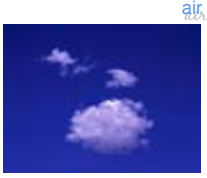
Greener Cleanups: How to Maximize the Environmental Benefits of Site Remediation



	action	level of difficulty	feasibility considerations: cost	feasibility considerations: schedule	feasibility considerations: technical complexity	benefits: air	benefits: water	benefits: land	benefits: energy
site assessment	Collect data necessary for site-specific risk assessment.	Medium	●	●	●	Improves decision-making and helps to prioritize action.			
site assessment	Collect data necessary to evaluate recycling options for waste and debris.	Low	●	●	●				
site assessment	Collect data necessary to evaluate alternate treatment methods.	Medium	●	●	●●				
planning and design	Develop and quantify "base case" remediation scenario.	Low	●	●	●	Base case data allow comparison of "standard" cleanup with "greener" cleanup.			
planning and design	Organize site layout to meet operational needs and reduce excavation requirements.	Low	●●●	●	●	Reduces air emissions from on-site construction equipment and from trucking waste materials.		Reduces waste material requiring off-site disposal.	Reduces fuel use in on-site construction equipment and in trucking waste materials.
planning and design	Use engineered barriers.	Low	●	●	●	Reduces air emissions from on-site construction equipment and from trucking waste materials.		Reduces waste material requiring off-site disposal.	Reduces fuel use in on-site construction equipment and in trucking waste materials.
planning and design	Use permeable barriers.	Medium	●	●	●●		Increase long-term permeability of site to reduce stormwater runoff.		
planning and design	Use institutional controls.	Low	●●●	●●●	●	Reduces air emissions from on-site construction equipment and from trucking waste materials.		Reduces waste material requiring off-site disposal.	Reduces fuel use in on-site construction equipment and in trucking waste materials. Reduces energy use in remediation systems.
planning and design	Use site-specific risk assessments.	Medium	●	●	●●	Reduces fuel use in on-site construction equipment and in trucking waste materials. Reduces energy use in remediation systems.		Reduces waste material requiring off-site disposal.	Reduces fuel use in on-site construction equipment and in trucking waste materials. Reduces energy use in remediation systems.
planning and design	Use soil management zones.	Low	●●	●	●	Reduces air emissions from trucking waste materials.		Reduces waste material requiring off-site disposal.	Reduces fuel use in trucking waste materials.
planning and design	Develop sequencing plan for work to integrate cleanup with construction.	Low	●●●	●●●	●●	Reduces air emissions from on-site construction equipment by combining project phases.	Reduces erosion.	Reduces waste material requiring off-site disposal and reduces interim fill requirements.	Reduces fuel use in on-site construction equipment by combining project phases.
planning and design	Identify salvage options for materials from existing structures.	Medium	●	●	●			Reduces waste material requiring off-site disposal.	
planning and design	Identify recycling options for waste and debris, such as metal, C&D, slag, and tires	Medium	●	●	●●			Reduces waste material requiring off-site disposal.	
planning and design	Consider reuse options for existing structures.	High	●	●	●●●	Reduces air emissions from demolition activities.		Reduces waste material requiring off-site disposal.	Reduces fuel use in on-site construction equipment and in trucking waste materials.
planning and design	Consider structural reuse of slabs or foundations.	High	●	●	●●●	Reduces air emissions from demolition activities.		Reduces waste material requiring off-site disposal.	Reduces fuel use in on-site construction equipment and in trucking waste materials.
planning and design	Evaluate active in-situ treatment systems, such as soil vapor extraction, enhanced bioremediation or air sparging.	High	●	●	●●●	Reduces air emissions from on-site construction equipment and trucking waste material.	Reduces erosion and potable water use.	Reduces waste material requiring off-site disposal.	
planning and design	Evaluate passive in-situ treatment methods, such as in-place oxidation or phytoremediation.	High	●	●	●●●	Reduces air emissions from on-site construction equipment and trucking waste material.	Reduces erosion and potable water use.	Reduces waste material requiring off-site disposal.	Reduces purchased energy use.
planning and design	Evaluate remediation technologies that permanently destroy contaminants.	High	●●●	●●	●●●	Reduces air emissions from on-site construction equipment and trucking waste material. Reduces future migration concerns.	Reduces future migration concerns.	Reduces future migration concerns.	
planning and design	Perform a life-cycle analysis of cleanup plan.	Medium	●	●	●●	Life-cycle analysis supports informed decision-making considering time, cost, remedy effectiveness, and environmental impact of the alternatives.			

High
Medium
Low

- ● indicates a benefit may add cost, time, or technical complexity - the number of symbols indicates the relative amount of the increase.
- ● indicates a benefit may reduce cost, time, or technical complexity - the number of symbols indicates the relative amount of the reduction.
- ● indicates a benefit may add or reduce cost, time, or technical complexity depending on the project specifics.
- ● indicates a benefit won't likely impact cost, time, or technical complexity.

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cleanup action

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					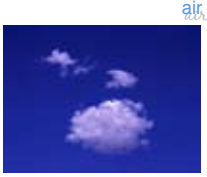			
Impose idling restrictions on construction equipment.	▼	●	●	●	Reduces air emissions from on-site construction equipment and from staged vehicles.			Reduces fuel use in on-site construction equipment and in trucking waste materials.
Use low-sulfur diesel fuel.	›	●	●	●	Reduces air emissions from on-site construction equipment and from staged vehicles.			
Use alternate fuels (biodiesel, E85).	›	●	●	●	Reduces air emissions from on-site construction equipment and from trucking waste materials.			Reduces use of petroleum products in on-site construction equipment and in trucking waste materials.
Use construction equipment with enhanced emission controls.	›	●	●	●	Reduces air emissions from on-site construction equipment and from staged vehicles.			
Sequence work to minimize double-handling of materials.	▼	●●●	●●●	●	Reduces air emissions from on-site construction equipment. Reduces nuisance dust from stockpiles.	Reduces erosion.		Reduces fuel use in on-site construction equipment.
Cover stockpiles with tarps, apply alternate dust-control measures, or vegetate stockpiles.	▼	●	●	●	Reduces nuisance dust from stockpiles.	Reduces erosion.		
Collect rain water for on-site use, such as dust control.	▼	●	●	●		Reduces potable water use.		
Implement a water conservation plan.	▼	●	●	●		Reduces potable water use.		
Capture and treat greywater for reuse.	›	●	●	●●		Reduces potable water use.		
Abandon rather than remove subsurface structures.	›	●●	●●	●●			Reduces waste material requiring off-site disposal. Reduces off-site fill requirements.	Reduces fuel use in on-site construction equipment and in trucking waste materials.
Crush existing structures to optimize scrap recovery and produce fill materials.	›	●	●	●			Reduces waste material requiring off-site disposal. Reduces off-site fill requirements.	Reduces fuel use in trucking waste material and fill material.
Grind waste wood and other organics for on-site use.	›	●	●	●			Reduces waste material requiring off-site disposal.	Reduces fuel use in trucking waste material.
Use recycled materials for fill.	▼	●	●	●			Reduces virgin fill requirements.	
Routinely evaluate treatment processes for optimal performance.	▲	●	●	●●●	Reduces air emissions from treatment processes.	Reduces potable water use and waste water discharge from treatment processes.	Reduces waste material requiring off-site disposal.	Reduces purchased energy use.
Capture free product or emissions for on-site energy recovery.	▲	●	●	●●●	Reduces air emissions from treatment processes.	Reduces waste water discharge from treatment processes.	Reduces waste material requiring off-site disposal.	Reduces purchased energy use.
Incorporate renewable energy sources, such as wind or solar, into treatment systems.	▲	●	●	●●●				Reduces purchased energy use.
Use energy efficient systems and office equipment in job trailer.	▼	●	●	●				Reduces purchased energy use.

▲ High
› Medium
▼ Low

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