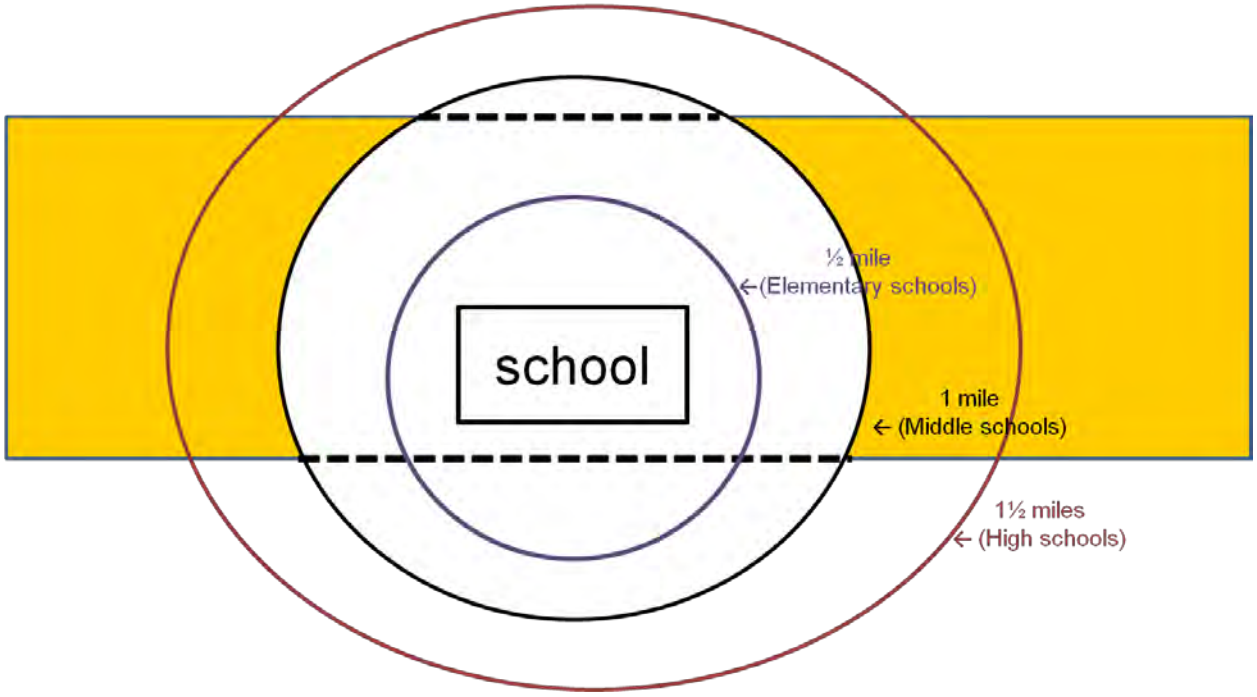
- Elementary schools: ½-mile radius around school;
- Middle schools: 1-mile radius around school; and
- High schools: 1½-mile radius around school.

The example in Exhibit 3, adapted from the "Active School Neighborhood Checklist" created by the Arizona Department of Transportation (www.adotenhancement.com/SafeRoutes/PDF/Documents_Active_School_Neighborhood_Checklist.pdf), shows a middle school enrollment area that exceeds one mile in radius and creates a prohibitively long walking/biking trip for students who live in the shaded areas.

4.3.4. Plan for and Develop Safe Routes to School Programs that Can Support Alternative Modes of Transportation

A growing number of communities are implementing measures to improve the safety of walking and biking to school. Many schools participate in a program funded by the U.S. Department of Transportation (DOT) called Safe Routes to School (www.nhtsa.gov/People/Injury/Pedbimot/Bike/Safe-Routes-2004/Index), which encourages both infrastructure improvements and education programs to help more children safely walk or bike to and from school. In addition to the federally funded program, many schools offer similar programs (also called safe passages or walk to school programs) that facilitate and encourage safe walking and biking to school. These programs often educate community members, families, students, administrators, faculty and staff on the benefits of walking and biking to school and on approaches to make walking and biking to school a safe alternative. Related efforts include improvements to existing infrastructure that

Exhibit 3: Example Enrollment Area that Creates a Prohibitively Long Walking/Biking Trip for Some Students



make routes to school safer and more convenient for walking and biking. More information about Safe Routes to Schools Programs can be found on the Resources page of the guidelines website. (www.epa.gov/schools/siting/resources.html#LINKS_Community_planning)

When planning for a new school location, the LEA and the SSC should consider ensuring that safe routes to school exist for children to bike and walk. In addition, transit connections near walking and biking routes may facilitate their use outside of the immediate school neighborhood. Factors related to walking and biking that should be considered include:

- The likelihood that bike lanes and paths, adequate sidewalks and crosswalks will be developed;
- Access to building entrances for pedestrians and bikers without crossing bus zones, parking entrances, or student drop-off and pick-up areas;
- Connectivity to transit lines for students outside the immediate neighborhood of a school;
- Bus flow plans that ensure pedestrian and bike safety;
- Accessibility for parents, students, teachers and staff with disabilities; and
- Walking and biking routes that do not cross or run adjacent to highways, other large roadways and transportation facilities (e.g., rail lines), and other large pollution sources.

Relevance of Childhood Obesity to School Locations

Today, nearly one in every three (or more than 23 million) children in the United States is overweight or obese, and physical inactivity contributes to this.[44] Children who carry their obesity into adolescence have up to an 80-percent chance of developing an associated chronic disease (e.g., high blood pressure, high cholesterol and diabetes).[45] This childhood obesity epidemic is the result of the interaction of three identified factors: genetics, behavior and environment.[46] Two of these factors are associated with an ever-decreasing amount of physical activity in the lives of our children due, in part, to how our communities are built. For example, a lack of sidewalks, safe bike paths and parks in neighborhoods can discourage children from walking or biking to school as well as from participating in physical activity. While childhood obesity does not discriminate across race and ethnicity, studies show that a disproportionate number of minority children are overweight and obese; while 30.7 percent of white children ages 2 to 19 are considered obese or overweight, 34.9 percent of African-American children and 38 percent of Mexican-American children are considered so.[47] Physical activity is especially important for youth not only because of its immediate health and academic benefits, but also because participation in physical activity tracks from youth into adulthood.[48] See Principle 3 (see Section 1.4.3) in the About the Guidelines section for further discussion (see Section 1).

[44] American Academy of Pediatrics Committee on Environmental Health, "The Built Environment: Designing Communities to Promote Physical Activity in Children," *Pediatrics* (June 2009) 123:6. 1591-1598. Online article available at: http://aappolicy.aappublications.org/cgi/content/full/pediatrics;123/6/1591.

[45] U.S. Department of Health and Human Services, "The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity," U.S. Department of Health and Human Services, Public Health Service, Office of the Surgeon General, 2001. Available at:: www.surgeongeneral.gov/topics/obesity/calltoaction/CalltoAction.pdf.

[46] Ibid.

[47] Cynthia L. Ogden, Margaret D. Carroll and Katherine M. Flegal, "High Body Mass Index for Age Among U.S. Children and Adolescents, 2003-2006," *Journal of the American Medical Association,* Washington, DC (May 2008) 299:20. 2401-2405.

[48] R.M. Malina, Institute for the Study of Youth Sports, Michigan State University, "Tracking of physical activity and physical fitness across the lifespan," *Research Quarterly for Exercise and Sport* (September 1996) 67(Suppl 3). S48-57. Available at: www.ncbi.nlm.nih.gov/pubmed/8902908.

4.3.5. Consider the Potential Use of the School as an Emergency Shelter

Although schools are built with a primary mission of providing education services to youth, schools can, and often do, serve multiple purposes for their communities. Schools located and designed to withstand natural disasters and terrorist attacks not only protect students, faculty and staff from harm, but can also serve as emergency shelters in the immediate aftermath of a disaster, particularly when proper emergency preparedness plans are coordinated among school officials, local emergency management authorities and voluntary relief organizations (such as the American Red Cross). In some jurisdictions, it may be required or encouraged for certain school facilities to be designed or available to serve as an emergency shelter for the community.

For some communities, schools may be the best suited structure to serve as a post-disaster shelter. Schools frequently contain gymnasiums or other large multipurpose spaces that can shelter large numbers of residents and frequently have food preparation and storage capacity. Further, school building locations tend to be well-known among residents and sited within the communities they serve. Because schools are public property, the financial costs of using school facilities temporarily are often minimal. Thus, choosing a school location that is central to the community and easily accessible to residents can aid in disaster preparedness, planning and recovery.

The Federal Emergency Management Agency, the Department of Health and Human Services, the Red Cross and other governmental and non-governmental entities have translated the lessons learned from Hurricane Katrina and subsequent disasters into better planning and operational considerations for both emergency and longer term community shelters. Links to these resources are available in the emergency planning section of the Resources page of the guidelines website. (www.epa.gov/schools/siting/resources.htmll#LINKS_emergency_planning_and_response)

4.3.6. Summary

Exhibit 4: Desirable Attributes of Candidate Locations is intended to summarize some of the important attributes for communities to consider in identifying candidate sites for school.

Exhibit 4: Desirable Attributes of Candidate Locations

Feature	*Description*	*Distance*	*Recommendation*	*Potential Benefit*	*References and Resources*[49]
No unacceptable environmental or public health risks	Poses the least potential for exposure and risks to children and staff from pollutants in air, soil and water	Site-specific	Conduct thorough and transparent environmental review of environmental risks	▪ Reduced risks to children and staff ▪ Avoid remediation costs ▪ Reduced potential liability and disruption due to environmental issues	*Meaningful Public Involvement* *(see Section 3)* *Environmental Review Process* *(see Section 5)* *Evaluating Impacts of Nearby Sources of Air Pollution* *(see Section 6)* *Quick Guide to Environmental Issues* *(see Section 8)*
Community facilities	Nearby community facilities, parks, public pools, etc.	½ mile	Locate school such that neighborhood resources are within walking/biking distance of schools and/or joint use is available onsite	▪ Ability to walk or bike to compatible student resources ▪ Reduced space required for parking ▪ Less air pollution ▪ Increased exercise	Community Centered Schools Resources Emergency Planning Resources Green/High Performance School Resources

[49] Visit the Resources website for additional information (www.epa.gov/schools/siting/resources.html).

Feature	*Description*	*Distance*	*Recommendation*	*Potential Benefit*	*References and Resources*[49]
Attendance boundary	Area in which most students live	½ mile to 1½ miles	Locate school such that a large portion of the student body lives within ½ mile (elementary) to 1½ miles (high school) of school	▪ Ability to walk or bike to compatible student resources ▪ Reduced space required for parking ▪ Reduced bus transportation costs ▪ Less air pollution ▪ Increased exercise	Community Centered Schools Resources
Neighborhood access via street connectivity and infrastructure	Presence of sidewalks, bike lanes, crosswalks, transit stops, etc.	½ mile	Ensure that safe routes to and from school are available for students	▪ Ability to walk or bike to compatible student resources ▪ Reduced space required for parking ▪ Reduced bus transportation costs ▪ Less air pollution ▪ Increased exercise ▪ Increased pedestrian and bike safety	Community Centered Schools Resources
Sensitive land preservation	Critical habitats, important farmland, parks, etc.	Site-specific	Avoid siting new schools on or in close proximity to existing sensitive land uses	▪ Preservation of critical land uses	Green/High Performance School Resources

Feature	*Description*	*Distance*	*Recommendation*	*Potential Benefit*	*References and Resources*[49]
Renewable energy	Potential to use alternative energy sources such as geothermal heat pumps, solar or wind	Site-specific	Make use of renewable natural resources for energy generation	▪ Contributes to green energy and sustainability	Energy Efficiency/Renewable Energy Resources Green/High Performance School Resources
Public water and sewer	Ability to tap into the public water supply and sanitary services; review the county sewer and water plan for boundary areas	Site-specific	If your school has to drill a well and become its own water source, it is a Public Water System and subject to the regulations of the Safe Drinking Water Act. If your school is on a septic system, you will need to determine if the soils are suitable according to tribal, state, municipal and/or county regulations.	▪ Little maintenance or upkeep ▪ No added regulatory or technical expertise needed to maintain a water and septic system ▪ Less costly to have municipal services	Water
Other infrastructure	Presence or absence of adequate roads, adequate traffic lights and telecommunication infrastructure	Site-specific	Take advantage of previous investments in infrastructure	▪ Avoided or reduced costs of building or extending infrastructure	Community Centered Schools Resources

4.4. Consider Environmental Hazards

The primary purpose of establishing environmental criteria for school siting is to guide the screening and evaluation of candidate school locations for natural, safety and environmental hazards to identify the location that poses the least potential health and safety risk to students and staff and financial risk to the community. While the typical steps and procedures that should be included in an effective environmental review are described in the Environmental Review Process section (see Section 5), this section describes some principles used to define environmental criteria and the typical environmental and safety issues that the school siting process should consider and address to ensure that the location chosen does not pose unacceptable environmental and public health risks. **EPA strongly recommends identifying and evaluating hazards associated with a location prior to taking title or ownership of that property, or in the case of leased space, prior to executing the lease.**

4.4.1. Potential Onsite Hazards

Current or prior site uses

A large number of properties in the United States have been contaminated by past uses or naturally occurring hazards, such as high levels of arsenic in ground water or radon in rock formations. Some of these properties fall under the oversight of EPA, in which case EPA works together with state, tribal and local authorities to assess and remediate the site. Other known contaminated properties may be under the jurisdiction of the Department of Defense, the Department of Energy or other federal land managers, such as the Bureau of Land Management or the Bureau of Indian Affairs in the Department of Interior, while others may be dealt with directly by state, tribal and local authorities. There is also an unknown number of sites that may be contaminated but have not yet been identified by federal, state, local or tribal authorities.

Applicability of the Guidelines

The school siting guidelines are NOT designed for retroactive application to previous school siting decisions. They are designed to inform and improve the school siting decision-making process from this point forward. In developing these guidelines, EPA seeks to strengthen information exchange and cooperation between LEAs, state and tribal education agencies and their environmental counterparts to better serve school children, parents, staff and their communities in providing safe school environments.

EPA recommends that districts periodically inspect existing schools for potential environmental health and safety risks using tools designed for that purpose such as EPA's Healthy School Environments Assessment Tool (HealthySEAT; www.epa.gov/schools/healthyseat/) or the NIOSH Safety Checklist Program for Schools. (www.cdc.gov/niosh/docs/2004-101/) Where deficiencies are found, steps to reduce student and staff exposure to potential hazards should be identified and implemented (see Section 9.13).

Documentation of contaminated sites can be housed in many different locations (e.g., federal or state environmental regulatory agency, local health or planning department, private property owner). This can make it difficult to find a complete record of the contamination history at the site. Efforts are underway to consolidate these different information sources through geospatial and Internet accessible methods. Currently members of the public can use EPA's MyEnvironment search application (www.epa.gov/myenvironment) to find a cross section of environmental information based on location. Additionally, members of the public can contribute to the information collection effort through their own recollections as neighbors or

employees. The public should be engaged to help establish historical uses of potential school sites and adjacent sites and to assess the likelihood and possible presence of contamination. Because these groups may also have frequent contact with the site, they can significantly contribute to efforts to ensure compliance with site use restrictions as part of long-term site management plans. The Meaningful Public Involvement section provides more information on engaging the public in the school siting process (see Section 3).

Existing structures

While there are economic, social and environmental benefits to renovating/reusing an existing structure for a school, it is important for the LEA and the SSC to be aware that a number of products used historically in building construction (e.g., asbestos, lead, PCBs) are now recognized to be potentially hazardous to the health of children and adults in certain situations, such as when disturbed or managed unsafely by improperly trained staff or contractors. LEAs considering renovating existing schools or structures for school use or adapting other existing structures for educational purposes should weigh the hazards and the costs of the safe removal or management of these hazardous materials compared to the steps and costs associated with evaluating and acquiring sites to construct new school facilities. Links to more information on considerations related to existing buildings are provided in the Resources page of the guidelines website. (www.epa.gov/schools/siting/resources.html#LINKS_maps_and_mapping)

Natural hazards

The potential for natural hazards should be explored in decisions to renovate existing schools, as well as all potential new school locations. The natural hazards may be common or unique to the area and may include the site's geology (naturally occurring hazards such as elevated levels of radon, arsenic or other naturally occurring toxic materials), areas of seismic activity, flooding or frequent wildfires, or areas prone to extreme weather events. Additional consideration may need to be given to natural hazards where school facilities are also planned or renovated to serve as temporary or longer term emergency shelters. Links to more information on natural hazards are provided in the Resources page of the guidelines website. (www.epa.gov/schools/siting/resources.html#LINKS_natural_hazards)

4.4.2. Potential Nearby Hazards

There is a wide range of potential environmental and safety hazards that may be located in close proximity to a prospective school location. The offsite hazards may change over time as areas are developed for industrial, transportation or other new uses; existing facilities change production processes, activity or configuration; or unforeseen events, such as spills, occur. Identifying, evaluating and planning for potential hazards from nearby sources is a critical component of successful school siting. Characterizing potential risks from nearby hazards is challenging because of the wide range of variables that influence whether there is an actual exposure to a potential hazard that may pose a risk. Additional factors to consider are whether physical, engineering or other controls can reduce or remove exposures, thus reducing risk, if such measures are properly maintained.

Exhibit 5: Factors Influencing Exposures and Potential Risks, presents some of the environmental hazards that may be on or located near candidate sites, the variables that influence the potential for exposure and risk, and mitigation options for each hazard. In some cases, the mitigation options differ if there will be a new school facility constructed **(N)** or if there is an existing structure that is being renovated **(E)**. These differences are designated in the table.

Exhibit 5: Factors Influencing Exposures and Potential Risks

Potential Hazard	*Potential Variables*	*Potential Mitigation Options* ***N**=New schools* ***E**=Existing structure*
Air Pollution (see Section 8.1)	▪ Type and volume of contaminant released ▪ Distance from the source ▪ Nearby traffic type, fuel, volume and speed (mobile sources) ▪ Stack height, facility practices and type of pollution control employed (stationary/point sources) ▪ Timing of operations (stationary/point sources) ▪ Meteorological conditions (e.g., prevailing wind direction and wind speed) ▪ Atmospheric stability and mixing ▪ Regulatory compliance ▪ Intensity of use ▪ Presence of natural or man-made buffers (e.g., trees, hills, buildings) ▪ Planning and zoning	▪ Adopt an area-wide approach to address air pollution issues **(N/E)** ▪ Maximize distance from transportation or other pollution sources **(N)** ▪ Vegetation buffers **(N/E)** ▪ Anti-idling policies **(N/E)** ▪ Limiting bus or personal car use on and near campus **(N/E)** ▪ Enhanced indoor filtration/air cleaning **(N/E)** ▪ Locating sensitive activities and outside air intakes away from sources (e.g., locate playgrounds and classrooms away from source; place parking lots, utilities closer) **(N/E)** ▪ Timing of HVAC system operations **(N/E)** or industry operating periods **(N/E)** ▪ Limiting outdoor activities during high exposure periods **(N/E)**
Soil Contamination	▪ Type of contamination ▪ Extent of contamination ▪ Concentration of contamination ▪ Depth of contamination ▪ Potential transport (e.g., runoff or migration to ground water, air transport) ▪ Geology and soil characteristics ▪ Water table ▪ Access or exposure potential (e.g., dermal contact/ingestion) ▪ Barriers (e.g., plants, grass, ground cover, pavement)	▪ Site cleanup and removal **(N/E)** ▪ Onsite treatment **(N/E)** ▪ Engineering controls (e.g., cap, venting systems, vapor barriers) **(N/E)** ▪ Institutional controls **(N/E)**

Potential Hazard	*Potential Variables*	*Potential Mitigation Options* ***N**=New schools* ***E**=Existing structure*
Use of Agricultural Pesticides (see Section 8.12)	▪ Use pattern (application rate, crop type) ▪ Environmental conditions (wind, temperature, etc.) ▪ Toxicity of the pesticide ▪ Volatility ▪ Persistence	▪ Application of Integrated Pest Management measures to reduce pesticide use **(N/E)** ▪ Choice of pesticide active ingredients **(N/E)** ▪ Oversight and strict enforcement of product label use directions and drift restrictions **(N/E)**[50] ▪ Use of drift reducing application technologies and best management practices **(N/E)** ▪ Enhanced indoor filtration/air cleaning **(N/E)** ▪ Locating sensitive activities and outside air intakes away from sources (e.g., locate playgrounds and classrooms away from source; place parking lots, utilities closer) **(N/E)** ▪ Timing of HVAC system operations **(N/E)** ▪ Limit opening of classroom doors and windows during periods of potential spray drift **(E)** ▪ Limiting outdoor activities during high potential exposure periods **(E)** ▪ Notification when pesticides are applied **(N/E)**

[50] Buffer zones are specified on all pesticide product labels. The buffer zones provide flexibility based on several factors such as application rate, field size, application method, and soil characterization.

Potential Hazard	*Potential Variables*	*Potential Mitigation Options* ***N**=New schools* ***E**=Existing structure*
Ground Water Contamination	▪ Type of contaminant(s) ▪ Type and frequency of contact with contaminated water ▪ Type of contact with contaminated water/route of exposure (e.g., ingestion) ▪ Extent of contamination ▪ Concentration of contaminants ▪ Extent of vapor intrusion (for certain contaminants)	▪ Seek alternative drinking water sources or install water treatment systems **(N/E)** ▪ Restrict access to water bodies **(N/E)** ▪ Phytoremediation **(N/E)** ▪ Mitigation system for vapor intrusion **(N)**
Surface Water Pollution	▪ Type of contaminant(s) ▪ Type and frequency of contact with contaminated water/route of exposure (e.g., dermal) ▪ Extent of contamination ▪ Concentration of contaminants ▪ Stormwater runoff	▪ Improve riparian buffers **(N/E)** ▪ Restrict access to water bodies **(N/E)** ▪ Green roof, rain gardens and barrels **(N/E)**
Safety Hazards	▪ Frequency ▪ Intensity of hazard (e.g., explosion vs. flooding)	▪ Emergency response plans **(N/E)** ▪ Emergency shelter design incorporated **(N)**
Noise (www.epa.gov/schools/siting/resources.html#LINKS_noise)	▪ Distance ▪ Timing and intensity of source ▪ Presence of natural or man-made buffers (e.g., hills, noise barriers)	▪ Active noise control **(N/E)** ▪ Install or preserve noise barriers (e.g., highway barriers or other noise buffers) **(N/E)**
Odors	▪ Timing of operations ▪ Meteorological conditions (e.g., prevailing wind direction and wind speed)	▪ Locating sensitive activities and outside air intakes away from sources (e.g., locate playgrounds and classrooms away from source; place parking lots, utilities closer) **(N/E)** ▪ Enhanced indoor filtration/air cleaning **(N/E)**

4.4.3. Screening Locations for Potential Environmental Hazards

The initial screening process of identifying and narrowing potential school location choices takes into account a wide range of school siting considerations and challenges. Among the most important of these is to identify potential environmental and public health concerns as early in the process as possible to fully understand the potential costs and benefits of candidate locations before deciding to pursue a particular site. Unanticipated environmental issues can be extremely costly in terms of cleanup costs, time delays, community concern and potential loss of support for siting choices. A full understanding of the potential risks of candidate sites to ensure that a prospective school site does not pose unacceptable health and safety risks to students and staff is very important but can be costly and time-consuming. For this reason, it may be desirable to try to avoid sites that have onsite contamination or are in very close proximity to pollution generating land uses at the initial stage of identifying candidate sites if other acceptable locations exist in the community that may pose fewer environmental challenges.

Exhibit 6: Screening Potential Environmental, Public Health and Safety Hazards, below, contains a list of potential environmental and safety hazards that should be identified, evaluated and weighed, along with other factors, in choosing a school location. In general, the closer a potential hazard is to a candidate location for a school, the more important it is to gain an early understanding of the potential risks that may be associated with that hazard. Exhibit 6 is intended to be used in conjunction with the example Environmental Review Process (see Section 5) and with Evaluating Impacts of Nearby Sources of Air Pollution (see Section 6).

Screening perimeters can help the LEA and SSC quickly identify activities or features on or in the area surrounding a prospective school location that have the potential to pose a hazard to students and staff and warrant further evaluation. These include a wide range of potential ongoing sources of air, water and land contamination as well as features or activities that may pose safety risks from accidental releases. For potential school locations identified within the "screening perimeter" of an environmental feature, further study is warranted to ensure that the potential risks associated with that feature are not significant.

Screening perimeters are intended to facilitate:

- Rapid identification of land uses near candidate school locations that could potentially pose health and safety hazards to students and staff;
- Consultation with appropriate state, tribal, local and other authorities, local stakeholders and the public to assist with the evaluation; and
- Consideration of appropriate mitigation or separation strategies to reduce potential risks within the context of the broader school siting decision-making process.

Determining screening distances for various hazards is, to a large degree, a matter of best professional judgment. Several jurisdictions have adopted screening distances based primarily on existing state or local rules, law, ordinance, policy or guidance. Links to this information are provided on the Resources page of the guidelines website (www.epa.gov/schools/siting/resources). In the following table, EPA has included recommended screening distances based on existing approaches at the state and local level as *approximate* distances within which EPA recommends that potential hazards should be identified and considered for additional study.

NOTE: Screening distances are intended to identify potential land uses near candidate school locations that warrant further consideration rather than to identify land uses that may be incompatible with the location of schools. Screening distances, alone, may not be predictive of the actual potential for a source located within that distance to present an environmental or health hazard. Potential hazards associated with candidate school locations should be evaluated as part of the site screening and evaluation process.

Exhibit 6: Screening Potential Environmental, Public Health and Safety Hazards

IMPORTANT: This table is intended to assist with the initial screening of candidate locations but is NOT a substitute for case- and site-specific evaluation of potential risks and hazards. It is intended to be used in conjunction with the example Environmental Review Process (see Section 5) and Evaluating Impacts of Nearby Sources of Air Pollution (see Section 6). For more information on typical environmental hazards that may be encountered during the school siting process, see the Quick Guide to Environmental Issues in Section 8). Existing applicable federal, state, tribal or local statutes, ordinances, codes or regulations take precedence over the recommendations contained in this table. Users should check with state, tribal and local authorities for applicable requirements or other recommendations.

Feature/Land Use	*Description*	*Potential Hazard(s)*	*Recommendations*		*Additional Information*[51]
			Screening Perimeter	*Evaluation*	
Onsite buildings or structures (including all leased space)	▪ All onsite or adjacent buildings/structures slated for reuse, renovation or demolition.	▪ Legacy contaminants in existing structures including lead and other heavy metals, asbestos, PCBs, vapor intrusion/(VOCs), mold, radon, pesticides, pests ▪ For existing school buildings, chemicals from laboratory, art, shop, drama, maintenance, cleaning, grounds ▪ Structure may not meet current building codes (e.g., for seismic activity)	▪ All onsite structures slated for demolition, reuse or renovation	▪ Evaluate for the presence of hazardous materials or conditions. Age, location, condition and type of structure, and the history of use are critical factors to consider in assessing potential risks. Identify all potential hazards and remediate as appropriate.	▪ *Lead* ▪ *Heavy Metals* ▪ *Asbestos* ▪ PCBs ▪ *Vapor Intrusion/ (VOCs)* ▪ *Mold* ▪ *Radon* ▪ *Mercury* ▪ *Pesticides* ▪ *Air Pollution* ▪ *Risk Assessment*

[51] See the Resources page of the guidelines website for links related to the topics listed under the 'Additional Information.' (www.epa.gov/schools/siting/resources)

Feature/Land Use	*Description*	*Potential Hazard(s)*	*Recommendations*		*Additional Information*[51]
			Screening Perimeter	*Evaluation*	
Contaminated sites (formerly or currently regulated under Superfund, RCRA hazardous waste sites, state-regulated hazardous waste sites, or unremediated sites under federal, tribal or state orders or agreements for cleanup)	▪ Properties that have or are managing hazardous waste onsite, or have had releases of hazardous waste in the past, and are under federal (CERCLA, RCRA Subtitle C), tribal or state regulation.	▪ Air pollution ▪ Dust ▪ Soil contamination ▪ Ground water contamination ▪ Vapor intrusion into structures ▪ Surface water contamination ▪ Odors ▪ Accidental release/spill of hazardous chemicals	▪ Identify and evaluate all facilities within~1 mile of prospective locations ▪ Applies to both onsite as well as adjacent or nearby sites	▪ Evaluate on a case- and site-specific basis. See Exhibit 5 for potential variables and mitigation options. ▪ Regulating agencies should be consulted to obtain environmental status of the site, if it has been assessed. The site may have had contamination removed or addressed, and be safe for use, or the site may still need additional cleanup. The site should not be used for a school unless regulating agencies can confirm that the potential for unsafe human exposures has been prevented.	▪ *Air Pollution* ▪ *Risk Assessment* ▪ *Maps and Mapping* ▪ *Vapor Intrusion/ (VOCs)* ▪ *Heavy Metals in Soil and Ground Water* ▪ *Water*

Feature/Land Use	*Description*	*Potential Hazard(s)*	*Recommendations*		*Additional Information*[51]
			Screening Perimeter	*Evaluation*	
Solid waste landfills and transfer stations	▪ Properties that have or are managing non-hazardous solid waste.	▪ Air pollution ▪ Soil contamination ▪ Ground water contamination ▪ Vapor intrusion into structures ▪ Surface water contamination ▪ Odors ▪ Pests and disease vectors ▪ Diesel emissions and heavy truck traffic ▪ Fires	▪ Identify and evaluate all facilities within ~1 mile of prospective locations ▪ Applies to both onsite as well as adjacent or nearby sites	▪ Evaluate on a case- and site-specific basis. See Exhibit 5 for potential variables and mitigation options. ▪ Regulating agencies should be consulted to obtain environmental status of the site, if it has been assessed. The site may have had contamination removed or addressed, and be safe for use, or the site may still need additional cleanup. The site should not be used for a school unless regulating agencies can confirm that the potential for unsafe human exposures has been prevented.	▪ *Air Pollution* ▪ *Heavy Metals in Soil and Ground Water* ▪ *Vapor Intrusion/ (VOCs)* ▪ *Risk Assessment* ▪ *Maps and Mapping* ▪ *Water*

Feature/Land Use	*Description*	*Potential Hazard(s)*	*Recommendations*		*Additional Information*[51]
			Screening Perimeter	*Evaluation*	
Formerly Used Defense Sites (FUDS)	▪ Properties formerly owned, leased, possessed or used by the Department of Defense (DOD) or its components that were transferred from DOD control prior to the enactment of the Superfund Amendments and Reauthorization Act (SARA). The FUDS program communicates with regulatory agencies, tribes and the public to ensure proper characterization and cleanup of past DOD lands.	▪ Unexploded ordnance (FUDS) ▪ Discarded military munitions ▪ Munitions constituents ▪ Surface water contamination ▪ Ground water contamination ▪ Legacy contaminants in existing structures including lead and other heavy metals, asbestos, PCBs, vapor intrusion/(VOCs), mold, radon, pesticides, pests	▪ Identify and evaluate all facilities within ~1 mile of prospective locations ▪ Applies to both onsite as well as adjacent or nearby sites	▪ Consult with state, tribal and local authorities to identify sites.	▪ *Formerly Used Defense Sites* ▪ *Maps and Mapping* ▪ *Water*

Feature/Land Use	*Description*	*Potential Hazard(s)*	*Recommendations*		*Additional Information*[51]
			Screening Perimeter	*Evaluation*	
High-traffic roads and highways	▪ High-traffic roads or roads with heavy diesel truck traffic.	▪ Air pollution ▪ Noise ▪ Accidental releases/spills of hazardous chemicals ▪ Pedestrian and bike safety	▪ Identify and evaluate all high-traffic roads and highways within ~½ mile ▪ Roads farther away with a high likelihood of accidental releases should also be considered	▪ In general, air pollutant concentrations will be highest closer to the source, decreasing with distance from the road. Many factors affect the magnitude and extent of impacts, so the potential variables and mitigation options described in Exhibit 5 should be evaluated. Consider additional mitigation strategies for locations near high-traffic roads. Also, consider potential adverse consequences related to inability of students to walk/bike to school, etc.	▪ *Roads* ▪ *Air Pollution* ▪ *Noise* ▪ *Risk Assessment* ▪ *Water*
Distribution centers, bus terminals, bus garages and truck-stops	▪ Facilities with more than 100 trucks/buses per day, or more than 40 refrigerated trucks per day.	▪ Air pollution, including diesel emissions ▪ Soil contamination ▪ Ground water contamination ▪ Surface water contamination ▪ Vapor intrusion ▪ Heavy truck or bus traffic	▪ Identify and evaluate all major distribution centers within ~½ mile ▪ Centers farther away with a high likelihood of accidental releases should also be considered	▪ Evaluate on a case- and site-specific basis. See Exhibit 5 for potential variables and mitigation options.	▪ *Risk Assessment* ▪ *Maps and Mapping* ▪ *Vapor Intrusion/ (VOCs)*

Feature/Land Use	*Description*	*Potential Hazard(s)*	*Recommendations*		*Additional Information*[51]
			Screening Perimeter	*Evaluation*	
Large industrial facilities	▪ Fossil fuel power plants (more than 50 MW), incinerators, refineries, chemical/ pharmaceutical/rubber and plastics plants, cement kilns, metal foundries and smelters, other large industrial facilities.	▪ Air pollution ▪ Soil contamination ▪ Ground water contamination ▪ Surface water contamination ▪ Accidental releases/spills of hazardous chemicals ▪ Odors ▪ Heavy vehicular traffic	▪ Identify and evaluate all large industrial facilities within ~½ mile	▪ Evaluate on a case- and site-specific basis. See Exhibit 5 for potential variables and mitigation options. ▪ Consult with local air quality agencies to determine sites with high concentrations nearby.	▪ *Air Pollution* ▪ *Risk Assessment* ▪ *Maps and Mapping* ▪ *Vapor Intrusion/ (VOCs)* ▪ *Water*
Other large sources	▪ Metal platers (especially chrome), rendering plants, sewage treatment plants, composting operations, fertilizer or cement plants, large manufacturing facilities.	▪ Air pollution ▪ Soil contamination ▪ Ground water contamination ▪ Surface water contamination ▪ Accidental releases/spills of hazardous chemicals ▪ Odors	▪ Identify and evaluate all other large sources within ~½ mile	▪ Evaluate on a case- and site-specific basis. See Exhibit 5 for potential variables and mitigation options. ▪ Consult with local air quality agencies to determine appropriate separation.	▪ *Air Pollution* ▪ *Risk Assessment* ▪ *Maps and Mapping* ▪ *Vapor Intrusion/ (VOCs)* ▪ *Water*

Feature/Land Use	*Description*	*Potential Hazard(s)*	*Recommendations*		*Additional Information*[51]
			Screening Perimeter	*Evaluation*	
Gas stations and other fuel dispensing facilities	▪ Large gas station dispense more than 3.6 million gallons per year.	▪ Air pollution ▪ Soil contamination ▪ Ground water contamination ▪ Vapor intrusion into structures ▪ Heavy vehicular traffic	▪ Identify and evaluate gas stations and other fuel dispensing facilities within ~1,000 feet of prospective school locations ▪ Applies to both onsite as well as adjacent or nearby locations	▪ Evaluate on a case- and site-specific basis. See Exhibit 5 for potential variables and mitigation options. ▪ Consult with state, tribal and local authorities for applicable requirements. ▪ Evaluate for spills, leaking underground storage tanks, potential air emissions.	▪ *Air Pollution* ▪ *Risk Assessment* ▪ *Maps and Mapping* ▪ *Underground Storage Tanks* ▪ *Vapor Intrusion/ (VOCs)*
Dry cleaners	▪ Facilities using perchloroethylene or similarly toxic chemicals.	▪ Air pollution ▪ Soil contamination ▪ Ground water contamination ▪ Vapor intrusion into structures	▪ Identify and evaluate dry cleaning operations within ~1,000 feet of prospective school locations ▪ Applies to both onsite as well as adjacent or nearby locations	▪ Evaluate on a case- and site-specific basis. See Exhibit 5 for potential variables and mitigation options. ▪ Consult with state, tribal and local authorities for applicable requirements. ▪ Consult with local environmental agencies to determine locations with high concentrations.	▪ *Air Pollution* ▪ *Risk Assessment* ▪ *Maps and Mapping* ▪ *Vapor Intrusion/ (VOCs)*

Feature/Land Use	*Description*	*Potential Hazard(s)*	*Recommendations*		*Additional Information*[51]
			Screening Perimeter	*Evaluation*	
Other area/small sources	▪ Auto body shops, furniture manufacturing and repair; wood product manufacturing or processing; printing, electronics and chip manufacturing; charbroilers, commercial sterilization, back-up generators; small neighborhood metal platers	▪ Air pollution ▪ Soil contamination ▪ Ground water contamination ▪ Surface water contamination ▪ Odors ▪ Vapor intrusion into structures	▪ Identify and evaluate other small sources within ~1,000 feet of prospective school locations ▪ Applies to both onsite as well as adjacent or nearby locations	▪ Evaluate on a case- and site-specific basis. See Exhibit 5 for potential variables and mitigation options. ▪ Consult with local health and/or environmental agencies to determine locations with high concentrations.	▪ *Air Pollution* ▪ *Risk Assessment* ▪ *Maps and Mapping*
Large agricultural growing operations	▪ Operations employing aerial pesticide spraying	▪ Air pollution (from volatilization and drift) ▪ Soil contamination ▪ Ground water contamination ▪ Surface water contamination	▪ Identify and evaluate all large agricultural growing operations within ~3 miles	▪ Evaluate on a case- and site-specific basis. See Exhibit 5 for potential variables and mitigation options.	▪ *Air Pollution* ▪ *Risk Assessment* ▪ *Maps and Mapping* ▪ *Water*
Large concentrated animal feeding operations	▪ Animal feeding operations	▪ Air pollution ▪ Soil contamination ▪ Ground water contamination ▪ Surface water contamination ▪ Odors	▪ Identify and evaluate all animal feeding operations within ~1 – 3 miles	▪ Evaluate on a case- and site-specific basis. See Exhibit 5 for potential variables and mitigation options. ▪ Consult with local health and/or environmental agencies to determine locations with high concentrations.	▪ *Concentrated Animal Feeding Operations* ▪ *Air Pollution* ▪ *Risk Assessment* ▪ *Maps and Mapping* ▪ *Water*

Feature/Land Use	*Description*	*Potential Hazard(s)*	*Recommendations*		*Additional Information*[51]
			Screening Perimeter	*Evaluation*	
Ports	▪ Marine ports with more than 100 truck visits/day	▪ Air pollution ▪ Noise ▪ Soil contamination ▪ Surface water contamination ▪ Heavy vehicular traffic ▪ Accidental releases/spills of hazardous chemicals	▪ Identify and evaluate all port facilities within ~1 mile ▪ Ports farther away with a high likelihood of accidental releases should also be considered	▪ Evaluate on a case- and site-specific basis. See Exhibit 5 for potential variables and mitigation options.	▪ *Air Pollution* ▪ *Noise* ▪ *Risk Assessment* ▪ *Maps and Mapping* ▪ *Vapor Intrusion/ (VOCs)*
Rail yards, intermodal freight terminals and major rail lines	▪ A major service and maintenance rail yard; Rail lines serving more than 50 trains/day (excluding electric light rail, except for safety)	▪ Air pollution ▪ Noise ▪ Odors ▪ Soil contamination ▪ Ground water contamination ▪ Vapor intrusion into structures ▪ Accidental releases/spills of hazardous chemicals ▪ Fire/explosions ▪ Safety ▪ Large truck traffic	▪ Identify and evaluate all major rail yards, intermodal freight terminals and rail lines within ~1 mile ▪ Rail facilities farther away with a high likelihood of accidental releases should also be considered	▪ Evaluate on a case- and site-specific basis. See Exhibit 5 for potential variables and mitigation options. ▪ Consult with local air quality agencies to determine locations with high concentrations. ▪ Consider additional mitigation approaches.	▪ *Air Pollution* ▪ *Noise* ▪ *Risk Assessment* ▪ *Maps and Mapping* ▪ *Vapor Intrusion/ (VOCs)*

Feature/Land Use	*Description*	*Potential Hazard(s)*	*Recommendations*		*Additional Information*[51]
			Screening Perimeter	*Evaluation*	
Rail lines	▪ All rail lines (excluding electric light rail)	▪ Air pollution ▪ Noise ▪ Odors ▪ Soil contamination ▪ Ground water contamination ▪ Physical hazards due to derailment ▪ Hazardous cargo spills ▪ Train road crossings and access to rail tracks	▪ Identify and evaluate all rail lines within ~1/2 mile ▪ Rail lines farther away with a high likelihood of accidental releases should also be considered	▪ Evaluate on a case- and site-specific basis. Evaluate safety based on cargo, speed, traffic, etc. See Potential Variables under Exhibit 5. ▪ Consult with local air quality agencies to determine locations with high concentrations. ▪ Consider additional mitigation approaches.	▪ *Rail Yards and Rail Lines* ▪ *Maps and Mapping* ▪ *Noise*
Airports and heliports	▪ All commercial and military airports, consider flight patterns/runway configuration	▪ Safety concerns near runways ▪ Noise ▪ Air pollution	▪ Identify and evaluate all locations within ~2 miles from runways	▪ Evaluate on a case- and site-specific basis. See Exhibit 5 for potential variables and mitigation options. ▪ Consult with state, tribal and local authorities for applicable requirements. ▪ Consult with local air quality agencies to determine locations with high concentrations.	▪ *Airports* ▪ *Maps and Mapping* ▪ *Noise*

Feature/Land Use	*Description*	*Potential Hazard(s)*	*Recommendations*		*Additional Information*[51]
			Screening Perimeter	*Evaluation*	
Power lines	▪ High voltage power lines more than 50 kV.	▪ Exposure to electromagnetic fields ▪ Safety concerns if power lines fall	▪ Identify and evaluate all high voltage power lines within ~500 feet of prospective school locations ▪ Applies to both onsite as well as adjacent or nearby locations	▪ Consult with state, tribal and/or local authorities for requirements. ▪ Variable, depending on voltage and if lines are above ground or below ground.	▪ *Power Lines* ▪ *Electromagnetic Fields*
Cellular phone towers	▪ All cellular phone towers and antennas.	▪ Exposure to electromagnetic fields ▪ Fall distance of towers	▪ Identify and evaluate cell towers within ~200 feet of prospective school locations ▪ Applies to both onsite as well as adjacent or nearby locations	▪ Review and apply Federal Communications Commission regulatory guidance.	▪ *Electromagnetic Fields*
Hazardous material pipelines	▪ Oil pipelines, high pressure natural gas pipelines, chemical pipelines, high pressure water lines.	▪ Soil contamination Ground water contamination ▪ Accidental release/spills of hazardous materials ▪ Fire/heat from flammable fuels ▪ Flooding/erosion from water ▪ Explosion hazard	▪ Identify and evaluate hazardous material pipelines within ~1,500 feet of prospective school locations ▪ Applies to both onsite as well as adjacent or nearby locations	▪ No hazardous pipelines on site (except natural gas serving school).	▪ *Pipelines* ▪ *Maps and Mapping* ▪ *Water*

Feature/Land Use	*Description*	*Potential Hazard(s)*	*Recommendations*		*Additional Information*[51]
			Screening Perimeter	*Evaluation*	
Reservoirs, water or fuel storage tanks	▪ All aboveground large volume liquid storage tanks	▪ Potential for inundation in an accident ▪ Surface water contamination ▪ Ground water contamination ▪ Vapor intrusion into structures ▪ Air pollution	▪ Identify and evaluate reservoirs, water or fuel storage tanks within ~1,500 feet of prospective school locations ▪ Applies to both onsite as well as adjacent or nearby locations	▪ Evaluate drainage direction and emergency planning options.	▪ *Aboveground Storage Tanks* ▪ *Maps and Mapping* ▪ *Water*
Geologic features	▪ Earthquake faults, liquefaction zones, volcanic/geothermal activity, landslide/lahar zones, flood zones, methane zones, naturally occurring hazardous materials (examples: asbestos, uranium, radon) areas, etc., reservoirs, high water table	▪ Natural hazards ▪ Air pollution ▪ Soil contamination ▪ Surface water contamination ▪ Ground water contamination ▪ Dust ▪ Moisture intrusion	▪ Identify and evaluate potential geologic hazards within ~¼ mile of prospective school locations ▪ Applies to both onsite as well as adjacent or nearby locations	▪ Evaluate geologic/ geotechnical hazards for every location.	▪ *Natural Hazards* ▪ *Maps and Mapping*

5. Environmental Review Process

5.1. Overview

While the decision to build a new school is primarily focused on the educational needs of children in the community and reflects a great many local factors and considerations, a full understanding of the environmental issues associated with each candidate site is essential for a fully informed school siting decision.

The example environmental review process presented in this section describes a process of evaluating candidate sites that are under serious consideration as a location for a school. EPA recommends that all sites under serious consideration undergo an initial screen (see Section 5.5) and preliminary environmental assessment (see Section 5.6). If no environmental concerns are found in the preliminary assessment, no further assessment is needed. If potential environmental concerns are found, the local education agency (LEA)(see Section 10) should select a different site or perform a comprehensive environmental assessment (see Section 5.7) to ensure that environmental concerns are identified and remediated (i.e., cleaned up) or mitigated, as appropriate. If remediation or mitigation is necessary to prevent exposures, site-specific remediation/mitigation measures (see Section 5.7 and 5.8) and a long-term stewardship plan (see Section 5.9) should be developed, reviewed by the public and implemented.

> You will see the word "site" mentioned throughout this section, which is an established term in the environmental profession. Its use should not be interpreted to reference only vacant sites or greenfields; it includes locations (sites) with existing buildings.

A full understanding of the potential risks of candidate sites to ensure that a prospective school site does not pose unacceptable health and safety risks to students and staff is very important but can be costly and time-consuming. For this reason, it may be desirable to try to avoid sites that have onsite contamination or are in very close proximity to pollution generating land uses at the initial stage of identifying candidate sites if other acceptable locations exist in the community that may pose fewer environmental challenges.

5.2. Why Is an Effective Environmental Review of Prospective Candidate Sites So Important?

Children, particularly younger children, may be more vulnerable when exposed to contaminants in both indoor and outdoor environments. There are multiple pathways for potential exposures to contaminants in air, water or soil that should be considered during the site evaluation process. Indoor pathways can include vapor intrusion into structures from soil and ground water and poor indoor air quality from infiltration of air contaminants through windows, doors and ventilation air intakes. Children competing in outdoor sports or playing on school grounds could be exposed to contaminants present in soil, water and outdoor air on school grounds. Therefore, it is important to determine whether a site is

contaminated or could be impacted by contaminants that may migrate to the site from nearby air, land and water sources. If these contaminants reach a level that poses a threat to the health of children and staff, cleanup or other mitigation actions may be required to prevent unacceptable exposures. These contaminants may be present due to historical and current industrial activity, unsafe demolition practices, illegal dumping or through material brought to a site, such as fill, which could have resulted in soil, ground water or surface water contamination. EPA recommends that all properties or structures proposed for use as a school be carefully evaluated for potential environmental contaminants and potential exposures of children, staff and visitors before making final decisions to use a site or structure for a school. The site evaluation process should identify and evaluate all potential safety hazards and sources of environmental contamination that may be present at the site or which may migrate to the site from nearby sources.

The environmental review process for candidate school sites is designed to answer the following questions:

- Are site surface soils, subsurface soils, soil gases, ground water or surface water contaminated with hazardous materials and substances to a degree that the site should be remediated before use or should not be used for school purposes (i.e., onsite contamination);
- Are there offsite sources of pollution, contaminants or other environmental hazards affecting the site such that the hazards should be mitigated before use of the site or the location should not be used for school purposes (i.e., offsite environmental impacts); and
- Are there environmental and public health impacts associated with putting a school on the site that should be mitigated or that are so significant that the site cannot safely be used for school purposes (i.e., impacts of the project on the environment)?

NOTE: LEAs, as well as states and tribes (see Section 7), are encouraged to adopt and use an environmental review process comparable to the process outlined in this section to the maximum extent possible. However, EPA recognizes that elements of the process outlined may be beyond the current capacity of some LEAs, states, tribes and other participants in the process to fully implement with existing authorities, expertise and resources. EPA encourages LEAs, states, tribes, communities and other interested organizations to work collaboratively with each other to identify opportunities to leverage existing resources as well as to identify and work toward fulfilling needs for improving local, state and tribal capacity to conduct a rigorous site evaluation process and to safely operate risk reduction measures such as lead encapsulation systems.

Existing State Requirements

Some states, such as California, Maryland, Minnesota, New Jersey, New York and Washington, require sponsors of new school construction projects to assess the environmental impact of the project as part of a state environmental review process. Other states have environmental review laws including Connecticut, Georgia, Hawaii, Indiana, Montana, North Carolina, South Dakota, Virginia and Wisconsin. The extent to which human health impacts are considered in such reviews varies. More information can be found on the Resources page of the guidelines website. (www.epa.gov/schools/siting/resources.html#LINKS_States)

5.2.1. The Importance of Meaningful Public Involvement

An essential prerequisite to an effective site review and selection process is to develop and formalize substantive public involvement in site selection decisions (see Section 3). LEAs should develop a communication plan at the beginning of the process. When draft and final reports are available for public comment, written notice of the

results of the reports should be posted on the website, sent to those identified in the communications plan and should include:

- A statement that a report has been completed;
- A brief statement in plain language describing its specific components and results;
- The location where people can review a copy of the report or an executive summary written in the appropriate foreign language (if applicable);
- Announcement of a public comment period that provides a reasonable opportunity for meaningful public involvement (typically 30 – 90 days, as determined by the circumstances, LEA practice or recommendations of the state or tribal environmental agency);
- Instructions and addresses for submitting public comments; and
- The date, time and location of any scheduled public meetings.

More information on the process for establishing and maintaining meaningful public involvement can be found in the Meaningful Public Involvement (see Section 3).

5.3. Recommended Environmental Review Process

The example environmental review process presented in this section and illustrated in the flow charts describes a transparent, thorough, prospective process for evaluation of potential school sites and structures. The purpose of the process is to ensure that all potential hazards are addressed prior to the decision to acquire land or use a particular location or structure for a school or other purpose where children will spend a significant amount of time (see Section 1.1).

If no significant environmental and public health issues are found during the initial screening stages (Stage 1, Section 5.5 and Stage 2, Section 5.6), no further assessment is needed. Later stages should be used for those sites that may have contamination issues (onsite or from nearby sources) that must be resolved prior to use for a school.

Ideally, the LEA should not acquire or lease any location for school use until the appropriate environmental review has been completed (e.g., Stage 2, Section 5.6, for sites with no or few environmental issues and Stage 5, Section 5.9, for sites with significant contamination issues). The most resource intensive environmental reviews of candidate school locations occur in Stages 3-5.

The following site review and selection process recommends state and tribal environmental regulatory approval and oversight for evaluation of onsite contamination of candidate sites. States and tribes (see Section 7) can also provide technical assistance for an evaluation of offsite environmental hazards and the potential environmental impacts associated with placing a school on a candidate site. However, the actual tribal or state and local oversight relationships for various steps in the environmental review process may vary, with state or tribal policies mandating greater or lesser oversight.

All state and most tribal environmental regulatory agencies (http://www.astswmo.org/Pages/Resources/State_Agency_Links.htm) have programs in place to evaluate and approve cleanup plans of onsite contamination for specific types of sites or projects. Few states currently require sponsors of new school construction projects to assess the environmental impact of the project as part of a state environmental review process. EPA encourages LEAs to seek technical assistance on assessment from environmental regulators in the absence of other legislative or regulatory requirements.

State and tribal education agencies and their local education counterparts will benefit from involvement and technical assistance from the state or tribal voluntary cleanup program or brownfields response program in identifying, assessing and ensuring safe school site selection in accordance with state and federal requirements. Potential health and environmental risks posed by

locations near Superfund sites or facilities regulated under the Resource Conservation and Recovery Act (RCRA) can best be addressed through
consultation with appropriate tribal, state and federal hazardous site cleanup staff.

Special Considerations for Existing Structures/Leased Space

EPA recommends that existing structures/leased space be subject to a thorough environmental review consistent with these guidelines prior to use as a school. Existing structures at the site may have additional considerations for environmental review, including, but not limited to, the concern that a structure may not have been built and/or remediated to an adequate standard for occupation by students (e.g., with respect to the presence of toxic substances, potential vapor intrusion, or seismic activity) and that existing structures may not be accessible for intrusive sampling of onsite contamination.

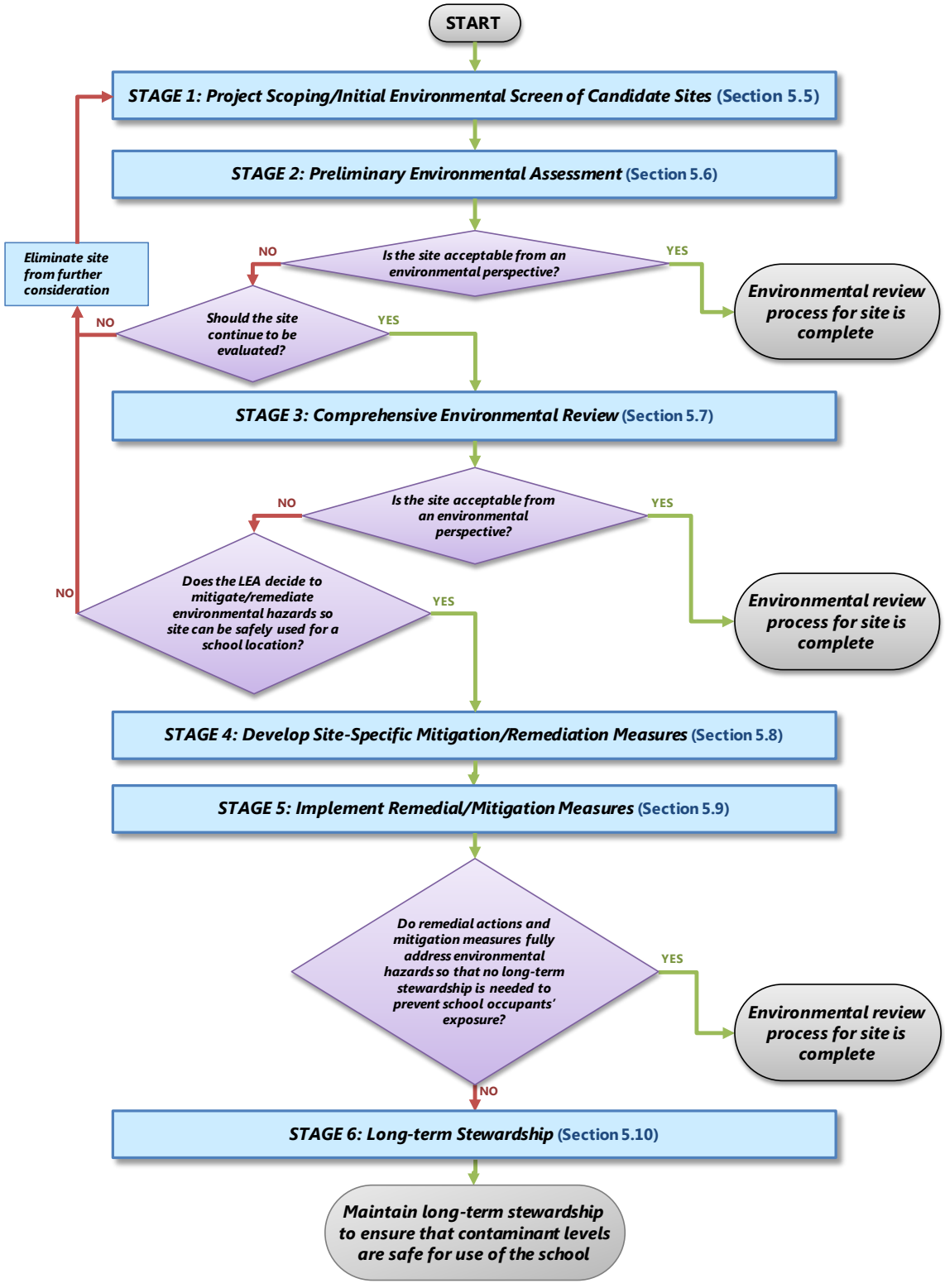
5.4. Stages of Site Review

The recommended process for evaluating candidate school sites should be performed by environmental professionals (see Section 10) and will benefit from public involvement (see Section 3) at multiple steps in the process. The environmental review begins with project scoping of the candidate site followed by a preliminary environmental review. If no significant issues are found in the preliminary assessment, no further assessments are needed. If potential environmental hazards are identified in the preliminary assessment, the environmental review should continue to Stage 3, which begins the more detailed or comprehensive environmental review, or another site should be selected. The process of environmental review culminates in a final evaluation that responds to comments received from the public and the agencies providing oversight of the process.

- Stage 1 – Project Scoping/Initial Screen of Candidate Sites (see Section 5.5)
- Stage 2 – Preliminary Environmental Assessment (see Section 5.6)
- Stage 3 – Comprehensive Environmental Review (see Section 5.7)
- Stage 4 – Develop Site-specific Remediation/ Mitigation Measures (see Section 5.8)
- Stage 5 – Implement Mitigation/Remediation (see Section 5.9)
- Stage 6 – Long-term Stewardship Plan (see Section 5.10)

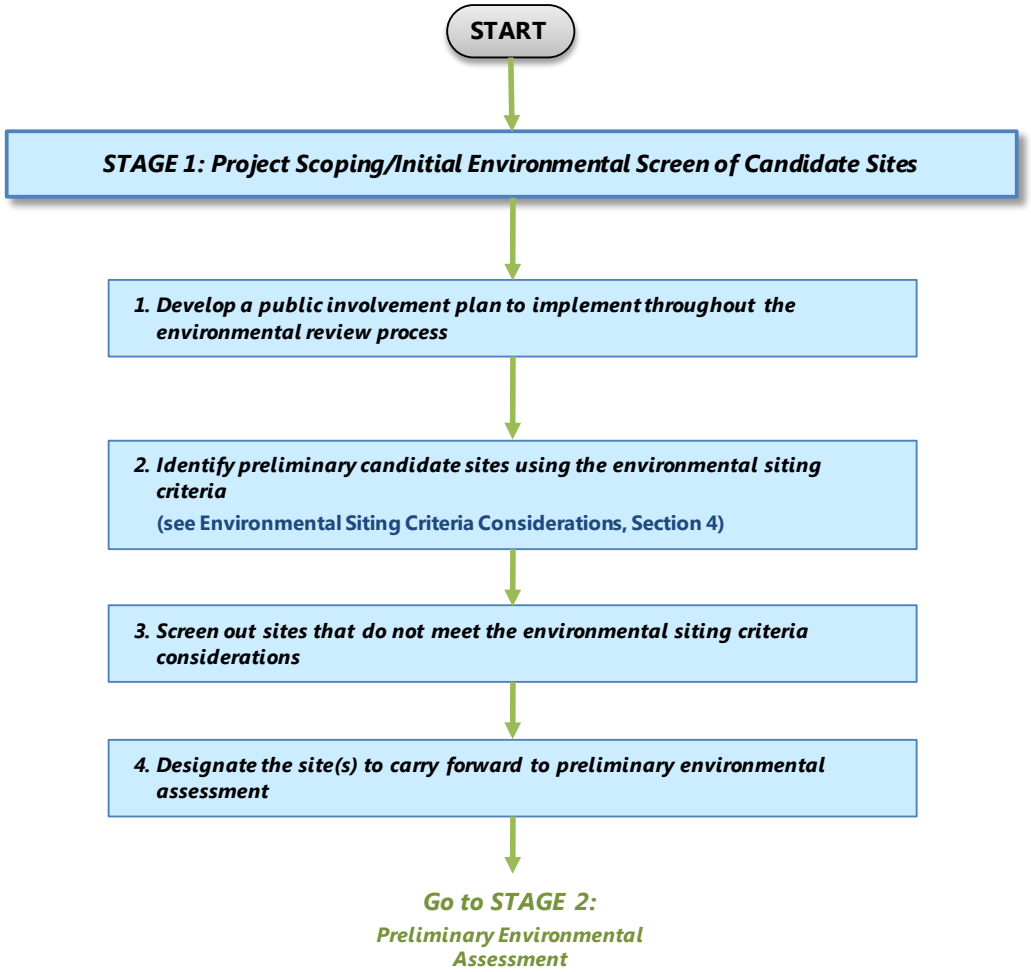
It is important to note that the full process for environmental review can be quite lengthy if site remediation and mitigation are necessary. The LEA may want to consider alternative locations early on rather than take a site through the entire environmental review process.

Exhibit 7: Stages of Site Review



5.5. Stage 1: Project Scoping/Initial Screen of Candidate Site

Exhibit 8: Stage 1: Project Scoping/Initial Screen of Candidate Site



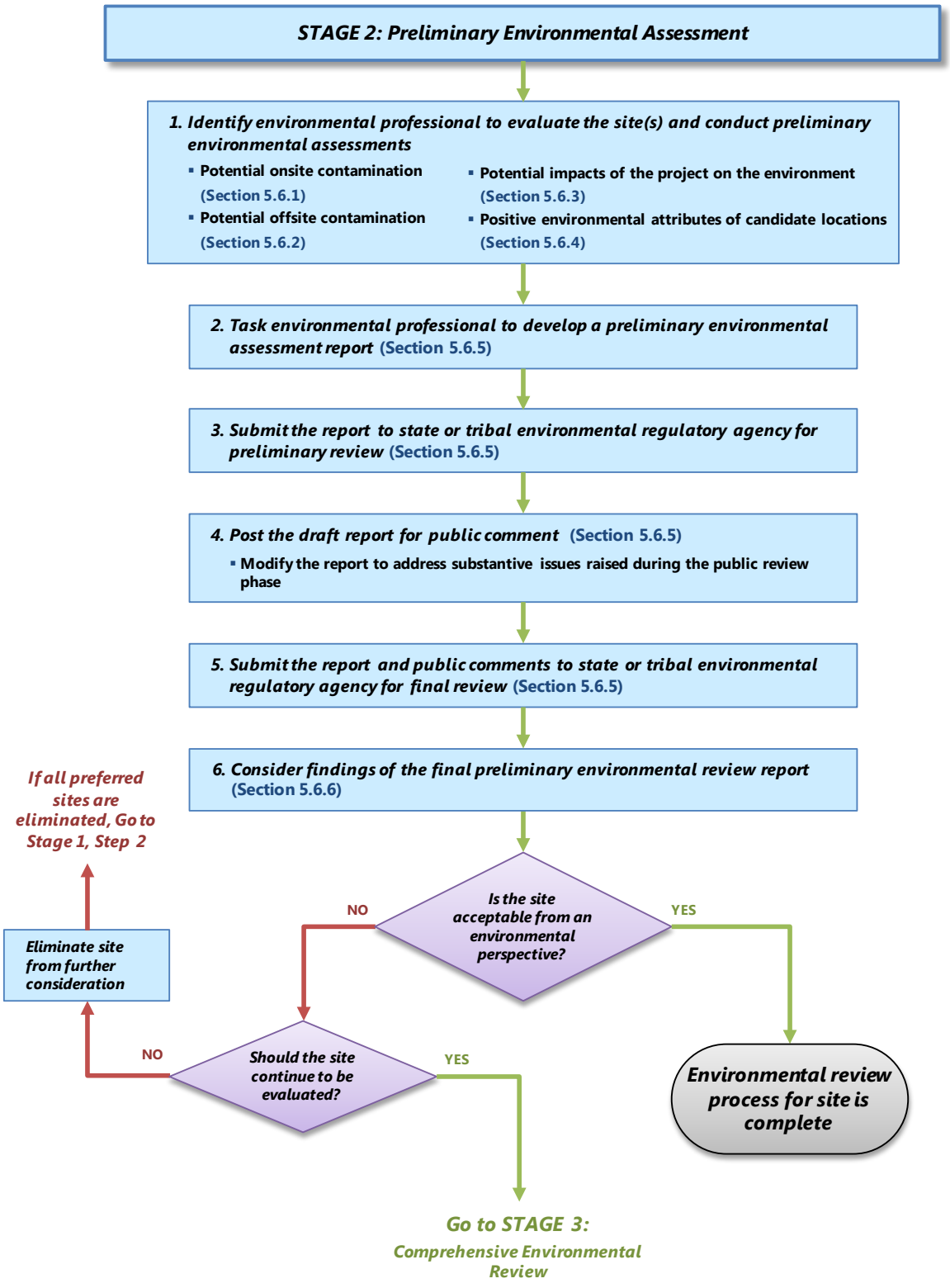
This stage of the environmental review process begins when the LEA decides to proceed with a school facility project. At this point the school siting committee (SSC) (see Section 3.3) should be tasked with identifying candidate locations for the school project and plan to give the public an opportunity to comment (see Section 3.7) on the preferred location that is selected.

The SSC would typically begin with a review of possible locations for the project and screen sites using a variety of siting criteria considerations (see Section 4) that would include, but not be limited to, community, environmental, planning and transportation factors, and public health considerations. The scope of criteria considered by the SSC could also include cost, availability, educational programs, services to be provided, zoning and other considerations appropriate to the locality. The screening should also assess the likelihood of obtaining the various environmental, historical, cultural and other land use approvals and permits relevant to the proposed school site. For example, such an evaluation is required in New Jersey under the School Development Authority Environmental Screening Report (www.njsda.gov/Business/Doc_Form/PDFsForms/RE_Manual.pdf), beginning on page 15 of Appendix A. Many of the factors that will be considered by the SSC are beyond the scope of these guidelines. While all of these factors play an important role in school siting decisions, the remainder of this section will focus on environmental factors that should be considered by the SSC in recommending appropriate locations for schools.

The SSC and LEA may wish to consult existing state or tribal site inventories to streamline the acceptance or rejection of sites. The screening activity may need to be facilitated or supported by advisers from various disciplines, including environmental professionals and consultants. Support from federal, state, tribal or local government may be needed at this stage as well.

5.6. Stage 2: Preliminary Environmental Assessment

Exhibit 9: Stage 2: Preliminary Environmental Assessment



Once the LEA designates candidate sites for the project, the LEA should engage an environmental professional (see Section 10) to conduct the necessary environmental reviews for the project.[52] Because LEAs may have limited experience and limited resources for conducting or overseeing the work described in the guidelines, the LEA may need assistance from federal, state, tribal or local government agencies to guide or even undertake this work. If the local government has an environmental department, the LEA should consult with them as they may be in the best position to oversee contractors or otherwise help with the environmental review process.

The preliminary environmental assessment of the site is intended to:

- Identify issues related to the environmental suitability of the preferred site; and
- Identify issues to be addressed in detail during the next stage of environmental review (Stage 3, Comprehensive Environmental Review, Section 5.7) if environmental issues are identified and the site continues to be considered.

The first step of the preliminary environmental assessment involves four environmental reviews, which can be conducted concurrently.

- Environmental Site Assessment (ESA) of onsite contamination;
- Preliminary environmental assessment of offsite environmental impacts;
- Preliminary environmental assessment of impacts of the project on the environment; and
- Preliminary environmental assessment of desirable environmental attributes of candidate locations.

The following four environmental reviews should be combined into a preliminary environmental assessment report when they have been completed.

5.6.1. Environmental Site Assessment (ESA) of Onsite Contamination

An Environmental Site Assessment (ESA) initially examines the site history and former use of the property, and may include interviews with nearby property owners and residents, to assess potential for onsite contamination of surface soils, subsurface soils, soil gases, ground water and surface water that may be contaminated.

The purpose of the ESA is to identify the presence or the likely presence of any environmental hazards on a property based on historical and current land uses that might pose health risks. An ESA, as a preliminary environmental assessment process, will help identify issues for decision-making as well as screen for issues that may need to be addressed in greater detail. The industry standard for ESAs is the ASTM International Standard E1527-05.[53] (www.astm.org/Standards/E1527) The ESA will be based on a review of public and private records of current and past land uses, historical aerial photographs, environmental databases and the files of federal, tribal, state and local regulatory agencies. In addition, the assessment includes conducting a site visit, inspecting adjacent properties and interviewing people familiar with the site's history, including past and present owners.

Many lenders and insurers require an ESA prior to property acquisition to obtain Comprehensive Environmental Response, Compensation, and

[52] The qualifications of an environmental professional needed to conduct ESA's are defined in ASTM International Standard E1527-05 (www.astm.org/standards/e1527.htm); also see U.S. Environmental Protection Agency, "All Appropriate Inquiries Rule: Definition Of Environmental Professional," U.S. Environmental Protection Agency, Washington, DC, EPA 560-F-05-241, October 2005. (Accessed on September 16, 2011) Available at: http://epa.gov/brownfields/aai/ep_deffactsheet.pdf.

[53] ASTM E1527-05 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process sets forth the activities to be conducted and information to be gathered. The standard is used during real property transfers. (www.astm.org/standards/e1527.htm)

Liability Act[54] (CERCLA; also known as "Superfund") (www.epa.gov/superfund/policy/cercla) liability protections such as:

- The bona fide prospective purchaser protection (www.epa.gov/compliance/cleanup/revitalization/bfpp);
- Contiguous property owner protection (www.epa.gov/compliance/cleanup/revitalization/cpo); and
- The innocent landowner defense (www.epa.gov/oecaerth/cleanup/revitalization/ilo).[55]

The Environmental Review Process section of the Resources page (www.epa.gov/schools/siting/resources.html#LINKS_environmental_review_process) lists links to ASTM standards related to site assessment for commercial transactions.

Additionally, an eligible LEA may apply for an EPA Brownfields Assessment Grant to conduct an ESA on one or multiple sites and will be required to have completed one if the LEA intends to apply for an EPA Brownfields Cleanup Grant. The LEA may also be required under state or tribal laws or regulations to ensure that all potential hazards are identified, including those that are beyond the scope of CERCLA. Tribal and state voluntary cleanup programs often provide guidance and oversight during real property transfer transactions. ESAs conducted for proposed school sites should also address non-CERCLA related potential hazards from both onsite and offsite sources (see Exhibit 6: Screening Potential Environmental and Safety Hazards).

Ultimately, an ESA or subsequent environmental site assessment is used to determine if further action or no further action is required for the site. For example, if a review of records shows onsite environmental contamination exceeds state, tribal or local standards, a comprehensive environmental review would need to be conducted before the site could be developed as a school. Many states have established a variety of environmental standards to support cleanups. In some cases, states or tribes have developed guidance or rules specifically to guide the school siting process when considering environmental contamination. In other cases, states or tribes have other standards that have been developed for more generic purposes that may be appropriate for assessing the suitability of candidate school sites. When state or tribal standards exist, they should be used. In the absence of such standards, states and tribes may wish to employ EPA risk assessment methods for the establishment of cleanup levels. (www.epa.gov/oswer/riskassessment/risk_superfund)

The environmental standards used to evaluate site contamination should be based on either 1) standards developed for schools or residential use or 2) risk based levels set for residential use. If further action is required, the ESA report should specify recognized environmental conditions for further study.

5.6.2. Preliminary Environmental Assessment of Offsite Environmental Impacts

In the preliminary environmental assessment of offsite environmental impacts, the environmental professional should identify potential environmental hazards surrounding the candidate site such as from old waste sites (including Superfund sites), localized air pollution (e.g., rail lines, industrial facilities), hazardous material pipelines and others. Hazards of potential concern and the screening distance from the site for which potential hazards should be identified for evaluation are described in Exhibit 6: Screening Potential Environmental and Safety Hazards.

Some level of air quality analysis should be considered for every new school site prior to project approval by the LEA. This analysis should

[54] *Comprehensive Environmental Response, Compensation, and Liability Act, U.S. Code 42 (1980) §§9601 et seq.*

[55] In the CERCLA liability context, an ESA, usually called "All Appropriate Inquiries," (see: http://www.epa.gov/brownfields/aai) is usually a prerequisite to obtaining any of these liability protections. If the LEA intends to obtain and maintain any of these CERCLA liability protections, it must conduct an ESA within one year prior to acquisition, with certain elements updated within 180 days prior to acquisition.

at a minimum include criteria air pollutants (i.e., ground-level ozone, sulfur dioxide, lead, carbon monoxide, nitrogen oxides and particulate matter) and hazardous air pollutants (e.g., air toxics such as benzene, formaldehyde and diesel exhaust). Depending on the location of the site, the analysis may require database reviews, contaminant transport and dispersion modeling, monitoring, health risk assessments, site reconnaissance and/or other methods. For more specific guidance see Evaluating Impacts of Nearby Sources of Air Pollution (see Section 6).

The Emergency Planning and Community Right-To-Know Act[56] (www.epa.gov/oecaagct/lcra#Hazardous%20Chemical%20Notification%20and%20Inventory%20Reporting) gives communities access to information on toxic and hazardous chemicals inventories in their communities. Additionally, Section 112(r) of the Clean Air Act[57] requires facilities that produce, handle, process, distribute or store certain chemicals to develop and submit a Risk Management Plan to EPA, which is also available to communities.[58]

5.6.3 Preliminary Environmental Assessment of Impacts of the Project on the Environment

In assessing a potential site for new school construction (rather than renovating or expanding an existing school or adapting another structure), LEAs should consider the environmental impacts of building a school on the new location, in addition to potential health and safety risks to the surrounding community. An environmental impact review conducted during the preliminary environmental assessment identifies potential significant impacts of the project on the surrounding environment and human health, as well as construction and regulatory obstacles that cannot be overcome. An environmental impact review may be required by a state or tribal environmental regulatory agency or planning board (e.g., for large school construction projects).

The outcome of the environmental impact review could result in rejecting a site from further consideration either by the state or tribe or by the LEA. The potential categories for consideration that should be assessed may include:

- Community amenities;
- Existing infrastructure; and
- Potential impacts or hazards.

Potential impacts that should be assessed may include:

- Local utilities such as water supply, sewage service and electricity;
- Increases in local traffic and congestion as well as impacts on pedestrian safety;
- Hydrology/water quality such as coastal wetlands, floodplains and stream encroachment constraints;
- Public land such as displacement of parks;
- Access to public resources such as parks and libraries;
- Historic or archeological resources;
- Threatened or endangered plant or animal species;
- Habitat loss;
- Aesthetics such as lighting or noise from stadiums;
- Hazards and hazardous materials related to transport and disposal of onsite contamination removed from the site during cleanup;
- Agricultural resources such as displacement of farmland;

[56] *Emergency Planning and Community Right-To-Know Act, U.S. Code 42 (1986) §§11001 et seq.*
[57] *Clean Air Act, U.S. Code 42 (1970) §§7401 et seq.*
[58] U.S. Environmental Protection Agency, "Risk Management Plan Rule." Last modified September 19, 2011. Available at: http://www.epa.gov/osweroe1/content/rmp/.

- Air quality such as emissions from construction, including engine exhaust and dust from clearing, grading and burning;
- Geology/soils such as creating slope instability during construction;
- Mineral resources such as displacing drilling rights;
- Public services such as police and fire;
- Ability to serve as an emergency shelter;
- Excessive community relocation and displacement impacts;
- Time spent traveling to and from school;
- Walk/bike route audits; and
- Percentage of students who could walk/bike to school.

5.6.4. Preliminary Environmental Assessment of Desirable Environmental Attributes of Candidate Sites

Desirable environmental attributes of a given site should also be assessed, such as the site's proximity to residences where future students live (so students would be able to walk or bike to school); whether sidewalks, crosswalks and streets in proximity to the site provide safe routes to school; the availability of public transportation to and from the site; and access to community resources, such as libraries, community centers, parks and other features. See Exhibit 4: Desirable Environmental Attributes of Candidate Sites.

5.6.5 Review of the Preliminary Environmental Assessment Report

Once the environmental professional has completed the four reviews described earlier, a report should be developed and submitted for the review steps that follow.

Preliminary agency review of the preliminary environmental assessment report

The LEA will need to comply with the state's requirements for environmental review and would typically submit the draft preliminary environmental assessment or additional assessments to the state or tribal environmental regulatory agency (www.astswmo.org/Pages/Resources/State_Agency_Links.htm) for any site it is considering pursuing. When state or tribal requirements are not present, the LEA should secure an agreement with the state or tribal environmental regulatory agency for review of the draft ESA results. It is desirable to have the state or tribe review the offsite contamination assessment, environmental impact assessment and assessment of desirable environmental attributes as well.

Public comment on the preliminary environmental assessment report

All four reviews that comprise the preliminary assessment report should be made available to the public and relevant local agencies (e.g., the local department of transportation and the local police) for comment. To aid with the understanding of these work products, the environmental professional or the LEA should prepare a plain language summary of the preliminary environmental assessment reports for the community, including translation for non-English speaking stakeholders, if applicable.

If the preliminary environmental assessment report recommends no further action, the LEA should release the work conducted (e.g., reports submitted to the state, any responses and other supporting assessments) for public comment and, if appropriate, hold a public hearing, before formally adopting the recommendations of the preliminary review. If the preliminary environmental assessment report recommends further action, public review of the preliminary environmental assessment report may occur during Stage 3 (see Section 5.7).

Regardless of the findings, the components of the preliminary review report should be subject to

public comment. The LEA should follow the steps described earlier (see The Importance of Meaningful Public Involvement, Section 5.2.1) to solicit public comment on the preliminary environmental assessment report and proposed next steps based on review findings. A public comment period may be required by the state or tribal regulatory agency, particularly if the preliminary review indicates that no further environmental review is necessary and no other method of securing public comment are likely. The information listed earlier should be included in a public notice. More information on effective public involvement can be found in the Meaningful Public Involvement section (see Section 3).

Final agency review of preliminary environmental site assessment

Prior to final state- or tribal-level review, the LEA's report should be modified to address substantive issues raised during the public review phase. The state or tribal environmental regulatory agency (www.astswmo.org/Pages/Resources/State_Agency_Links.htm) should also review all comments received on the preliminary environmental assessment report and determine whether no further action is required on the site or whether further action (e.g., a comprehensive environmental review) is required.

5.6.6. SSC and LEA Review and Recommendation

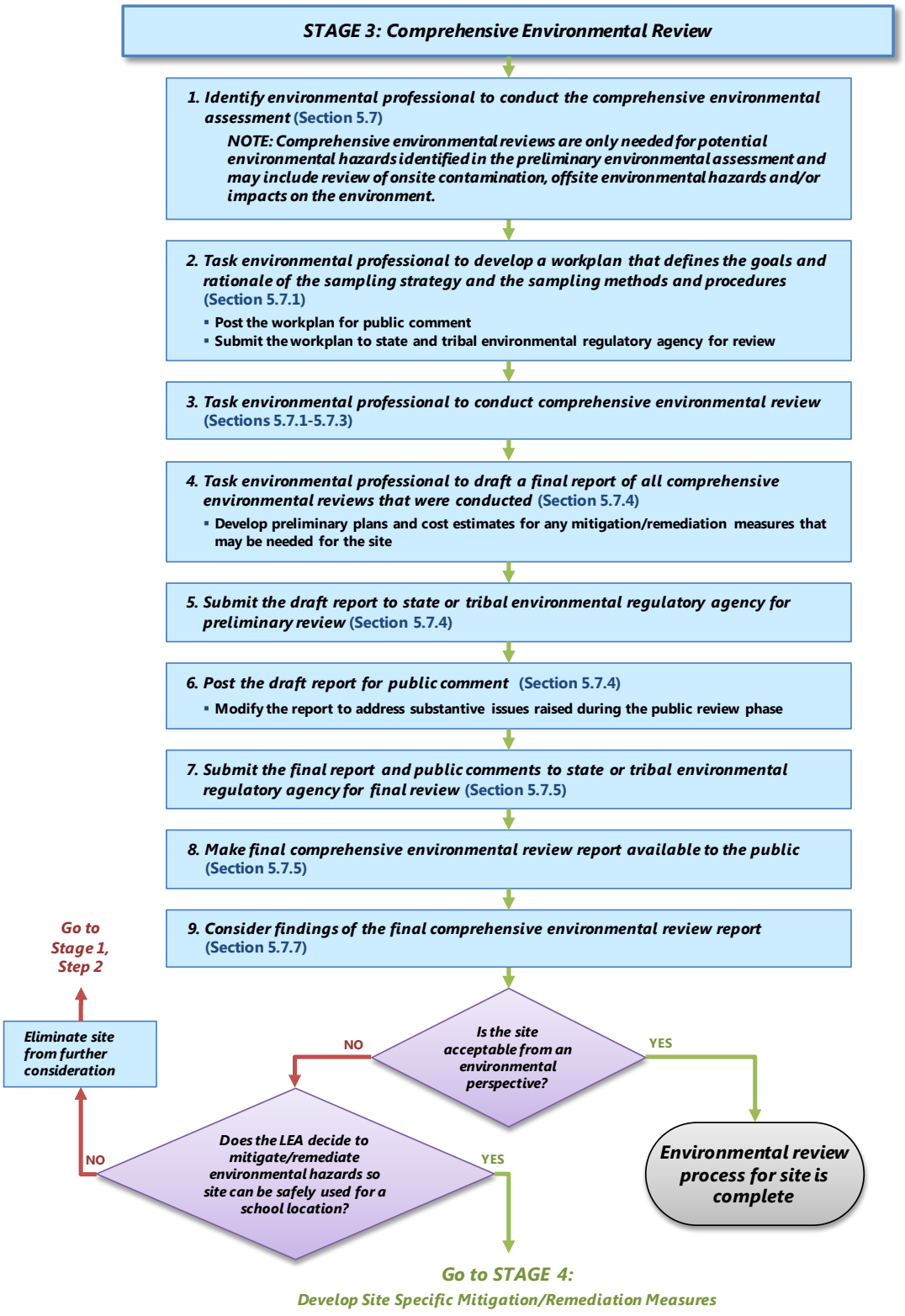
After the state or tribal environmental regulatory agency responds to the findings of the final preliminary environmental assessment report and determines whether further action is needed, the SSC and the LEA should review the findings of the preliminary environmental assessment report and make a recommendation on the project. The recommendation should be based on the Preliminary Assessment Report and public comments received. The purpose of this review is for the LEA to either:

1. **Proceed with plans** for construction if no further remediation or study is required;
2. **Continue evaluating** the potential environmental hazards at the site with a comprehensive environmental review; or
3. **Eliminate the site** from further consideration and pursue alternative locations.

If the recommendation is to proceed with construction or with a comprehensive environmental review, decisions should be explicitly described and steps should be taken to involve the public to the greatest extent possible. If the recommendation is to proceed with construction of a new school because no further remediation or study is required (no further action is needed), the governing body of the LEA should formally accept and document the findings of the review and then proceed with the project.

5.7. Stage 3: Comprehensive Environmental Review

Exhibit 10: Stage 3: Comprehensive Environmental Review



If the LEA decides to conduct a comprehensive environmental review, the environmental professional (see Section 10) employed or hired to perform the assessment will conduct a more thorough examination of the potential issues identified in the preliminary environmental review.[59] The LEA is encouraged to work with its state or tribal environmental program to assist with this effort. The following description of the comprehensive environmental review includes assessment of onsite contamination, offsite environmental hazards and potentially significant environmental impacts of the proposed school on the surrounding environment. It is important to note that it may not be necessary to perform all three comprehensive reviews. The findings from the preliminary environmental review can be used to determine which assessment(s) is/are needed to fully characterize the site.

The purpose of the comprehensive environmental review is to gather and analyze data on environmental hazards and impacts identified in the Preliminary Environmental Review, and evaluate the risks posed to children's health, public health and the environment based on the contamination or impacts found. The comprehensive environmental review also includes developing preliminary plans and cost estimates for mitigating or reducing risks. The cost of the comprehensive environmental review will depend on the complexity of the site. LEAs are strongly encouraged to work with their state or tribal environmental regulatory program to identify critical environmental factors that need to be considered in the environmental assessment process.

In many states, the only portion of the comprehensive environmental review that is subject to review and approval by the state environmental regulatory agency is the onsite contamination component. An oversight review of the offsite and environmental impact reports should also be completed, but the agency that conducts the review will vary from state to state.

The environmental professional should prepare draft reports for each review being performed, and the LEA should publish those drafts for public comment. All final drafts should consider public comments. The final drafts should be subject to review and approval by the SSC and LEA. To capture a range of considerations the three reviews that follow (or whichever of the three reviews that are needed, based on the preliminary environmental review) can be conducted concurrently.

The comprehensive environmental review should also include an evaluation of the potential risks posed to children's health, public health or the environment based on the contaminants identified at the site. This evaluation should include:

- **A conceptual site model** that includes a written description and graphic depiction of all possible pathways of exposure that could result in children, school staff and the community being exposed to potentially harmful contaminants at the school site (e.g., inhalation, soil ingestion, dermal);[60] and
- **A description of potential health consequences** of long-term and short-term exposure to any potentially harmful contaminants, to the extent feasible.

5.7.1 Comprehensive Environmental Review of Onsite Contamination

If the state or tribal regulatory agency concurs with the findings from the preliminary environmental assessment and no further action

[59] The qualifications of an environmental professional needed to conduct ESA's are defined in ASTM International Standard E1527-05 (www.astm.org/standards/e1527.htm); also see U.S. Environmental Protection Agency, "All Appropriate Inquiries Rule: Definition Of Environmental Professional," U.S. Environmental Protection Agency, Washington, DC, EPA 560-F-05-241, October 2005. (Accessed on September 16, 2011) Available at: http://epa.gov/brownfields/aai/ep_deffactsheet.pdf.

[60] Many conceptual site models have been developed. For example, there is a model in Section 3.1 of the Regional Screening Level Guidance available at: www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/usersguide.htm and California has a model available at: www.dtsc.ca.gov/SiteCleanup/upload/Appdx_A1_083108.pdf.

is required, the review for onsite contamination is complete.

If the preliminary environmental assessment (see Section 5.6) shows that further assessment of onsite contamination is necessary, the environmental professional should conduct a comprehensive environmental review to determine if hazardous materials are present, or if there is potential for a release of a hazardous material or substance that could pose a health threat to children, staff or community members. The comprehensive environmental review should also assess the need for cleanup based on levels of contamination found and identify the cleanup standards that will be used.

Before any work is done on the comprehensive environmental review, the LEA should develop a public involvement plan (see Section 3) that ensures meaningful public and community involvement in the comprehensive environmental review process. The plan should indicate what mechanisms the LEA will use to involve the public. The LEA should submit the public involvement plan to the state or tribal regulatory agency for comment before comprehensive environmental review activities begin; in some cases, this may be a state or tribal requirement.

Before conducting any sampling for the detailed comprehensive environmental review, the environmental professional should prepare a workplan that defines the following:

- The goals of the sampling;
- The rationale for the sampling strategy, including the number and location of sampling sites and what substances to analyze in the samples; and
- The sampling methods and procedures that will be used, and the analytical methods and procedures, in accordance with quality assurance plan requirements.

The comprehensive environmental review may include full-scale grid sampling and analysis of soil, soil gases (if any), and potentially surface water, ground water and air (www.epa.gov/schools/siting/resources) to accurately define the type and extent of contamination present at the candidate site. State or tribal environmental regulatory agency (www.astswmo.org/Pages/Resources/State_Agency_Links.htm) review of the workplan should be obtained prior to the initiation of sampling. Prior to sampling, the LEA should obtain signed access agreements from property owners.

Criteria for establishing the degree of cleanup needed should be based on state or tribal cleanup

Engineering and Institutional Controls and Community Involvement

Engineering controls and institutional controls are tools to ensure that sites remain safe by preventing potential exposures to contaminants and preventing land uses likely to create exposures (see Section 8.15).

Communities have an important role to play in ensuring engineering and institutional controls remain in place and are effective in preventing potential exposures. Through the community involvement and planning process, the community can become familiar with the nature of residual contamination, engineering controls and institutional controls that place restrictions on how the land can be used. They can help LEAs meet their obligations by reporting actions in conflict with those land use restrictions to LEA management and tribal or state environmental regulatory authorities. The LEA and the SSC also can continue to play a role in updating the community about their inspection, monitoring and maintenance efforts, with the assistance of tribal or state technical oversight, as appropriate. See the Quick Guide for Environmental Issues (see Section 8.15) for information about engineering and institutional controls.

rules or guidance, where they exist. The environmental standards used to evaluate site contamination should use either 1) standards developed for schools or residential use or 2) risk-based levels designed to be protective for residential use. If cleanups are going to leave residual contamination that exceeds residential use levels, engineering and institutional controls (see Section 8.15) and long-term stewardship (see Section 8.16) should be included to provide a safe environment.

The process of identifying the capability of the state, tribal or local agencies to maintain institutional and/or engineering controls and implement long-term stewardship will vary with the jurisdiction. For example, communities with well established environmental departments are more likely to be familiar with institutional and engineering controls and long-term stewardship, especially if there are sites within their community where institutional and engineering controls and long-term stewardship have been employed. In situations where the local government lacks the resources, expertise or authority to implement and enforce institutional/engineering controls as part of overseeing long-term stewardship plans, state or tribal staff may need to assume this responsibility. If staff or resources are not available to support institutional and engineering controls and long-term stewardship that would be needed, a site that requires these tools should not be selected because exposures without institutional and engineering controls and long-term stewardship could pose unacceptable risks to students and workers.

When environmental testing is completed, and remedial actions are undertaken to prevent potential environmental exposures, it may be important to preserve the ability to pursue cost recovery in the future, in cases where legal cost recovery mechanisms exist. The environmental professional should keep detailed records during all phases of the environmental assessment and remediation and is required to sign documentation of their findings and recommendations. Photo documentation, complete field notes, written notification to property owners of environmental conditions and provisions to allow property owners to obtain split samples for analysis are all recognized methods to preserve cost recovery rights.

5.7.2. Comprehensive Environmental Review of Offsite Environmental Hazards

Using the list of offsite hazards identified in the preliminary environmental assessment report (Stage 2, see Section 5.6), the environmental professional should evaluate and estimate the risks those hazards may pose to future users of the school site. (If no nearby hazards were identified in the preliminary environmental review, no further review of offsite environmental hazards is needed.) The environmental professional should identify both the risks that can be mitigated and those that cannot be mitigated and identify measures to reduce these risks to the extent feasible. Old waste sites, including Superfund sites, industrial air pollution sources, rail lines, rail yards and highways are examples of the kind of hazards that would be evaluated at this stage (See Exhibit 6: Screening Potential Environmental and Safety Hazards). The report about offsite hazards should discuss whether feasible mitigation measures are available that would eliminate all significant risks. For more specific guidance see Evaluating Impacts of Nearby Sources of Air Pollution (see Section 6).

5.7.3. Comprehensive Environmental Review of Impacts of the Project on the Environment

Using the list of potential significant environmental impacts (e.g., habitat and water quality) identified in the preliminary environmental assessment (see Section 5.6), the environmental professional should evaluate and report potential impacts the project may have on the surrounding environment and propose alternatives to mitigate or eliminate those impacts. The report should discuss what environmental impacts will remain even after mitigation measures are taken. (If no potential

significant environmental impacts were identified in the preliminary environmental review, no further review of impacts of the project on the environment is needed.)

5.7.4. Development and Review of Comprehensive Environmental Assessment Reports

The environmental professional should prepare a draft report that combines the findings of the environmental assessment(s) performed in the comprehensive environmental review. This draft comprehensive environmental review report will also describe proposed and alternative mitigation measures to reduce potential risks and impacts. Through findings and conclusions with supporting data, the report should document potential impacts that:

- Are not considered to be of concern;
- Could be effectively managed though mitigation; and
- May pose significant or unacceptable risks even after all feasible mitigation steps have been implemented.

The LEA should submit the draft comprehensive environmental review report to the environmental agencies involved in the regulatory oversight of the school siting decision, which may include tribal, state, other local agencies or federal agencies (such as Bureau of Indian Education or Department of Defense), and the public upon its completion by the environmental professional. To solicit public comment, the LEA should post the draft comprehensive environmental review on the project website and should follow the steps described earlier in this section.

The LEA and state or tribal environmental regulatory agency should evaluate public response to the notice and modify the public involvement plan (e.g., by extending the comment period), as necessary, to ensure meaningful public input throughout the school siting process. The LEA should address all substantive comments received during the comment period.

The state, tribal, local or federal environmental regulatory agency that is overseeing the conduct of the comprehensive environmental review should review all comments received. The agency may then accept or reject the conclusions of the review or request revisions. In some cases (e.g., due to timing or access constraints), the comprehensive environmental review may not characterize all environmental hazards. A separate supplemental site investigation may be necessary prior to determining the potential need for remediation/mitigation. The process for conducting a supplemental site investigation should follow the steps identified earlier for the comprehensive environmental review. If accepted, the state, tribal, local or federal environmental regulatory agency may concur with the finding that no further action is required or that a remedial action workplan is required if the LEA decides to pursue development of the site. The agency will explain in detail the reasons for accepting or rejecting the comprehensive environmental review report and the basis for its determination.

5.7.5. Final Comprehensive Environmental Review Report

Following the public comment period the environmental professional, in consultation with the LEA and the SSC, should evaluate and respond to all public comments and incorporate those comments into a final comprehensive environmental review report.

The final report should then be forwarded to the SSC and to relevant public agencies. To solicit public comment, the LEA should post the final comprehensive environmental review on the project website and should follow the steps described earlier in this section.

5.7.6. Cost Estimates and Schedules of Remediation and/or Mitigation Measures

If the final report of potential environmental risks and impacts includes proposals for mitigation measures (e.g., institutional controls (see Section 8.15), engineering controls (see Section 8.15),

encapsulation of lead based paint (see Section 8.16), enclosure of asbestos (see Section 8.8), and long-term stewardship (see Section 10), potential cost estimates and schedules of implementation should be developed in coordination with facility planners (e.g., architects and local agencies). In addition, preliminary cost estimates and schedules for implementation of any remediation of onsite contamination should be prepared, including, where appropriate, the cost of maintaining and monitoring controls over the life of the school. These preliminary cost and schedule estimates for mitigation and remediation should then be forwarded to the SSC and LEA.

5.7.7. SSC Review and Recommendation

The SSC should review:

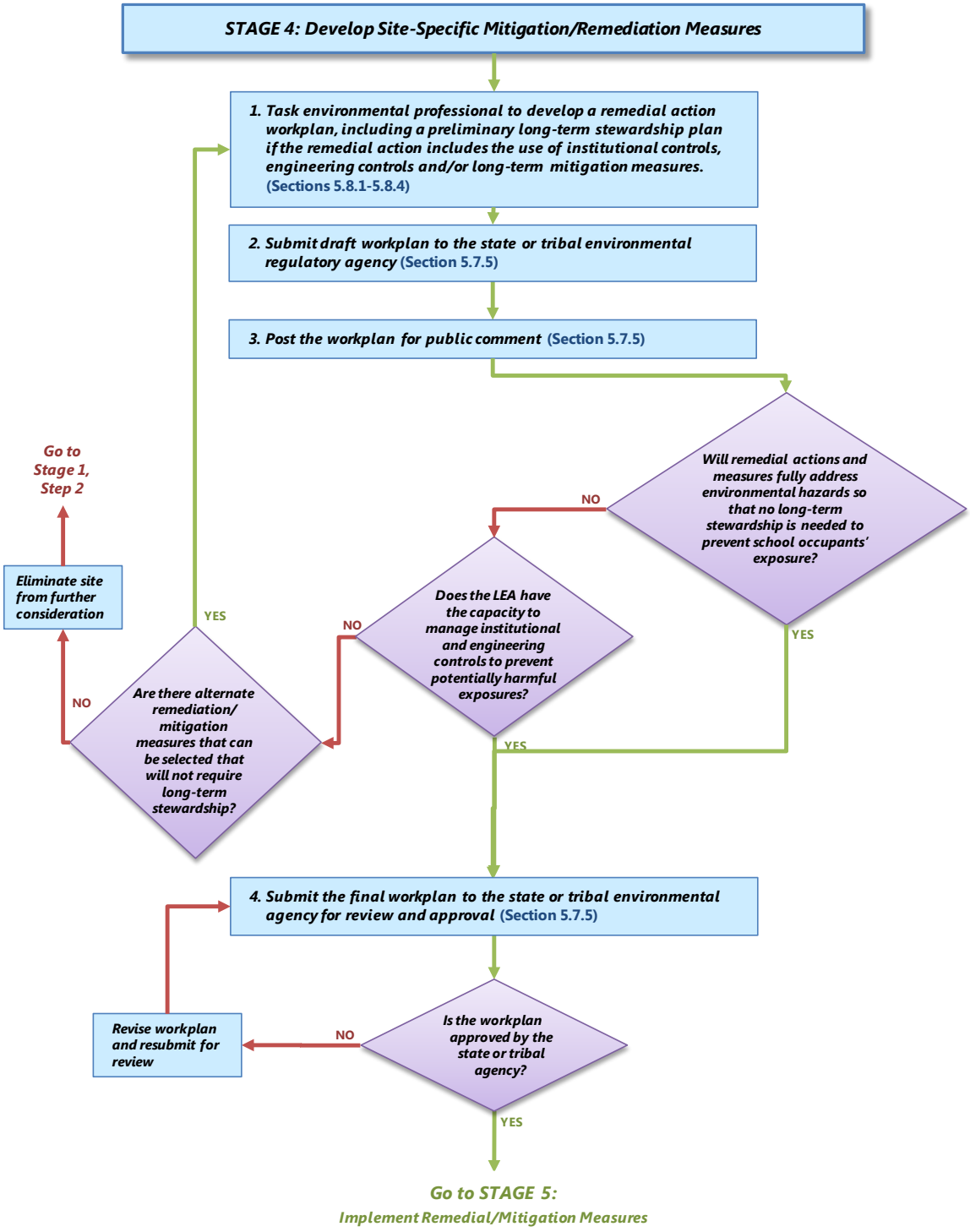
- Final comprehensive environmental review report;
- Preliminary cost estimates and schedules for remediation and mitigation; and
- Public comments received on these documents.

The SSC should recommend to the LEA whether the environmental reports adequately characterize potential environmental concerns at the candidate site. Following this determination, the SSC can recommend to the LEA whether to proceed or eliminate the site from further consideration based on public health risks, costs and schedule impacts, public concerns and other factors.

The LEA should then review the committee recommendations, including any analysis of potential alternatives, impacts to public health, project costs/schedule impacts, public concerns, etc., and decide to certify the environmental reports or request further revisions to the reports. Following this determination, the LEA may approve proceeding with the project at the site for which the comprehensive environmental review was completed or decide to eliminate the site from further consideration. If the LEA decides to eliminate the site from further consideration, the LEA should work with the SSC to identify another preferred location for environmental review that begins at Stage 2 (see Section 5.6) or Stage 3 (see Section 5.7), depending on what assessment has already been performed for the new preferred location. In those instances, records of environmental investigation, findings and decisions should be retained.

5.8. Stage 4: Develop Site-specific Mitigation/Remediation Measures

Exhibit 11: Stage 4: Develop Site-specific Mitigation/Remediation Measures



5.8.1. Offsite Mitigation Measures

In addition to remediation of onsite contamination, the LEA should coordinate with the appropriate state, tribal and local government agencies to implement any necessary offsite mitigation measures, such as installing traffic signals, signage, utilities, etc., as well as identify potential measures that can be implemented at the proposed school site to mitigate hazards from offsite pollution sources by eliminating exposures to pollutant hazards. For more specific guidance see Evaluating Impacts of Nearby Sources of Air Pollution (see Section 6).

5.8.2. Onsite Remediation Measures

If the LEA decides to proceed with a site where contamination will be cleaned up, a remedial action workplan should be developed and submitted to the state regulatory agency for approval. Typically, an environmental professional will assist with the workplan. When designing cleanup activities, the LEA should recognize that young children will be present on the site and evaluate assumptions used in establishing cleanup standards and remedial response. When available, the state and LEA should use cleanup levels that are explicitly protective of early life sensitivity to toxicants and early life exposures.

NOTE: Typically, cleanup levels for sites intended for residential use are appropriate for use at sites considered for a future school use. State and tribal programs may recommend cleanup levels based on their review of the specific site characteristics, contaminants present on the site and other factors. Where cleanup is needed, all cleanup work should be completed and approved by the state or tribal regulatory agency prior to occupancy of the school. In cases where residual waste or contamination will remain on site following cleanup, a careful and objective evaluation of the capacity of the school district and local and state authorities should be completed to ensure safe operations and that institutional and engineering controls (see Section 8.15) will be maintained (i.e., long-term stewardship) over the long term and be subject to public review before the decision is made to rely on such controls. Where state or tribal regulators have approved cleanup to restricted reuse standards, LEAs need to secure funds or post a bond to ensure the continued monitoring and maintenance of institutional and engineering controls.

The remedial action workplan should:

- **Identify methods for cleaning up** the site to contaminant levels that meet the applicable environmental and public health standards;
- **Contain a financial analysis** that compares estimated costs over the life of the school for the identified cleanup methods that will bring the site into compliance with applicable safety standards;
- **Recommend a cleanup plan** from the alternatives identified, including a description of long-term maintenance, monitoring and the cost of any institutional or engineering controls and long-term stewardship implemented as part of the cleanup (preliminary site maintenance plan);
- **Explain how the recommended cleanup option will prevent children from being exposed to the environmental hazards** found at the site or on any adjoining contaminated parcels; and
- **Clearly describe the responsibilities and long-term environmental stewardship obligations of the LEA** (or other responsible party) for inspection, maintenance and reporting associated with any engineering control implemented as part of the cleanup.

If cleanups are going to leave residual contamination on the site that require implementation and maintenance of engineering/institutional controls (see Section 8.15), LEAs should ensure that the site cleanup plan is approved by the state or tribe for state or tribal voluntary cleanup sites.

5.8.3. Remediation Techniques

Although the specific remedial response measures prescribed in a remedial action workplan will need to be tailored to the particular characteristics of a given site, a number of environmental conditions in need of remediation are routinely encountered at existing and proposed school locations. The environmental professional and the state or tribal environmental regulatory agency should have the expertise needed to develop each of the remediation options that follow.

The following text provides examples of situations that might be encountered. These examples are being provided because they highlight scenarios that have been repeated in different locations throughout the country. They highlight types of contamination and remedies that have been employed. See the Quick Guide to Environmental Issues, Section 8, for additional information about the examples below, and see the Resources (www.epa.gov/schools/siting/resources) page of the guidelines website for links related to environmental issues that may be encountered for some sites.

Example 1

The presence of volatile organic compounds (VOCs) in soil and ground water (see Section 8.3) may require mitigation measures to protect against potential vapor intrusion into overlying school buildings. Common contaminants in soil and ground water that can cause a vapor intrusion concern include benzene (e.g., from gasoline) and dry cleaning and degreasing solvents (e.g., trichloroethylene and perchloroethylene). If these or other volatile contaminants are present and the LEA decides to proceed with the site, there are ways the facility can be located on the property, designed and engineered to minimize the potential for vapor intrusion and include mitigation equipment for future use, if needed, at a lower cost than if retrofitted after construction. When constructed, periodic indoor air testing is often warranted, and depending on the concentration and potential duration of exposure, remedial actions such as the installation of an underground soil vapor recovery system may be required to eliminate a potential vapor intrusion concern. Water quality testing may also be required. If ground water is found to be contaminated, monitoring wells may need to be drilled at the site, and long-term water monitoring may be required.

Example 2

The presence of petroleum in soil and ground water (see Section 8.5) as a result of leaking underground storage tanks may require soil and ground water remediation. If the soil is excavated, and if separated phase petroleum is floating on the water table, it usually requires recovery and offsite treatment and disposal. Contamination from underground storage tanks can also result in vapor intrusion concerns, which are discussed in the earlier example.

Example 3

In some cases, structural fill is brought onto a site to provide a reliable structural surface for construction, and in other cases, the soils on the site are composed of historic fill (see Section 8.14). If fill is contaminated, it can present a potential risk to students or staff. If feasible, the LEA should clean up the site to residential use levels, which may involve removal of fill material. Where removal of large quantities of fill material is infeasible, institutional/engineering controls and an enforceable long-term stewardship plan, approved by an environmental regulatory agency, may be utilized to eliminate exposure to contaminated soil. Landscaping plans need to be compatible with the engineering control. For example, plants with only a shallow root zone may be allowed but trees may be prohibited.

Example 4

The presence of banned pesticides (see Section 8.12) may be encountered in soil and ground water at existing and proposed school sites as a result of former agricultural and pest management practices. Some of these pesticides do not readily degrade, and as a result may

present a potential exposure when soil is excavated. Depending on prior uses of the site, sampling for pesticides may be appropriate to consider in the development of the comprehensive environmental review plan described earlier in Stage 3 (see Section 5.7).

5.8.4. Preliminary Long-term Stewardship Plan

If the remedial action workplan includes partial cleanup in conjunction with the use of institutional and engineering controls to prevent potentially harmful exposures to contaminants, the LEA should develop a preliminary long-term stewardship plan as part of the remedial action plan to ensure full consideration of long-term feasibility and cost. A preliminary long-term stewardship plan should include:

- **Identification of contaminants of concern** and, if possible, maps showing the location of contamination, property boundaries, and institutional and engineering controls;
- **Proposed plans to contain contaminants**, including any engineering and institutional controls to be used;
- **Long-term maintenance and monitoring measures** necessary to ensure the long-term integrity of engineering and institutional controls;
- **A detailed evaluation of the resources and expertise necessary** to implement the plan and a discussion of alternative measures considered and the basis for their rejection;
- **A demonstrated commitment of funding** sufficient to ensure the implementation and maintenance of all plan components over the long term (i.e., the life of the school);
- **A remedial action workplan** that addresses cleanup of the entire contaminated site when a school is proposed for only a portion of a known contaminated site. In this case, the long-term stewardship plan should outline the ongoing security measures which will ensure that only authorized persons can gain access to the unremediated portion of the contaminated site;
- **Plans for monitoring institutional and engineering controls** should include timeframes for monitoring (annual monitoring reviews should be adopted at least for the first few years when institutional controls/engineering controls are employed), recordkeeping and reporting;
- **Conditions and procedures for modification and termination of institutional controls;** and
- **Recommendations for the final site sampling to be done after the cleanup has been completed** to ensure that all residual contamination is less than the cleanup goals defined for the site. Such sampling recommendations should be designed to discover the highest possible concentrations of contamination at the candidate site.

There are a number of resources that document types of remediation, costs and effectiveness for a range of contaminants, engineering controls and institutional controls that can be effective in managing contaminants, including EPA's Office of Solid Waste and Emergency Response onsite cleanup (www.epa.gov/oswer/cleanup/index) and EPA's Clu-In (www.clu-in.org/) websites, which are listed on the Resources (www.epa.gov/schools/siting/resources) page of the guidelines website. While these websites provide extensive materials, the cost, effectiveness and variety of methods will vary with the site and need to be properly monitored and maintained to remain protective.

5.8.5. SSC and State or Tribal Agency Review and Public Comment

The LEA should secure state or tribal regulatory agency review and approval of the remedial action workplan prepared by the environmental professional. Upon submitting this plan to the state or tribal environmental regulatory agency, the draft remedial action workplan should be

made available to the SSC for review and comment. Once the workplan is submitted to the state or tribal agency for approval, the LEA should post the draft comprehensive environmental review on the project website and follow the steps described earlier to solicit public comment.

A public hearing on the remediation plan should be conducted in the neighborhood or jurisdiction of the candidate site. The LEA should publish a notice of the hearing in newspapers of general circulation, including foreign language newspapers if the school district has a sizable number of non-English speaking parents, and post a notice on the LEA and project websites stating the date, time and location of the hearing.

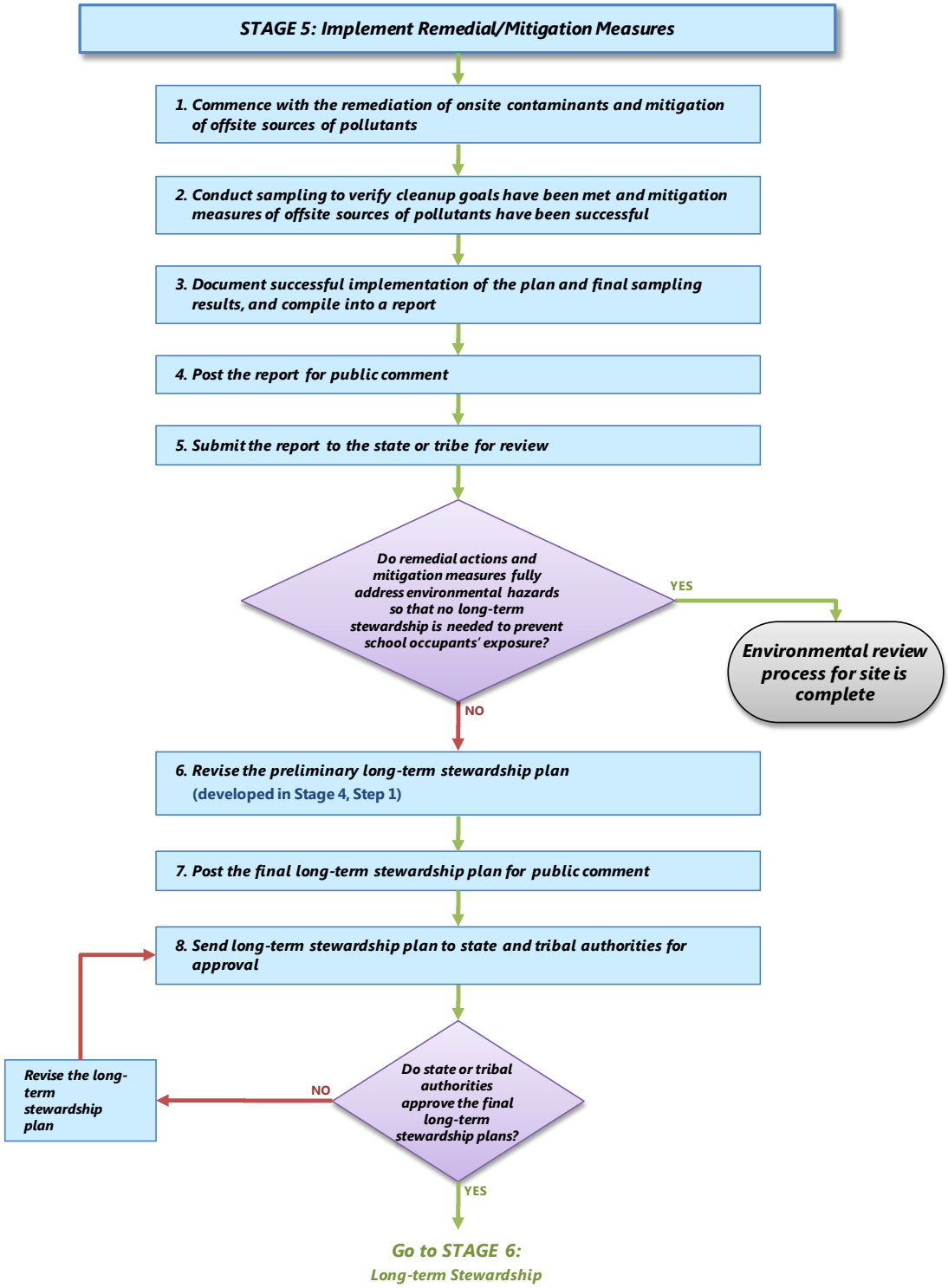
After the public hearing and review of any comments received during the public comment period, the state or tribe should approve the remedial action workplan, approve the workplan with revisions or disapprove the workplan. If the state or tribe requires additional information, a copy of the state's or tribe's comments and the responses prepared by the environmental professional in coordination with the LEA should be made available to the SSC and be posted on the project website. Any additional information submitted by the LEA to the state or tribe should also be made available to the SSC.

The state or tribe should explain in detail the reasons for accepting or rejecting the workplan. Before approving a workplan, the state or tribe should make an explicit finding that the LEA has the requisite capacity to oversee and manage the remediation/mitigation measures and institutional and engineering controls proposed in the remedial action workplan.

After the state or tribe approves the workplan, the SSC may also review the plan and recommend to the LEA whether to proceed with acquiring the site and implementing the remediation plan. The LEA should not begin constructing the school until site clearance has been provided by the state or tribal environmental regulatory agency, following its approval of the remediation activities (post-Stage 5).

5.9. Stage 5: Implement Remedial/Mitigation Measures

Exhibit 12: Stage 5: Implement Remedial/Mitigation Measures



Prior to the onset of any school construction at the candidate site, EPA recommends the remediation of the site as defined in the remedial action workplan be completed. If engineering controls are required as part of remediation, construction of those controls may begin following approval by the state or tribal environmental regulatory agency.

Remediation measures taken to reduce risks from offsite hazards can be conducted prior to or during school construction activities, depending on the mitigation measures being implemented. Appropriate state, tribal and local environmental agencies should be consulted before and after the remediation measures are installed to ensure that the mitigation controls taken will reduce exposures to the environmental hazards of concern. For more specific guidance see Evaluating Impacts of Nearby Sources of Air Pollution (see Section 6).

Final sampling, in accordance with sampling procedures in the comprehensive environmental review or the remedial action workplan, should be conducted to verify that cleanup goals have been met. Documentation regarding the implementation of the plan and all final sampling results should be compiled into a report and submitted to the LEA and SSC for posting on the project website and also submitted to the state or tribe for review, which may require additional sampling and/or remediation efforts as the state or tribe deems appropriate. Any modifications to the remedial action workplan should also go through the appropriate public review processes described earlier.

Toward the completion of remedial activities, the environmental professional should revise the preliminary long-term stewardship plan (LTSP) developed in Stage 4, Section 5.8, which will set forth, in detail, the specific manner in which institutional and engineering controls will be employed. The preliminary LTSP should address all contamination left on site following remediation that would prevent residential use. The preliminary LTSP should be submitted for public review and comment in the same manner undertaken for all of the preceding plans and reports and should be submitted to the state or tribe for approval prior to the commencement of construction. A critical component of such a plan is a clear commitment for the funding and other support needed to effectively monitor and ensure the integrity and effectiveness of any institutional and engineering controls.

A description of the recommended contents of the preliminary or final LTSP follows:

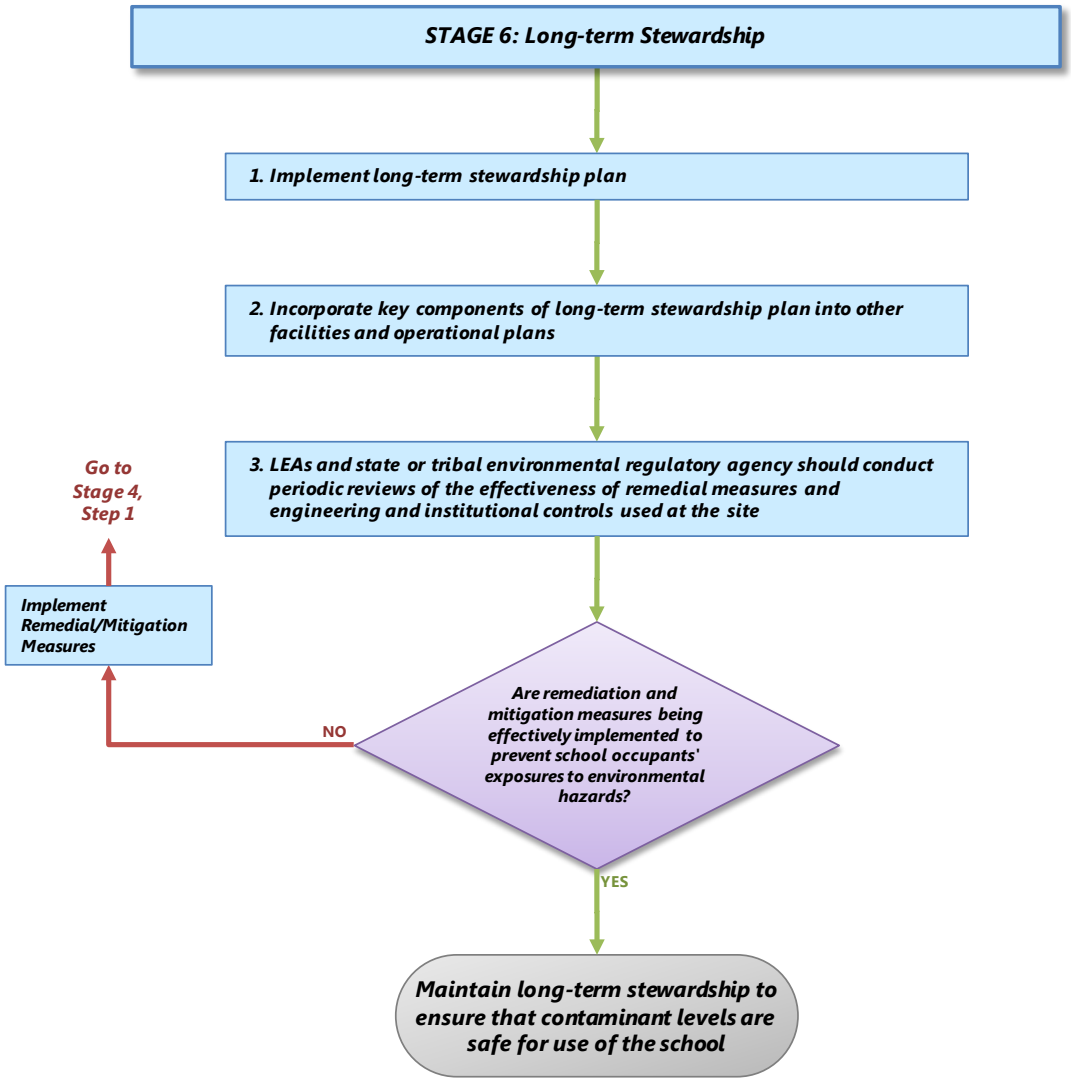
- **A site description** that includes:
  - Historical uses of the site and relevant adjacent historical uses;
  - A summary of the environmental evaluation of the site including details on the location and extent of soil/water contamination in excess of regulatory standards; and
  - A summary of the remedial work done at the site along with the test results.
- **A clear depiction of the institutional and engineering controls** that includes:
  - Accurate maps showing the institutional and engineering controls;
  - A description of the long-term environmental stewardship obligations along with a statement of who will be responsible for their implementation; and
  - A public document that outlines the responsibilities for maintaining both engineering and institutional controls, provided contamination levels warrant the controls.
- **Specific contingency plans** that describe engineering control restoration activities should the engineering control be disturbed;
- **A description of prohibited activities** (e.g., digging) in areas constructed with an engineering control to maintain the integrity of the engineering control;

- **A definition of the minimum professional requirements** (i.e., licensed professional engineer) for maintaining the engineering control, including where appropriate any necessary training of school staff responsible for managing school grounds including:
  - Identification/creation of a position within the schools facility department for a technically knowledgeable person trained and responsible for oversight of the school and grounds;
  - Training on techniques for monitoring cracks in the school foundation and breaches in the engineering control;
  - How to handle and/or report problems with equipment and remedial systems; and
  - How to handle complaints and comments about environmental conditions at the school.
- **A compliance monitoring program** to be carried out by qualified environmental professionals, as necessary, that will include:
  - Routine inspections, tests and maintenance of engineering and institutional controls to ensure their continued effectiveness;
  - Tests for the presence of contaminants in the soil, soil gas, ground water and indoor and ambient air on the school grounds if an engineering control is disturbed;
  - Procedures for recordkeeping and reporting;
  - Allocation of responsibilities for these activities among LEAs, state or tribal agencies, school officials and staff; and
  - An independent review by a licensed professional engineer not affiliated with the school.
- **A public accountability/oversight plan** that includes:
  - The prominent placement of signage within the school that clearly defines the extent of the contaminated areas along with appropriate institutional and engineering controls on the property, and directs readers to appropriate personnel and documents for further inquiry;
  - Development of a "due care plan," to be kept onsite and made available to the public electronically, that summarizes key elements and responsibilities for implementing the plan in a lay-accessible manner;
  - Measures to promote the long-term, institutional and public memory of the plan through activities designed to promote awareness by students, staff and the community, such as guest speakers and dedication of a section of the school or local library to the history of the site, remediation strategies and oversight and stewardship measures; and
  - The establishment of regular reporting mechanisms that publicly disseminate information on the location of controls, compliance status and monitoring reports in a manner consistent with the notice provisions discussed earlier and including relevant local and tribal or state environmental agencies. Included in this should be testing reports that clearly describe the purpose of the testing, sample locations and collection procedures, and analytical methods used. The release of these reports should:
    - Be accompanied by a meaningful opportunity for the public to provide comment and meet with school officials responsible for maintaining the engineering controls; and
    - Target outreach and communications about release of reports to parents and school workers (should be notified yearly about where and how to obtain information about contamination, remediation activities and ongoing monitoring).

School building construction should begin only after the state or tribal authority approves the final long-term stewardship plan and determines that the site is ready for construction. Engineering controls may be implemented before, during or after construction, depending on the type of controls to be used.

5.10. Stage 6: Long-term Stewardship

Exhibit 13: Stage 6: Long-term Stewardship



LEAs should incorporate key components of the long-term stewardship plan into other facility and operational plans and training materials for principals, facility staff, groundskeepers and contractors. The long-term stewardship component of the school management plan memorializes the remedial actions that were performed, monitoring of well locations, the standards to which the remediation was performed, the location of material removed and replaced, and tests and confirmatory sampling of materials brought as replacement fill and any wastes or material left capped in place. This plan describes in detail the specific manner in which institutional and engineering controls will be employed in the future and by whom. The final plan should clearly show figures and drawings of those locations where soil or water quality remains above residential use standards, including as-built drawings depicting the engineering control. The plan should clearly define the roles and responsibilities for maintaining the engineering controls, and these responsibilities should be memorialized in an institutional control such as a deed restriction that stays with the property even when bought, sold or donated. Where offsite sources of contamination exist, area-wide partnerships may be an effective tool to address contamination.

After the school project is complete and the school is opened, the state or tribal environmental regulatory agency should conduct a periodic review of the effectiveness of remedial measures and engineering and institutional controls used at the site. Annual assessments of school sites may also be required as part of a school facility operation plan or long-term facility plan or as part of local government master planning or comprehensive plan updates and reporting. One potential model for such reviews is the five-year review EPA currently conducts for Superfund sites. Five-year reviews[61] (www.epa.gov/superfund/cleanup/postconstruction/5yr)

[61] U.S. Environmental Protection Agency, "Superfund Five-Year Reviews." Last modified August 9, 2011. Available at: http://www.epa.gov/superfund/cleanup/postconstruction/5yr.htm.

provide an opportunity to evaluate the implementation and performance of a remedy to determine whether it remains protective of human health and the environment. These reviews will also be useful in identifying new sources of environmental hazards arising after school construction and occupancy.

When employing institutional/engineering controls, plans should be developed to address issues that might arise. For example, the failure of an institutional or engineering control should trigger immediate notification by the LEA of the staff, parents and community, as well as state or tribal authorities. Actions may be needed to ensure that students or staff are not exposed to contamination. School emergency preparedness plans should provide for ensuring that students and staff will not be at risk in the event of the failure of engineering controls. Plans should also outline requirements for personnel to monitor engineering controls, which might be a combination of maintenance staff and environmental engineers. Complaints or concerns related to the performance of engineering and institutional controls should be tracked and responses to those complaints/concerns documented.

To help ensure that the management of institutional and engineering controls will receive the attention they require, the procedures for management of institutional and engineering controls should be part of the school facility operations procedures. The procedures should include monitoring requirements, effectiveness and integrity review requirements, any performance review requirements (such as calibration procedures) and documentation requirements. Because these documents can be challenging for a lay audience, a summary written in plain language (and translated for non-English speaking stakeholders) should be available to community members. Routine monitoring, reviews for the effectiveness and integrity of the remedy, and reporting all need to continue for as long as contamination levels do not meet safe levels for use of the school.

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6. Evaluating Impacts of Nearby Sources of Air Pollution

6.1. Overview

This section provides guidance on assessment of offsite environmental hazards during the environmental review process (see Section 5.1). It can be complex to measure and understand the potential risks to school occupants that may be associated with air emissions sources situated in the vicinity of the proposed school location. The local education agency (LEA) (see Section 10) and school siting committee (SSC) (see Section 3.3) should consider any potential impacts from nearby sources of air pollution early in the selection process. Airborne pollutants from nearby emission sources can directly contaminate the ambient air at the location or be deposited on the site over time. Sources of these air pollutants are varied, but most are human-made, including:

- **Mobile sources** (e.g., cars, trucks and buses on roadways; trains and rail yards; ships and port facilities; planes and airport equipment);
- **Stationary major sources** (e.g., factories, refineries, power plants); and
- **Local area sources** (i.e., collections of small point sources, such as auto-body spray shops or dry cleaners).

The Environmental Protection Agency (EPA) identifies pollutants of interest in evaluating air quality at a particular location either as criteria pollutants or toxic air pollutants, also known as hazardous air pollutants (HAPs).

- **Criteria pollutants** refer to six common air pollutants that are regulated through the development of human health-based and environmentally-based criteria (i.e., science-based guidelines) that are used to set the National Ambient Air Quality Standards (NAAQS).[62] They are particles (often referred to as particulate matter), ground-level ozone, carbon monoxide, sulfur dioxide (SO_2), nitrogen dioxide (NO_2) and lead. States with areas where ambient concentrations are above the NAAQS (nonattainment areas) are required to develop plans to bring them into attainment.
- **Air toxics** are pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects. The current list of HAPs is available on EPA's Technology Transfer Network Air Toxics website. (www.epa.gov/ttn/atw/188polls) In addition to this list, diesel emissions are considered a mobile source air toxic. Brief summaries of the pertinent toxicity information on these HAPs and information on where more comprehensive and primary data can be obtained are located at www.epa.gov/ttn/atw/hlthef/hapindex.

[62] U.S. Environmental Protection Agency, "National Ambient Air Quality Standards (NAAQS)." Last modified August 4, 2011. Available at: www.epa.gov/air/criteria.

As discussed in the Environmental Siting Criteria Considerations (see Section 4) and Environmental Review Process (see Section 5) sections, the initial screen of potential locations for schools should consider potential onsite and nearby environmental and safety hazards. In general, the LEA and SSC should seek to avoid locations that are in close proximity to land uses that may be incompatible with schools, such as those included in Exhibit 6: Screening Potential Environmental and Safety Hazards, particularly in cases where acceptable alternative locations exist that may pose fewer environmental challenges and still meet other important school siting criteria.

If an LEA is considering locations that are in proximity to air pollution sources that may pose potential risks, an understanding of those potential exposures and risks is essential. Due to the many variables involved (such as those included in Exhibit 5: Factors Influencing Exposures and Potential Risks from Nearby Hazards), assessing risks from air pollution is inherently complex and should be performed by a trained environmental professional with monitoring, modeling and risk assessment expertise. The overall process involves the following components:

- Thorough familiarity with the potential school location's layout (see Section 6.2), including local meteorology, topography and the land use of the surrounding neighborhood;
- Initial assessment of existing air quality monitoring and modeling information (see Section 6.3) to gauge air quality in the neighborhood around a potential school location;
- Development of an inventory of pollution sources (see Section 6.4) and associated emissions that may impact the air quality at a location;
- Screening evaluation of potential air quality (see Section 6.5) and, if feasible, health impacts potentially associated with a location's air quality based on modeling and/or monitoring assessments; and
- Development of an environmental assessment report (see Section 6.6) containing descriptions of activities, conclusions and recommendations.

Public involvement (see Section 3) is an important part of evaluating the impacts of nearby sources of air pollution. The LEA and SSC should inform the public about the evaluation and give opportunities for public comment on assessment reports and, in cases where mitigation is needed, on potential mitigation measures.

Examples of Local Air Toxics Monitoring (www.epa.gov/schools/siting/resources)

EPA's Initiative on Assessing Outdoor Air Near Schools: In 2009, EPA embarked on an initiative to understand whether outdoor toxic air pollution poses health concerns to school children. This initiative, "Assessing Outdoor Air Near Schools," (www.epa.gov/schoolair) is instructive about some of the types of school air monitoring efforts that have been performed and provides useful examples of assessing outdoor air near schools.

Community-Scale Air Toxics Ambient Monitoring Projects (www.epa.gov/ttn/amtic/local): Since 2003/2004, EPA has conducted periodic Community-Scale Air Toxics Ambient Monitoring grant competitions to support state, local and tribal communities in identifying and profiling air toxics sources, characterizing the degree and extent of local air toxics problems, and tracking progress of air toxics reduction activities. The Community-Scale Air Toxics Ambient Monitoring website has grant information, final project reports and a training module, How to Create a Successful Air Toxics Monitoring Project. (www.epa.gov/ttn/amtic/airtox-daw-2011.html#how)

6.2. Location Layout and Study Area

The study area around a potential location will vary with the land use (i.e., urban vs. rural), the nature of nearby emission sources (i.e., major stationary sources, mobile sources, area sources), and the types of pollutants (i.e., gaseous or particulate). The recommended screening perimeters included in Exhibit 6 should be considered as a rule of thumb for the environmental professional. Depending on the wind directions and the existence of large major emission sources upwind of the candidate school location (i.e., the direction of the prevailing wind carries the air from around the source toward the school), the environmental professional may need to adjust the study area.

6.3. Initial Assessment of Area Air Quality

An initial assessment of air quality around a potential school location should make use of existing data that is representative of conditions in the neighborhood around the location.

Air quality monitoring can play multiple roles in the initial assessment. Early in the assessment, the environmental professional should evaluate local air quality monitoring data as a means of initially gauging air quality at a location. To facilitate access to data on criteria pollutants, EPA's AirExplorer website (www.epa.gov/airexplorer) is an online collection of user-friendly tools for visualizing and mapping air monitoring data. AirExplorer allows users to download monitoring data for monitoring sites in a specific area, produce graphs of monitored air quality and visualize locations using Google Earth. As an initial screen of site conditions, monitored air quality data at nearby stations may be compared to the level of the NAAQS. Nearby monitoring data may also be available for assessing air toxics at a potential location. EPA's AirData website (www.epa.gov/air/data) allows users to query and map air quality data from locations across the country. Compared to criteria pollutant monitoring, air toxics monitoring data are generally more limited in their coverage and in the amount of time the monitors have been operating. State, tribal and local air agencies may also have local air quality monitoring data that can be used in this initial assessment.

Existing air monitors will vary in the extent to which they represent air quality at a particular location. Monitors are more representative of a potential school location when they share similarities in the types of nearby sources, land uses, topography and meteorological conditions present. The environmental professional should document the extent to which existing monitors are likely to represent air quality conditions at a candidate school location.

EPA's National-Scale Air Toxics Assessment (NATA) (www.epa.gov/ttn/atw/natamain) is a screening tool that provides modeled estimates of average ambient air pollutant concentrations, and associated cancer risk, across broad geographic areas such as counties and states. NATA can be used to identify and prioritize emission sources, locations and pollutants of interest for further study. However, NATA is not a definitive means for pinpointing specific risk values at a site or characterizing or comparing risks at local levels, such as between neighborhoods or between candidate school locations. Consequently, other information sources are necessary to assist in developing the initial assessment.

With available data in hand, the environmental professional should conduct an initial assessment of air quality conditions at the candidate location. The environmental professional should note whether local monitoring data are available for both criteria pollutants and air toxics and when available data are limited to NATA. An initial screening assessment of air quality at the location may include comparison of criteria pollutant levels to the NAAQS and characterizing risks associated with air toxics in and around the potential location.

If the environmental professional determines that there is a basis for air quality concern due to high ambient concentrations, or there is insufficient information to determine whether a concern is present, additional site-specific analyses (description to follow) should be considered. For environmental professionals needing more site-specific air quality information, onsite monitoring or local air quality modeling should be considered. Air monitoring and modeling are complex and expensive to conduct. For the monitoring and modeling to provide accurate and relevant information, the activities must be appropriately performed. The assessment plan and the results should be clearly communicated to stakeholders before, during and after completion of the monitoring and/or modeling.

The following steps pertain to refined site-specific analyses that may be performed.

6.4. Inventory of Air Pollutant Sources and Emissions

The environmental professional should develop or obtain an inventory of all the potential pollution sources, both large and small, within the study area. Developing the inventory should include consulting with the state, tribal or local air agency (e.g., permits, monitoring) and EPA Regional Offices (www.epa.gov/aboutepa/index.html #regional) to determine what data resources may be available that can provide additional information for inventory development. The state agencies (www.epa.gov/air/where) are particularly useful in that they may have emissions data or other studies that are not reported at the national level. When local information is unavailable from state, tribal or local air agencies, other information sources can be used, such as EPA's AirData website, (www.epa.gov/air/data) which queries large national databases such as the National Emission Inventory (NEI) (www.epa.gov/oar/data/neidb) and allows users to download emission data on local sources permitted to emit criteria pollutants and air toxics. At a minimum, this pollutant inventory should include:

- The name of each point and industrial area source;
- A description of the source (e.g., point source, mobile source, fugitive emission, major or area source); and
- The distance from the source to the study area.

For point and industrial area sources, also include:

- Their locations (i.e., street address, latitude/longitude);
- The ongoing activity at the source;
- The pollutants emitted or released (i.e., criteria pollutant, or chemical name and Chemical Abstracts Service number for toxics); and
- The emission rate of each pollutant (e.g., pounds/year or tons/year).

Highways and other transportation facilities may be nearby emission sources. However, detailed emissions information is often not readily available for these sources, and mobile source inventories are usually developed by allocating emission factors from broad geographic areas using estimated values. As such, when assessing nearby transportation sources, local data on activity such as use (e.g., vehicles per day, trains per day) and time of operations (e.g., morning/evening rush hours for highways, ship and truck activity in ports) should be collected and applied to emission rate estimates to develop local inventories. The NATA (www.epa.gov/ttn/atw/natamain/) and NEI (www.epa.gov/oar/data/neidb) databases may also contain information on some transportation facilities in an area. The environmental professional should consult with transportation and urban planning agencies to identify the location and activity of all transportation facilities in the area, such as state departments of transportation and metropolitan planning organizations for metropolitan areas with at least 50,000 residents. These organizations can also provide information on future planned infrastructure in the area that may impact air quality around the school location.

More information on considering nearby highways and other transportation facilities, including goods movement (see Section 8.2), is included in the Quick Guide to Environmental Issues (see Section 8).

The environmental professional should recognize that all databases have limitations. They may not be up-to-date; they may not have the most accurate location information for some of the sources in the study area; or they may not identify all the potential sources in the study area. Also, the data contained in these databases may be aggregated at some larger level (e.g., county or state level) and lack the necessary detail for the study area. Therefore the environmental professional should be prepared to utilize additional methods, such as an on-the-ground visual survey, often called a "windshield survey," to complete the pollutant inventory.

A windshield survey is extremely valuable for identifying those sources not available through national and regional databases and agencies, identifying new sources that have recently opened near the location, and verifying whether sources identified in the initial database reviews are still operating. The survey can be informed by maps, aerial photographs, online resources and local government records (e.g., utility records, tax records). Also, documents, such as the South Coast Air Quality Management District's "Air Quality Issues in School Site Selection Guidance Document," (www.aqmd.gov/prdas/aqguide/doc/School_Guidance.pdf) can provide the environmental professional with useful guidance for identifying general categories of emission sources for inclusion in the survey.

If new sources are discovered during the windshield survey, or if modifications are observed in known sources, the environmental professional should contact the state or tribal air agency and the EPA Regional Office to fill in data gaps. If source-specific emission details are not available, these agencies may recommend surrogate parameters (e.g., emissions profiles and emission rates) to help complete the inventory. To quantify the extent of emissions from nearby roads and other sources, emission models may be employed. For example, the environmental professional can use EPA's Motor Vehicle Emission Simulator (MOVES) (www.epa.gov/otaq/models/moves/index.htm) to calculate emission rates for individual road links, and EPA's AP-42 (www.epa.gov/ttnchie1/ap42/) can be used for stationary and area sources.

In interpreting the impact of nearby sources on a school location, it is helpful to evaluate meteorological conditions present at the prospective location. For instance, potential school locations that are situated predominantly downwind of an air pollution source may realize greater impacts than those that are located upwind of the source. However, even if a potential location is situated upwind of a source based on historical wind data, there will still be occasions when the location will be downwind of the source. In addition, for highways and other traffic sources, pollutants can travel upwind of the road because of air flows created by the vehicles operating on the roadway. Thus, for roadway sources, there may not be a significant difference between upwind and downwind locations with regard to air pollution impacts.

Based on the inventory and on professional judgment pertaining to the many factors influencing exposures and potential risks (see Exhibit 5), the environmental professional should determine whether there is reason for initial concern related to air pollutant exposures at the location and determine if onsite ambient air monitoring is warranted prior to choosing the location.

6.5. Screening Evaluation of Potential Air Quality

6.5.1. Local Air Quality Modeling

If the environmental professional determines that additional information pertaining to local air quality beyond that developed in the initial assessment is needed, air quality modeling may be considered as a means to provide this information. In particular, dispersion models are tools that calculate the air quality impacts of nearby sources at downwind locations. They may be used to model ambient concentrations of both criteria pollutants and air toxics and to estimate the magnitude of nearby sources' impacts on air quality at a given location.

Dispersion models require information on emission rates of nearby sources (from an emission inventory (see Section 6.4) as previously discussed), meteorological conditions at a location, and information on terrain and land use in the vicinity of the candidate location. There are two major categories of dispersion models: screening models and refined models.

- **Screening models** estimate the maximum likely impacts of a given source, generally at the receptor with the highest concentrations. These models are intended to eliminate the need for more detailed modeling in cases that will clearly not create ambient concentrations of concern. For many sources in simple terrain, the SCREEN3 (www.epa.gov/ttn/scram/dispersion_screening.htm) model may be used to estimate maximum ground-level concentrations resulting from a single source. For roadways and intersections, the CAL3QHC model (www.epa.gov/ttn/scram/dispersion_prefrec.htm#cal3qhc) may be used to estimate likely maximum concentrations at locations nearby.
- **Refined models** use detailed local information and simulate detailed atmospheric processes to provide more specialized and accurate estimates of how nearby sources affect air quality at downwind locations. Relative to screening models, refined models can require a significant investment of time and resources to conduct a proper analysis. AERMOD (www.epa.gov/ttn/scram/dispersion_prefrec.htm#aermod) is EPA's general-use model recommended for a wide range of sources in all types of terrain. For most situations, AERMOD is an appropriate model for estimating the impact of nearby sources on air quality near a potential location.

6.5.2. Onsite Air Quality Monitoring and Risk Analysis

If the environmental professional determines that onsite monitoring is warranted, and upon authorization by the LEA, the environmental professional should develop and implement an onsite air quality monitoring and analysis study. The objective of the study is to determine whether the targeted air pollutants identified in the inventory are present at the location in concentrations that may pose either short-term or long-term health risks to children or adults that may utilize the school facility. Monitoring can also capture impacts from sources that were not explicitly included in any local scale modeling, including unreported or unidentified sources. Ambient air monitoring, however, is costly in terms of the time, resources and technical expertise required to generate meaningful data. To minimize these costs as much as possible, a short-term monitoring approach can be used as an initial screen to determine if a location is suitable for future development. In addition, passive and other portable sampling techniques can also be used in screening monitoring to compare and evaluate multiple potential school locations.

Throughout the monitoring activity, the environmental professional should review the monitoring and analysis procedures to confirm compliance with the appropriate quality assurance and quality control (QA/QC) protocols

and assess local meteorological conditions during monitoring activities to identify any possible impacts on the sample collection. There are a number of studies and programs described on EPA's website that provide examples of local monitoring activities. EPA's "Assessing Outdoor Air Near Schools" (www.epa.gov/schoolair) Initiative provides useful guidance for this approach relative to air monitoring and the determination of potential adverse health impacts. EPA's Community-Scale Air Toxics Ambient Monitoring Projects (www.epa.gov/ttn/amtic/local) website should also be consulted for recommendations on conducting air toxics monitoring analyses. Both websites include information on QA project plans for outdoor air monitoring. The NO_2 near-road monitoring website (www.epa.gov/ttnamti1/nearroad) provides some information on pilot studies conducted at several cities in the United States using passive sampling devices.

6.5.3. Development of Pollutant Specific Screening Criteria

An important step in determining a location's acceptability is the identification of a set of screening criteria for each of the targeted air pollutants. These criteria should be protective of children's health. As discussed in Principle 1 (see Section 1.4.1) in the About the Guidelines (see Section 1) section, children are more vulnerable to environmental exposures than adults.

For criteria pollutants, these criteria may be based on comparison with the relevant NAAQS. For air toxics, the criteria should screen for the potential of adverse health effects resulting from both short-term (i.e., acute) and long-term (i.e., chronic) exposures at the location. If using a dispersion model to assess potential exposures, the output should be formatted to reflect the averaging times relevant to the screening criteria. In a short-term monitoring study, established reference concentrations, dose-response assessments or other similar benchmarks may not be available for all of the pollutants detected. Consequently, the environmental professional may need to employ other approaches to identify appropriate screening criteria, including the development of surrogates for use in lieu of established acute values. The environmental professional will also need to evaluate the air sampling data for potential adverse health impacts resulting from chronic exposures to pollutants at the location. Therefore, the environmental professional should develop health-based screening criteria that can be used as long-term comparison levels. The development of suitable screening criteria for chronic exposures depends on the availability of two different types of long-term comparison levels:

- A cancer-based comparison level that is an estimated continuous (i.e., 24 hours per day, 365 days per year) exposure concentration set at an acceptable lifetime cancer risk. EPA typically considers lifetime cancer risks in the range of 1 in one million to 100 in one million to be acceptable. In some situations, other acceptable risk levels could be appropriate.
- A noncancer-based comparison level, such as the reference concentration or a comparable value, which is the estimated continuous (i.e., 24 hours per day, 365 days per year) exposure concentration considered likely to be without adverse effects over a lifetime.

In deriving the chronic screening criteria, priority should be given to the use of relevant and appropriate air standards (e.g., the NAAQS) as well as EPA's risk assessment guidance and precedents. Data from EPA's Integrated Risk Information System (www.epa.gov/iris/) can also be used to derive the appropriate screening criteria. Integrated Risk Information System contains both Inhalation Unit Risk values for chemicals with carcinogenic effects and reference concentrations for chemicals with chronic, noncancer health effects. Other data sources can be found on the following websites:

- EPA Office of Air's Technology Transfer Network Air Toxics (www.epa.gov/ttn/atw/toxsource/summary);

- California Environmental Protection Agency Office of Environmental Health Hazard and Assessment (www.oehha.ca.gov/air);
- Texas Commission on Environmental Quality (www.tceq.texas.gov/toxicology);
- New Jersey Department of Environmental Protection (www.state.nj.us/dep/daq/); and
- Agency for Toxic Substances and Disease Registry (www.atsdr.cdc.gov/mrls).

An example of how both acute and chronic screening criteria have been established for previous air toxics monitoring studies can be found at www.epa.gov/schoolair/pdfs/UsesOfHealthEffectsInfoinEvalSampleResults.pdf.

6.5.4. Evaluation of Potential for Adverse Acute and Chronic Health Impacts

With analytical results in hand and screening criteria in place, the environmental professional can begin an evaluation of the location's potential air quality impacts on acute and chronic health effects. Those sample results showing pollutant concentrations less than the screening criteria indicate acceptable air quality and do not require further action. Those pollutants determined to be present at concentrations above the screening criteria should be flagged for further consideration in the final report.

When evaluating onsite monitoring data, the environmental professional will also need to consider the potential impacts of the location's meteorology on any samples collected. This will require comparing the meteorological data taken on actual sampling days against those data taken onsite over all the days within the monitoring period, as well as available data from a nearby weather station. This will enable the environmental professional to determine the representativeness of the samples collected with respect to what might be expected over the longer term.

For an example of how to compare monitored values to acute and chronic screening criteria, go to the school air toxics monitoring project at www.epa.gov/schoolair/pdfs/UsesOfHealthEffectsInfoinEvalSampleResults.pdf.

When several locations are being considered, a comparison of potential health impacts at alternative locations may help in identifying the location with the lowest risk.

6.6. Development of an Environmental Assessment Report

After completing the comparison, the environmental professional should prepare and submit an environmental assessment report. When developing recommendations for the report, the environmental professional will need to consider and weigh a variety of factors. Among these is the fact that the screening levels were developed specifically to be conservative indicators of the risk of an adverse health effect. Exposures at or above a specific screening level do not necessarily indicate that a risk exists; rather it indicates that as exposures increase above an indicator, there is an increasing potential for risk of adverse health effects.

Taking into account these factors and the results from the environmental assessment, the final report may include one of several recommendations. If no pollutants of concern have been identified at concentrations greater than the acute or chronic screening criteria, the report may conclude that the location is acceptable from an air quality perspective. In those instances in which either or both of the acute or chronic screening criteria are exceeded by a pollutant, the report may conclude that the location is unacceptable from an air quality perspective or that additional measures (e.g., additional monitoring, site-specific risk assessment) are required. If no candidate locations are available that are without air quality concerns, the report should describe what mitigation options may be available for the candidate school location.

At a minimum, the final report to the LEA and SSC should describe and discuss the following:

- **Study area**, including the sources, activities and emissions located within area boundaries;
- **Pollutant inventory process**, including the identification of the pollutants targeted for monitoring;
- **Modeling approach and modeled concentrations** for locations in and around the site;
- **Monitoring approach and results**, including actual measured pollutant concentrations, projections of potential longer term concentrations and a comparison of these concentrations against national and regional averages;
- **Acute and chronic screening criteria**, including the process for selecting and/or deriving the criteria;
- **Comparison of pollutants against the screening criteria**, including potential health effects and toxicity information for those air toxics determined to be at the location;
- **Potential for multipollutant impacts** in those cases where multiple pollutants have been detected at levels above or just below their respective comparison levels;
- **Identification and evaluation of potential contributing sources**;
- **Conclusions and recommendations for next steps**; and
- **Impacts of the uncertainty and limitations** associated with the recommendations arising from limited sampling, location meteorology, available toxicity information, etc.

The draft report should be made available for public comment, as described in the Meaningful Public Involvement, Section 3. The environmental professional should consider public comments in drafting the final report.

The LEA and SSC should review the environmental professional's report and the public comments received on the report and, in light of other assessments being performed at the location, determine next steps. To further clarify its options, the LEA may elect to have the report reviewed by a third party, such as a state, tribal or federal agency, with expertise in the subject area. In addition, the LEA may choose to identify and evaluate actions (regulatory or otherwise) being taken or planned nationally, regionally or locally that may achieve emission and/or exposure reductions in an acceptable time frame. The decision about next steps should be based on the weight of evidence supported by the environmental professional's report, other data developed during the environmental review process (see Section 5.1), and the potential for future reductions in exposure

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7. Recommendations for States and Tribes

7.1. Overview

State and tribal involvement and oversight offers many opportunities to enhance the work of local education agencies (LEAs) (see Section 10) and school siting committees (SSCs) (see Section 3.3) in identifying potential sites or structures for schools. This section identifies important steps that states and tribes can take to enhance the capacity of local communities to identify locations for schools that enhance the educational process by providing a safe and healthy environment for children, teachers and staff.

7.2. Recommendations for States

States often play an important role in community school site selection decisions, depending on state legislation, regulations and guidance. A number of states (see Section 5.2.1) have developed comprehensive school siting policies, including:

- California: www.dtsc.ca.gov/schools/index.cfm;
- New Jersey: www.nj.gov/dep/dccrequest/; and
- Washington: www.ecy.wa.gov/programs/sea/sepa/e-review.html.

At a minimum, state agencies are important resources for communities on siting issues. For example, states often serve as a central repository for expertise in the many complexities associated with choosing the best possible site. This is often the result of promulgated legislation, state regulations or state-specific recommendations related to issues that are relevant to school siting decisions. While individual LEAs may have limited resources for investing in their own specialists, states may be able to help defer the costs of such expertise through centrally located resources that can be made available to all state LEAs. For example, a state-wide listing of environmental professionals licensed or registered with a central state agency can serve as an important resource for LEAs needing highly qualified and well-respected onsite evaluation of potential sites or buildings.

Policies that Impact the Siting of Potential Sources Near Schools

States, tribes and localities should evaluate siting and permit processes that influence where potential sources of environmental pollution (see Source categories identified in Exhibit 6: Screening Potential Environmental and Safety Hazards) may be allowed to locate with respect to schools. While these land use decisions are highly complex and beyond the scope of these guidelines, states, tribes and communities should seek to avoid situations in which new nearby sources of potentially harmful pollutants are sited in such close proximity to schools that they may pose a potential hazard to the school occupants.

Because land for development is becoming less available in many states, officials at the state level in these states often develop comprehensive statewide or regional land use and development plans. Working together, LEAs and state officials can effectively coordinate to identify appropriate lands for locating schools. Establishment of statewide school siting policies and guidelines, where they are not currently in place, can help states promote educational, environmental, health and safety objectives associated with school facility construction and renovation. In some cases, states have programs in place that allow them to partially fund projects that meet state school siting guidelines.[63]

7.2.1. State Resource Review

Many state agencies have expertise that can contribute to sound school siting decisions and implementation, including departments of education, public health, transportation, planning, parks, community development, historic preservation and environment. Different agencies will likely have staff with complementary knowledge, expertise and skills that can be helpful in various parts of the school siting process. However, it may be challenging for LEAs and local community residents to know which agencies to contact for specific concerns and questions. States are encouraged to share the expertise, available assistance, state-level contacts and responsibilities they have across agencies, and to assign an office or agency to serve as the liaison for school siting questions and assistance. In doing so, states can review whether there are adequate staff resources with appropriate expertise in place to assist local communities with school siting decisions and planning processes and develop a plan to support local school siting efforts, including addressing gaps in staffing and resources as necessary.

Two of the ways states can support local communities in the selection of potential school sites are to provide information from existing site inventories to LEAs and to develop policies to support local communities making school location decisions. In addition, states are encouraged to partner with LEAs to build capacity to effectively manage waste or contamination that remains through the implementation of engineering and institutional controls (see Section 8.15) and long-term stewardship (see Section 8.16).

There are several important steps that states can take to support development of local capacity for identifying appropriate locations for schools:

- Improved coordination across state programs (see Section 7.2.2);
- Staffing and financial resources (see Section 7.2.3);
- Participation in public meetings (see Section 7.2.4); and
- Access to state information on school siting (see Section 7.2.5).

7.2.2. Improved Coordination across State Programs

Many existing state programs have the capacity to support local land use decisions related to the siting of schools. States are encouraged to enhance coordination across state programs to assist local communities with school siting decisions. Some key factors for states to consider include:

- Whether the existing state program management structure is able to perform the necessary coordination and supervision between agencies needed to support LEAs in making school siting decisions;
- Which state and/or local agencies can contribute to school siting and the responsibilities of each agency; and
- Whether there are legal and institutional impediments that need to be addressed.

[63] For more information on existing state policies, see "50 State Survey," conducted by Rhode Island Legal Services. Available at: www.childproofing.org/school_siting_50_state.htm.

Effective coordination across state programs can help to ensure that the programs with responsibility, knowledge and expertise in healthy schools issues are engaged in the school siting process. A state should consider identifying a point of contact with responsibility for coordinating across state agencies with authorities, responsibilities, programs, policies, guidelines or standards affecting decisions concerning whether and where to build new schools or carry out major expansion of existing facilities, as well as coordinating other school facility issues. States are also encouraged to coordinate with local and regional planning agencies to ensure locations selected for schools meet multiple community goals.

Many states have processes to determine appropriate land and resource uses for sites that have residual contamination after cleanup; these processes may already apply to school siting or may be expanded to apply to school siting decisions. State inventories of assessed or remediated locations or structures as well as those undergoing or planned for assessment and cleanup may be useful to share with LEAs and other state, public or private entities to ensure safe reuses. It is essential that the agency and department responsible for reviewing potential school sites for potential environmental contamination be identified early in the siting process so that they will be appropriately involved.

Local governments with robust environmental, planning and health departments often bear primary responsibility for managing environmental health or contaminated site cleanup programs. However, in many parts of the country, local government resources to support school siting decisions are very limited or perhaps may not even exist. In these cases, the state government frequently provides assistance to the local agency or identifies a suitable third party to manage efforts to determine appropriate land and resource uses for properties with residual contamination. These activities are particularly important in situations where schools may be constructed on sites with residual contamination to ensure proper maintenance and oversight for any necessary engineering or institutional controls or long-term monitoring.

States may want to consider developing a formal memorandum of understanding between agencies to ensure that staff resources and expertise are available to assist with school siting. For example, the Iowa Department of Historic Resources has a memorandum of understanding with the Iowa Department of Education to provide information about older and historic schools.[64]

7.2.3. Staffing and Financial Resources

An assessment of the human and financial resources available in state agencies to support local school siting decisions should address the following questions:

- How can staff with the appropriate expertise assist local communities with school siting decisions and planning processes; and
- How can budgetary or other resource gaps be overcome to safely renovate or site schools?

7.2.4. Participation in Public Meetings

State government representation at meetings with the community is important when the state has oversight responsibilities for environmental cleanup or reuse planning. Even when oversight responsibilities have been delegated to local agencies, state government participation can be helpful to ensure that the review process is sound and that communications with the community are effective and to reinforce that the special sensitivities of children were considered as part of the school location selection process.

[64] State Historical Society of Iowa, "Historic Preservation." Accessed on September 16, 2011. Available at: www.iowahistory.org/historic-preservation/.

7.2.5. Access to State Information on School Siting

States should consider developing a publicly available, easily accessible website/database to provide a centralized source of information pertinent to school evaluation and selection, including:

- Policies and procedures for site location evaluation and review, including state-specific guidance for evaluation of candidate sites, if available;
- Public involvement guidelines;
- Mapping and other resources to assist in evaluation of potential school locations;
- Records of location reviews (e.g., findings, description of site remediation activities, institutional and engineering controls, decision documents for cleanup and documentation of sites that meet standards for residential use); and
- Surveys of historic properties, including schools, case studies and awards given for historic renovation, reports about costs of renovation vs. costs of new construction.

7.2.6. State Oversight Roles

State environmental regulatory agencies may oversee assessment and cleanup activities for properties enrolled in their voluntary cleanup programs. Many states have adopted risk-based cleanup actions and determine level of cleanup needed based on proposed reuse. Institutional control tracking programs may be a part of their program oversight as well. However, this state regulatory oversight does not relieve the LEAs or private property owners of their responsibility to manage their property, monitor and maintain land use controls and ensure safe site reuse.

Environmental evaluation

LEAs should work with state governments to ensure all sites proposed for construction of new schools, renovation of an existing building for school use or expansion of existing schools have received appropriate environmental approval from the state agency prior to construction. Sites should be assessed prior to acquisition or donation to determine if there is potential environmental contamination onsite or at neighboring sites that could pose health or environmental risks to children, faculty or staff, and for their impacts on transportation, air quality and accessibility.

Where proposed sites adjoin or abut a location that has environmental or public health concerns, LEAs should seek out the appropriate planning, environmental and health review to ensure that a potential site would be an appropriate and safe location for a school.

Cleanup procedures

Although most states do not have school siting procedures that specifically apply to site investigation, sampling, cleanup, determination of appropriate land and resource uses and long-term stewardship, many do have these policies and practices in place that apply more generally to sites being considered for reuse. In general, cleanups are tailored to meet the intended reuse. Locations which are to be used for schools should be cleaned up to levels that support residential use. In the event that residual contamination remains on the site, engineering and institutional controls to prevent exposure and a clear, documented long-term stewardship plan should be in place at the location. For more information see the Environmental Review Process, Section 5.

Meaningful public involvement

Meaningful public involvement (see Section 3) throughout the school siting process is of critical importance. Plans for public involvement should be formalized prior to initiating the identification of potential school sites. Details of site assessment processes, findings, cleanup decisions (e.g., scope, procedures, findings), land use restrictions (engineering and institutional controls, see Section 8.15) and subsequent school construction plans should be provided to the public and subject to community involvement and public notification.

It is important for LEAs to develop a communications plan to ensure effective public involvement (see Section 3.4).

Local capacity to manage institutional and engineering controls

States should establish standards to assess the capacity of any party for management of institutional or engineering controls at potential school locations. The standards should be designed to ensure the long-term integrity of any institutional or engineering controls put in place at potential school sites where residual contamination or offsite hazards to be mitigated exist. The capacity to manage engineering and institutional controls should consider the following:

- Availability of accurate information on the location or extent of institutional and engineering controls, perhaps provided on a map;
- Establishment of, and participation in, a one-call system (see Section 10) to protect against human exposure to contaminated soil;
- Establishment of a mandatory monitoring program to routinely review institutional and engineering controls to ensure their continued effectiveness;
- Establishment of enforceable institutional controls, which require compliance;
- Establishment of informational institutional controls that effectively disseminate information on the location of controls, compliance status and monitoring reports to interested stakeholders, especially parents, state and local environmental officials;
- Long-term budget commitment to provide funds for the operation and maintenance of institutional and engineering controls, including required training of staff responsible for maintaining controls;
- Tracking of expenditures associated with institutional and engineering controls by the LEA so that historical expenditures can be used to refine planning estimates for the cost of maintaining institutional and engineering controls;
- Using more than one institutional control (i.e., "layering") to improve overall reliability and effectiveness for managing the amount, concentrations, toxicity and other characteristics of the residual waste or contamination; and
- Availability of a process to report malfunctions of controls.

7.2.7. State Policy Review

States are encouraged to review existing laws, policies and regulations addressing school siting to determine whether changes are needed to encourage improved school siting decisions. Such a review of existing policies across state agencies would help identify gaps and outdated policies that no longer serve state goals and objectives. Education, health, environmental, planning, and transportation agencies, as well as others, such as the State Historic Preservation Officer, should work together to consider how existing regulations, policies and guidelines influence or affect decisions about school renovation, remodeling or the siting of new schools. Review of existing guidelines or policies may focus on those related to the following general topics:

- Community involvement and public participation in school siting and renovation decisions;
- Long-range school facilities plan;
- School funding of new construction or to support existing school renovation;
- Prohibitions on state reimbursement of land costs that force communities toward the lowest cost sites, regardless of potential environmental challenges;

- School size formulas or requirements for lot size and access to recreational areas;
- Minimum school enrollment requirements;
- Environmental evaluation and associated costs;
- Environmental cleanup (including cleanup standards and long-term stewardship site controls) and associated costs;
- Community use of schools (and joint use of community resources such as libraries, theaters, parks and ball fields);
- Energy efficiency;
- Sustainable development; and
- Emergency preparedness and sheltering plans.

States may also consider developing policies, guidelines or regulations with local health jurisdictions to involve them in approval of school sites, and states should provide local communities with information related to state policies that pertain to siting decisions.[65]

Public health policies should promote school sites that do not lead to harmful environmental exposures and that do facilitate physical activity, healthy behaviors and healthy communities. Schools located in the neighborhoods of the students they serve will have an increased number of children who walk, bike or take public transit to and from school and will provide families with access to playgrounds and facilities that encourages physical activity outside of school time. Policies related to environmental review should facilitate assessment of locations before an LEA purchases or leases a property. State policies, laws and regulations can promote these goals in a number of ways, including:

- **Encourage the creation of long-range school facilities plans** (see Section 4.2.1) by LEAs, including LEA guidance on how these plans can involve stakeholders and community members and complement comprehensive plans and other planning efforts at the municipal (and state) levels. One resource is California's Guide to Long-Range Facilities Plan (www.cde.ca.gov/ls/fa/sf/longrangeplan.asp);
- **Do not require minimum number of acres for school sites.** Acreage requirements can prevent LEAs from using smaller sites within neighborhoods and force them to build schools on large tracts of lands on the outskirts of communities. The Council of Educational Facility Planners International (www.cefpi.org/) has abolished its "minimum acreage standards" policy but many states still have now-outdated laws based on this policy in effect;
- **Encourage communities and LEAs to plan and develop joint use agreements** for libraries, parks and ball fields for efficient use of available land;
- **Do not favor larger enrollment schools**, which are challenging to build within neighborhoods, in formulas for education funding allocations;
- **Do not favor new construction over renovation** of existing schools in school construction funding formulas (often called the two-thirds rule or "60 percent" rule). Renovation and modernization could help achieve educational objectives by creating school environments that support improved academic achievement by helping to alleviate the backlog of repair and maintenance projects. In a study conducted in the Los Angeles Unified School District (www.edfacilities.org/pubs/LAUSD%20Report.pdf), researchers found that

[65] For more information on existing state policies, see "50 State Survey," conducted by Rhode Island Legal Services. Available at: www.childproofing.org/school_siting_50_state.htm.

improvements in the quality of school facilities led to an increase in student performance; [66]

- **Consider true long-term costs of a site assessment/investigation**, including land acquisition, initial construction, long-term busing costs and other transportation costs, improvements to the utilities and street network around the school, long-term site location monitoring and maintenance costs in policies on estimating costs for renovation versus construction;
- **Encourage efficient location of schools and judicious use of busing** through school busing reimbursement formulas and busing radius policies;
- **Consider "walkability" infrastructure** (e.g., adequate sidewalks, absence of traffic hazards, safe routes to schools);
- **School funding mechanisms at the state level should allow time for proper analysis** and consideration of suitable sites for construction, particularly at sites where environmental concerns are involved;
- **Provide technical support to LEAs during the environmental review**. Policies of state health and environmental agencies should allow for and encourage LEAs to partner with state agencies in conducting a thorough environmental review; and
- **Encourage public involvement throughout the siting process**.

In addition to policies related to environmental review and cleanup, relevant policies include those that promote public health and take into account the impact of proposed or existing offsite sources on existing schools.

[66] Jack Buckley, Mark Schneider and Yi Shang, "LAUSD School Facilities and Academic Performance," Los Angeles Unified School District, Unpublished report prepared as part of Building Educational Services Together initiative, 21st Century School Fund, Washington, DC. Accessed on September 16, 2011. Available at: www.ncef.org/pubs/LAUSD%20Report.pdf.

7.3. Recommendations for Tribes

Tribes are sovereign entities and play a central role in community school site decisions when an existing or potential school site is situated in Indian country or on other tribal lands. This role may also depend on what type of school is being built, and whether a community, tribal or Bureau of Indian Education school is on trust or tribal lands. School siting decisions on tribal lands may also depend on federal and tribal legislation, regulations and guidance or memoranda of understanding with state and local governments. Tribal government coordination with federal, state and local governments, as appropriate, is also desirable. Tribal agencies can be critical resources for communities on siting issues.

In cases where tribal members attend schools outside of Indian country, tribes will want to coordinate with state and local governments about siting nearby schools. The balance of this section will focus on situations where schools are being sited inside Indian country.

In addition to the critical role of the local school siting committees (SSCs) (see Section 3.3) in identifying potential sites for new school construction, tribal involvement and oversight offers many advantages. For example, tribes can be a central repository for expertise in the many nuances associated with choosing the best possible site, thereby ensuring that the site will not only be suitable from the perspective of environmental health and safety, but will also respect the local traditions and customs of the community.

Working together, LEAs and tribal level officials, possibly in conjunction with states, can more effectively coordinate to determine appropriate lands for locating schools. Establishment of tribal school siting policies and guidelines, where they are not currently in place, can help tribes promote educational, environmental, health and safety objectives associated with school facility construction and/or renovation.

7.3.1. Review Tribal Expertise

Tribal councils and/or several tribal agencies, including departments of education, public health, transportation, historic preservation and environment, can play an important role in school siting decisions and implementation along with local governments. Different agencies will likely have staff with complementary knowledge, expertise and skills that can be helpful throughout the school siting process. Tribes are encouraged to share existing inventories of contaminated sites with local communities to assist with assessment of potential school locations (www.epa.gov/schools/siting/resources) and to help to identify locations that may require the use of engineering and institutional controls (see Section 8.15) and development of a clearly documented long-term stewardship plan to meet standards for residential use. Local residents may not know which agency to contact for specific concerns and questions, so tribes are also encouraged to coordinate across programs and to assign an office or agency to serve as the liaison for community members.

There are several important steps that tribes can take to support development of local capacity for identifying appropriate locations for schools:

- Coordination across tribal programs (see Section 7.3.2);
- Staffing and financial resources (see Section 7.3.3);
- Participation in public meetings (see Section 7.3.4); and
- Access to information on school siting (see Section 7.3.5).

7.3.2. Coordination across Tribal Programs

Enhanced coordination across tribal programs with responsibility for healthy schools can play an important role in informing local school siting decisions. Among the institutional questions that tribes should consider with respect to school siting are:

- Which tribal or other agencies need to be involved in school siting; and
- Are there legal or institutional impediments that need to be addressed?

Some tribal governments have established processes to determine appropriate procedures for addressing sites that have residual contamination after cleanup. In other cases, tribes work with federal partners to address these issues. It is essential that the agency and department responsible for reviewing potential school sites for potential environmental contamination is identified early, so that they will be appropriately involved throughout the siting process. Tribes are also encouraged to coordinate with local and regional planning agencies to ensure locations meet multiple community goals.

Tribes are encouraged to identify a point of contact with responsibility for coordinating across agencies with authorities, responsibilities, programs, policies, guidelines or standards affecting decisions concerning whether and where to build new schools or carry out major expansion of existing facilities, as well as coordinating other school facility issues.

Tribes may want to consider developing a formal memorandum of understanding with different government agencies (federal, state, local) to ensure that staff resources and expertise are available to assist with school siting.

7.3.3. Staffing and Financial Resources

An assessment of the human and financial resources available in tribal agencies should address the following questions:

- How can staff with the appropriate expertise assist local communities with school siting decisions and planning processes; and
- How can budgetary or other resource gaps be overcome to safely renovate or site schools?

7.3.4. Participation in Public Meetings

Tribal government meetings with the community are especially important when environmental review activities need discussion with the community. Even when oversight responsibilities have been delegated to local agencies, tribal government participation can be helpful to ensure that the review process is sound and that communications with the community are effective, and to reinforce that the special sensitivities of children were considered as part of the school location selection process.

7.3.5. Access to Information on School Siting

Tribes should consider developing a publicly available, easily accessible website/database to provide a centralized source of information pertinent to school evaluation and selection, including:

- Policies and procedures for site evaluation and review;
- Public involvement guidelines;
- Mapping and other resources to assist in evaluation of potential school locations;
- Records of location reviews (e.g., findings, description of site remediation activities, institutional and engineering controls, decision documents for cleanup and documentation of sites that meet standards for residential use); and
- Surveys of historic properties, including schools.

7.3.6. Tribal Oversight Roles

Tribes are encouraged to identify and document tribal roles and responsibilities for long-term oversight early in the school siting process. If a site that has not been cleaned up to standards for residential use is selected for a school, tribal agencies may oversee the environmental review to ensure that institutional and engineering controls and the long-term stewardship plan are sufficient to prevent exposures to environmental hazards. Alternatively, this role may be shared with or delegated to a local agency or other partner, provided the partner can demonstrate the capacity to manage these important issues.

Environmental evaluation

LEAs should work with tribal governments to ensure that all sites under tribal jurisdiction that are proposed for renovation of an existing building for school use, construction of new schools or expansion of existing schools have received appropriate environmental approval from the tribal agency prior to construction. Sites or buildings should be assessed prior to acquisition or donation to determine if there is environmental contamination onsite or at neighboring sites that could pose health or environmental risks to children, faculty or staff. Federal review may also be needed.

Cleanup procedures

Although most tribes do not have procedures that specifically apply to investigation, sampling, cleanup, determination of appropriate land and resource uses, and long-term stewardship of potential school locations, they often do have policies and practices in place that apply more generally to locations being considered for reuse. Locations selected for use as schools should be cleaned up to standards for residential use. Cleanups should also follow cleanup plans that have clearly delineated contamination and verify that cleanup efforts have been effective. In the event that a site does not support residential use because of residual contamination, institutional controls (and possibly engineering controls) may be a necessary component of the cleanup. Because the purpose of institutional and engineering controls (see Section 8.15) is to prevent exposure to contaminants and protect the integrity of the cleanup, effective management of institutional and engineering controls is critical to ensuring that a site can be used safely.

Meaningful public involvement

Meaningful public involvement (see Section 3) throughout the school siting process is of critical importance. Tribes should ensure that their public involvement requirements will effectively involve the community, and plans for public involvement should be formalized prior to initiating the identification of potential school sites. Details of site assessment processes, cleanup decisions (e.g., scope, procedures, findings), land use restrictions (engineering and institutional controls, see Section 8.15) and subsequent school construction plans should be provided to the community and subject to public notification and comment. It is important for LEAs to develop a communications plan to ensure effective public involvement (see Section 3.4).

Local capacity to manage institutional and engineering controls

Tribes should establish standards to assess the capacity of any party for management of institutional or engineering controls at potential school locations. The standards should be designed to ensure the long-term integrity of any institutional or engineering controls put in place at potential school sites where residual contamination or offsite hazards to be mitigated exist. The capacity to manage engineering and institutional controls should consider the following:

- Availability of accurate information on the location or extent of institutional and engineering controls, perhaps provided on a map;
- Establishment of, and participation in, a one-call system (see Section 10) to protect against human exposure to contaminated soil;
- Establishment of a mandatory monitoring program to routinely review institutional and engineering controls to ensure their continued effectiveness;
- Establishment of enforceable institutional controls, which require compliance;
- Establishment of information on institutional controls that effectively disseminate information on the location of controls, compliance status, and monitoring reports to interested stakeholders, especially parents, tribal and local environmental officials;
- Long-term budget commitment to provide funds for the operation and maintenance of institutional and engineering controls, including required training of staff responsible for maintaining controls;
- Tracking of expenditures associated with institutional and engineering controls by the LEA so that historical expenditures can be used to refine planning estimates for the cost of maintaining institutional and engineering controls;
- Using more than one institutional control (i.e., "layering") to improve overall reliability and effectiveness for managing the amount, concentrations, toxicity and other characteristics of the residual waste or contamination; and
- Availability of a process to report malfunctions of controls.

7.3.7. Tribal Policy Review

Tribes are encouraged to review existing laws, policies and regulations addressing school siting to determine whether changes are needed to encourage improved school siting decisions. Such a review of existing policies across tribal agencies would help identify gaps and outdated policies that no longer serve state goals and objectives. Education, health, environmental, planning and transportation agencies, as well as others, such as Historic Preservation Offices, should work together to consider how existing regulations, policies and guidelines influence or affect decisions about school renovation, remodeling or the siting of new schools. Review of existing guidelines or policies may focus on those related to the following general topics:

- Community involvement and public participation in school siting and renovation decisions;
- Long-range school facilities plan;
- School funding of new construction or to support existing school renovation;
- Prohibitions on tribal reimbursement of land costs that force communities toward the lowest cost sites, regardless of potential environmental challenges;
- School size formulas or requirements for lot size and access to recreational areas;
- Minimum school enrollment requirements;
- Environmental evaluation and associated costs;
- Environmental cleanup (including cleanup standards and long-term stewardship site controls) and associated costs;
- Community use of schools (and joint use of community resources such as libraries, theaters, parks and ball fields);
- Energy efficiency;
- Sustainable development; and
- Emergency preparedness and sheltering plans.

Tribes may also consider developing policies, guidelines or regulations with local health jurisdictions to involve them in approval of school sites, and tribes should provide local communities with information related to tribal policies that pertain to siting decisions.[67]

Public health policies should promote school sites that do not lead to harmful environmental exposures and that do facilitate physical activity, healthy behaviors and healthy communities. Schools located in the neighborhoods of the students they serve will have an increased number of children who walk, bike or take public transit to and from school and will provide families with access to playgrounds and facilities that encourages physical activity outside of school time. Policies related to environmental review should facilitate assessment of locations before an LEA purchases or leases a property. Tribal policies, laws and regulations can promote these goals in a number of ways, including:

- **Encourage the creation of long-range school facilities plans** (see Section 4.2.1) by LEAs, including LEA guidance on how these plans can involve stakeholders and community members and complement comprehensive plans and other planning efforts at the municipal (and tribal) levels. One resource is California's "Guide to Development of Long Range Facilities Plan" (www.cde.ca.gov/ls/fa/sf/longrangeplan.asp);
- **Do not require minimum number of acres for school sites.** Acreage requirements can prevent LEAs from using smaller sites within neighborhoods and force them to build schools on large tracts of lands on the outskirts of communities. The Council of Educational Facility Planners International (www.cefpi.org/) has abolished its "minimum acreage standards" policy but some tribes may still have now-outdated laws based on this policy in effect;
- **Encourage communities and LEAs to plan and develop joint use agreements** for libraries, parks and ball fields for efficient use of available land;
- **Do not favor larger enrollment schools**, which are challenging to build within neighborhoods, in formulas for education funding allocations;
- **Do not favor new construction over renovation** of existing schools in school construction funding formulas (often called the two-thirds rule or "60 percent" rule). Renovation and modernization could help achieve educational objectives by creating

[67] For more information on existing state policies, see "50 State Survey," conducted by Rhode Island Legal Services. Available at: www.childproofing.org/school_siting_50_state.htm.

school environments that support improved academic achievement by helping to alleviate the backlog of repair and maintenance projects. In a study conducted in the Los Angeles Unified School District (www.edfacilities.org/pubs/LAUSD%20Report.pdf), researchers found that improvements in the quality of school facilities led to an increase in student performance;[68]

- **Consider true long-term costs of a site assessment/investigation**, including land acquisition, initial construction, long-term busing costs and other transportation costs, improvements to the utilities and street network around the school, long-term site location monitoring and maintenance costs in policies on estimating costs for renovation versus construction;
- **Encourage efficient location of schools and judicious use of busing** through school busing reimbursement formulas and busing radius policies;
- **Consider "walkability" infrastructure** (e.g., adequate sidewalks, absence of traffic hazards, safe routes to schools) in tribal school funding policies;
- **School funding mechanisms at the tribal level should allow time for proper analysis** and consideration of suitable sites for construction, particularly at sites where environmental concerns are involved;
- **Provide technical support to LEAs during the environmental review.** Policies of tribal health and environmental agencies should allow for and encourage LEAs to partner with tribal agencies in conducting a thorough environmental review; and
- **Encourage public involvement throughout the siting process.**

In addition to policies related to environmental review and cleanup, relevant policies include those that promote public health and take into account the impact of proposed or existing offsite sources on existing schools.

[68] Jack Buckley, Mark Schneider and Yi Shang, "LAUSD School Facilities and Academic Performance," Los Angeles Unified School District, Unpublished report prepared as part of Building Educational Services Together initiative, 21st Century School Fund, Washington, DC. Accessed on September 16, 2011. Available at: www.ncef.org/pubs/LAUSD%20Report.pdf.

8. Quick Guide to Environmental Issues

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This section provides general information on some of the common environmental issues that the local education agency (LEA), the school siting committee (SSC) and the community may encounter during an environmental review.

8.1. Air Pollution

The potential exposure of children to air pollution is both a general community concern, depending on the overall air quality in any given region, and a very local concern, depending on what sources of air pollution may be located in proximity to a prospective school location. There are many potential sources of air pollution ranging from large scale industries to small businesses located within neighborhoods; a variety of transportation related activities such as roads and transportation hubs; and area sources including agricultural activities and a myriad of other land uses. Major pollutants include:

- **Criteria pollutants** (ozone, particulate matter, carbon monoxide, nitrogen oxides, sulfur dioxide and lead) – Exposure to these pollutants is associated with numerous effects on human health, including increased respiratory symptoms, heart or lung diseases and even premature death (www.epa.gov/air/urbanair/); and

- **Air toxics** include 187 specific pollutants that are known or suspected to cause serious health effects and are regulated as hazardous air pollutants, or HAPs. Examples of toxic air pollutants include benzene, which is found in gasoline; perchloroethlyene, which is emitted from some dry cleaning facilities; and methylene chloride, which is used as a solvent and paint stripper by a number of industries. Examples of other listed air toxics include dioxin, asbestos, toluene and metals such as cadmium, mercury, chromium and lead compounds. (www.epa.gov/air/toxicair)

In 2009/2010, EPA, state and local air pollution control agencies conducted air monitoring at 63 schools in an effort to better understand the air around selected schools throughout the country. Data from this air monitoring initiative can be found at www.epa.gov/schoolair.

Link to air pollution resources: www.epa.gov/schools/siting/resources.html#LINKS_air_pollution.

8.2. Nearby Highways and Other Transportation Facilities (Including Goods Movement)

Recent research has demonstrated a link between exposures to air pollutants from traffic emissions near large roadways and adverse human health effects. The Health Effects Institute (HEI) recently completed a review of a large number of health studies, concluding that near-road exposures "are a public health concern."[69] Although the link between adverse health effects and near-road exposures has been made, the science has not yet progressed to an understanding of how some key elements affect these associations, such as the type and size of roads of concern, the vehicle fleet mix and activities leading to highest exposures, and the distance from the road at which near-road health impacts subside. Most studies on traffic and health focus on roads with high levels of traffic (for example, 100,000 annual average daily traffic or higher). A few studies have reported health effects associated with smaller traffic volumes, with one study showing effects at volumes as low as 10,000 annual average daily traffic in an area. Further, while the health studies reviewed by HEI focused on exposures to traffic emissions, other transportation sources such as rail yards, rail lines, airports and marine ports have similar concerns due to similarities in the type and characteristics of air pollution emissions.

For most transportation sources, air pollutant concentrations are generally highest closest to the source, with concentrations decreasing with distance from the facility. According to the HEI report, studies that have examined gradients in air pollutant concentrations as a function of distance from roadways have indicated "exposure zones for traffic-related air pollution in the range of 50 to 1500 m" from the highways and major roads evaluated. However, the magnitude and extent of these increased air pollutant concentrations can vary based on a number of factors related to emissions from the source, meteorological and topographic conditions affecting pollutant transport and dispersion, and the influence of roadway design and roadside features on pollutant transport and dispersion.

Traffic emissions may vary depending on the total number of vehicles using a road, the level of congestion on the road and the number of heavy-duty trucks present. For rail operations, the number of trains, maintenance activities and line/yard configuration will influence emissions and exposures. Ports and airports will generate emissions from the ships/planes present at the facility, as well as support equipment and operations at the facility. For marine ports, large numbers of heavy-duty trucks may also be present on local roadways to move goods from the port. Air pollutant concentrations near transportation

[69] Health Effects Institute Panel on the Health Effects of Traffic-Related Air Pollution, "Traffic-Related Air Pollution: A Critical Review of the Literature on Emissions, Exposure, and Health Effects," *Health Effects Institute Special Report 17* (January 2010). Available at http://pubs.healtheffects.org/view.php?id=334.

facilities will also be affected by wind direction, wind speed and atmospheric stability. Changes in local topography from natural or roadway design features will also affect air pollutant transport and dispersion, which can lead to varying exposures for school occupants. Thus, air quality may vary based on surrounding terrain and features, such as cut sections, noise walls, vegetation or combinations of these features.

The complexity and multitude of factors affecting air pollutant concentrations near transportation sources (see Exhibit 5: Factors Influencing Exposures and Potential Risks from Nearby Hazards) make it difficult to recommend a strict set of guidance for safe distances from these source types, particularly given the potential for unintended consequences. Locations in close proximity to major transportation facilities should consider a range of approaches to mitigate or avoid potential exposures. When evaluating potential locations that may be located near a highway or other major transportation facility, several factors should be considered:

- Are there other locations in the community at farther distances from the source that are also being considered? Urban areas may be limited in their ability to find appropriate locations away from major roads and other transportation sources; thus, careful consideration should be given to near-road and other transportation source locations before eliminating them if the only alternatives are to locate schools much farther from the communities being served. Unintended negative consequences to moving schools away from these communities may include increased pollutant exposures during longer bus or personal car commutes, increased traffic on local roads to access schools further from their communities, and lack of walking, biking, or other alternative commute options to school; and
- What options might be feasible for mitigating pollutant concentrations at the site from these offsite sources?
  - Studies suggest that roads in cut sections (i.e., road surface below existing terrain) or that have combinations of noise barriers, vegetation and/or buildings near the roadside may reduce downwind air pollution concentrations;
  - School design techniques may be employed to reduce exposures at near-source schools, such as locating athletic fields, playgrounds and classrooms as far from the source as possible, and locating air intakes in areas on the school building(s) that are least affected by offsite or onsite transportation air pollutant sources;
  - Installing or preserving barriers such as trees, buildings and noise barriers may reduce air pollutant exposures;
  - Filtration devices as part of HVAC design can be used to improve indoor air quality as described in other sections of this guidance; and
  - Adding controls or redesigning offsite sources to reduce school area pollutant concentrations (e.g., replacing or retrofitting port and rail engines/equipment with cleaner technologies, reducing idling at terminal facilities, rerouting existing or projected traffic away from school or other populated areas (e.g., truck-only lanes), and adoption of high density development and transit alternatives).

The section Evaluating Impacts of Nearby Sources of Air Pollution provides information that can assist LEAs and environmental professionals in evaluating potential sources of air pollution early in the site evaluation process (see Section 6).

Links to air pollution resources: www.epa.gov/schools/siting/resources.html#LINKS_air_pollution and www.epa.gov/schools/siting/resources.html#LINKS_highways_and_traffic.

8.3. Volatile Organic Compounds (VOCs) in Soil and Ground Water

The potential for vapor intrusion into overlying buildings has received much attention in the past decade. There is a heightened awareness nationally and internationally by the general public of the potential health concerns related to vapor intrusion.

Vapor intrusion is generally defined as the upward migration of volatile organic compounds (VOCs) into overlying buildings from underground soils and ground water. Common contaminants that may create a vapor intrusion health concern include, but are not limited to, gasoline components (e.g., benzene) and dry cleaning and degreasing solvents. Common dry cleaning and degreasing solvents include perchloroethylene and trichloroethylene.

The presence of these contaminants in the soil or the ground water beneath a building does not always present a vapor intrusion concern. Physical factors, such as soil chemistry, ground water conditions, subsurface features and weather conditions, also affect whether vapor intrusion occurs. Extremes in weather conditions can increase extent of the vapor intrusion (e.g., in times of drought). Likewise, excess precipitation may cause plumes to migrate (e.g., based on water cascading off edges or aprons of gas stations) and/or travel farther (e.g., under nearby schools). These weather and geophysical conditions can result in unanticipated exposures.

Even though well-designed, well-constructed and well-operated new buildings are generally not susceptible to vapor intrusion, the use of integrated foundation sub-slab venting systems equipped with polyethylene or other vapor barriers is becoming increasingly common in new construction in densely-populated regions of the country, including California, New York and New Jersey. There are many different types of designs for sub-slab venting systems. Most systems, originally developed for protection against naturally occurring radon gas accumulation, consist of a relatively inexpensive network of horizontal perforated Polyvinyl chloride piping installed within an aggregate layer under a poured concrete slab beneath the ground floor of a building. The polyvinyl chloride pipes are connected to a manifold collection system, and the collected vapor is vented by vertical piping up through the roof of the building. In some cases, a synthetic vapor barrier is recommended, or roof-top fans are included to operate the system in a more active mode.

In much the same way that venting systems are used to intercept radon gas before it enters a home, such venting systems are effective in preventing the accumulation of VOCs. Addressing vapor intrusion into older buildings is more of a challenge.

The design and installation of sub-slab venting systems and vapor barriers built into the building foundation are best completed by experienced architectural and engineering firms. The proper installation of a vapor barrier that may overlie a sub-slab venting system is very important. Once installed, the vapor barrier should be inspected, tested and certified by the engineer or architect of record that the barrier was installed correctly and works as designed. Smoke testing is a recognized method to assess proper installation of vapor barriers and other synthetic liners.

The engineer and/or architect of record should furnish a report to the LEA along with the results of the testing, and a copy of the inspection and test results should be included in a report to an oversight regulatory agency.

Performance monitoring of a venting system is equally important. If residual underground soil and ground water contamination exists, the LEA should retain an experienced environmental professional to develop a long-term monitoring plan and periodically complete testing around the school to document that the system is operating properly. Soil gas sampling ports are best integrated into the building design, within a vent

piping, or as close to the building as is feasible if the structure already exists.

Link to vapor intrusion/VOC resources: www.epa.gov/schools/siting/resources.html#LINKS_vapor_intrusion_vocs.

Additional information regarding volatile organic compounds can be found here: www.epa.gov/iaq/voc.html#Additional%20Resources.

8.4. Radon

Radon is a naturally occurring, radioactive, soil gas. Inhaling radon can lead to lung cancer. Radon enters buildings through openings in ground contact floors and walls. Well water may also contain radon and contribute to the level of radon in indoor air. Always test for radon in indoor air before testing for radon in water. Fortunately, simple, proven and inexpensive techniques have been used in many schools to keep radon at acceptable levels.

Soil testing a site for radon is not a reliable way to determine if a school building will have high radon levels once constructed. Instead, EPA recommends that all schools in high radon potential areas be built with radon prevention techniques. Such schools should be tested upon completion and periodically over time to ensure the radon is at acceptable levels. EPA recommends the following radon prevention techniques for construction of schools: installation of active soil depressurization systems, pressurizing the building using the HVAC system, and sealing major radon entry routes.

For existing structures, EPA recommends testing all schools for radon. As part of an effective indoor air quality management program, schools can take simple steps to test for radon and reduce risks to occupants if high radon levels are found. The only way to know if elevated radon levels are present is to test. Some states regulate radon-related activities in schools, for example, by requiring schools to take certain actions or licensing radon measurement and mitigation services providers.

Link to radon resources: www.epa.gov/schools/siting/resources.html#LINKS_radon.

8.5. Petroleum Hydrocarbons in Soil and Ground Water

One common environmental issue likely to be encountered at existing and proposed school locations is contamination from petroleum or other fuel or heating oils attributed to petroleum products that have been spilled during use or leaked from old underground storage tank systems and piping. These oil and fuel storage tanks are commonly associated with gas stations or fuel storage areas governed by federal and state environmental regulations. Nonresidential underground storage tanks (including commercial heating oil and commercial motor fuel) can be larger than 10,000 gallons in size. Care should be exercised whenever older petroleum tanks are encountered. Soil and water samples should be obtained from around the underground tank prior to its removal or abandonment, and appropriate budget contingencies should be established by the LEA to address soil and ground water remediation costs associated with leaking petroleum tanks. If the underground storage tank has leaked, it may be necessary to drill monitoring wells and regularly test the water, adding to the cost of remediation.

Above- or underground heating oil tanks are often regulated by the local fire marshal or health department, depending on the size. In many parts of the country, especially older cities, home heating oil is commonly used as a fuel in homes. Most buried residential underground tanks are smaller than 1,000 gallons in size, but due to their age, poor condition and location (commonly under sidewalks), fuel leaks are commonly encountered. In some instances, fuel tanks are located within basements. These systems present less of a concern, as they can be visually inspected.

The LEA should retain an experienced environmental professional to oversee the removal of underground storage tanks and any excavation that may be necessary to remove and properly dispose of petroleum-impacted soil. Issues concerning underground or aboveground storage tanks should be identified in the preliminary environmental assessment. As discussed in the Environmental Review Process section, the purpose of the preliminary environmental assessment is to identify the presence or the likely presence of any environmental hazards on a property based on historical and current site uses.

Link to underground storage tank resources: www.epa.gov/schools/siting/resources.html#LINKS_Storage_Tanks.

More information related to aboveground storage tanks: www.epa.gov/oilspill/spcc.

8.6. Lead-based Paint Hazards and Lead in Soil and Drinking Water

Lead has been used in a wide range of industrial, commercial and residential products from gasoline, piping, flashing or solder as well as pesticides and paint.

Paint and Soil: Lead was commonly used in paint before the 1978 ban by the Consumer Products Safety Commission on lead-based paint for applications where consumers may be exposed. Building exteriors may contain lead-based paint and soils surrounding older buildings may contain lead at levels that present an unacceptable exposure risk. EPA has promulgated regulations governing both the abatement, as well as the renovation, repair and painting of, among other things, pre-1978 child-occupied facilities, which generally include preschools or building areas where children under six spend a significant amount of time. (See 40 CFR Part 745, Subparts E and L.) For post-1978 buildings and schools in general, representative testing for lead on building exteriors and in surface soils is a best practice. If lead is detected at a concentration in soil that poses a risk to children, the best practice is to have an experienced and licensed hazardous waste professional properly remove and dispose of impacted soils. If lead-based paint hazards exist on the exteriors of post-1978 school buildings, the best practice is to have an EPA or state certified renovator perform renovation, repair and painting work in accordance with EPA's lead-safe work practice requirements for child-occupied facilities found at 40 CFR Part 745 or cap the soils to reduce exposures.

Drinking Water: The LEA should engage an experienced environmental professional to investigate the drinking water quality within existing buildings/structures if the school is served by a municipality. For schools that are to be renovated or expanded, the sampling and analysis of water from taps and fountains where people may be drinking and cooking within the building(s) is a best practice to determine the presence and concentration of lead. This work is best done by an environmental professional experienced in water quality testing. If lead is detected above the EPA action level, the environmental professional should furnish a report to the LEA that identifies the locations of concern and provides options on how best to address the situation. The school should stop using that tap or water fountain until the recommendations from the environmental professional can be enacted.

If a school is a public water system and supplies its own water with a well, it is subject to state and federal Safe Drinking Water Act regulations and should be aware of any lead levels that exceed the EPA action level. LEAs can contact their local drinking water program for assistance.

Link to lead resources: www.epa.gov/schools/siting/resources.html#LINKS_lead.

Additional information regarding sampling drinking water in schools can be found here:

http://water.epa.gov/drink/info/lead/testing.cfm and

http://water.epa.gov/infrastructure/drinkingwater/schools/guidance.cfm.

8.7. Polychlorinated biphenyls (PCBs) in Fluorescent Light Ballasts, Window Caulking and Soil Associated with Older Buildings

Polychlorinated biphenyls (PCBs) were widely used in electrical and manufacturing processes before they were banned 30 years ago. If an older building is being considered as a possible location or exists on a site proposed for a school, the LEA should engage an experienced environmental professional to investigate existing buildings/structures to determine the presence of PCB-containing equipment/fixtures and building materials. PCBs can be found in light fixtures, electrical equipment (transformers), older paint formulations and older window caulk products. If elevated concentrations of PCBs are found, an environmental professional should furnish a report to the LEA that documents their occurrence and remediation options and costs. The environmental professional should also identify and follow the federal and state regulatory requirements for handling, storage and marking of PCB-containing items.

Ballasts: Many schools in the United States built before 1979 have light ballasts containing PCBs. The PCBs are contained within the light ballast capacitors and in the ballast potting material. Until the late 1970s, PCBs were commonly used as insulators in electrical equipment because they have high tolerance to heat, do not burn easily and are nonexplosive.

Congress banned the manufacture of PCBs in the United States in 1977 because of their toxic effects. In 1979, EPA banned the processing or use of PCBs, except in totally enclosed equipment. However, a large number of fluorescent light ballasts that were installed prior to these bans may contain PCBs and may still be in use in schools.

Intact, operational ballasts where PCBs remain in the ballasts and potting material may not pose a health risk or an environmental hazard. However, as they age, the ballasts degrade. Depending on the number of operating hours, the typical life expectancy of a magnetic fluorescent light ballast is between 10 and 15 years. The failure rate prior to the end of the useful life of ballasts is about 10 percent. After this typical life expectancy, ballast failure rates increase significantly. All of the pre-1979 ballasts in lighting fixtures that are still in use are now far beyond this life expectancy, increasing the risk of leaks or even fires, which would pose a health and environmental hazard. A PCB containing ballast may also be lacking in thermal overload protection, increasing the possibility of fires or leaks. The hazard can be worsened by mishandling by personnel who are unaware of the presence of PCBs in the lighting ballasts. A ballast that has been damaged or mishandled can increase exposure of students and school personnel to PCBs.

Caulk and Soil: Recent studies conducted by EPA have identified a potential exposure risk to PCBs because they were used in the past for certain window caulk and rubberized paint formulations to make them more flexible and durable. As a result, PCBs may be found in soil that surrounds older buildings. Representative testing of surface soils and deteriorated window caulk for PCBs in buildings that were built or renovated between 1950 and 1978 is a best practice. If PCBs are found in deteriorated window caulking, the best practice is to have an experienced and licensed contractor properly remove and dispose of the caulking. Similarly, if PCBs are detected in soils, the best practice is to have an experienced and licensed contractor properly remove and dispose of impacted soils.

Links to PCBs resources: www.epa.gov/schools/siting/resources.html#LINKS_pcbs and www.epa.gov/pcbsincaulk/guide/guide-sect4.

8.8. Asbestos-Containing Material Surveys

Asbestos is a naturally occurring mineral fiber that has been used in a wide variety of products as an insulator and fire-retardant. The Asbestos Hazard Emergency Response Act (AHERA), a provision of the Toxic Substances Control Act, became law in 1986. AHERA requires local education agencies (LEAs) to inspect their schools for asbestos-containing building material and prepare management plans to prevent or reduce asbestos hazards.

If an older building is being considered for a possible school location, the LEA should engage an experienced environmental professional to determine the presence of asbestos-containing materials and its condition using recognized testing methods. Asbestos-containing materials may be found on interior and exterior pipe/duct insulations, equipment and boiler insulations, fire brick, HVAC units, plaster materials, floor and ceiling tiles, mastics/glues, roofing materials, window glazing caulks, wire wrap, between old wooden flooring (for noise reduction) and fireproofing materials. Asbestos may also be found in vermiculite insulation. The environmental professional should furnish a report to the LEA that includes the test results, an itemized inventory of all suspected asbestos-containing materials, and a corresponding cost estimate to abate such conditions (including management in place, where appropriate) and conduct the appropriate testing in accordance with all applicable regulatory agency and code requirements.

Links to asbestos resources: www.epa.gov/schools/siting/resources.html#LINKS_asbestos.

A list of EPA regional asbestos contacts is available at: www.epa.gov/asbestos/pubs/regioncontact.

Additional guidance on asbestos programs for schools can be found at EPA's asbestos website: www.epa.gov/asbestos.

8.9. Mold

Leaks, condensation and high humidity can result in significant mold contamination of structures. Buildings that are intended for reuse should be evaluated for evidence of prior moisture problems and potential for future moisture and mold issues. In buildings where mold issues are identified, proper assessment and remediation of both the underlying moisture problems and cleanup of existing mold should be completed prior to occupancy. Potential health effects and symptoms associated with mold exposures include allergic reactions, asthma and other respiratory complaints.

Link to mold resources: www.epa.gov/schools/siting/resources.html#LINKS_mold.

Additional guidance regarding mold remediation in schools can be found here: www.epa.gov/mold/mold_remediation.

8.10. Chemicals in Schools

Existing buildings may contain improperly stored, hazardous and outdated chemicals, which can pose a risk to students, staff and other school occupants. From elementary school maintenance closets to high school chemistry labs, schools use a variety of chemicals. When they are mismanaged, these chemicals can put students and school personnel at risk from spills, fires and other accidental exposures. The Schools Chemical Cleanout Campaign website gives K-12 schools information and tools to responsibly manage chemicals. To view the Schools Chemical Cleanout Campaign website, visit

www.epa.gov/schools/programs and click on Schools Chemical Cleanout Campaign.

Link to chemicals in schools resources: www.epa.gov/schools/siting/resources.html#LINKS_chemicals_in_schools.

8.11. Heavy Metals in Soil and Ground Water

In addition to lead, metals such as arsenic, cadmium, mercury and chromium can be found in paint pigments and older pesticide formulations. Metals may also have been released to the environment from commercial or industrial operations. Metals do not degrade in the environment, and as a result, can be found in soil and ground water in many areas. Although low background levels of metals may not represent a health concern, elevated levels of metals in soil are frequently encountered across the country.

Metals are also found in older masonry products. A standard of care needs to be undertaken if masonry materials from older buildings are to be crushed and recycled as fill material. This issue has only recently surfaced in environmental assessments of older building slated for demolition. Older masonry materials may contain elevated levels of metals, such as beryllium and cadmium that may not be suitable for onsite recycling. This is especially true if masonry materials are painted. Representative samples of the masonry should be obtained by an experienced environmental professional to determine whether the masonry is suitable for onsite recycling.

Links to resources on specific metals: www.epa.gov/schools/siting/resources.html#LINKS_lead,

www.epa.gov/schools/siting/resources.html#LINKS_arsenic and www.epa.gov/schools/siting/resources.html#LINKS_mercury.

The following links provide information regarding laws and regulations and technical approaches related to ground water and soil.

Ground Water: www.epa.gov/lawsregs/topics/water.html#ground,

http://water.epa.gov/type/groundwater/index.cfm and www.epa.gov/schools/siting/resources.html#LINKS_drinking_water.

Soil: www.epa.gov/gateway/science/land and www.epa.gov/superfund/index.

8.12. Pesticides

Pesticides may be encountered on existing and proposed school sites. If a proposed school was historically used for residential or agricultural purposes, surface and subsurface soils should be tested for pesticides such as chlordane, dieldrin, lead arsenate and dichlorodiphenyltrichloroethane as well as other pesticides associated with the crops or agricultural activities at that site. If there is a well on the property, the water should also be tested if it is likely to be used for consumption. Pesticides used for termite protection at schools were routinely sprayed adjacent to building foundations. If a school building is proposed for demolition or expansion, soils should be tested for pesticides in areas proposed for disturbance. Proper health and safety precautions should be employed by workers that may come in contact with pesticides. Excavation and offsite disposal of soil found to contain pesticides may be required prior to or during school construction.

Pesticides in ground water generally occur as a result of leaching from soil into ground water as well as injection of soil fumigant pesticides into the ground. The potential presence of pesticides in ground water should also be considered if an onsite source of drinking water is required.

Aerial- as well as ground-based applications of pesticides can result in unintended spread of pesticides from the intended target location to other locations due to equipment, application techniques, applicator error or weather or other application conditions. The drift of spray and dust

from pesticide applications can expose people, wildlife and the environment to pesticide residues that can cause health and environmental effects and property damage.

While large scale aerial spraying of agricultural operations has resulted in poisoning of farm workers, children and others, spray drift can occur during any pesticide application, including in suburban or urban environments. Drift can even occur during indoor use of pesticides.

Potential pesticide usage near prospective school sites in rural, suburban as well as urban locations should be considered and evaluated for potential to expose children or staff to pesticides. Where such potential exists, steps to mitigate potential exposures should be considered and implemented. Potential mitigation approaches include:

- Oversight and strict enforcement of product label use directions and drift restrictions;
- Use of drift reducing application technologies and best management practices; and
- Buffer zones based on case- and site-specific considerations.

Links to pesticide resources: http://www.epa.gov/schools/siting/resources.html#LINKS_pesticides.

8.13. Securing Safe Soil and Fill

Soil and fill materials should not always be assumed to be free of contaminants. Depending on the source of soil and fill materials to be imported to a school site, the soil and fill may contain contaminants as well as construction and demolition debris. Not only does fill material imported to a school site need to be suitable from an engineering perspective, the soil may need to meet environmental quality standards. It is recommended that material be tested and the architect or engineer of record approves the placement of fill material on school sites before it is delivered to the site. Contract documents should clearly state that imported fill materials need to meet established environmental quality specifications.

Contract documents should clearly state that fill and topsoil imported to a proposed school site be suitable for the intended future use of the property as a school, from both an engineering and environmental quality perspective, and that the quality of the imported fill and topsoil shall not change the environmental classification of the property from an unrestricted to a restricted use. Similarly, the exportation of excess fill and topsoil that originates from a proposed school site should not be assumed to be free of contaminants. Low levels of contaminants are commonly found, especially in urban and former agricultural areas. The LEA and its environmental professional are responsible for ensuring that the exportation of fill material is suitable for property to which it is delivered.

When testing is necessary to document fill and soil quality, representative samples of the fill and soil should be tested for such contaminants as pesticides, PCBs, metals and polycyclic aromatic hydrocarbons.

Additional information regarding legacy land use or contamination can be found here: www.epa.gov/superfund/health/index.

8.14. Historic Fill

Historic fill is generally defined as nonindigenous material that was imported to a site to raise the topographic elevation. Examples of historic fill may include: construction debris, dredge spoils, incinerator residue, demolition debris, fly ash or nonhazardous solid waste.

Prior to the turn of the past century, it was a common practice in certain areas of the United States to fill low-lying areas to reduce mosquito breeding grounds and expand urban land on which to build. In many instances, this historic fill material originated from an offsite location, and its environmental quality was never determined.

Most historic fill contains low levels of pollutants, but some historic fill can have poorer quality.

In some instances there can be economic and impracticability issues associated with removal of such large quantities of historic fill materials, which in some areas of the northeastern United States can be 20 feet thick. In these instances, construction of various impervious and engineering controls is currently an accepted practice.

Additional information regarding legacy land use or contamination can be found here: www.epa.gov/superfund/health/index.

8.15. Institutional and Engineering Controls

Institutional controls are legal and administrative controls used to prevent human exposure to residual contamination and protect the integrity of the remedy. Examples of institutional controls include zoning, notices and warnings, easements, restrictive covenants, other land or resource use restrictions, permits/governmental controls and administrative orders.

Engineering controls: Examples of engineering controls include the placement of two feet (or more) of clean soil/fill material (suitable for residential uses) and turf grass on playgrounds and athletic fields, impervious engineered surface parking lots and building slabs, landfill soil caps, impermeable liners, other containment covers, underground slurry walls, fences, air filtration devices and physical and planted vegetation barriers.

Best construction and performance management practices should be used when an engineering control in the form of a clean soil cover is necessary to eliminate direct contact exposure to soil found to contain pollutants. The most common practice is to isolate the underlying soil using geotextile and visual barrier materials (such as polyethylene orange construction/snow fencing material). Two feet of clean fill and soil is placed over the geotextile and visual barrier. The visual barrier serves as a "marker layer" to warn anyone who might dig into the soil that soil below this marker contains pollutants in soil that should not be disturbed. However, sites that contain an area of contaminated soil/fill may require additional engineering controls to encapsulate the contaminated layer of soil/fill. For example, a layer of crushed stone underneath the clean fill layer will provide a "capillary break" that limits the upward and downward movement of water or leachate. This layer will also prevent burrowing animals and worms from transporting contaminated soil into the clean fill and potentially to the surface. LEAs should review EPA's requirements for encapsulating contaminated soils.

Underground utilities are best installed within clean soil zones to mitigate exposure should future repairs, alterations, improvements or disturbances be necessary. Such "clean utility corridors" are recommended when an engineering control is necessary for a particular property to eliminate a potential direct contact exposure to pre-existing soils that may contain residual contamination. A clean utility corridor is defined as a linear trench that is excavated to support the installation of underground utilities; the trench is restored to grade, after the installation of utilities, using clean soil or fill materials. Clean utility corridors reduce the potential for damage to an existing engineering control when future utility repairs, alterations or improvements are necessary.

Planting trees with extensive root systems should be avoided if a site is constructed with a multilayered engineering control barrier. When an engineering control, in the form of a clean landscaped soil cover of sufficient thickness, is employed, trees and shrubs should be planted in clean soil zones specifically excavated to accommodate their root systems. Trees and shrubs should be kept away from water wells and septic fields. This often requires excavation to a

depth of four to six feet to accommodate the root ball of the tree or shrub.

Link to cleanup regulations and processes: www.epa.gov/schools/siting/resources.html#LINKS_cleanup_regulations_and_processes.

Additional information regarding cleanup programs and standards can be found here: www.epa.gov/oswer/cleanup/index and www.epa.gov/oswer/cleanup/programs.

Additional information regarding risk assessment processes can be found here: www.epa.gov/oswer/riskassessment.

8.16. Capacity for Long-term Maintenance of Engineering and Institutional Controls

The use of institutional and engineering controls can be an effective method for eliminating direct contact exposure. Where there is concern about an LEA's capacity and ability to manage sites with institutional and engineering controls (see Sections 7.2.6 and 7.3.6, under "Local capacity to manage institutional and engineering controls"), LEAs are encouraged to enroll prospective sites in their state or tribal voluntary cleanup/ brownfields response program to ensure oversight of assessment and cleanup efforts and to identify a process for an LEA, working with their regulatory partners, to oversee continued safe site management. If an institutional or an engineering control is necessary to eliminate direct contact exposure, the LEA should adequately budget for periodic inspections, maintenance and repair/replacement of the controls.

An institutional control, in the form of a notice to the property deed, can specify certain actions to be completed by the property owner and will identify the various reporting requirements to document that the engineering control remains intact. This "deed notice" typically:

- Informs the owner (and future owners) of the property to maintain the engineering controls and to notify the regulatory agency prior to any alterations, improvements or disturbances in the area (i.e., the restricted area);
- Sets forth the schedule to conduct periodic inspections of the area; and
- Specifies any particular certification requirements that the engineering control remains intact.

Long-term stewardship resources: www.epa.gov/schools/siting/resources.html#LINKS_longterm_stewardship.

Additional information regarding cleanup programs and standards can be found here: www.epa.gov/oswer/cleanup/index and www.epa.gov/oswer/cleanup/programs.

Additional information regarding risk assessment processes can be found here: www.epa.gov/oswer/riskassessment.

9. Frequent Questions

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  - Do the guidelines apply to child care centers or other facilities where children spend time? (see Section 9.15)

9.1. How do the guidelines address community involvement in the school siting process?

The guidelines emphasize the importance of meaningful public involvement (see Section 3)

throughout the school siting process. The guidelines recommend that at the beginning of the school siting process, the local education agency (LEA) (see Section 10) should create a public involvement plan and formalize the role of the public, including reviewing potential locations, environmental reports, cleanup plans and long-term stewardship plans. EPA recommends forming a school siting committee (SSC) (see Section 3.3) that includes representatives from the community to make recommendations to the LEA throughout the siting process.

9.2. Do the guidelines apply retroactively to previous siting decisions?

No. The School Siting Guidelines are not designed for retroactive application to existing school locations or previous school siting decisions, but rather to inform and improve future school siting decision-making processes. However, irrespective of these guidelines, EPA recommends that districts periodically inspect existing schools for potential environmental health and safety risks. These inspections should use tools designed for that purpose, such as EPA's Healthy School Environments Assessment Tool (HealthySEAT; www.epa.gov/schools/healthyseat/) or the NIOSH Safety Checklist Program for Schools. (www.cdc.gov/niosh/docs/2004-101/) Where deficiencies are found, EPA recommends steps to reduce student and staff exposure to potential hazards be identified and implemented, to the maximum extent practical (see Section 9.5).

9.3. Do the guidelines address the retention and renovation of existing schools?

Yes. The siting decision often starts with evaluating existing schools and their suitability to be updated to meet the future needs of the LEA. The guidelines recommend that communities consider renovation, repair and/or expansion options (see Section 4.2.2) before deciding to build a new school. Many existing schools can be retrofitted with new technologies to expand their useful life, possibly at a lower cost and with fewer environmental impacts (e.g., energy savings, less impact on open space) than new construction. Renovating existing neighborhood school facilities can provide an impetus for community revitalization, have an impact on neighboring property values, encourage investment in schools by community members and preserve irreplaceable community assets.

EPA recommends that districts periodically inspect existing schools for potential environmental health and safety risks. These inspections should use tools designed for that purpose, such as EPA's Healthy School Environments Assessment Tool (HealthySEAT; www.epa.gov/schools/healthyseat/) or the NIOSH Safety Checklist Program for Schools (www.cdc.gov/niosh/docs/2004-101/). Where deficiencies are found, EPA recommends steps to reduce student and staff exposure to potential hazards be identified and implemented, to the maximum extent practical (see Section 9.5).

9.4. Will EPA's School Siting Guidelines prevent pollution generating facilities from being built near existing schools?

Land use decisions are generally made at the local level, subject to the local jurisdiction's zoning and other land use policies. While many types of industries, commercial operations and transportation infrastructure projects are subject to state, tribal and/or federal environmental or other regulations, the requirements vary. However, the recommendations in these guidelines can be used by planning and environmental agencies in land use and permitting issues to the extent applicable.

EPA recommends that states, tribes and communities evaluate siting and permitting processes that influence where potential sources of environmental pollution (see source categories identified in Exhibit 6) may be allowed to locate

with respect to schools. While these land use decisions are highly complex and beyond the scope of these guidelines, states, tribes and communities should seek to avoid situations in which new nearby sources of potentially harmful pollutants are sited in such close proximity to schools that they may pose a potential hazard to the school occupants.

9.5. What can I do to protect my child right now from environmental hazards at their current school?

There are many steps that parents can take to help promote healthy school environments. EPA has resources (see below) for parents in a number of programs that are designed to help schools and communities take action to protect children's health in one of the most important places—where children learn. EPA also encourages parents to partner with schools and local community planners to make school walking and biking routes safer for children. This encourages more active transportation choices which results in fewer vehicles on the road.

EPA Schools Web Portal—The Web portal provides links to EPA and other programs addressing environmental health issues in schools, from air pollution and asbestos to chemical management, pesticides, water conservation and more. Visit: www.epa.gov/schools.

Healthy School Environments Assessment Tool (HealthySEAT)—HealthySEAT is a free software tool to help school districts assess and manage all of their environmental health and safety risks. Visit: www.epa.gov/schools/healthyseat.

Reduce engine idling around schools, clean up old school buses and reduce other diesel emission sources in the community—School buses are a safe way for children to get to school. However, pollution from older diesel vehicles has health implications for everyone, especially children. The goals of the Clean School Bus USA Campaign are to reduce children's exposure to diesel exhaust and the amount of air pollution created by diesel school buses. Schools can also encourage the reduction of personal vehicle idling and overall use on campus.

For tips on how to reduce engine idling and diesel emissions around schools and in the community, visit: www.epa.gov/cleanschoolbus/whatyoucando.

Protect indoor air quality at schools—Improving and protecting indoor air quality at schools is important to children's health. Indoor levels of air pollutants can be two to five times higher than outdoor levels. Sources of poor indoor air quality in schools range from inadequate ventilation systems to fumes from pesticides and cleaning agents. Many of the nation's schools are implementing indoor air quality management programs, most of which are based on EPA's voluntary *Indoor Air Quality Tools for Schools Program*, which helps schools identify, resolve and prevent indoor air quality problems using mostly low- and no-cost measures.

For EPA's guidance on preventing and resolving indoor air quality problems in schools, visit www.epa.gov/iaq/schools.

Use integrated pest management (IPM)—IPM provides safe and usually less costly options for effective pest management. Visit: www.epa.gov/pesticides/ipm/.

Ensure drinking water quality—Consuming enough fluids on a daily basis is important for children's health and water is a healthy choice. Ensuring that children receive safe drinking water at their schools and child care centers is important because that's where children spend part of their day, and they are likely to drink water while they are there. Schools and child care centers can find on EPA's website information about lead in drinking water, source water protection, water conservation, cross-contamination, and other best management practices to assist schools and child care centers in providing safe drinking water to

students and staff. Visit: www.epa.gov/safewater/schools/.

Manage chemicals safely—From elementary school maintenance closets to high school chemistry labs, schools use a variety of chemicals. When they are mismanaged, these chemicals can put students and school personnel at risk from spills, fires and other accidental exposures. EPA's school chemical cleanout campaign website gives K-12 schools information and tools to responsibly manage chemicals. Visit www.epa.gov/schools/programs (click on Schools Chemical Cleanout Campaign).

Protect students and staff from the sun—Too much sun can lead to heat stress and unhealthy exposure to UV radiation. EPA's SunWise program provides information and materials to schools, educators and parents to help them prevent cancer and blindness caused by UV exposure. Visit: www.epa.gov/sunwise/.

Check the Air Quality Index—Children are one of the sensitive groups at risk for health effects from air pollution, in part because their lungs are still developing. The Air Quality Index (AQI) (www.airnow.gov) lets you know when air quality in your area is unhealthy and how you, your family and your community can protect your health. The AQI uses a color-coded scale and maps to provide daily air quality information. The AQI is available at www.airnow.gov and it is reported in many local newspapers and on television and radio stations.

For tips on how you can reduce air pollution in and around your community, visit: www.airnow.gov/index.cfm?action=jump.jump_youcando.

To teach students about air quality, use EPA's toolkit: www.airnow.gov/index.cfm?action=learning.workshop_for_teachers.

Create Safe Routes to Schools—The U.S. Department of Transportation's Safe Routes to School program encourages schools and communities to improve infrastructures and educational programs to encourage more children to safely bike or walk to and from school. Visit: http://safety.fhwa.dot.gov/saferoutes/.

Examples of EPA-funded projects in communities:

Community Action for a Renewed Environment (CARE) grant program—EPA's CARE is a competitive grant program that offers an innovative way for a community to organize and take action to reduce toxic pollution in its local environment. Through CARE, a community creates a partnership that implements solutions to reduce releases of toxic pollutants and minimize people's exposure to them. To learn more about community efforts that are being supported by EPA's CARE program, visit: www.epa.gov/care/communitybyregion.

Community-Based Air Toxics Projects—EPA supports air toxics projects in about 30 communities across the nation to help inform and empower citizens to make local decisions concerning the health of their communities. (http://yosemite.epa.gov/oar/CommunityAssessment.nsf/Welcome?OpenForm)

Make simple choices on the road—Doing your part to improve air quality and reduce traffic congestion around schools and in your community is easy. Incorporating even a few of the simple steps offered here can help clean the air and reduce traffic congestion. For easy tips, visit: www.italladdsup.gov/resources/what_can_i_do.asp.

9.6. Shouldn't schools be built as far away from major pollution generating sources as possible?

When acceptable alternative sites exist within the neighborhood(s) being served by the new school, the guidelines recommend that the LEA and SSC seek to avoid sites that are either on or in close proximity to land uses that may not be compatible with schools during the initial screen of candidate sites. These include locations that have onsite contamination that has not been addressed, major

pollution sources, clusters of industrial facilities or other potential hazards (see Siting Criteria, Exhibit 6: Screening Potential Environmental, Public Health and Safety Hazards). If no acceptable alternative sites exist, it is critically important for the LEA and SSC to fully explain the absence of alternatives in a transparent manner and fully engage the public in identifying and implementing both site-specific and community-wide exposure and risk reduction strategies.

High traffic roads can be a major pollution source that require careful consideration and evaluation by the LEA and SSC because these sources are common and there is typically a direct relationship between the transportation system and the accessibility of the school for staff and students. The guidelines recommend that when practicable, a chosen school site should be as far from high traffic roads as feasible. High traffic roads may include highways, local roads experiencing heavy congestion, local roads with significant stop and go activities, and roads with large numbers of trucks. Since high traffic roads are very common, especially in urban areas, it may be difficult to find locations away from these roads yet still be located within the community being served by the new school. Under these circumstances, the LEA and the SSC should consider a number of factors in making the best choice for student health, safety and accessibility. These factors can include: 1) if the school site and design provide an opportunity to place classrooms, playgrounds, athletic fields and air intakes as far from the road as possible; 2) whether barriers (e.g., noise barriers, nonsensitive buildings) or natural features (e.g., vegetation, berms) are or can be located between the school and road to reduce air quality impacts; and 3) whether certain sites allow students to walk/bike to school compared with alternatives that require bus and personal vehicle travel. Because of all of these factors and the difficulty in comprehensively assessing the advantages and disadvantages of particular sites under these conditions, an environmental professional should be consulted to provide assistance. More information is provided in the Quick Guide for Environmental Issues (see Section 8).

9.7. Isn't an uncontaminated site always the best location for a new school?

The best school location will be one that provides a healthy and safe learning environment for children, while also meeting a diverse array of other community goals. For example, integrating community centered schools into existing residential neighborhoods often allows for better environmental, community, economic, educational and public health outcomes. The voluntary School Siting Guidelines are intended to help communities appropriately consider environmental health and safety in the context of this complex decision-making process.

Of course, if uncontaminated structures or sites are readily available in the community the school is intended to serve, and meet the community's other important educational, economic and community criteria, selecting an uncontaminated location would be the ideal choice. However, such locations are rare in many urban communities, and often the LEA is faced with choosing among locations that have some level of contamination from prior uses or are close to potential sources of contamination. Building schools on the undeveloped outer edges of communities—often called greenfields—creates other problems such as increased transportation risks, longer transportation times and increased traffic-related air pollution, while reducing opportunities for students, parents and staff to walk or bike to school in their community.

9.8. Can schools be safely built on sites with residual soil or ground water contamination?

Schools can be safely located on sites where all waste and contaminated media have been removed, as well as those with residual contamination, provided that the location is carefully managed over time to ensure that no exposure to the contamination can occur. In cases where complete removal of contamination is not feasible, exposures can be prevented through the use of engineering controls and/or institutional controls (see Section 8.15). For example, vapor intrusion from soil or ground water contaminated with certain chemicals can pose a risk to the people who use buildings that are located above the contamination. Engineering controls can be used to alter the flow of contaminated air or restrict land use in a specific area so that contaminated air does not enter the building's indoor air. The use of engineering and institutional controls can prevent exposures, but only if effective systems are in place to maintain and enforce them, such as periodic monitoring to ensure their continued protectiveness and safe operation. Nationwide, brownfields and other formerly contaminated lands, including those with residual contamination, now safely support housing, schools, clinics, hospitals and other reuses that meet community needs.

Criteria for establishing the degree of cleanup needed should be based on state or tribal cleanup rules or guidance, where they exist. The environmental standards used for determining the appropriate level of cleanup should be based on either 1) standards developed for schools or residential use, or 2) risk-based levels set for residential use. If the site will have residual contamination at concentrations above these levels after the cleanup has been completed, engineering and/or institutional controls will be needed to ensure no exposure occurs (see Section 8.15). As part of their review of the cleanup plan, state, tribal and local regulatory agencies should consider the ability of the LEA and other governmental bodies to effectively maintain those controls. In the event that there is concern that these controls cannot be effectively and reliably managed, then the LEA may need to clean the site to residential levels, or select another location.

9.9. In cases where the best available location for a school relies on engineering and/or institutional controls to prevent potential exposures, how can the community work with the LEA and other responsible entities to ensure that those controls are effective for the life of the school?

Communities have an important role to play in ensuring that engineering and institutional controls remain in place and are effective in preventing potential exposures (see Section 8.15). Through the community involvement and planning process, the community can become familiar with the nature of residual contamination, engineering and institutional controls and any restrictions on how the land can be used. They can assist LEAs and help them meet their obligations by reporting actions in conflict with those land use restrictions to LEA management and state environmental regulatory authorities. The LEA and the SSC can also continue to play a role in updating the community about inspection, monitoring and maintenance over time, with the assistance of state technical oversight, as appropriate.

9.10. What cleanup or remediation of contamination at a school site should be completed before the school is occupied?

Before a school or portion of a school is occupied, all contamination that could pose a risk of harmful exposure to students and staff should be removed

or controlled. In cases where there is residual contamination, any necessary engineering and institutional controls should be in place and the site certified by the state or tribal regulatory agency as suitable for occupancy (see Section 8.15). For example, occupation of a school above a ground water plume that is undergoing remediation to clean the ground water should not pose a threat to students, faculty, staff or others unless there is a threat of vapor intrusion from the ground water. If the contaminated ground water poses a threat of vapor intrusion, any institutional or engineering controls should be in place at least for any portion of the school where there is a potential for exposure.

9.11. To what cleanup standard should school sites be remediated?

Criteria for establishing the degree of cleanup needed should be based on state or tribal cleanup rules or guidance, where they exist. The environmental standards used for determining the appropriate level of cleanup should be based on either 1) standards developed for schools or residential use, or 2) risk-based levels set for residential use. If the site will have residual contamination at concentrations above these levels after the cleanup has been completed, engineering and/or institutional controls will be needed to ensure no exposure occurs (see Section 8.15). As part of their review of the cleanup plan, state, tribal and local regulatory agencies should consider the ability of the LEA and other governmental bodies to effectively maintain those controls. In the event that there is concern that these controls cannot be effectively and reliably managed, then the LEA may need to clean the site to residential levels, or select another location.

9.12. Does EPA recommend buffer or exclusion zones (also sometimes called distance criteria or separation distances) to make sure schools aren't built close to major sources of pollution?

No, the guidelines do not include distance-based buffer or exclusion zones for potential school locations. EPA's approach to the School Siting Guidelines is to encourage and promote an integrated and holistic evaluation of a wide range of community and location-specific criteria in selecting the best location for a new school. The distance between a school location and a major source of pollution is only one of many complex factors that influence whether that source poses risks of concern to students and staff (see Exhibit 5). These factors can only be effectively evaluated on a case- and location-specific basis and require consideration of the extent to which a specific source raises a concern for a potential school location, as well as the degree to which any risk can be reduced or eliminated. Some states and local governments have developed distance-based requirements or guidance for schools and other locations that may have sensitive receptors, and while EPA does not believe that establishment of buffer or exclusion zones at a national level is appropriate, this should not be construed as a criticism of those jurisdictions that have adopted or are applying buffer or exclusion zones as a useful tool.[70]

[70] Examples include:
"Air Quality and Land Use Handbook: A Community Health Perspective," California Environmental Protection Agency, California Air Resources Board (April 2005). Available at: http://www.arb.ca.gov/ch/handbook.pdf; Rhode Island Department of Elementary and Secondary Education School Construction Regulations. (May 24, 2007). Available at: www.ride.ri.gov/regents/Docs/RegentsRegulations/Regents%20School%20Constructions%20Regulations.pdf.
California Department of Education, "School Site Selection and Approval Guide," Prepared by School Facilities Planning Division. Last modified March 10, 2011. Available at: www.cde.ca.gov/ls/fa/sf/schoolsiteguide.asp;
Links to additional state and local regulations and guidance are available in the Resource section of the guidelines website. (www.epa.gov/schools/siting/resources)

EPA believes that establishing national distance criteria is likely to result in a variety of negative unintended consequences. For example, use of national distance criteria as the basis for selecting locations that are farther away from the children they serve, without careful consideration of location-specific factors, could create less healthy environments for students and staff through increased transportation risks, reduced opportunities for walking and biking and increased traffic-related air pollution.

EPA recommends that sound technical assessments of both onsite and nearby potential hazards be undertaken to determine whether such potential hazards might pose a threat to students or school staff (see Exhibit 6). Locations should be excluded from further consideration if nearby or onsite hazards pose unacceptable risks that cannot be eliminated or reduced to an acceptable level.

9.13. What is the difference between "screening perimeters," which are included in the guidelines, and "buffer" or "exclusion" zones?

EPA has included some distance-based screening recommendations in the Environmental Siting Criteria Considerations section of these guidelines under Exhibit 6: Screening Potential Environmental and Safety Hazards (see Section 4). The screening perimeter distances are approximate distances for use in the initial screening process. During this initial screening process, an environmental professional (see Section 10), the LEA (see Section 10) and the SSC should identify all potential hazards that are within this distance of a prospective school location and determine those that need further evaluation. The screening distances included in the guidelines are based primarily on existing state or local rules, laws, ordinances, policies or guidance and are intended as general rules of thumb. Potentially important sources that may be outside the recommended screening perimeters may also be appropriate for further evaluation.

Screening distances, alone, may not be predictive of the actual potential for elevated exposures and risks from that source. Exposure to contaminants from a source could be nonexistent, or could be significant. To determine the potential for exposure, an assessment should be performed as part of the school siting screening and evaluation process. In contrast, buffer or exclusion zones are based on a presumption that there is a high potential for significant exposures from a source located within that zone. LEAs should work with the appropriate state response or tribal regulatory program in assessing school locations within the screening perimeter to determine if facilities pose a risk sufficient to influence siting location decisions or require alternative site selection. In the event that a facility poses a potential risk to students, staff, parents or others, the resolution of any unacceptable risk associated with that facility should be addressed before the decision to site a school.

9.14. The School Siting Guidelines place a lot of emphasis on state and tribal involvement in evaluating and approving siting decisions where environmental contamination is present. At a time of shrinking state and tribal budgets, how are states and tribes to meet the anticipated demand for more involvement?

EPA recognizes that elements of the recommended environmental review process may be beyond the current capacity of some LEAs and other participants in the process to fully implement with existing authorities, expertise and resources (see Section 5). All state and most tribal environmental regulatory agencies have programs

in place to evaluate and approve cleanup plans for specific types of sites or projects (see Section 7). EPA encourages LEAs, states, tribes, communities and other interested organizations to work collaboratively and with EPA to identify opportunities to leverage these and other existing resources as well as to identify and work toward fulfilling needs for improving local and state capacity to conduct as rigorous a process of site evaluation as possible. EPA recommends that LEAs work directly with the state and tribal environmental response program regarding the needed evaluation and approval of cleanup plans. EPA also recommends that LEAs seek advice from state and tribal environmental response programs to ensure that long-term stewardship responsibilities are effectively met. The Resources page of the guidelines website contains potentially helpful funding and capacity building resources. (www.epa.gov/schools/siting/resources.html#LINKS_Technical_Assistance)

9.15. Do the guidelines apply to child care centers or other facilities where children spend time?

While the guidelines are primarily intended to be used by LEAs in evaluating and selecting locations for K-12 schools, EPA believes that the recommendations in the guidelines represent a set of best practices that may inform and improve the evaluation and selection of locations for a wide range of settings where children spend time. However, EPA recognizes that there are many differences across the types of child-occupied facilities. For example most K-12 schools generally have a clearly identifiable central authority and significant (though not necessarily plentiful) resources, while many child care centers are small businesses with extremely limited resources and subject primarily to state licensing authorities. Nevertheless, the siting criteria considerations (see Section 4), environmental review process (see Section 5) and public involvement (see Section 3) practices recommended within the School Siting Guidelines may be applied, with appropriate adaptation, to a wide range of school-related institutions.

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10. Glossary

Terms not defined herein should have their ordinary meaning within the context of their use. Ordinary meaning is as defined in, for example: "Webster's Collegiate Dictionary," see the online version at www.m-w.com/.

A | **B** | **C** | **D** | **E** | **F** | **G** | **H** | **I** | **J** | **K** | **L** | **M** | **N** | **O** | **P** | **Q** | **R** | **S** | **T** | **U** | **V** | **W** | **X** | **Y** | **Z**

All Appropriate Inquiries: The process of evaluating a property's environmental conditions and assessing potential liability for any contamination. See All Appropriate Inquiries Standard 40 CFR Part 312 (http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=c712de4fbdbfd669e790daa37865a02e&rgn=div5&view=text&node=40:27.0.1.1.9&idno=40), EPA Fact Sheet: All Appropriate Inquiries Rule: Definition Of Environmental Professional (www.epa.gov/brownfields/aai/ep_deffactsheet.pdf), and ASTM E1527-05 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process. (www.astm.org/Standards/E1527)

Brownfield: A property, the expansion, redevelopment or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant or contaminant.

Capacity: The institutional, organizational, technical and financial ability to address issues. Used in the context of these guidelines as the capacity of education agencies or local governments to have the organization, staff, technical and financial resources to safely operate school facility risk reduction measures such as lead encapsulation and to inspect, maintain and ensure long-term stewardship of any institutional or engineering controls designed to protect people from residual site contamination following a cleanup (see Section 8.15).

CERCLA: The Comprehensive Environmental Response, Compensation, and Liability Act—otherwise known as CERCLA or Superfund—provides a federal "Superfund" to clean up uncontrolled or abandoned hazardous waste sites as well as accidents, spills and other emergency releases of pollutants and contaminants into the environment. Through CERCLA, EPA was given power to seek out those parties responsible for any release and ensure their cooperation in the cleanup.

Comprehensive environmental review: A stage in the environmental review process (see Section 5) that involves gathering and analyzing data on environmental hazards and impacts identified in the initial or preliminary environmental review (see Section 5.6) and evaluating the risks posed to children's health, public health and the environment based on the contamination or impacts found. The comprehensive environmental review (see Section 5.7) also includes developing preliminary plans and cost estimates for mitigation/remediation measures.

Concentrated animal feeding operations (CAFOs) or animal feeding operations (AFOs): Agricultural operations where animals are kept and raised in confined situations. AFOs generally congregate animals, feed, manure, dead animals and production operations on a small land area. Feed is brought to the animals rather than the animals grazing or otherwise seeking feed in pastures. Animal waste and wastewater can enter water bodies from spills or breaks of waste storage structures (due to accidents or excessive rain) and from nonagricultural application of

manure to crop land. An AFO is a lot or facility (other than an aquatic animal production facility) where the following conditions are met:

- Animals have been, are or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period; and
- Crops, vegetation, forage growth or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility. AFOs that meet the regulatory definition of a CAFO may be regulated under the National Pollutant Discharge Elimination System (NPDES) permitting program. For Regulatory Definitions of Large CAFOs, Medium CAFOs, and Small CAFOs, see: www.epa.gov/npdes/pubs/sector_table.pdf.

Criteria pollutants: The Clean Air Act requires EPA to set National Ambient Air Quality Standards for six common air pollutants. These common air pollutants are found all over the United States. They are particle pollution (often referred to as particulate matter), ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides and lead. These pollutants can harm human health and the environment, and cause property damage. Of the six pollutants, particle pollution and ground-level ozone are the most widespread health threats. EPA calls these pollutants "criteria" air pollutants because it regulates them by developing human health-based and/or environmentally-based criteria (science-based guidelines) for setting permissible levels. The set of limits based on human health is called primary standards. Another set of limits intended to prevent environmental and property damage is called secondary standards.

Engineering controls: For purposes of this guidance, the engineered physical barriers or structures designed to control or limit exposure to residual onsite contamination. Engineering controls are distinct from institutional controls. Certain engineered cleanups routinely involve ongoing operation and maintenance (O&M), monitoring, reporting and evaluation.

Environmental justice: For the purposes of this guidance, the fair treatment and meaningful involvement of all people, regardless of race, color, national origin or income with respect to the development, implementation and enforcement of environmental laws, regulations and policies.

Environmental professional: The qualifications of an environmental professional needed to conduct Environmental Site Assessments are defined in ASTM International Standard E1527-05. (www.astm.org/Standards/E1527) Also see EPA Fact Sheet: All Appropriate Inquiries Rule: Definition Of Environmental Professional. (www.epa.gov/brownfields/aai/ep_deffactsheet.pdf)

Environmental review process: A series of steps taken to determine whether a project will be impacted by potential hazards. In the case of school siting, the environmental review evaluates potential environmental hazards and exposures to children, staff and visitors before a decision is made to site a school in a particular location.

Further action: Denotes step(s) during the environmental review process that trigger additional review, evaluation, remediation, referral or other appropriate activity.

Greenfields: Locations, typically outside of cities, that have not previously been developed.

Green schools: See term healthy high performance schools in the glossary.

HAPs: Toxic air pollutants, also known as hazardous air pollutants (HAPs), are those pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects.

Health impact assessment (HIA): Most often defined as "a combination of procedures, methods and tools by which a policy, program or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population" (World Health Organization, 1999). This broad definition from

the World Health Organization European Center for Health Policy, as presented in the Gothenburg Consensus paper on HIA, (www.euro.who.int/document/pae/gothenburgpaper.pdf) reflects the many variants of HIA. A somewhat more precise definition is that HIA is "a multidisciplinary process within which a range of evidence about the health effects of a proposal is considered in a structured framework."

Healthy high performance schools: Facilities that integrate all aspects of the design process starting with selection of the design team and the school location to design schools that meet multiple educational, environmental and community goals. The environmental goals of such facilities include energy and water efficiency, healthy indoor air, safer materials selection (including life-cycle cost consideration) and reduced environmental impact from the school. The technologies and practices used to achieve these goals are often integrated into the curriculum and other student learning opportunities.

High traffic roads: May include highways, local roads experiencing heavy congestion, local roads with significant stop-and-go activities and roads with large numbers of trucks.

Institutional controls: Nonengineered instruments, such as administrative and/or legal controls, that help to minimize the potential for human exposure to contamination and/or protect the integrity of a remedy. See: EPA Citizen's Guide to Understanding Institutional Controls (www.epa.gov/fedfac/pdf/ic_ctzns_guide.pdf) and All Appropriate Inquiries Standard 40 CFR Part 312. (http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title40/40cfr312_main_02.tpl)

Joint use: The use of school district controlled, owned or utilized facilities by a nondistrict entity or the use of nonschool owned property, such as a library or park or athletic facility, by a school. There are five types of entities that constitute joint users:

- ***Individuals*:** Persons, generally residents of a community, who have access to exterior spaces, such as play equipment, athletic fields or courts, and open space for personal use.
- ***Civic Groups*:** Individuals, groups or organizations who seek occasional use of school buildings and grounds for activities or events such as polling stations, community meetings and special events.
- ***Other Public Agencies*:** A public agency that is not part of the school district that may offer programs, need to lease space and offer no program connection to the school and/or may seek joint development with ongoing joint programming.
- ***Private Nonprofit Organizations*:** The use of school buildings and/or grounds by a nonprofit organization such as after-school programs, health clinics or adult education classes.
- ***Private For-Profit Corporations*:** The use of school building and/or grounds by a private for-profit corporation, either for education-related work like a private testing service or unrelated work like private offices.

Joint use agreement (JUA): A formal agreement between two separate government entities, often a school and a city or county, setting forth the terms and conditions for shared use of public property or facilities. See: www.nplanonline.org/nplan/joint-use.

Local education agency (LEA): Any entity, whether public or private, including its staff and its governing or voting body (e.g., a school board or a tribal board) with responsibility for decision-making with respect to school buildings and operations.

Local community: General term referring to all members of a local area with an interest in school environmental health and safety issues, including but not limited to local governments, local education agencies (see term local education agency in the glossary), nongovernmental organizations and individuals.

Location-specific remediation/mitigation: Appropriate response measures, as prescribed in a remedial action workplan, that are tailored to the particular characteristics of the location in question.

Long-range school facilities plan: A way for local education agencies (LEAs) to identify important projections of long-term school and community needs such as student enrollment, operational costs and infrastructure to use in making school siting decisions.

Long-term stewardship: Long-term management of contaminated environmental media to protect human health and the environment, generally through the use of engineering or institutional controls (see Section 8.15).

LTSP: Long-term stewardship plan.

Meaningful public involvement: Fully engaging stakeholder groups throughout the review and decision-making process, including opportunities to share opinions and review relevant documents.

Nearby hazard: A potential risk or hazard located outside of the site property boundary. Determining what is nearby depends on many factors and will vary with type of potential hazard. See Exhibit 5: Factors Influencing Risks from Nearby Hazards and Exhibit 6: Screening Potential Environmental, Public Health and Safety for more information.

O&M: Operation and maintenance.

One call system: Centralized and integrated phone-based system for obtaining information from a single phone call on underground utilities or other hazards prior to digging or excavation (e.g., "Miss Utility").

PAH: Polycyclic aromatic hydrocarbons.

PCBs: Polychlorinated biphenyls (PCBs) belong to a broad family of human-made organic chemicals known as chlorinated hydrocarbons. PCBs were domestically manufactured from 1929 until their manufacture was banned in 1979. They have a range of toxicity and vary in consistency from thin, light-colored liquids to yellow or black waxy solids. Due to their nonflammability, chemical stability, high boiling point and electrical insulating properties, PCBs were used in hundreds of industrial and commercial applications including electrical, heat transfer and hydraulic equipment; as plasticizers in paints, plastics and rubber products; in pigments, dyes and carbonless copy paper; and many other industrial applications.

Petroleum hydrocarbons or total petroleum hydrocarbons (TPH): A large family of several hundred chemical compounds that are derived from crude oil. Some chemicals that may be found in TPH are hexane, jet fuels, mineral oils, benzene, toluene, xylenes, naphthalene and fluorene, as well as other petroleum products and gasoline components.

Phytoremediation: Describes the treatment of environmental problems (bioremediation) through the use of plants that mitigate the environmental problem without the need to excavate the contaminant material and dispose of it elsewhere. See EPA Citizen's Guide to Phytoremediation. (www.epa.gov/tio/download/citizens/citphyto.pdf)

Preliminary environmental assessment: Initial screening and review stage for candidate sites to identify potential environmental issues related to the suitability of a candidate school site, if any, that should to be assessed in detail if the LEA decides to pursue the site for use as a school location.

Public involvement: See term meaningful public involvement in the glossary.

Remedial action workplan: Detailed plan for remediation of onsite contamination, including cleanup methods, long-term maintenance requirements and long-term stewardship obligations.

School siting committee (SSC): Committee established to make recommendations to the

LEA's governing body on sites for building new schools, leasing space for new schools and/or renovating or expanding existing schools. The committee includes representatives of the LEA's governing body (such as elected school board members, facility, health and safety staff), local government or tribal staff (such as city planners, government environmental health specialist, county auditor) and representatives from stakeholder groups (such as parents of children likely to attend the new school, teachers, public health organizations, community members, environmental advocacy and environmental justice groups, age-appropriate students, local trade/building associations).

Screening perimeter: Screening distances intended to identify potential land uses near candidate school locations that warrant further consideration rather than to identify land uses that may be incompatible with the location of schools. Screening distances, alone, may not be predictive of the actual potential for a source located within that distance to present an environmental or health hazard. Potential hazards associated with candidate school locations should be evaluated as part of the site screening and evaluation process.

SVOC: Semi-volatile organic compound.

TPH: Total petroleum hydrocarbon.

Transparent: Readily accessible and understandable by all community members (e.g., decision-making criteria and procedures should be transparent).

Vapor intrusion: Migration of volatile chemicals from contaminated ground water or soil into an overlying building. For more information, see the discussion on this topic in the Quick Guide to Environmental Issues, see Section 8.

VOCs: Volatile organic compounds (VOCs) are emitted as gases from certain solids or liquids. VOCs include a variety of chemicals, some of which may have short- and long-term adverse health effects. Concentrations of many VOCs are consistently higher indoors (up to 10 times higher) than outdoors. VOCs are emitted by a wide array of products numbering in the thousands. Examples include: paints and lacquers, paint strippers, cleaning supplies, pesticides, building materials and furnishings, office equipment such as copiers and printers, correction fluids and carbonless copy paper, graphics and craft materials including glues and adhesives, permanent markers and photographic solutions.

Zoning and land uses: Zoning codes are developed to regulate the location and type of development in a given area. Zoning can determine the land use of a particular location, such as residential, commercial or industrial.

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