BROWN TO GREEN:

Making Site Clean-Up More Sustainable

BY DAVID LANEY, CHMM

Environmentally sound practices serve a dual purpose. They facilitate urban growth and development while minimizing the harm that these activities have on the earth's resources and ecosystems. In recent years, there has been an increased emphasis on identifying effective methods to utilize land, water and air without rampant depletion of these precious resources. At the forefront of this effort are a small but growing number of individuals, government agencies, and companies that have chosen to develop and implement best practices that minimize the environmental footprint of many of their day-to-day activities – from purchasing raw materials to recycling waste products.

SOUND PRACTICES

A trend that supports this philosophy is the reuse and redevelopment of environmentally impaired properties known as Brownfields. Rather than follow historic patterns of urban development, which seek to push the boundaries of development to greater distances from city centers in a quest to find undeveloped property, the impetus in the Brownfields movement is to reclaim previously developed property in the urban core. Although challenges arise when renovating and reusing these properties, this is an example of an environmental win-win, where developers get valuable real estate with good access to established infrastructure while preserving and protecting open space.

Another environmentally sound practice is the remediation of contaminated properties so as to mitigate the impact of the cleanup measures that are used. The year 2009 marked a turning point for cleanup practitioners when the U.S. Environmental Protection Agency (EPA) released its "Five Principles for Greener Cleanups," calling for green remediation. This entails indentifying the full spectrum of potential environmental effects of remediation and using best practices to lessen the footprint that such cleanup activities leave. In addition to complying with laws and regulations, the EPA asserts that cleanup efforts should benefit society by protecting human health in a transparent manner that involves the community at large, as well as all stakeholders. Specifically, the EPA stated that site cleanups should:

- Reduce total energy use and use of non-renewable fuel by opting to use more renewable forms of energy;
- Reduce the impact on water resources by minimizing the use of fresh water;
- Reduce the release of air pollutants including greenhouse gases;
- Reduce the use of raw material and the generation of waste requiring landfill disposal through the reuse/recycling of waste materials; and
- Protect and preserve ecosystems.

MAKING THE CASE

In late 2010, SCS Engineers implemented EPA standards for a green remediation project in Flagstaff, Arizona. It involved the cleanup of a 90-year old contaminated Brownfields site that was formerly home to a steam-powered electric utility, laundry and railroad yard. The site was located adjacent to the main waterway in the area, the Rio de Flag. The two-month project included the excavation and offsite disposal of 832 tons of contaminated soil from a structure where creosote was used to preserve wood.

Working closely with the city's Brownfield Land Recycling Program, our company performed community outreach, informing citizens in a series of public meetings of the intent to use green remediation methods to renovate the property. This intention was also written directly into all technical specifications and bid documents that were prepared for the job by SCS prior to hiring an excavation contractor. All work was reviewed and approved by the EPA, which helped to lay the groundwork for community acceptance and contractor cooperation.

Creosote, used to preserve wood, was part of the 832 tons of contaminated soil removed.

Pioneer Museum acknowledged the restored site and may display the 90-year old bricks, railroad ties and glass recovered during remediation.

BEST PRACTICES EMERGE

Once the work started, contractors were required to minimize the impact on freshwater supplies by using reclaimed water for dust control. They were also required to buy all materials and supplies locally, which reduced the generation of air pollutants and greenhouse gases typically generated from transportation.

SCS facilitated the use of a local landfill, which resulted in a roundtrip for each haul truck of 25 miles rather than 160 miles, a reduction of 84 percent. Since the roundtrip included landfill disposal that coincided with a visit to the borrow site to pick up backfill for the return trip, the contractor was able to reduce the haul truck's mileage from 2,200 miles to 1,400 miles, a reduction of 34 percent. This lessened the impact on local infrastructure (roads and bridges), improved safety, reduced air pollution and decreased the use of vehicle fuel, a non-renewable energy source.

To minimize the volume of virgin raw material used and the volume of waste generation, the excavation contractor was required to reuse soil from an existing remodel at the Flagstaff Mall as backfill. Working with this same contractor, we were also able to ensure that when a tree was removed during excavation, the wood chips could be reused as landscaping material. To protect and preserve the local ecosystem, it was mandatory that the site be reseeded with native grasses supplied by a local landscape specialist.

FUTURE OF GREEN REMEDIATION

This project's success, which has demonstrated positive implications for the future of green remediation, clearly shows that the EPA's principles are on the right track. The project was successfully completed without the use of fresh water, while reducing use of non-renewable fuel, reducing emission of air pollutants and greenhouse gases, reducing impacts to area roads, reducing the volume of raw materials used, and reducing the generation of waste material.

This green remediation project also reduced the overall project cost. Perhaps most importantly, the use of green remediation techniques received positive reviews from members of the community and city workers, who demonstrated their support by stopping by the site on their way to and from work to check on progress and view the latest developments.

In fact, the appearance of the fully-restored site was acknowledged by the Pioneer Museum, who requested the railroad ties, glass bottles and bricks recovered during the remediation project be donated for a possible museum display. Future plans for the site include the installation of flood control structures to regulate the flow of the Rio de Flag, use of the area for green space or a park, and construction of several structures whose use and design will be determined by area residents. Some of the ideas suggested for these buildings range from low-income housing and artist lofts to small business enterprises.

MINIMIZING ENVIRONMENTAL FOOTPRINTS

Best practices for green remediation are not limited to those implemented by SCS at this site. However, having such a strong example serves to both validate existing EPA guidance and demonstrate that use of green remediation can be beneficial to all parties involved.

To be truly green, site remediation projects should not only reduce or eliminate the environmental hazards that are present, they should also be performed in a manner that minimizes the environmental footprint that remains long after the last piece of equipment leaves. The effectiveness of remediating contamination at any site must be measured by what remains in the form of impacts to air, water and land, as well as the amount of contamination that was treated or removed.

This green remediation project proves that, by being creative, it is possible to achieve cleanup goals while avoiding practices that are harmful to the environment.

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An environmental professional for more than 26 years, David is Manager of Environmental Services for SCS Engineers Arizona operations. He applies sound and sustainable management practices to the assessment and remediation of contaminated properties, removal and closure of underground storage tank sites, Brownfields redevelopment, and assessment of vapor intrusion conditions. David is also actively engaged in developing solutions to ongoing regulatory compliance needs.