

Appendix M—Cost Estimates for the Task Force Recommendations

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Cost Estimates of Implementing the Task Force Recommendations

The project support contractor developed the following estimates of costs to implement the Area-Wide Soil Contamination Task Force's recommendations. These rough estimates were developed based on available information using a variety of assumptions. The estimates are intended to provide a general sense of the level of financial resources that might be needed to implement the Task Force recommendations. They are not detailed, accurate estimates for budgeting purposes. Actual costs will vary according to the type and number of the activities implemented, where the activities are implemented, the level of effort and operating expenses of the implementing entities, the ability to leverage funding for existing programs, and many other factors. *Actual costs, therefore, may be considerably higher or lower than these estimates suggest.*

It is important to see these estimates in the full context of the Task Force recommendations. The estimates are designed to give information on activity costs; however, the implementing entity will not necessarily bear the full costs of the activity. For example, residents who choose to test soils on their properties will not likely bear the full cost given Task Force recommendations to subsidize sampling activities. Similarly, because most of the Task Force recommendations rely on individuals to make choices about how to live with area-wide soil contamination, not all of the activities for which cost estimates have been prepared will be carried out at every property affected by area-wide soil contamination. Table 1 below provides unit cost estimates for some of the activities individuals and institutions may choose to implement to address area-wide soil contamination at developed residential properties (on an estimated 0.1 acre of land per residence) and during new construction of child-use areas, residences, or commercial or other developments on open land. Ranges of costs are provided to illustrate in a general sense how actual costs may vary.

Table 1: Cost Estimates for Activities in Residential Areas and New Development

Activity	Developed Residential Properties		Open Land Being Developed	
	Cost Range (per residence)	Mid-Range Costs (per residence) ¹	Cost Range	Mid-Range Costs
Sampling ²	\$100-\$300	\$200	\$1K-\$3K/acre	\$2K/acre
Individual Protection Measures ³	low, primarily non-monetary costs	low, primarily non-monetary costs	low, primarily non-monetary costs	low, primarily non-monetary costs
Grass Cover (Using Hydroseed) ⁴	\$200-\$750	\$300 (\$500 with surface preparation)	\$3K- \$7K/acre	\$5K/acre
6" Woodchips + Barrier ⁴	\$2.1K-\$4.5K	\$3K	\$21K- \$45K/acre	\$30K/acre
Clean Soil Cover (with Barrier & Hydroseed) ⁴	\$4.5K-\$9.6K	\$6.4K	\$34K- \$74K/acre	\$49K/acre
Soil for Raised Garden Bed ⁵	\$200-\$800	\$500	\$200-\$800/garden	\$500/garden
Soil Blending/Tilling (6" deep contamination)	\$3.5K-\$14K	\$9K(\$5K w/o mobilization charge for equipment)	\$56K- \$120K/acre	\$80K/acre
Soil Blending/Tilling (12" deep contamination)	\$7K-\$20K	\$13K(\$10K w/o mobilization charge for equipment)	\$106K- \$227K/acre	\$151K/acre
Soil Blending/Tilling (18" deep contamination)	\$9K-\$24K	\$16K(\$13K w/o mobilization charge for equipment)	\$155K- \$332K/acre	\$221K/acre
Consolidate Surface Soils & Cap with Asphalt (6" deep contamination) ⁶	N/A	N/A	\$55K- \$120K/acre	\$78K/acre
Consolidate Surface Soils & Cap w/ Asphalt (12" deep contamination) ⁶	N/A	N/A	\$67K - \$143K/acre	\$95K/acre
Consolidate Surface Soils & Cap with Asphalt (18" deep contamination) ⁶	N/A	N/A	\$78K- \$168K/acre	\$112K/acre
Soil Removal/ Replacement (top 6")	\$11K-\$23K	\$15K	\$56K - \$120K/acre	\$80K/acre
Soil Removal/ Replacement (top 12")	\$18K-\$39K	\$26K	\$106K- \$227K/acre	\$151K/acre
Soil Removal/ Replacement (top 18")	\$26K-\$56K	\$37K	\$155K- \$332K/acre	\$221K/acre
Dust Suppression During Construction ⁷	N/A	N/A	\$700-\$1.5K/acre	\$1K/acre
Plat Notices ⁸	minimal	minimal	minimal	minimal

Notes:

¹It is assumed that 0.1 acres are treated (e.g., 0.1 acres are newly covered with woodchips) at each residence.

²These low estimates of sampling costs assume 4 samples are taken per residence (or 40 per acre at open land) and an average cost of laboratory analysis of \$50 per sample. Actual costs will be greater if additional samples are analyzed (e.g., in the case of a new child-use area development).

³Costs include materials (dust masks, HEPA vacuum filters, etc.) as well as time and inconvenience.

⁴Actual costs for caps (e.g. grass cover, wood chips, or clean soil cover) will be lower if soil is already well covered.

⁵This estimate assumes that 18" of soil is spread over a 10'x10' garden bed; topsoil costs are based on average costs for soil at Seattle-area nurseries.

⁶Estimates assume that the consolidated and capped soil occupies an area that is one-third the size of the original contaminated surface area.

⁷This includes costs for a water truck and sprayer. Costs for dust suppression are included in the estimates for consolidation, removal, and tilling of soil.

⁸This assumes low administrative costs per property.

Where it was possible to develop rough estimates of funding needs for implementing the Task Force recommendations statewide, the project team developed two sets of estimates: (a) unit costs for each activity (e.g., the cost of sampling at one school) and (b) costs for the first 10 years of implementation of the recommendations (e.g., the cost of sampling 400 schools over 10 years). These estimates, as summarized in Tables 2 and 3 below, include potential costs for State and local efforts to develop and maintain maps, conduct outreach, investigate and address contamination at child-use areas, develop and adopt new policies, and conduct additional research and monitoring. Statewide costs are highly dependent on the number of places the activities are implemented (e.g., the number of local health jurisdictions implementing education and awareness building on area-wide soil contamination issues), which will depend on the choices of numerous individuals, organizations, and agencies as well as local needs and site-specific conditions, so these estimates have the greatest amount of uncertainty associated with them.

Table 2: Cost Estimates for Task Force Recommendations on Maps, Education, Technical Assistance, Policy Development, Research, and Monitoring

Activity	Unit Cost Range	Mid-Range Unit Costs	Statewide 10-Year Costs	Notes/Assumptions
Maps of Area-Wide Soil Contamination				
Initial Scoping Studies for Lead Arsenate Maps	\$5K-\$15K	\$10K	\$100K	If 10 counties decide to develop maps
Tier 1 Lead Arsenate Maps (by County)	\$2.5K-\$7.5K	\$5K	\$50K	Based on costs for existing Tier 1 county maps, assumes 10 other counties develop similar maps
Tier 2 Lead Arsenate Maps (Identifying Orchards)	\$20K-\$50K	\$35K (\$25K + \$10K scoping study)	\$350K	Based on costs for Yakima County Tier 2 orchards map, assumes 10 other counties develop similar maps
Defining Area-Wide Zones	\$20K-\$60K/yr	\$40K/yr	\$160K	Assumes 0.5 FTE is needed for 4 of 10 years
Data Management, Maintaining/Updating Maps	\$23K-\$68K/yr	\$45K/yr	\$180K	Assumes 0.5 FTE needed
<i>Subtotal for Maps</i>			<i>\$740,000</i>	
Broad-Based Education and Awareness Building				
Developing Educational Materials, Providing Training and Support	\$75K-\$225K/yr	\$150K/yr	\$900K	Assumes 1 FTE and \$50K/yr in materials & contract support for 6 of 10 years
Education Program Implementation (by Local Health Districts)	\$65K-\$360K/yr	\$240K/yr (large populations), \$130K/yr (small populations)	\$12.6 million	Assumes King & Pierce County health districts use 2 FTE and \$80K/yr for materials; the other 6 high-likelihood counties ¹ use 1 FTE and \$50K/yr for materials
Evaluate Effectiveness of Education in Increasing Implementation of Individual Protection Measures	\$200K-\$600K	\$400K	\$400K	Assumes baseline + follow-up survey; 0.25 FTE per high-likelihood county over 2 separate years
<i>Subtotal for Education</i>			<i>\$14 million</i>	

Activity	Unit Cost Range	Mid-Range Unit Costs	Statewide 10-Year Costs	Notes/Assumptions
Support for Sampling and Selection of Protection Measures				
Assisting with Interpretation of Sampling Data, Selection of Protection Measures	\$50K-\$100K/yr	\$75K/yr	\$750K	Assumes 0.75 FTE needed every year
Review Land-Use/Building Permit Applications	\$10K-\$50K/yr	\$30K/yr	\$9.9 million	Assumes 0.25 FTE + \$10K/yr in materials for 8 counties, 25 cities
Mobile XRF Analysis, Onsite Education to Support Residential Sampling	\$60K-\$200K/yr (8 counties); \$15K-\$45K per XRF machine	\$130K/yr staffing & maintenance (8 counties) + \$30K per XRF machine	\$1.4 million ²	XRF analysis & education provided 4 times per year (3-days each) in 8 high-likelihood counties, with 3 XRF machines, based on King Co. Wastemobile costs
<i>Total Support Costs (in addition to education)</i>			\$12 million	
Commercial Areas				
Maintain Paved Surfaces, Landscaping, Other Soil Cover	minimal additional costs	minimal additional costs	Not estimated	
Rulemaking/Policy Development				
Changes to Real Estate Disclosure Requirements	\$50K-\$150K	\$100K	\$100K	\$80K for salaries/benefits, \$20K other costs
Add Question to SEPA Checklist	\$50K-\$150K	\$100K	\$100K	\$80K for salaries/benefits, \$20K other costs
Adopt New Enforcement Forbearance Policy	\$40K-\$120K	\$80K	\$80K	\$60K for salaries/benefits, \$20K other costs
Establish Self-Implementing System for Recognition that a Site is Clean	\$25K-\$75K (setup); \$5K-\$15K per year (maintain)	\$50K setup; \$10K/yr	\$150K	0.3 FTE + \$20K in materials to establish web-based, self-certification system; 0.1 FTE to maintain/update
<i>Total Rulemaking/Policy Development Costs</i>			\$430K	
Research and Monitoring				
Research on Contamination from Leaded Gasoline	\$75K-\$225K	\$150K	\$150K	For initial study only; assumes ~8-10 acres total area sampled around different types of roads
Research on Ecological Risks	\$50K-\$150K	\$100K	\$100K	Assumes 0.5 FTE for 2 years for literature review and field research
Health Monitoring	\$60K-\$190K per year per health dist. (\$25K-\$75K startup)	\$125K/yr per health district, \$50K for startup statewide	\$10 million	For 8 health districts; assumes existing State infrastructure can be used for startup; ~6,000 additional children tested per year
<i>Total Research and Monitoring Costs</i>			\$10 million	
Total Estimated Costs <i>(does not include costs for residential, child-use, and open land scenarios)</i>			\$37 million	

Notes:

¹ For the purposes of these estimates, “high-likelihood counties” are those counties that have the greatest numbers of acres potentially affected by smelter emissions and/or use of lead arsenate pesticides. These counties are King, Pierce, Snohomish, Stevens, Chelan, Okanogan, Spokane, and Yakima counties.

² Costs are largely independent of the number of residents participating. If 5,000 residents participate per year (50,000 over 10 years), providing this service will cost \$28 per resident.

Table 3: Cost Estimates for the Task Force Recommendations at Child-Use Areas

Activity	Unit Cost Range	Mid-Range Unit Costs	Statewide 10-Year Costs	Notes/Assumptions
Qualitative Evaluations (Child-Use Areas)	\$30-\$80	\$50	\$105K	\$50 for 1 hour assistance/education, if 100% of an estimated 2,100 child-use areas affected by area-wide contamination in 8 high-likelihood counties conduct evaluations ¹
Sampling – Schools	\$2K-\$6K	\$4K	\$1.6 million	Assumes sampling at 400 schools (100% participation)
Sampling – Parks	\$1K-\$5K	\$3K	\$1.5 million	Assumes sampling at 500 parks (100% participation)
Sampling – Childcare Centers & Family Home Daycares	\$800-\$3K	\$2K/center, \$1.6K/family home	\$2 million	Assumes sampling at 300 childcare centers, 900 family homes (100% participation)
<i>Subtotal: Property Evaluations</i>			<i>\$5.2 million</i>	
Individual Protection Measures	low, mainly non-monetary costs	low, mainly non-monetary costs	Not estimated	Costs include time, inconvenience, and some materials (e.g., HEPA filters for ventilation systems, vacuums)
6" Woodchips + Barrier in Play Areas – Schools	\$10K-\$23K	\$15K	\$4.5 million	0.5 acre treated at 300 schools (75% of total) – actual costs lower if some cover is in place
6" Woodchips + Barrier in Play Areas – Parks	\$21K-\$45K	\$30K	\$11 million	Assumes 1 acre treated at 375 parks (75% of total) – actual costs lower if some cover is in place
6" Woodchips + Barrier in Play Areas – Childcare Centers & Family Home Daycares	\$4K-\$18K	\$12K/center, \$6K/family home	\$6.8 million	Assumes 0.4 acre treated at 225 centers, 0.2 acre treated at 675 family homes (75% of total) – actual costs lower if some cover is in place
Clean Soil Cover – Sports Fields	\$13K-\$29K	\$19K	\$9.5 million	Assumes 0.5 acres treated at 500 sports fields (e.g., baseball field lines)
Maintenance of Grass Cover – Schools ²	\$4.7K-\$20K	\$6.7K elementary school, \$13K high/middle school	\$2.7 million	Assumes in addition to regular maintenance: 3 acres seeded @200 elementary schools, 6 ac. @100 high/middle schools, every 5 yrs
Maintenance of Grass Cover – Parks ²	\$7.7K-\$17K	\$11K	\$4.2 million	Assumes in addition to regular maintenance: 5 acres seeded at 375 parks, every 5 years
<i>Subtotal: Protection Measures</i>			<i>\$39 million</i>	
Addressing Soil Contamination at New Child-Use Areas	See unit cost estimates for open land	See unit cost estimates for open land	Not estimated	

Activity	Unit Cost Range	Mid-Range Unit Costs	Statewide 10-Year Costs	Notes/Assumptions
Development & Administration of Childcare Certification Program	\$20K-\$60K/yr (\$25K-\$75K to establish program)	\$50Ksetup, \$40K/yr administration	\$450K	Assumes 0.25 FTE and \$20K/yr for materials in addition to broad-based education costs above
Total Child-Use Areas (not including education, maps)			\$45 million	

Notes:

¹ Child-use area numbers (2,100 total child-use areas: 400 schools, 500 parks, 300 childcare centers, 900 family homes) represent the project team's estimates (+/- 50%) of the number of child-use areas in areas affected by lead arsenate and/or smelter emissions in 8 high-likelihood counties; they are based on information from local health departments, OSPI, and DSHS. These numbers represent about 15% of all schools statewide and about 13% of all licensed childcare facilities statewide.

² Estimates are for costs in addition to regular maintenance costs.

The Task Force recognizes that these estimates are based on information available at the time and do not represent the actual costs that will be incurred. As the Task Force recommendations are implemented, however, the Agencies may gain a greater understanding of the extent of potential exposure to area-wide soil contamination and the expected costs of preventing and reducing this exposure. The Task Force recommends that the Agencies work with local agencies and other appropriate organizations to refine and more precisely estimate costs for responding to area-wide soil contamination in individual localities. Furthermore, the Task Force recommends that the Agencies regularly update information on costs of sampling and protection measures to help individuals make informed decisions about actions to reduce potential exposure to arsenic and lead in soil.