

FINAL REPORT

RECOMMENDED APPROACH FOR MANAGING LEAD ARSENATE LEGACY PESTICIDE CONTAMINATION ON HISTORICAL ORCHARDS IN CENTRAL WASHINGTON



CHELAN COUNTY
DEPARTMENT OF NATURAL RESOURCES

WENATCHEE, WASHINGTON

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LEGACY PESTICIDE WORKING GROUP

Clint Adamson, Pleasant Ridge Construction
Lori Barnett, City of East Wenatchee
Steve Bishop, Premier One Properties
Jim Blair, North Meridian Title and Escrow, LLC
Mark Botello, Douglas County
Lilian Bravo, Yakima Health District
Joan Davenport, City of Yakima
Joseph Calhoun, City of Yakima
Jon DeVaney, Washington State Tree Fruit Association
Glen Devries, City of Wenatchee
Dean Emanuels, Washington Trust Bank
Doug England, Chelan County
Pete Fraley, Ogden Murphy Wallace
Craig Gildroy, City of Chelan

Keith Goehner, Representative 12th Legislative District
Byron Gumz, Yakima County
Rob Jammerman, City of Wenatchee
Paul Jewell, WSAC
Hank Lewis, Local homebuilding interests
Curtis Lillquist, Douglas County
Ryan K. Mathews, CIH, CHMM, Fulcrum Environmental Consulting, Inc.
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Deb Miller, Action Health Partners
Don Mounter, Pipkin Construction
Dereck Nelson, DH Construction
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Kyle Steinburg, Douglas County
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CONSULTING TEAM

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1 INTRODUCTION

Tree fruit orchards have been an important economic and cultural resource in Central Washington communities since the late 1800s. Population growth and increasing demand for housing have resulted in conversion of historical orchard sites to other, nonagricultural uses, including residential development. Historical application of lead arsenate (LA) pesticides on tree fruit orchards has resulted in the accumulation of lead and arsenic in shallow soil at concentrations above State cleanup levels. These are levels that may be harmful to human health when these properties are used for activities other than agricultural or industrial land uses. This report outlines a recommended approach for managing and mitigating LA pesticide soil contamination, as well as educating impacted people and communities about the issue. The recommendations are intended to be consistent with the Washington State Model Toxics Control Act (MTCA).

Background

Tree fruit orchards have been an important economic and cultural resource in Central Washington communities since the late 1800s. Until approximately 1950, agricultural activities at tree fruit orchards often included the use of LA pesticides to mitigate insect damage. In some cases, historical application of LA pesticides has resulted in shallow-soil concentrations of lead and arsenic that exceed Washington State cleanup levels. According to the Washington State Agricultural Census from 1947, compiled by the Washington State Department of Ecology (Ecology), nearly 188,000 acres of land in Washington have been historical orchard areas subject to application of LA pesticides, and are therefore considered potentially contaminated by lead and arsenic. Of those areas, approximately 115,000 acres of potentially impacted tree fruit orchard lands are in Yakima, Chelan, Douglas, Okanogan, and Benton counties.

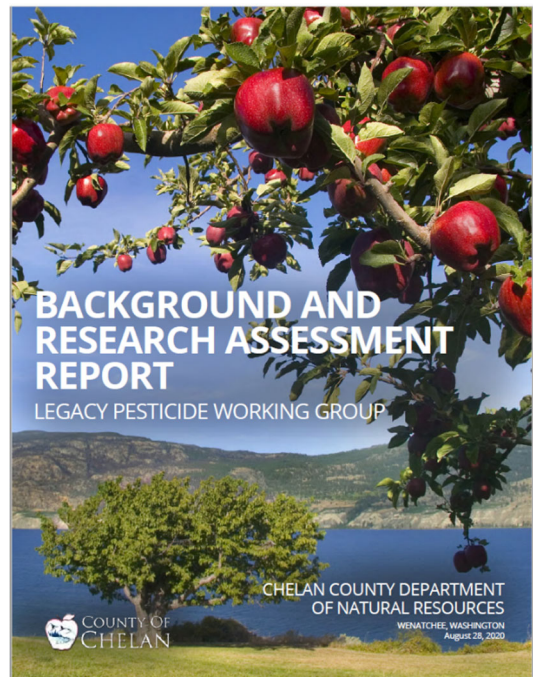
Growth in these counties has resulted in the transition of tree fruit orchards to nonagricultural uses (e.g., residential or commercial), increasing the potential for more frequent, direct exposure to soil that may have elevated concentrations of lead and arsenic that could adversely impact human health. In many cases, the concentration of lead and arsenic in the historical orchard soil exceeds the MTCA cleanup levels for these compounds. MTCA requires appropriate assessment, notification, and cleanup tools to ensure sufficient protection of potential, current, and future residents living in historical tree fruit orchard areas where lead and arsenic may be present at levels of concern.

Process

The Legacy Pesticide Working Group (LPWG), formed in December 2019, includes a diverse group of stakeholders, representing private and public interests, throughout Central Washington. As described on Ecology's website for this effort, the purpose of the LPWG is *"to address the complex issues surrounding lead and arsenic contamination on former orchard lands."*

The primary objectives for the working group were:

- Creating a process for evaluation of all properties.
- Notifying buyers and current homeowners concerning the specifics of LA pesticide contamination on their properties.
- Identifying actions that meet Ecology's cleanup regulations.
- Creating a broad-based strategy for educating the public about managing the risk from LA pesticide contamination.



This final report has been prepared in support of the LPWG's efforts and outlines a final recommended process to achieve these primary objectives. Following the completion of the work elements outlined below, Ecology will continue to develop and implement the activities discussed in this plan.

Legacy Pesticide Working Group—Work Plan

2020										
Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
<i>Working Group Meetings</i>										
<i>MFA Tasks</i>										
			Background & Research Assessment Report							
							Analysis & Final Report			
							Public Outreach Strategy & Materials			

QUICK REFERENCE GUIDE

I want to...	Relevant report sections
Understand the issue of LA pesticide contamination	Find information in the introduction of this report and online at https://ecology.wa.gov/Spills-Cleanup/Contamination-cleanup/Cleanup-sites/Former-orchard-lands
Find out if a property has LA pesticide contamination	Check your property address using the interactive webpage at (TBD)
Understand options to manage LA pesticide contamination	Review Figure 3-3 Cleanup Technology Comparison and page 11 for Best Management Practices
Understand my responsibilities for cleanup	Review Figure 3-2 Property Sampling Decision Tree
Understand my role in the permitting, land development and transaction process	Review chapters 2 and 3
Understand what Ecology has planned for community outreach	Review chapter 5 of this report
Understand the health risk associated with LA pesticide contamination	Review chapter 2 of the Background Report developed in August 2020
Understand the relevant federal and state regulations regarding LA pesticide contamination	Review chapter 3 of the Background Report developed in August 2020
Understand how soil sampling works and what I can do about it	Review chapter 4 of the Background Report developed in August 2020
Review what other agencies have done about similar contamination issues	Review chapter 5 of the Background Report developed in August 2020

2 AFFECTED DEVELOPMENT PROJECTS

This chapter provides typical scenarios for development project types that can take place in historical orchard areas in Central Washington. Scenarios show similarities across jurisdictions and points in permit review processes that will allow for consistent cleanup of LA pesticide.

Local planners and developers were interviewed to provide background for costs, permitting, and cleanup strategies that comply with MTCA.

Introduction

Generally, there are two situations - 1) existing developed properties and 2) proposed new development projects - where addressing the issue of lead and arsenic contamination from historical orchard practices will be required.

Existing single-family homes, apartment buildings, and school and park playgrounds and playfields already built in historical orchard areas are examples of developed properties that may have lead and arsenic contamination in shallow soils. Many existing schools and parks in Central Washington have either completed or will implement soil cleanup projects, often through available funding programs sponsored by Ecology.

Current residents in historical orchard areas will be one of the primary targets of a public education and outreach strategy being developed through this effort. This strategy will provide detailed information to existing residents on best management practices (BMPs) to lower the risk of impacts from any lead and arsenic contamination that may exist, as well as identifying Ecology resources that can be used to help them clean up their property, if they choose to do so.

New development on historical orchard areas may include a variety of activities including commercial and industrial land uses as well as public school and park projects that will follow the current cleanup processes available in MTCA. New residential development on historical orchards, including single family home construction, multifamily development projects and residential subdivisions, are the primary subject of the alternative MTCA compliance approach described in this report.

This chapter summarizes typical residential development projects and permitting processes, focusing on residential subdivisions, single family home construction, and multifamily development projects. MFA conducted a series of interviews with developers and local government planning staff to understand the perspectives of both developers and regulators. Insights from these interviews are integrated throughout this chapter. A comparison table of the interviewed local jurisdictions' development permit review processes is available in Appendix A. In addition to conducting the interviews, several recently completed and proposed development projects were reviewed to determine the typical scale and type of residential development occurring in the region.

Commonly Affected Development Projects

This report examines four scenarios based on residential development types that are common in Central Washington and that may be impacted by LA pesticides: large subdivisions, small subdivisions, new multifamily developments, and new single-family home construction. Based on interviews with developers and a review of recently completed and proposed projects, typical scenarios were created for each project type, presented below.

TYPICAL DEVELOPMENT PROJECTS AND SEPA REQUIREMENTS					
Project type	Lot Size (acres)	Individual Lot Size after Subdivision	Number of Lots/Units	Typical Unit Size	Subject to SEPA Review?
Large subdivisions	30	0.3	100	2,200 square feet 3 bedrooms	Yes
Small subdivisions	2.4	0.3	8	2,200 square feet 3 bedrooms	No
New multifamily development	2		100	800 square feet Studio 2 bedrooms	Dependent on jurisdiction
New single-family home construction	0.3		1	2,200 square feet 3 bedrooms	No

Development Process

This chapter provides an overview of the typical development project planning and permitting process, from initial due diligence to issuance of occupancy permits, based on conversations with both developers and local planning staff. In addition to the due diligence conducted by the developer prior to beginning a project, there are two basic permitting processes during which cleanup of contaminated soil is addressed: during the subdivision of a larger parcel into smaller lots for individual sale, and during construction of the residential structure.

For simplicity, this report describes projects where a single developer is responsible for not only creating the subdivision, but also constructing all of the housing units. However, it is common for one developer to acquire and subdivide property, and then to sell individual lots to different contractors/builders that continue with the individual construction process, eventually selling homes to a new homeowner or leasing apartments to residents. Regardless of the number of developers involved, the basic permit and review requirements remain the same, however there would likely be an additional round of due diligence conducted by the contractor/builder prior to the sale of the subdivided lot(s).

DUE DILIGENCE

Each type of residential development begins with a developer identifying a suitable property for their project idea. In this early phase of the project, the developer conducts due diligence to determine if it is feasible, given any constraints of the site such as zoning or site features such as size and slopes. The developer also creates an estimate of the number of housing units that can fit on the site and of the cost for site preparation and construction and the potential return on investment, once the units are sold or leased. If the developer believes that the project is feasible or that it “pencils,” they typically work to control the site by either purchasing it or negotiating a purchase agreement or purchase option that is dependent on completing further design or successful permitting processes.

PERMITTING PROCESS

Most jurisdictions in Central Washington, except Okanogan County and its cities, implement their development permit review processes consistent with the requirements of Washington State's Local Project Review (Revised Code of Washington 36.70B). These processes typically include the following review steps.

Preapplication: Usually involves a meeting that is conducted before submittal of application materials. It often includes the project proponent and various departments from the jurisdiction responsible for authorizing the permit, as well as other, outside agencies that may have permits or regulations applicable to a project proposal. This meeting allows the project proponent to discuss their project and gather information about what may be required for their proposal, including whether additional studies may be required.

Application review: Once a project proponent decides to submit their application materials, the formal review process begins. Depending on the complexity of the proposal, and after the application is determined to be complete and ready for processing, there may be a comment period that the jurisdiction uses to collect comments from internal departments, other agencies, and the public. For projects that require a State Environmental Policy Act (SEPA) review process, this comment period is also when comments are gathered following a Determination of Nonsignificance (DNS). The jurisdiction gathers the comments received, evaluates the proposal for compliance with applicable regulations, and prepares either a decision document for those projects that do not require a public hearing, or a staff report that is intended to support the decisionmaker conducting the public hearing.

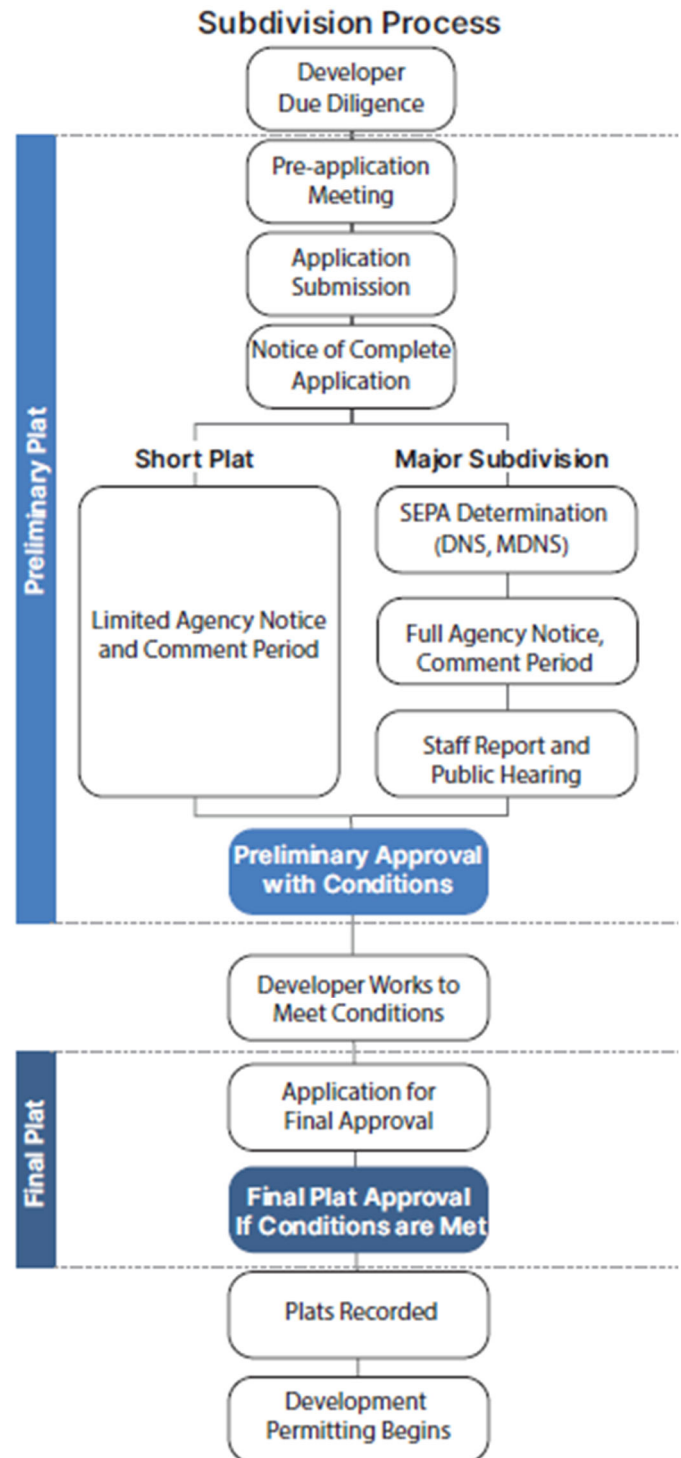
Public hearing, if required: The purpose of a public hearing is to allow another opportunity for review of the proposal, and for interested parties, including the general public, to provide comments about the development project before a final decision is made. The decisionmaker considers the staff report, as well as the testimony provided by interested parties at the public hearing and develops a decision.

Decision: For a significant number of development permit proposals, the final approval decision will include conditions with which the project proponent must comply. For example, for subdivision proposals (creating additional building lots), this typically includes development of on-site infrastructure and utilities (roads, stormwater facilities, water, sewer, power, and telecommunications), and in some cases additional, off-site improvements may be required. For other types of land use permits, conditions of approval may obligate the project proponent to change different aspects of their project or require them to conduct their activities in a certain manner to reduce potentially negative impacts to surrounding properties.

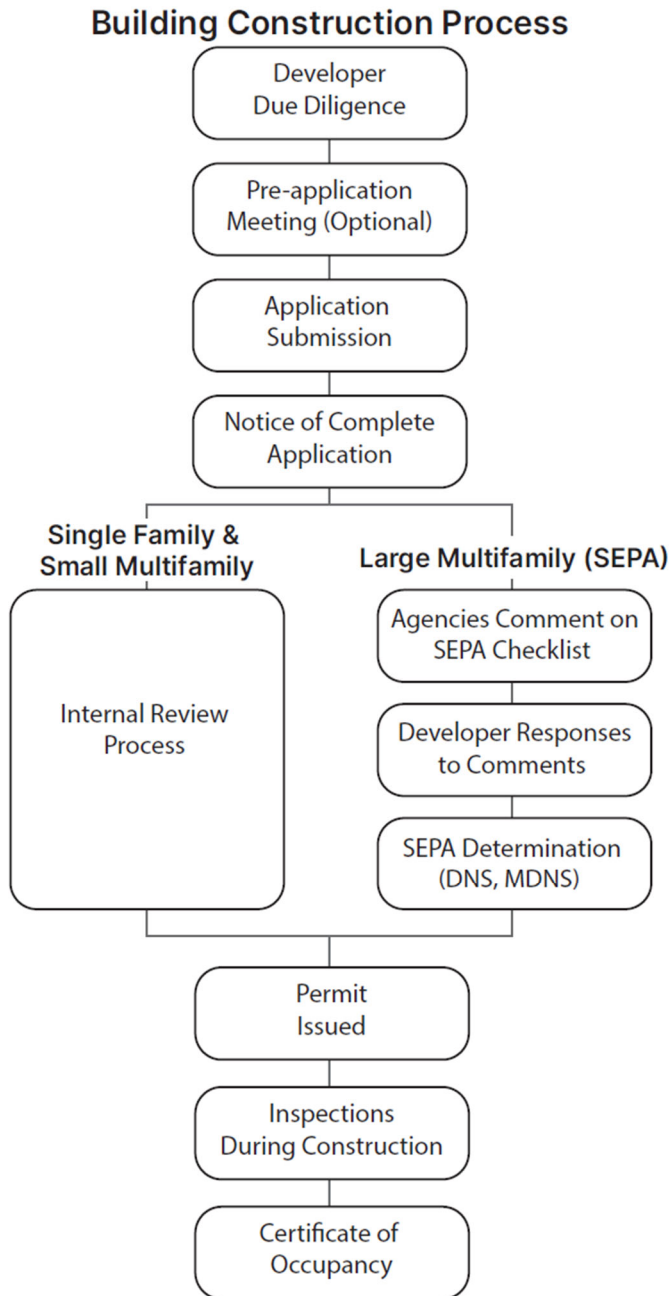
Residential Subdivisions

If a developer is planning a project on a large parcel that will have to be divided into smaller lots, they will need to go through a subdivision process. There are two types of processes: short subdivisions and major subdivisions. Depending on the permitting jurisdiction, subdivisions of up to four or up to nine lots can go through a short subdivision process, which is typically exempt from SEPA review. Subdivisions creating five or ten lots or more go through a major subdivision process, including a required SEPA review. Both types of subdivision processes include the preapplication and application review steps described above and successful applications result in a preliminary approval. The preliminary approval includes a series of required conditions, including the necessary site infrastructure improvements such as access roads and the extension of utilities to serve the proposed new lots.

Following preliminary approval, the developer completes the necessary survey work and construction of site improvements that define and create the new lots. Once the preliminary approval conditions have been completed, the developer can apply for final approval of the subdivision. The local government reviews the application to ensure that the conditions have been satisfied and issues a final approval decision, which allows the new lots to be recorded as legal lots that can then be sold individually. The timeline for this process varies greatly, depending on the size of the project, the completeness of the application materials submitted by the developer, and how quickly the preliminary conditions of approval are satisfied. One local planning staff member estimated that a short subdivision can take between six and eight months, while major subdivisions take one and one-half to three years to complete.



Building Permits



Once a subdivision of land is complete, permits for individual structures are required. For a single-family residence, a building permit is required. Multifamily development projects also require building permits, and in some instances additional land use permits, such as a conditional use permit, may be necessary before the building permit can be issued. Multifamily projects may also be subject to a SEPA review, based on the number of units being proposed. Each city and county establishes its threshold (based on a range established in the state law) that determines whether or not a SEPA review is required. These SEPA thresholds for multifamily projects range from four or more units in the City of East Wenatchee to 61 or more units in the City of Yakima. So, a 50-unit multifamily development project in East Wenatchee would be required to undergo SEPA review, but a similar project in Yakima would not.

Once the review of a completed application has been conducted, the jurisdiction issues a building permit. The construction authorized by a building permit requires multiple inspections throughout the development process to ensure compliance with building and development standards. Once construction and the required inspections are complete, the jurisdiction issues a certificate of occupancy. This marks the end of the permit process and allows the lease or sale of the unit to the new inhabitants.

Typical Costs

Developers provided ballpark estimates of typical costs associated with residential development scenarios, including property acquisition, site preparation, and building construction in Yakima and

Chelan County. Site preparation encompasses all activities required to prepare the site for construction, including development of infrastructure such as access roads and utilities, grading, off-site mitigation if needed, permitting, and holding costs while work is under way.

Land Acquisition

Land cost/acres	\$80,000
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Site Preparation

Cost/10,000 SF lot	\$45,000
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Single Family Home Construction

Cost per SF	\$150
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Average Unit SF	2,200
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Construction Cost/unit	\$330,000
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Multifamily Construction

Cost per SF	\$\$\$?
-------------	---------

Average Unit SF	???
-----------------	-----

Construction Cost/unit	\$\$\$\$,???
------------------------	--------------

3 RECOMMENDED APPROACH

Based on the findings outlined in Chapter 2, this Chapter reviews the recommended approach for a uniformly applied and streamlined process for cleanup and/or management of lead and arsenic contamination. The goal of this process is to integrate the assessment and cleanup requirements of MTCA with the residential development permit process.

Introduction

Based on study research, review of applicable land use and environmental regulations, and on input from the LPWG and Ecology, this report outlines a recommended approach for managing potential LA pesticide contamination on historical orchard areas in Central Washington. The recommended approach seeks to integrate required components of MTCA related to investigating, cleaning up, and managing LA pesticide contamination with the process of permitting and constructing development projects.

The recommended approach for managing potential LA pesticide contamination on historical orchard areas in Central Washington presented below includes four primary components:

Public education and outreach, including targeted outreach to people throughout Central Washington, including those who may be living in existing homes, including apartments, that may be located on historical orchard properties

Development of a Model Remedy pursuant to MTCA that outlines soil sampling and soil cleanup remedies that are preapproved by Ecology and that, if utilized in a development project, will result in certification that cleanup under MTCA has been satisfied

Implementation of an integrated development permit review process that clearly outlines how and when the recommended Model Remedy components are considered during the local government land use and building permit processes for residential development projects, including single-family home construction, residential subdivisions, and multifamily developments¹

Development of soil banks in different urban areas throughout Central Washington to either facilitate the availability of clean soil for cleanup technologies, provide approved locations for disposal of contaminated soil, establish facilities to treat and clean contaminated soil, or create facilities that provide a combination of these services based on the needs of the different communities.

Public Outreach and Education

Addressing the issue of potential LA pesticide contamination on properties that have already been developed will rely heavily on a robust public education and outreach strategy. The use of lead arsenate as a pesticide was widespread in Central Washington, however, the risks associated with exposure to these contaminants can be significantly reduced if homeowners implement appropriate best management practices (BMPs). It is important to ensure that homeowners and apartment dwellers currently living in owner-occupied and rented housing have access to and knowledge of these practices, some of which are listed below. Chapter 5 of this report discusses in detail the public education and outreach strategy that has been developed to support this component of the recommended approach.

¹ Evaluation of commercial, industrial, public school and public park projects is anticipated to continue through the currently available administrative pathways identified in MTCA.

The following homeowner BMPs will help to prevent exposure to LA pesticide residues in soil.

- Use raised beds with clean, imported soil for fruit and vegetable gardens.
- Ensure grass layer is kept up so no bare patches of soil are present
- Wash all fruits and vegetables before eating.
- Wash hands with soap after working or playing in the dirt.
- Remove shoes before entering your home.
- Wash children's toys and pacifiers frequently.
- Wear shoes and gloves when gardening and working outdoors.
- Wash dirt off pets frequently.
- Create children's play areas (for example, raised sandboxes or rubber mats below play areas).
- Vacuum and dust your home at least weekly.

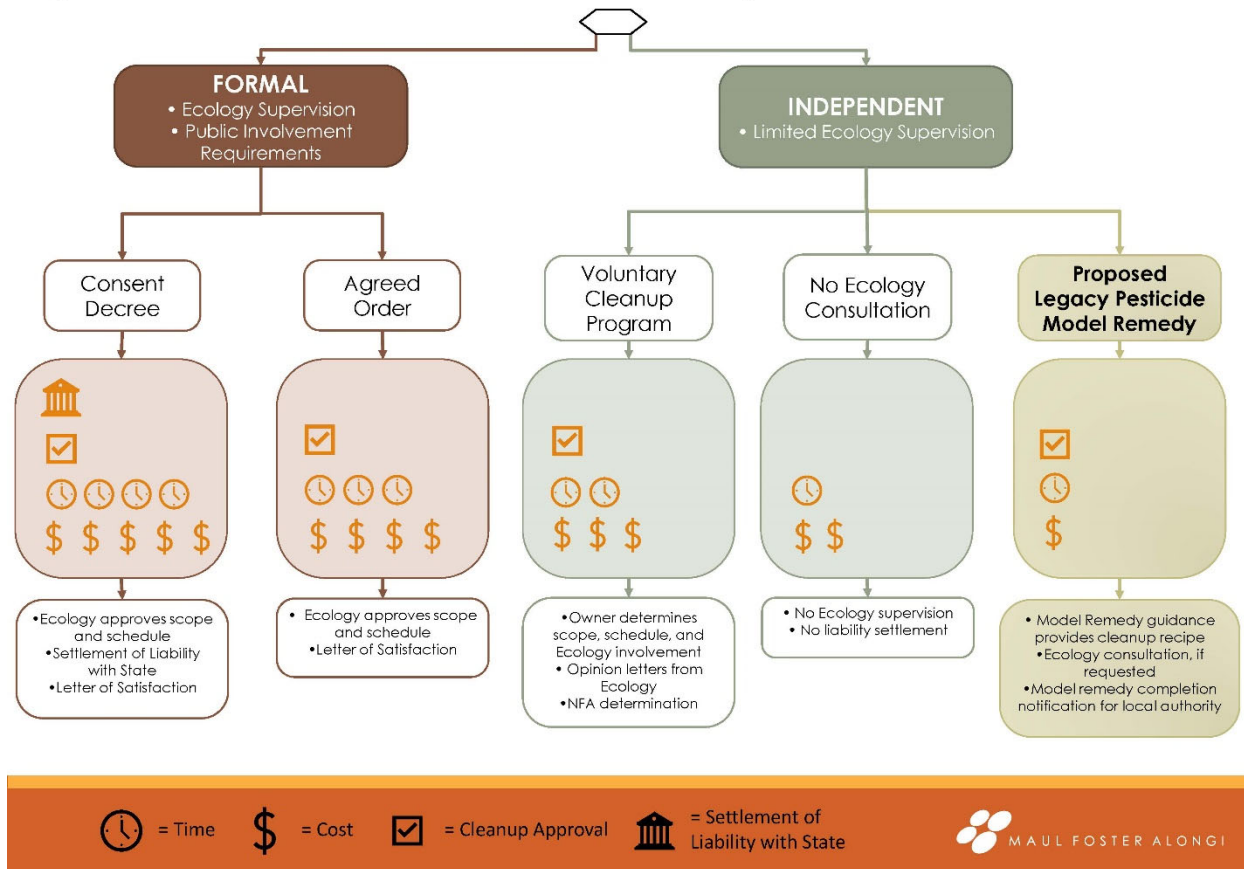
Development of a Model Remedy

Ecology has several existing administrative pathways by which a contaminated site is evaluated and cleaned up under MTCA. Figure 3-1 below provides a general summary of existing formal and informal pathways. Formal pathways typically years to complete and result in significant costs because they require extensive Ecology involvement, as well as consulting and attorney fees. Informal pathways are designed to be completed quickly and at a lower cost, but without a certification that cleanup is complete.

For purposes of this study, it is anticipated that existing regulatory cleanup pathways will continue to address commercial and industrial projects, as well as public school and park facilities. As summarized below and described in Appendix B, a new model remedy to address LA contamination on historical orchards in Central Washington is being recommended for new residential development.

Figure 3-1—MTCA Administrative Pathways

DRAFT Revision Date: 12/11/20



Where there are routine types of cleanup projects, with common features and lower risk to human health and the environment, MTCA allows for development of specific model remedies. MTCA defines model remedies as: “a set of technologies, procedures, and monitoring protocols identified by Ecology for use in routine types of cleanup projects at facilities that have common features and lower risk to human health and the environment.” Because potential contamination of shallow soils from LA pesticides on historical orchard properties is widespread and consistent, the recommended approach outlined in this study is based on Ecology developing and implementing a specific LA pesticide Model Remedy for historical orchard areas in Central Washington.

The recommended Model Remedy (detailed information is provided in Appendix B) is intended to accomplish the following:

- Creation of defined, Ecology-approved investigation and cleanup approaches that can be efficiently applied during development
- Provision of a framework that requires minimal Ecology oversight yet allows for Ecology engagement if requested

- Limiting delays associated with investigation, cleanup selection, and permitting for new residential development projects
- Minimization of costs associated with MTCA compliance related to Ecology oversight and/or consultant fees
- Allowing for ongoing homeowner/resident notification and awareness of not only the potential existence of LA pesticide contamination, but also of cleanup remedies and BMPs (for residents and during construction activities) to help manage potential contamination

PROPOSED MODEL REMEDY GUIDANCE

The following information summarizes the detailed recommendations in Appendix B regarding the technical content that should be included in the new Model Remedy. It is recommended that Ecology prepare a comprehensive document that summarizes the recommended approach and includes guidance on the following primary components:

- Investigation process
- Cleanup process
- Potential permits
- Construction BMPs
- BMPs for existing developments
- Cleanup notification

The figures provided below are visual representations of several of these recommended Model Remedy components, and are intended to be used in summary, nontechnical guidance documents to be provided to applicants and project proponents. Ideally, the summary guidance documents will not only be provided on Ecology-sponsored media platforms but will also be extensively used by local governments as they interact with applicants, particularly early on in the due diligence stage of a proposed project.

Figure 3-2 outlines the proposed framework for investigating whether LA pesticide contamination exists on a particular property and identifying the chemicals and their concentrations.

Figure 3-2—Property Sampling Decision Tree

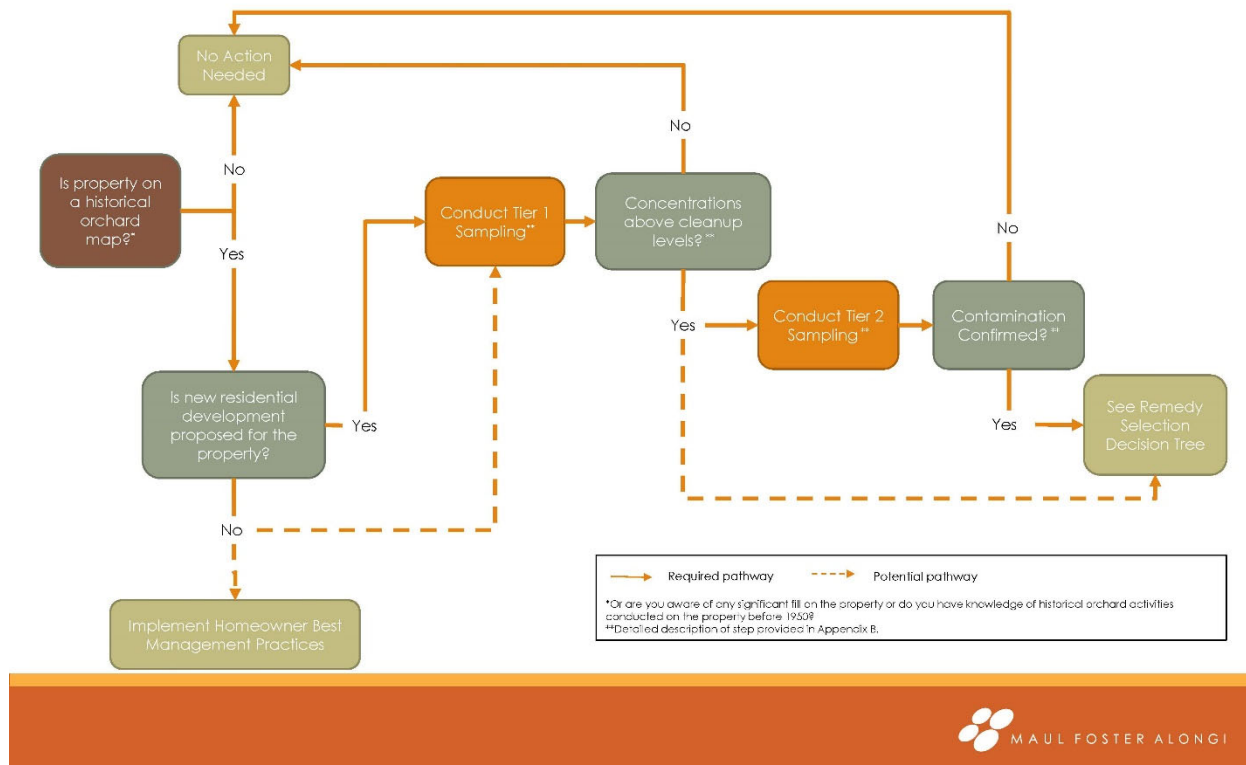





Figure 3-3—Cleanup Technology Comparison DRAFT Revision
Date: 12/11/20

Cleanup Technology	Requirements	Tier 2 Sampling?	Confirmation Sampling?	Requires Disposal of Soil?	TCLP Testing Required?	Import Soil Fill Testing Required?	CC&Rs or Plat Notes?	Timing Implementation Considerations	Potential Development Implementation Scenario	Advantages	Disadvantages
Soft Capping	At least 6 inches of soil or sod with demarcation fabric	✗	✗	✗	✗	✓	✓	Requires availability of clean fill.	• Can support lawns, landscaping, open space	• Relatively consistent with typical development	• Requires availability of clean fill. • Requires notification to future residents via CC&Rs or plat notes. • Potential to erode over time
Hard Capping	At least 3 inches of impervious or semipervious material ¹	✗	✗	✗	✗	✗	✓	Can occur as part of routine development (sidewalks, roads, foundations)	• Sidewalks, roads, driveways, foundations	• Consistent with typical development	• Limited to specific areas (e.g., roads, foundations) • Requires notification to future residents via CC&Rs or plat notes
Excavation	Typically requires removal of 2 to 3 feet of soil	✓	✓	✓	✓	✗	✗	If combined with soft or hard capping, confirmation sampling not required	• Grading for a development	• Relatively consistent with typical development when grading is needed • Would not require notification to future residents via CC&Rs or plat notes • Highly permanent remedy	• May require off-site disposal • Requires testing for off-site disposal to determine if soil is potentially hazardous
Mixing	Concentrations of lead and arsenic minimally exceed cleanup levels	✓	✓	✗	✗	✓	✗	Requires availability of clean fill	• Grading for a development	• Relatively consistent with typical development when grading is needed • Would not require notification to future residents via CC&Rs or plat notes	• Concentrations of lead and arsenic typically need to be below 483 and 33 mg/kg, respectively ² • Requires availability of clean fill
Consolidation	Combined with excavation and capping (soft or hard)	✓	✓	✗	✗	✓	✓	Most likely will occur during development	• Reconfiguring topography for a development (raising the grade) • Grading for a development	• Reduces the amount of material disposed of off site	• Implementation dependent on availability of area for containment. • Requires notification to future residents via CC&Rs or plat notes

Notes:
¹Compacted gravel of at least 6 inches with demarcation fabric would be considered a hard cap.
²Assumes that statewide background concentrations of lead and arsenic (17 and 7 mg/kg, respectively) will be present in imported fill, and mixing will occur at a 1:1 ratio.

Yes =  Yes, under conditions =  No = 


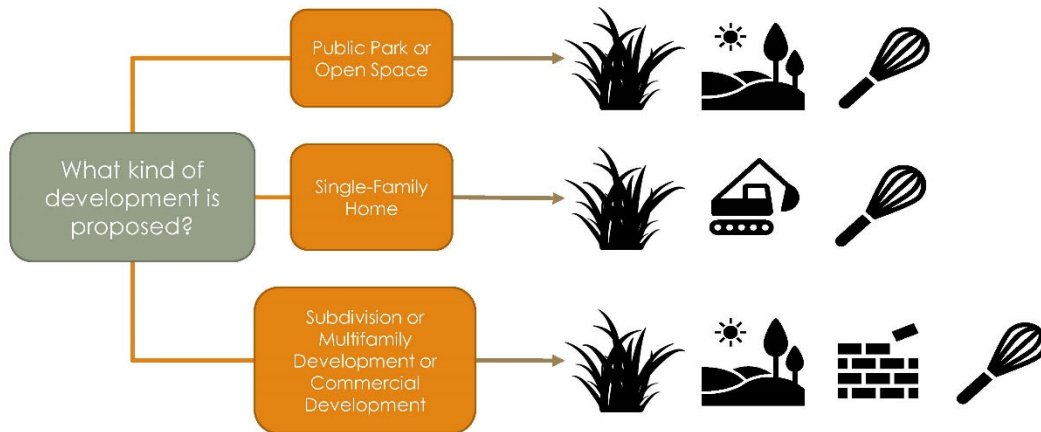
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Figure 3-3 identifies and compares the various preapproved cleanup methods/technologies that can be selected for use on property with LA pesticide contamination.

Figure 3-4—Remedy Selection Decision Tree



All remedy options may apply to a property.

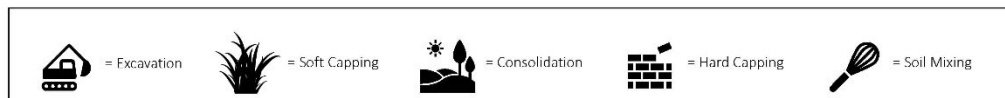


Figure 3-4 helps project proponents evaluate the available, preapproved cleanup methods, and to select the method that works best for their situation. This is one of the tools intended to reduce the need for direct Ecology evaluation and oversight on any specific project.

Figure 3-5—Example Development—
Multiple Cleanup Scenario

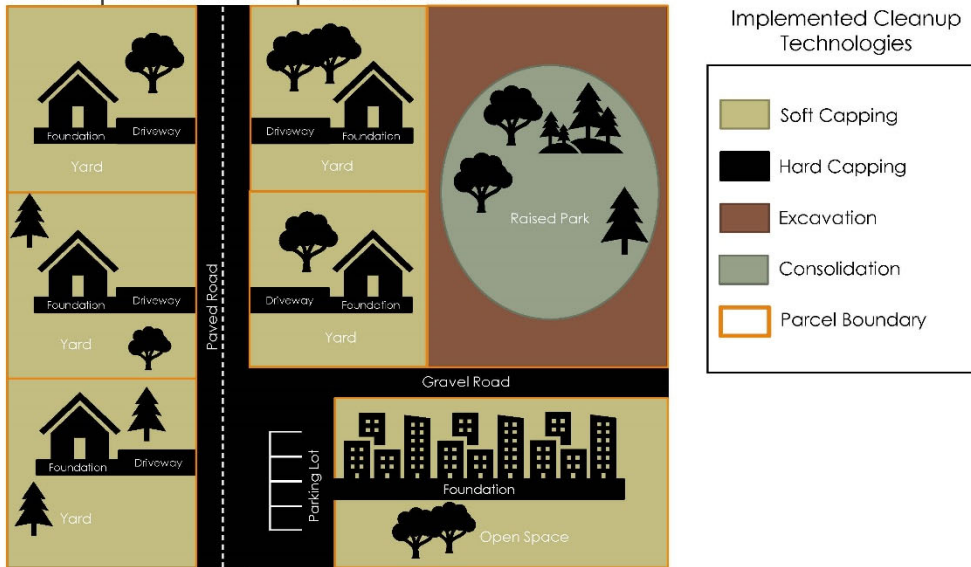


Figure 3-5 shows how the different cleanup methods might be used in different areas of a single project. For example, hard-capping technologies will typically be applied to roadways and individual building foundations, soft capping will often be used for yards and landscaped areas, and excavation or consolidation methods might be used in on-site stormwater and/or common open space areas.

COVENANTS, CONDITIONS AND RESTRICTIONS AND PLAT NOTES

In addition to the preapproved soil sampling and cleanup remedies identified in the Model Remedy, it will be important to ensure that notification and educational information about the presence of LA pesticide contamination is conveyed to future property owners. It is recommended that, in the Model Remedy, and in cooperation with local government jurisdictions issuing approvals for residential development projects and building permits, specific and consistent language be used throughout regarding the areas of historical orchard LA pesticide contamination in Central Washington.

In approving residential subdivisions applications and multifamily building permit applications, local governments can require Covenants, Conditions and Restrictions (CC&Rs) and notes on the face of new plats that alert future buyers of residential properties to the presence of LA pesticide contamination, conveying any physical remedy maintenance required, and providing important BMPs to reduce and manage the level of risk for exposure to contaminated soil. It is acknowledged that local

governments don't enforce CC&Rs; however, requiring that CC&Rs and plat notes be recorded with the County Auditor's office ensures that future buyers have ample opportunity for notification and information as part of their real estate transaction process.

Appendix B provides example conditions of approval that should be incorporated into the Model Remedy to ensure that local governments have the authority to require CC&Rs and plat notes. The integrated development permit review process described below lays out how and when these conditions can be applied and certified as having been completed.

POTENTIAL PERMITS

Often there are permits specifically related to site construction activities on a residential development project, in addition to the land use and building permits that are included in the discussion of the integrated development permit review process below. To help educate and inform people, it is recommended that the Model Remedy developed by Ecology outline the potential permits that may apply to specific cleanup technologies planned for a property, with an acknowledgment that these permits will vary by jurisdiction. This will help ensure that the proper permits are in place concurrent with the development and cleanup process. Additionally, the development of the Model Remedy should consider incorporating additional preapproved standards and practices for other Ecology-issued permits, such as the Construction Stormwater General Permit, to enhance the time and cost savings associated with reduced Ecology oversight that the Model Remedy seeks to achieve.

CONSTRUCTION BEST MANAGEMENT PRACTICES

Construction BMPs are focused on reducing the potential exposure of workers and the larger community to contaminated soils during construction. Standard construction BMPs for arsenic- and lead-impacted sites can be clearly identified in the Model Remedy, allowing contractors to easily understand and incorporate them into their operations. Recommended BMPs applicable to construction projects where LA pesticide contamination exists focus on reducing soil migration and dust generation (see Appendix B).

BEST MANAGEMENT PRACTICES FOR HOMEOWNERS/RESIDENTS

It is not recommended that sampling at existing developments and residences be required. Recommendations for implementing BMPs at properties within the historical orchard footprint should be provided in the Model Remedy guidance. The following BMPs are suggested for these properties:

- Wash hands with soap after working or playing in the dirt.
- Remove shoes prior to entering the home.
- Wash children's toys and pacifiers frequently.
- Wear shoes and gloves when gardening and working outdoors.
- Wash all fruits and vegetables before eating.
- Wash dirt off pets frequently.
- Create children's play areas (for example, raised sandboxes or rubber mats below play areas).
- Vacuum and dust the home at least weekly.

CLEANUP NOTIFICATION

Once a cleanup has been completed on a property, a record of the completed cleanup must be prepared. For residential subdivisions, the model remedy requires CC&Rs and plat notes be included to ensure future owners are given the opportunity to be aware of the cleanup that has occurred. Additionally, subdivisions and multifamily developments subject to SEPA review, a completion report form is required to be filled out by the developer and submitted before final plat approval is issued, or before a certificate of occupancy is issued. For residential construction projects that do not require SEPA review, a notarized self-certification form is required to be signed by the property owner and building contractor prior to a final certificate of occupancy being issued. Further information describing these elements is provided in the Appendix B.

Integrated Development Permit Review Process

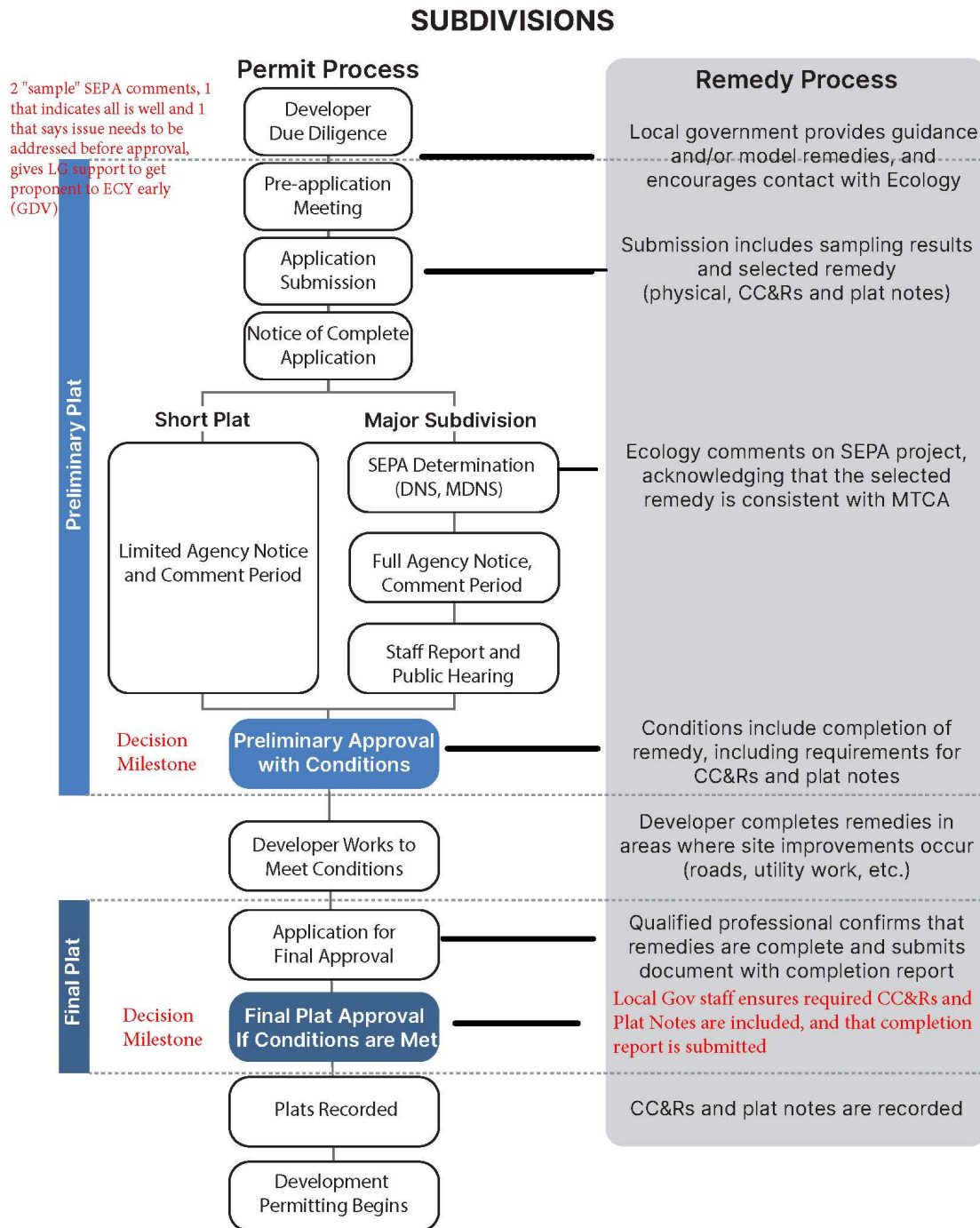
It is important to ensure compliance with MTCA, and protecting human health and the environment, for new residential development on historical orchard areas is accomplished in a way that is considerate of the land use and building permit processes a developer is required to complete, as they are administered cities and counties. One overarching goal of this project is to provide reasonable, low-cost, and protective mitigation options that are feasible and efficient for developers and homebuilders. The recommended approach described below outlines how the recommended model remedy components will be integrated into these processes to help achieve this goal.

RESIDENTIAL SUBDIVISION PROCESS

For residential subdivisions, the recommended approach relies on early and upfront education to project proponents that LA pesticides may be present on properties that fall within the mapping provided by Ecology. This notification is expected to be accomplished generally, through the broader public education and outreach strategy, but more specifically through simple, straightforward guidance, developed by Ecology and based on the model remedy, that is geared toward a nontechnical audience. The guidance will be given to local government permitting agencies to give to project proponents when they first contact the agency, along with contact information for Ecology staff and resources to help the project proponent.

Figure 3-6 outlines the recommended approach for integration of the model remedy components into new subdivision projects.

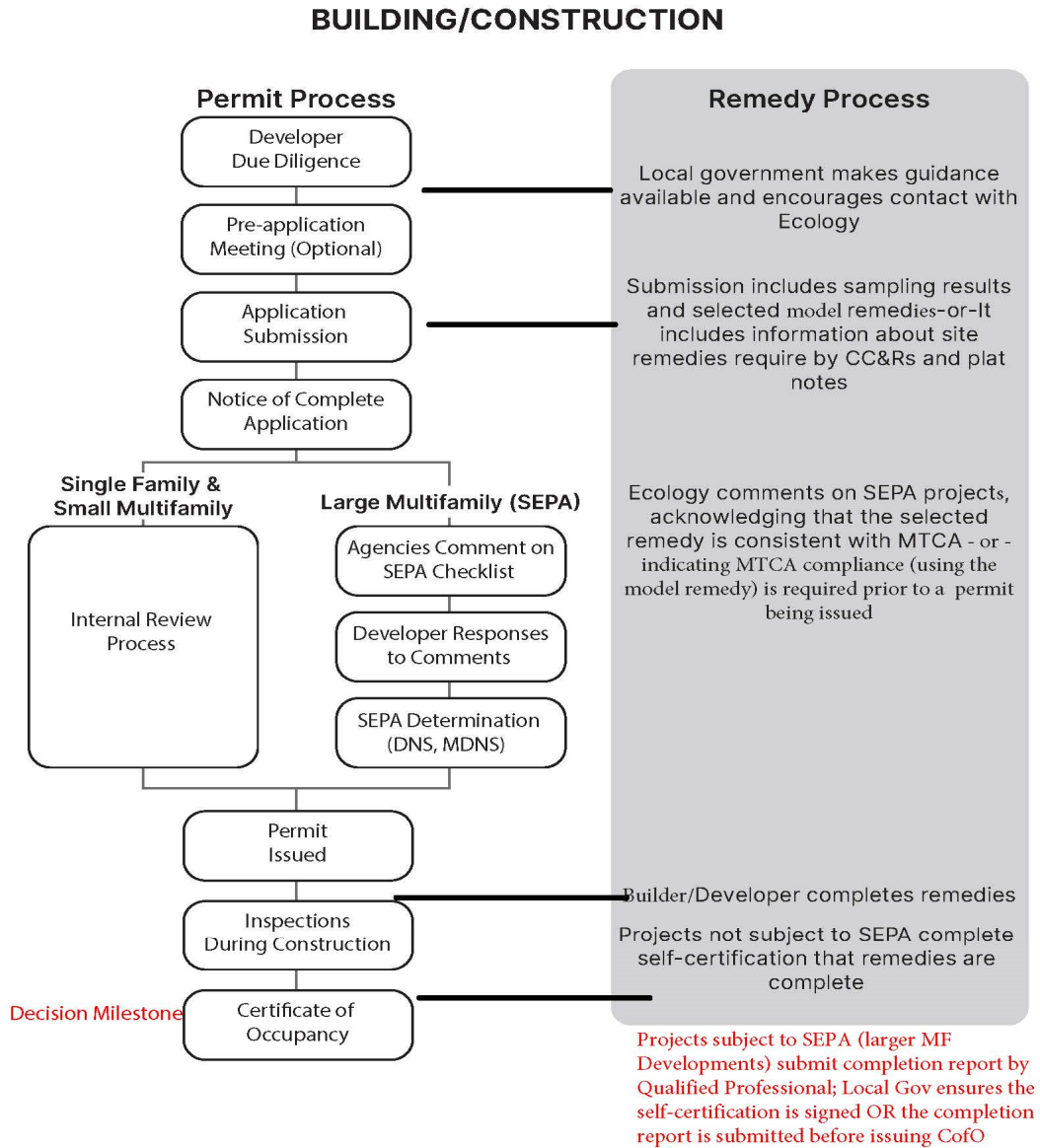
Figure 3-6 Integrated Subdivision and Model Remedy Process



RESIDENTIAL BUILDING/CONSTRUCTION PROCESS

The construction of both single family residential buildings and multifamily developments may happen subsequent to the above process which includes plat notes and CC&Rs, or they may happen on existing vacant lots created prior to the recommended process that don't include information about potential LA pesticide contamination to residential building contractors and future residents. To address these situations, Figure 3-7 demonstrates how the recommended approach integrates the model remedy components into new residential building construction projects.

Figure 3-7 Integrated Building/Construction and Model Remedy Process



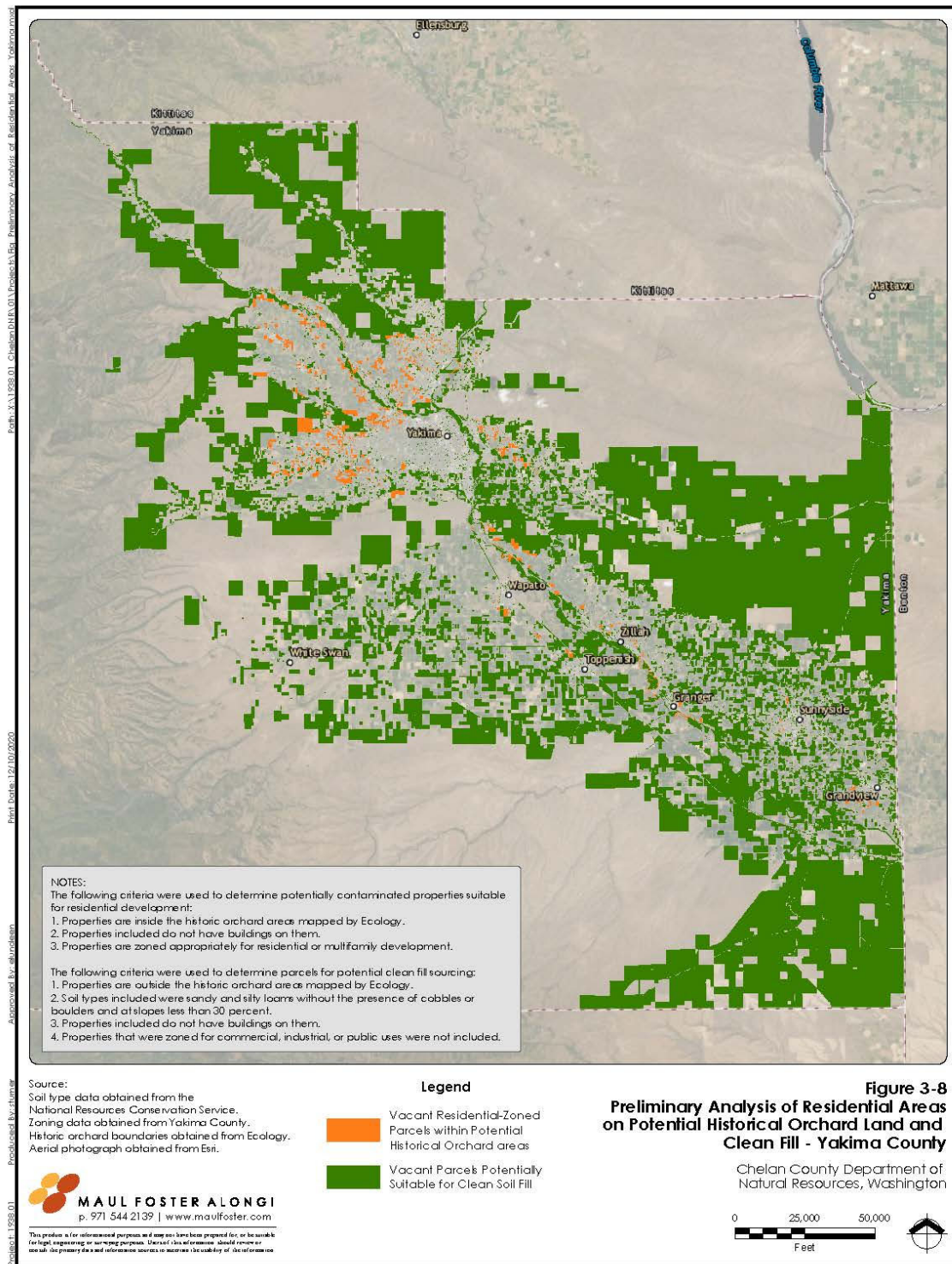
To support consistency and transparency across the different city and county jurisdictions implementing this process, the recommended approach includes sample letters that Ecology will use in communicating with project proponents and the agencies about the requirements for complying with MTCA through the model remedy process (please see Appendix C). There are two letters that can be used by Ecology for projects that are subject to SEPA review: one that indicates the applicant has been in contact with Ecology and that use of the components of the model remedy will meet the standards of MTCA, and one indicating contact with Ecology has not occurred and is required prior to approval of the project application. Additional letters have been included that could be used to help with early notification to a developer and/or to help verify, for a buyer's mortgage purposes, that the model remedy has been used to address the issue of potential LA pesticide contamination and meets the standards of MTCA.

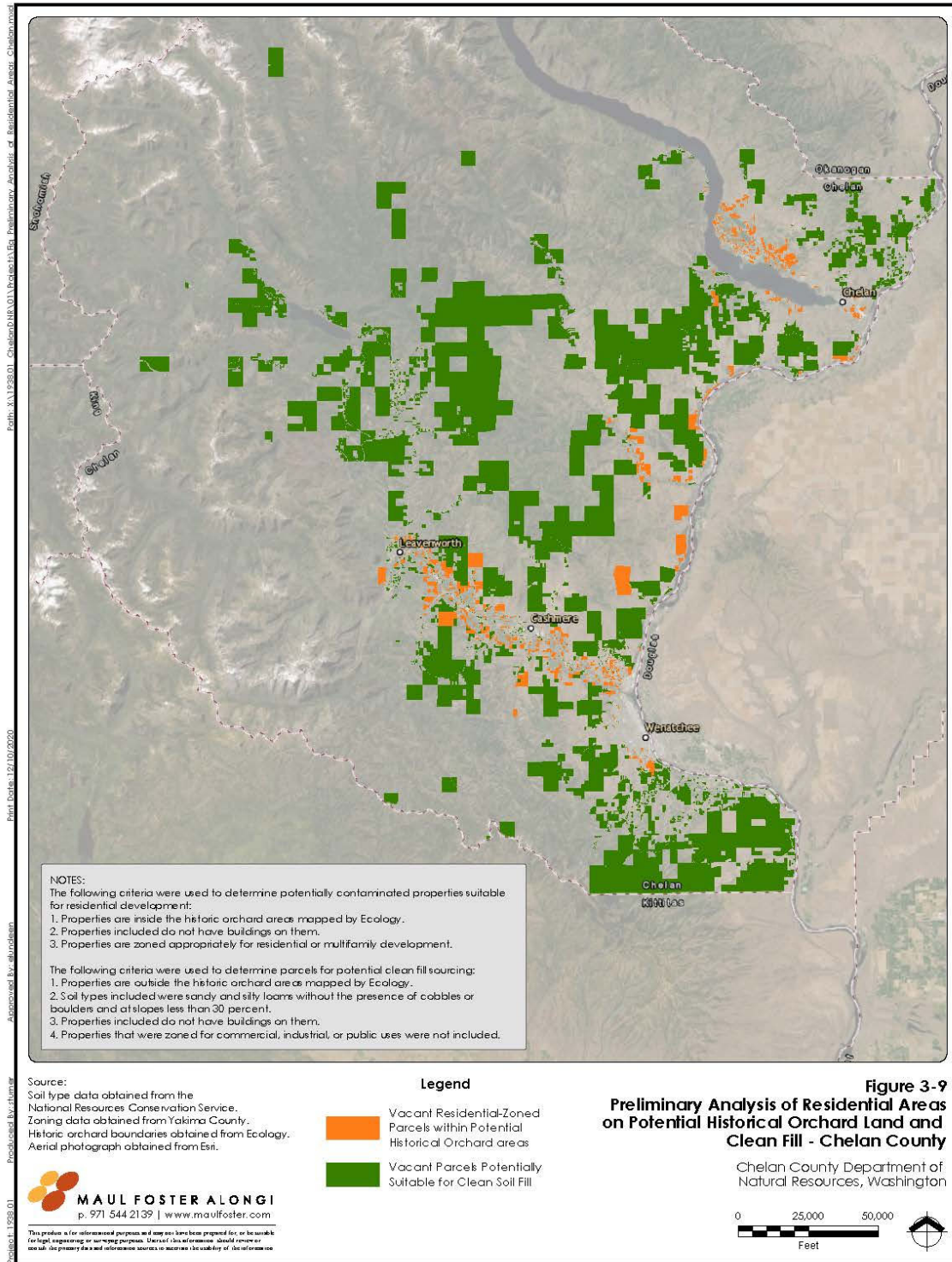
Soil Management

To understand the scale of the LA pesticide impact, it is important to understand how many acres of developable land may be contaminated with lead and arsenic. Ecology has developed maps of suspected historic orchard properties in Chelan and Yakima counties, but these maps do not identify land that has already been developed or land that is not zoned as residential. To determine how many acres of land which may require use of the recommended approach in the future, a geographic information system (GIS) analysis was performed. Using the Ecology map of potentially contaminated properties, local zoning data, and a Microsoft tool which identifies the presence of buildings using aerial imagery, it was estimated that there are roughly 17,000 acres in Chelan County and 10,000 acres in Yakima County that are potentially contaminated and candidates for future residential development.

GIS was also used to perform a simple analysis to identify potential areas where clean fill material could be sourced. The analysis used Ecology maps of contaminated soil, zoning data, Natural Resources Conservation Service soil maps, and a Microsoft tool which identifies the presence of buildings using aerial imagery. To be considered suitable, the soil type couldn't be stony or have cobbles and had to have a slope less than 30 percent. It was estimated that there are roughly 226,000 acres of potentially suitable sources of clean soil in Chelan County and 515,000 acres of suitable sources of clean fill in Yakima County.

The results of this analysis are provided in Figures 3-8 and 3-9. The GIS analysis does not factor in local rates of economic development and growth and is a rough approximation of potential need and supply of local clean fill material. While this analysis focused on Chelan and Yakima counties, Ecology is creating similar maps of historic orchards for other counties in central Washington.





Access to clean soil and disposal of contaminated soil are key elements of implementing the proposed model remedies. Additional support facilities would facilitate development in Central Washington by providing a ready source of clean soil and areas for disposal. For example, a centralized clean soil bank could provide an affordable source of material to reduce financial strain on developers, homebuilders, and homeowners looking to build on contaminated former orchard land. Such a facility would provide a dependable and easily identified source of clean soil for their projects and minimize the need for sourcing and sampling soil (to verify that the material is clean) from other sources. There are several different approaches, described below, that could aid in reducing cleanup costs and ensuring that cleanup can be implemented concurrent with the property development process, including a clean soil bank, a soil repository, and a soil treatment facility.

CLEAN SOIL BANK

A clean soil bank would provide a local source of clean material that could be used in the application of model remedies on the site. There are two primary methods that could be used for a source of dependable, clean materials.

Physical Facility

A physical clean soil bank is a location where clean soil is stored and distributed for use on legacy pesticide projects. The facility would operate like most landscape-supply businesses where clean soil is sold and distributed on a cubic-yard or ton basis. With a clean soil bank, developers would have a certified source of clean fill and would not need to perform soil sampling prior to bringing material on site.



Caption: An example of a commercial topsoil supply operation

Source: <https://kumackexcavatingandseptic.com/files/2016/09/Landscape-Supply-1-e1496178358758.jpg?&a=t>

Sourcing clean topsoil could be a challenge, as regionally available clean material may not have enough nutrients to support sod or seeded grass. To address this, composted material may be mixed in with the soil. Potential sources of clean soil and compost to supply a facility may include the following:

- Soil from nonhistorical orchards
- Composted fruit tree prunings or removal from modern orchards
- Cow manure and straw from dairy farms
- Dredged sediment from irrigation ponds
- Clean soil from other construction projects

These sources of soil and soil amendments would have to be periodically tested for lead and arsenic to ensure they classify as clean fill. The list below is a preliminary identification of components that are expected to make up a clean soil bank. A feasibility study and/or pro forma analysis is recommended for a deeper evaluation of the effort, expenses, and revenues of constructing and operating a clean soil bank, including consideration of the following elements:

- Land—to house the facility and potentially source clean soil
- Office—could be a full trailer or a small shed
- Basic soil testing equipment
- Heavy equipment (loader)—to move and load soil
- Concrete eco blocks—barriers to help contain stockpiles
- Stormwater infrastructure
- Perimeter fence and gates
- On-site gravel roads
- Stabilization (winterizing)

The initial capital expense of setting up a basic soil bank is estimated at between \$200,000 and \$475,000, depending on the size of the site and the type of office structure and equipment that are provided. A breakdown of the items included in this estimate are provided in Appendix D. This estimate does not include costs associated with purchasing land; design, permitting, or operational labor expenses; and the costs of facility maintenance.

Virtual Program

Under the virtual program, there would not be a physical facility to provide clean soil. Individual citizens, contractors, farmers, and others who have sources of clean soil that they wish to remove from their sites would be matched with developers and homeowners who need clean soil to complete the model remedies. Soil transactions would be coordinated on an individual basis.

A staff member would be assigned to manage the program; this person would be in charge of reviewing applications and coordinating exchanges between parties. Coordinating soil exchanges

could present challenges. For the transaction to run smoothly, the construction schedules of both parties would have to align. Parties involved may become frustrated or avoid using the service in the future if soil is not collected or provided on time, is not of the quality they expected, or is not available when needed.

Key components of the virtual program include:

- Office or assigned staff member
- Online platform or application (optional)

While it is the most cost-effective option, the virtual program relies on voluntary participation from individuals with clean soil and an adequate supply to feed the regional demand. Clean material would have to be sampled before the program could accept it.

SOIL REPOSITORY

A soil repository would offer a centralized location to take contaminated soil, reducing transportation costs and potentially reducing disposal costs. Under this model, contaminated material from former orchard properties is transported to the repository. Using heavy equipment, the soil is consolidated and then compacted. After the repository is filled, it is closed with a liner placed over the top.



Caption: EPA-operated soil repository in Idaho.

Source: Leadville Harold, Rachel Woolworth, May 16, 2018
https://www.leadvilleherald.com/news/article_142e7500-5941-11e8-a7a7-83aed3396621.html

A repository has more significant regulatory requirements than the clean soil bank, as it is essentially a functioning landfill. Material being sent to the repository will have to be tested for lead and arsenic,

using the toxicity characteristic leaching procedure to ensure that the material is not classified hazardous waste. There are also various long-term maintenance requirements even after the facility has closed.

An additional feasibility study is needed to create complete cost estimates and a facility design, but the basic required components of a repository are:

- Land
- Office—could be a full trailer or a small shed
- Heavy equipment (loader, excavator, compactor)—to move, consolidate, and compact material
- Concrete eco blocks—barriers to help contain stockpiles
- Perimeter fence and gates
- Truck scale (optional)
- Concrete pad (optional)—to drop off contaminated material
- Dust control
- Top High Density Poly Ethylene or polyvinyl chloride liner—to close facility
- Bottom liner (may or may not be required)
- Leachate management (may or may not be required, based on above)
- Stormwater infrastructure
- Stabilization (winterizing)
- Wheel wash and wash water treatment or collection facility
- On-site gravel roads
- Engineering and regulatory support (operating plans, closure plans, permitting support)

The initial capital expense of setting up a soil repository is estimated at between \$525,000-\$1,600,000, depending on the size of the repository and whether a bottom liner is required. A breakdown of the items included in this estimate are provided in Appendix D This does not include costs associated with purchasing land, a truck scale, a concrete pad, design, permitting, operational labor, maintenance, and closure of the facility. The lower estimated cost also assumes that a bottom liner and a leachate management system are not required.

If the creation of a new repository is determined to be too expensive or not practical, another option may be to work with existing licensed landfills to accept contaminated soil at a reduced rate. Municipal landfills require soil to properly cover waste and may be willing to reduce the cost of disposal in exchange for this useful material. The landfill will likely require that material be sampled for lead and arsenic prior to acceptance.

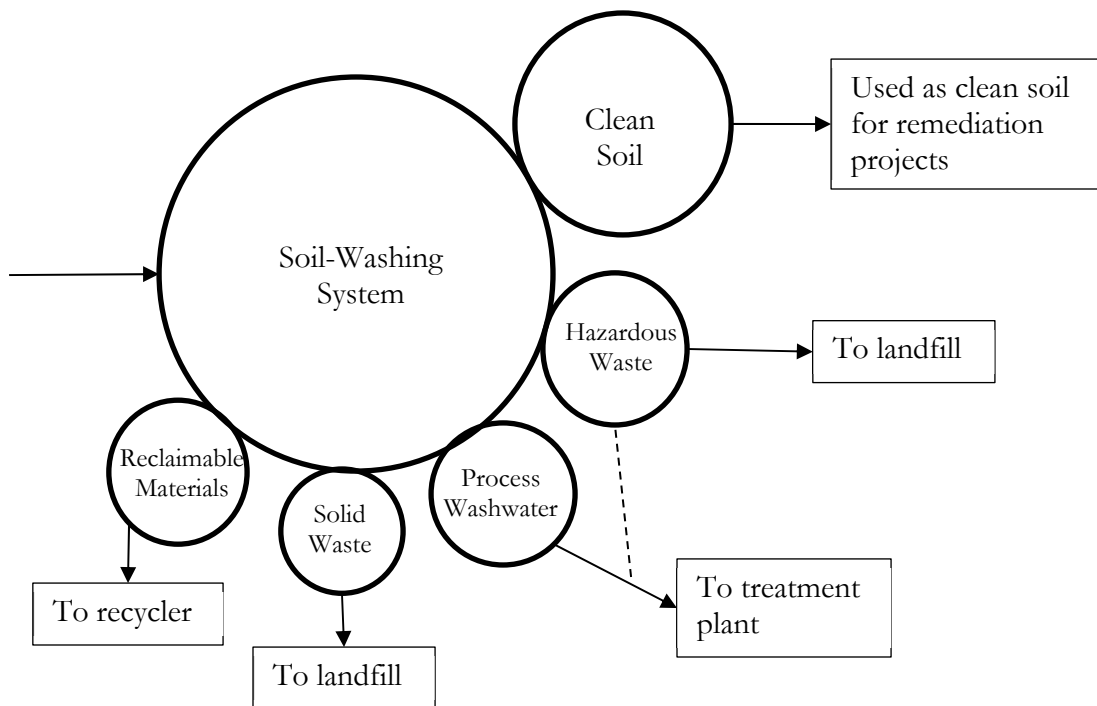
TREATMENT FACILITY

A treatment facility would take in soil contaminated with lead and arsenic from former orchard sites; treat it to remove the metals, using soil-washing technology; and then distribute the clean soil for use on model remedy projects. Contaminated soil would be delivered to the facility and run through on-site process equipment. Once soil is treated, it would be tested and then distributed in the same manner as in the clean soil bank concept.

The treatment process uses physical and chemical separation methods to remove the lead and arsenic. For the treatment to be effective, the soil must have a specific set of physical characteristics. A pilot study using local orchard soils would have to be conducted to assess the effectiveness of the treatment and design a full-scale process facility. Compared to the other soil bank models, the treatment facility requires more equipment, testing, and operational labor to implement. The treatment process generates several waste streams, which would have to be managed and disposed of in appropriately regulated landfills.

While this process is more complicated than the other two models, it offers two services instead of one and therefore two potential revenue streams to fund operation. Fees would be charged for disposal of contaminated soil as well as purchase of the clean soil after it goes through the treatment process. The process also generates a potentially hazardous waste stream that the facility would have to manage and dispose of appropriately. Figure 3-10 provides a visual diagram of a soil washing process.

Figure 3-10 Flow Diagram of Soil Washing Process





Caption: Example of a soil-washing plant.

Source: Baioni <https://www.baioni.it/en/News/PORTABLE-SOIL-WASHING-PLANT/>

An additional feasibility study is needed to create complete cost estimates and a facility design, but the basic required components of the soil treatment facility are:

- Pilot/treatability planning and study
- Land
- Office—could be a full trailer or a small shed
- Heavy equipment (loader, excavator)
- Concrete eco blocks—barriers to help contain stockpiles
- Small on-site laboratory
- Stormwater infrastructure
- Waste disposal (hazardous and/or dangerous)
- Washwater handling
- On-site gravel roads
- Stabilization (winterizing)
- Cover structure
- Truck scales
- Process equipment
 - Soil hopper and conveyor
 - Leaching tank
 - Precipitation tanks
 - Acid tanks
 - Washwater tanks
 - Sand screws
 - Log washers

- Jigs
- Filter press

Unlike the clean soil bank and the soil repository, the cost of the process equipment is heavily dependent on the results of the pilot study. Sizing of different equipment and estimates of process waste may change, based on the process efficiency and project life span. The initial capital expense of setting up a soil treatment facility is estimated at between \$800,000 and \$1,600,000, depending on the size of the facility and equipment needed. While this analysis did not yield an exact cost for all of the necessary treatment processing equipment, short-term remediation projects (not permanent installations) had treatment costs ranging from \$97 to \$430 per ton (numbers adjusted for inflation) of soil, making this a very expensive treatment. With the soil treatment facility operational labor costs will be higher than the other two models, and there are also costs associated with waste disposal of the byproducts from the treatment system.

It is important to note that while the cost between a treatment facility and a repository may appear similar, there are more significant costs associated with the treatment facility that are not represented in cost estimate. A breakdown of the items included in this estimate are provided in Appendix D. This estimate does not include costs associated with purchasing land, design, permitting, operation and maintenance, and waste management. Due to the significant costs, operational labor, and waste stream generation, a soil treatment facility is not a likely candidate for the region.

Additional Considerations

Based on input from the LPWG and Ecology, several additional concepts and ideas were identified for both Ecology and local governments to consider that could enhance the efficiency of the recommended approach. These important and innovative concepts and ideas are generally described below.

ECOLOGY

- To address concerns related to disclosure of potential LA pesticide contamination in shallow soils at the time of sale of existing properties, Ecology could request the Legislature to consider changes to RCW Chapter 64.06 Real Property Transfers – Sellers’ Disclosures. For example, amendments to specifically require disclosure of known soil conditions, and prior pesticide use could be added and/or enhanced, and they could be made part of the environmental disclosures that cannot be waived in the transaction.
- Consider updates to the SEPA Guidance on the Ecology website and in the SEPA Handbook to direct examination of soil contamination records with Ecology, and to specifically identify/address LA pesticide contamination associated with historical orchard practices.
- Provide guidance on how to research and access Ecology records and databases.
- Consider funding the development of a soil bank in/near each of the larger urban areas within Central Washington to assist the community with an identifiable source of clean soil that is necessary to ensure success of the recommended approach described in this report.

LOCAL GOVERNMENTS

- To maximize the ability to ensure property owners are aware of the potential presence of LA pesticide contamination and how to successfully manage the associated potential risk, consider amending local land use and/or building codes, if necessary, to clearly indicate the requirement to provide a “self-certification” (as described in Appendix B Model Remedy Recommendations) for those smaller projects not requiring a “notice of complete application” (such as single family building permits) and/or for those projects exempt from SEPA.
- Consider amending local ordinances to allow for additional density for those projects (single family residential subdivisions, multifamily developments) that are required or choose to use the recommended Model Remedy approach once it is developed by Ecology.
- Consider adding a requirement for pre-application meetings/conferences for larger projects (such as those requiring a full administrative and/or public hearing review process) to ensure project proponents have ample opportunity to be made aware of the potential presence of LA pesticide contamination as early as possible in their due diligence process.

Responsibilities Table

The issue of potential LA pesticide contamination of historical orchards in Central Washington is a complex issue that requires effort on the part of all stakeholders. The table below is intended to provide a summary of the important roles different stakeholders play in helping the proposed recommended strategy in this report succeed.

Who	What	When
Existing homeowner/renter	Incorporate BMPs, reach out to Ecology re: testing/added physical remedies	Following being made aware of the situation via Public Outreach and Education Strategy tactics
Realtors	Help inform buyers and sellers in real estate transactions of the potential for LA pesticide contamination and direct them to the Ecology resources (online mapping, model remedies, staff contacts) that can assist with managing the potential impacts if the contamination is present on a particular property.	As properties are listed for sale by owners. As buyers are identifying properties of interest for purchase
Developers/Contractors	Use available Ecology resources (online mapping, model remedies) when made aware of the potential presence of LA pesticides during the due diligence process	Early in the due diligence process

	Implement the Ecology Model Remedy as applicable to each development, including investigation, soil clean up, notification remedies (CC&Rs, plat notes), and certification	Once the Model Remedy is implemented by Ecology
Local Governments	Direct people to Ecology's Model Remedy (guidance, mapping) early and often	At the permit counter, during pre-app meetings, website links, development brochures. Primarily for subdivisions and for building and construction permits happening on existing lots (NOT those created thru the "new", Model Remedy process)
	Ensure proponents/applicants understand if there are CC&R's and plat notes related to the Model Remedy if applicable to a project	Primarily for building construction projects, applicable for those subdivisions going through this recommended process
	Ensure Model Remedy components (physical, CC&R's, plat notes) are included in the application materials submitted	As applications are turned in, and prior to issuing "notice of complete application" for those projects that require it
	Require Model Remedy components as part of the approval process (Notice of Decision/SEPA determination), including use of the example conditions of approval language, and the required plat notes and CC&Rs	Preliminary plat approval (short and long/SEPA and non-SEPA). Permit issuance/Notice of decision for construction projects
	Ensure either a Remedy Completion Report or a notarized Self-Certification is provided for physical model remedy components (not a qualitative review, only that they are included in the public record of the permit process) Ensure CC&R's are recorded, and Plat notes are included	Final plat approval for subdivisions (short and long/SEPA and non-SEPA) Certificate of Occupancy for building permits
Department of Ecology	Implement the Public Education and Outreach Strategy	As soon as possible
	Officially adopt Model Remedy that includes our recommendations (see Model Remedy Components)	As soon as possible
	Develop and implement technical Model Remedy guidance consistent with our recommendations	As soon as possible

	Develop simple guidance based on technical guidance to be handed out by the Local Governments	As soon as possible
	Respond to individuals (existing homeowners – BMPs, sampling) and project proponents (new projects) with help re: the Model Remedies	As contacted
	Work within Ecology divisions to simplify other, related permit approvals (e.g., construction stormwater permits) for these projects, if possible	As soon as possible

4 COMPARATIVE ANALYSIS

Introduction

To assess the impact that the recommended approach could have on the cost of developing a historical orchard property, a cost analysis for several common development scenarios was performed. For each scenario, two estimates were prepared: one using a traditional MTCA cleanup process, and one using the recommended approach. These costs were compared with the standard costs of development.

Development Scenarios

For the analysis, the costs associated with construction of a single-family home, a small subdivision, a large subdivision, and a multifamily development were evaluated. Assumptions regarding lot sizes, housing footprints, housing density, and other development details were made, based on interviews with developers from Chelan and Yakima counties. A description of each development scenario and the cleanup actions is provided in the table below:

Table 4-1: Overview of Development and Remedial Scenarios		
Development Scenario	MTCA Baseline Scenario	Recommended Approach
New Single-Family Home <ul style="list-style-type: none">• 10,000-square-foot lot• 2,200-square-foot home• 1,150-square-foot garage and driveway	<ul style="list-style-type: none">• Excavate contaminated soil to a depth of 2 feet across the entire property.• Dispose of excavated material off site at a licensed landfill.	<ul style="list-style-type: none">• Hard cap areas underneath house and driveway.• Soft cap open spaces with a demarcation layer, 4 inches of topsoil, and 2 inches of sod.
New Small Subdivision <ul style="list-style-type: none">• 8 lots• 400 feet of 30-foot-wide road with sidewalks• 10,000-square-foot lots• 2,200-square-foot homes• 1,150-square-foot garage and driveway per lot	<ul style="list-style-type: none">• Excavate contaminated soil to a depth of 2 feet across the entire property.• Dispose of excavated material off site at a licensed landfill.	<ul style="list-style-type: none">• Hard cap areas underneath house, driveway, roads, and sidewalks.• Soft cap open spaces with a demarcation layer, 4 inches of topsoil, and 2 inches of sod.

Table 4-1: Overview of Development and Remedial Scenarios		
Development Scenario	MTCA Baseline Scenario	Recommended Approach
New Large Subdivision <ul style="list-style-type: none"> • 100 lots • 6,600 feet of 30-foot-wide road with sidewalks • 10,000-square-foot lots • 2,200-square-foot homes • 1,150-square-foot garage and driveway per lot • ½-acre park in development 	<ul style="list-style-type: none"> • Excavate contaminated soil to a depth of 2 feet across the entire property. • Dispose of excavated material off site at a licensed landfill. 	<ul style="list-style-type: none"> • Hard cap areas underneath house, driveway, roads, and sidewalks. • Consolidate 2 feet of soil in the park area and cap. • Soft cap open spaces with an orange demarcation layer, 4 inches of topsoil, and 2 inches of sod.
New Multifamily Development <ul style="list-style-type: none"> • 2-acre lot • 35,000-square-foot building footprint • 100 units • 9,000-square-foot parking lot 	<ul style="list-style-type: none"> • Excavate contaminated soil to a depth of 2 feet across the entire property. • Dispose of excavated material off site at a licensed landfill. 	<ul style="list-style-type: none"> • Hard cap areas underneath building and parking lot. • Soft cap open spaces with an orange demarcation layer, 4 inches of topsoil, and 2 inches of sod.

Comparative Analysis

The base development cost includes all the costs associated with going through the standard development process. This includes land purchase, permitting, infrastructure development, land preparation, and building construction. Base development costs were gathered anecdotally through interviews with local developers and homebuilders in Chelan and Yakima counties and may not be representative of development costs in all affected areas.

MTCA baseline costs assume that the conservative MTCA compliant cleanup approach outlined in Table 4-1 is implemented prior to the start of development. Since cleanup occurs prior to any development actions on the property, the estimates include additional administrative, planning, design, and mobilization costs. These baseline estimates were created using standard estimating techniques typically applied for feasibility studies.

Unlike the MTCA baseline costs, the recommended approach is assumed to occur throughout the development process. The cost estimates for the recommended approach include all costs associated with implementing the model remedies detailed in Table 4-1. These estimates were also created using standard estimating techniques typically applied for feasibility studies.

For a new single-family home, it was estimated to cost \$8,000 to implement the proposed model remedy approach. This cost is primarily dependent on the size of the home footprint relative to the size of a lot. If the footprint of a home takes up most of the lot the cost of the model remedy will be lower compared to a property with a large lawn and lots of open space.

While costs of both development and cleanup will vary from site to site, the comparative analysis showed that the programmatic approach could significantly reduce the added cost of remediation compared to the MTCA baseline scenario. Detailed versions of these cost estimates are provided in Appendix E.

Table 4-2: Comparative Analysis Costs			
Scenario	Base Development Cost (Estimated) ¹	Additional Remediation Expense ²	
		MTCA Baseline Cost (Estimated)	Recommended Approach Cost (Estimated)
New Single-Family Home	\$390,000–\$400,000	\$185,000 (+46-47%)	\$8,000 (+2%)
New Small Subdivision	\$3,000,000–\$3,500,000	\$1,440,000 (+41-48%)	\$61,000 (+2%)
New Large Subdivision	\$38,000,000–40,000,000	\$17,612,000 (+44-46%)	\$1,031,000 (+3%)
New Multifamily Development	???	\$1,190,000 (+??%)	\$40,000 (+??%)
¹ Bare development costs include all costs associated with taking an empty lot and getting a property containing a home ready for sale, including: permit, grading, utilities, infrastructure, and home construction. Values were obtained through interviews with developers and homebuilders. ² These costs are estimated based on the Typical Development Projects and Cost Estimates identified in Chapter 2.			

5 PUBLIC EDUCATION AND OUTREACH STRATEGY

In addition to the recommended approach described in Chapter 3, Ecology will start an education and outreach strategy about LA pesticide contamination, cleanup strategies, and BMPs.

Introduction

The public education and outreach strategy includes an analysis of the communications environment related to LA pesticide contamination as well as recommendations for how best to achieve proactive and targeted public education and outreach to a wide and varied audience of community stakeholders. The primary audiences for the public education and outreach strategy are people who currently live on potentially impacted properties and the broader community in the counties with known LA pesticide contamination. Chapter 1 through 4 of this final report outline a process in which our other key audiences, including developers, builders, and planners, will address legacy pesticides and remediation through existing property development processes.

This chapter is a summary of the full public education and outreach strategy that Ecology is implementing.

Goals

Ecology's overarching goal for the Legacy Pesticide Working Group process is to provide reasonable, low-cost, and protective mitigation options that are feasible and efficient for developers and homebuilders. For the education and outreach strategy the primary goal is to educate the public about how to manage their risk regarding LA soil contamination. More specifically, Ecology will use the education and outreach strategy to:

- Demonstrate that Ecology has a plan and is addressing LA pesticide contamination on historical orchard properties.
- Increase public awareness and understanding about LA pesticide contamination, how to test for contamination, and how to manage risk on impacted properties.
- Partner with community leaders, including local governments, landowners/ranchers, developers, builders, and real estate companies, to help communicate about LA pesticide contamination and what people can do about it.

The education and outreach strategy also identifies how best to share information about legacy pesticide contamination. Outreach will target key stakeholders and landowners, emphasizing messages for those who live, work, and play where legacy pesticides are commonly found in historical orchard areas. Attention will be given to the steps people can take, from testing their property for contamination, to cleaning up soils, and other best management practices and actions that can be taken to manage and mitigate risk if LA pesticide impacts exist.

Project Timeline

The public education and outreach strategy outline all elements of the effort that will begin in early 2021 and continue as long as LA pesticides remain an issue of concern. The strategy outlines tactics to establish within the first year of implementation, as well as activities to ensure an ongoing rhythm of education and outreach. Because things change over time, this plan requires updating to address new issues, audiences, and opportunities.

Education and Outreach Sequence

2020	2021				2022	
Q4	Q1	Q2	Q3	Q4	Q1	Onward
Draft strategy and materials	Partner onboarding and test messages	Finalize materials and distribute "partner toolkit"	Conduct Outreach and Education			

Tools

Project materials	<ul style="list-style-type: none"> • Display or presentation materials (e.g., PowerPoint). • Updated informational fact sheets and handouts, translated into English, Spanish. • Post project materials on Ecology's web page. • Partner toolkit to share information, materials, and resources with partners and request they share the information with their networks.
Direct outreach	<ul style="list-style-type: none"> • Stakeholder lists • Mailers, door hangers, and county annual assessment or utility bill inserts to be sent to all potentially impacted properties. • Project email inbox to collect incoming questions from target audiences. • 2-1-1. Provides information and referrals to health, human, and social service organizations. • PreventionPays. Text message service that links texters with resources.
Web-based tools	<ul style="list-style-type: none"> • Project-specific public-facing web page that includes all project materials, engagement opportunity information, project contact information (email and distribution list sign-up) and is regularly updated. • Project listserv email sign-up and email updates using existing distribution lists for project updates and engagement opportunities. • Ecology blog posts. • Social media posts. • Online public information sessions. • Short videos.
Media	<ul style="list-style-type: none"> • Public service announcement. • Proactive media outreach: <ul style="list-style-type: none"> – News releases for local and regional newspapers and media at key milestones, when blogs are posted, and other news-worthy events. – Deskside briefings and deep dives on important topics, or topics otherwise difficult for the general public to grasp, to help pull back the curtain and make topics more accessible to all.

Events	<ul style="list-style-type: none"> • Online and in-person informational sessions with the general public. • Briefing circuit. Attend existing meetings and provide briefings to partner agencies, local elected officials and city councils, business, and other interest groups.
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Audiences (Broad Groups)

- Ecology staff
- LPWG
- State/federal agencies and groups
- Impacted residents, homeowners, and landowners
- Real estate parties
- Local health care providers
- Schools, including nurses and teachers
- Daycare providers
- Impacted workers
- Interest groups (e.g., housing, building, environmental, gardening, WSU Master Gardeners program, WSU Extension)
- General public
- Local and regional media

Ways to get Engaged

This public education and outreach strategy is just the tip of the iceberg. Ecology is embarking on a multiyear, multifaceted education and outreach effort to reach communities across Central Washington. If you have ties to these communities and want to make sure you are on the partner contact list, please send your preferred email and contact information to us at [\[email\]](#).

APPENDIX A

LOCAL GOVERNMENT LAND USE PERMITTING PROCESSES



Permitting Stakeholder Interview Findings								
Project Type	Size (Lots, Units)	SEPA Review	Decision maker	Pre-app meeting	Notice of Complete Application	Application referred to agencies	Public comment & hearing	Appeal
Jurisdiction: City of East Wenatchee								
Short Plat	4 lots or less	No	Admin	Optional	Yes	Yes	No	Hearing Examiner
Major Subdivision	5 lots or more	Yes	Planning Commission	Yes	Yes	Yes	Yes	LUPA process
Small MF Development	3 units or less	No	Admin	Yes	Yes	Yes	No	LUPA process
Large MF Development	4 units or more	Yes	Admin	Yes	Yes	Yes	Yes	LUPA process
Jurisdiction: City of Wenatchee								
Short Plat	9 lots or less	No	Admin	Optional	Yes	Yes	No	Hearing Examiner
Major Subdivision (5 or more lots)	10 lots or more	Yes	Hearing Examiner	Optional	Yes	Yes	Yes	District Court
Small MF Development	20 units or less	No	Admin	Optional	Yes	No	No	Hearing Examiner
Large MF Development	21 units or more	Yes	Admin	Optional	Yes	Yes	Yes	Hearing Examiner
Jurisdiction: City of Yakima								
Short Plat	9 lots or less	No	Admin	Optional	Yes	No	Yes	Hearing Examiner
Major Subdivision (5 or more lots)	10 lots or more	Yes	City Council	Optional	Yes	Yes	Yes	Superior Court
Small MF Development	60 units or less	No	Admin	Optional	Yes	No	No	Hearing Examiner
Large MF Development	61 units or more	Yes	Admin	Optional	Yes	Yes	Yes	Hearing Examiner

Permitting Stakeholder Interview Findings								
Project Type	Size (Lots, Units)	SEPA Review	Decision maker	Pre-app meeting	Notice of Complete Application	Application referred to agencies	Public comment & hearing	Appeal
Jurisdiction: Chelan County								
Short Plat	4 lots or less outside UGA, 9 lots or less within UGA	No	Admin	Optional	Yes	Yes	Yes	Hearing Examiner
Major Subdivision (5 or more lots)	5 lots or more outside UGA, 10 lots or more within UGA	Yes	Hearing Examiner	Yes	Yes	Yes	Yes	LUPA process
Small MF Development	60 units or less within UGA, 25 units or less outside UGA	No	Admin	Optional	Yes	No	No	Hearing Examiner
Large MF Development	61 units or more within UGA, 26 units or more outside UGA	Yes	Admin	Optional	Yes	Yes	Yes	Hearing Examiner
Jurisdiction: Douglas County								
Short Plat	4 lots or less outside UGA, 9 lots or less within UGA	No	Admin	Yes	Yes	Yes	Yes	Hearing Examiner
Major Subdivision (5 or more lots)	5 lots or more outside UGA, 10 lots or more within UGA	Yes	Hearing Examiner	Yes	Yes	Yes	Yes	LUPA process
Small MF Development	20 units or less	No	Admin	Yes	Yes	Yes	Yes	Hearing Examiner
Large MF Development	21 units or more	Yes	Admin	Yes	Yes	Yes	Yes	Hearing Examiner

APPENDIX B

MODEL REMEDY RECOMMENDATIONS



Introduction

The recommended approach is predicated on the Department of Ecology developing and implementing a specific Model Remedy, as defined in MTCA, for mitigating proposed new residential development projects on properties in Central Washington that were developed as tree fruit orchards prior to 1950. Below are the proposed detailed components of the *Model Remedy for Central Washington LA Pesticide Contamination on Historical Orchards* that are the basis of the recommended approach in Chapter 3 of the Final Report.

Investigation Process

The proposed framework for identifying and investigating a property for LA pesticide contamination is provided below in Figure 3-2 of the Final Report. The primary elements include:

- Identifying if the property is located on a historical orchard. The online mapping tool will be made accessible to the public on the Ecology website.
- Sampling will be needed for a property if it is located within the historical orchard footprint and development is proposed. For existing developments within the historical orchard footprint, BMPs will be implemented to mitigate risk. Owners of existing developments may also request soil sampling conducted by Ecology at no cost.
- If sampling shows lead or arsenic concentrations exceed cleanup levels at a property with proposed development, then cleanup will be required. Initial Tier 1 sampling can be conducted by Ecology at no cost. Tier 2 sampling is optional and may be conducted by the developer to confirm Tier 1 sampling results and refine the contamination extent.

MAPPING

The first step for assessing a property for LA pesticide contamination is identifying if the property is located on property that was used for a historical orchard using Ecology's online mapping tool. The online mapping tool will be provided by Ecology and will be made easily accessible to the public. The historical orchard online mapping tool is being developed through the review of historical aerial photographs, land use, and elevation data.

If a property **is not** located on a historical orchard and there is no evidence of soil imported to the property from another location, **no additional evaluation is required.**

If a property **is** located on a historical orchard, additional evaluation (i.e., soil sampling) may be required.¹

¹ Additional evaluation (i.e., Tier 1 sampling) is recommended if there is knowledge of significant fill placement or historical orchard activities on a property prior to 1950.

SOIL SAMPLING

Once a property is identified as being located on a historical orchard, the development status of the property should be considered prior to soil sampling.

Existing developed properties:²

- If a developed property is located on a historical orchard property, soil sampling is strongly encouraged, but is not required.
- If a property is sampled, results above State cleanup levels must be reported to the Washington Department of Ecology and disclosed to future property owners, as is the case for sample results from all property types.
- If sampling is not conducted, or if sampling confirms lead or arsenic above State cleanup levels, best management practices (BMPs) should be implemented to reduce potential exposure to contaminated soil (further described in the *Best Management Practices for Existing Developments* section below).

Properties with proposed residential development (all types of subdivisions and multifamily development projects subject to SEPA review):³

- Required to perform sampling of soil, as described in the *Tier 1 Soil Sampling* subsection.

Two types of soil sampling, Tier 1 and Tier 2, may be performed. Tier 1 sampling will provide an initial evaluation of the presence or absence of contamination. Tier 2 sampling is optional and can be conducted to refine the extent of contamination associated with LA pesticide use. Tier 2 sampling may also be conducted to inform the types of cleanup technologies that can be applied to different areas of a property.

Tier 1 Soil Sampling

Tier 1 sampling evaluates the presence or absence of lead and arsenic concentrations in soil above cleanup levels.⁴ The completion of Tier 1 sampling informs the need for Tier 2 sampling. If feasible, it is recommended that a representative from Ecology conduct the Tier 1 sampling for a property. However, it is suggested that Ecology provide Tier 1 sampling guidance on how an individual citizen can perform the Tier 1 sampling with Ecology oversight. *Tier 1 sampling is highly recommended for all properties with proposed development on a historical orchard, regardless of whether a remedy (for example, capping) has been preemptively selected, allowing Ecology to provide more detail for specific concerns.*

If lead or arsenic concentrations **are not** identified above cleanup levels during the Tier 1 sampling, **no additional evaluation is required**

² Existing residential homes, private property where development is not planned, and existing parks/open spaces are examples of properties where development may not be proposed.

³ New commercial, industrial, public school, and public park development projects remain subject to the existing administrative pathways outlined in MTCA.

⁴ Lead concentrations above 250 milligrams per kilogram (mg/kg) or parts per million (ppm) and arsenic concentrations above 20 mg/kg or ppm are above Model Toxics Control Act Method A cleanup levels.

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If lead and/or arsenic concentrations **are** identified above cleanup levels during the Tier 1 sampling, additional soil sampling may be needed to refine the area and depth of contamination. If capping is selected as the preferred remedy for a property, then Tier 2 sampling will not be necessary, and the project proponent will move to the cleanup process. See the *Cleanup Process* section.

Tier 2 Soil Sampling

Tier 2 sampling evaluates the nature and extent of lead and arsenic concentrations above cleanup levels. This type of sampling will require collection of more soil samples to determine the vertical and horizontal extent of contamination on a property. It is recommended that Ecology provide guidance in the Model Remedy document on how to conduct Tier 2 sampling.

Given the likelihood that representatives from Ecology will not be able to conduct the Tier 2 sampling, the following considerations are proposed for the Tier 2 sampling guidance for ease of understanding and completion:

- If Tier 2 sampling is conducted in accordance with the Ecology-provided guidance, it is not necessary that a work plan be prepared or submitted to Ecology.
- While an environmental consultant may complete Tier 2 sampling, the approach should be relatively basic so that individuals with limited to no soil sampling experience can perform the sampling. For example, consider providing guidance for collecting a specific number of samples per acre and per depth increment.
- Allow for averaging of concentrations in areas with isolated concentrations of lead or arsenic above the cleanup level consistent with MTCA. This would limit isolated exceedances requiring large-scale cleanups.
- Limit the maximum required number of samples collected to 50 to reduce the effort of handling and processing a significant number of samples.
- If desired, a work plan can be submitted for review and approval by Ecology to conduct Tier 2 sampling using a modified approach.
- Composite sampling should be considered to characterize areas of similar history or to reduce the number of collected samples analyzed at a laboratory.
- If soft or hard capping is the preferred remedy for a property, Tier 2 sampling is not needed, as described in the *Cleanup Process* section.

If lead or arsenic concentrations **are not** identified above cleanup levels during the Tier 2 sampling, **no cleanup is required.**

If lead and/or arsenic concentrations **are** identified above cleanup levels during the Tier 2 sampling, a remedy must be selected for implementation during development. See the *Cleanup Process* section.

Cleanup Process

Once soil sampling has been completed, a cleanup technology or combination of technologies must be selected. Any combination of the cleanup technologies described in the following could be

considered for completing a cleanup. It is recommended that Ecology outline the requirements for appropriate implementation of each cleanup technology and include visuals of how multiple cleanup technologies could be implemented in a development. The following cleanup technologies that are recommended for incorporation into the model remedy guidance:

- Soft Capping
- Hard Capping
- Excavation
- Mixing
- Consolidation

CLEANUP TECHNOLOGIES

Soft Capping

Contaminated soil can be covered with a brightly colored demarcation fabric (marker material) and at least 6 inches of clean soil and/or sod. This remedy would be easily implemented in development areas with proposed landscaping, lawns, or vegetation. This remedy leaves contamination in place but prevents exposure to the contaminated soils. A brightly colored demarcation fabric provides an easy visual for current and future property owners to ensure that impacted soils are not exposed during future construction, maintenance or landscaping activities. In some cases, placement of more than 6 inches of soil may be appropriate—for example, to mitigate soil thinning (e.g., on slopes), to account for placement of irrigation systems that have a burial depth of more than 6 inches, and to account for landscaping areas where deeper-rooting plants may be installed. Homeowners with demarcation fabric on their property will be notified of the presence and use of the marker material in the Covenants, Conditions, and Restrictions (CC&Rs) and plat notes for the property (see the *CC&Rs and Plat Notes* section).

If soft capping is selected as a cleanup technology, Tier 2 sampling and confirmation sampling (see the *Considerations for Cleanup Selection* section below) are not required for that area of the property. Because contamination will be capped, the lateral and vertical extent of contamination does not require characterization, and exposure to impacted soil will be prevented.

Soft capping likely will require importing of clean soil fill to create a portion, if not all, of the soft cap. Imported clean soil fill will have to be sampled to ensure that contamination is not present. See the *Considerations for Cleanup Selection* section below.

If a soft capping cleanup is completed for a property, a record of the soft capping cleanup must be recorded on CC&Rs and on plat notes to ensure that future homebuilders and owners are notified of the cleanup. Cap monitoring reports will not be required for submittal to Ecology (see the *Cleanup Notification* section below for additional details).

Hard Capping

A cleanup that includes hard capping can be implemented as part of routine site-development activities (construction of sidewalks, roadways, building foundations). This remedy leaves contamination in place but prevents exposure to contaminated soils, given typical maintenance of impervious or semipervious material. Contaminated soil should be covered with at least 3 inches of impervious or

semipervious material (asphalt, pavement, concrete). A layer of at least 6 inches of compacted crushed gravel (e.g., for driveways) and a demarcation fabric are also considered to constitute a hard cap.

If hard capping is selected as a cleanup technology, Tier 2 sampling and confirmation sampling (see the *Considerations for Cleanup Selection* section below) are not required for that area of the property. Because contamination will be capped, the lateral and vertical extent of contamination does not require characterization, and exposure to impacted soil will be prevented.

As with soft capping, should a hard capping cleanup be completed for a property, it is recommended that a record of the hard capping cleanup be recorded on CC&Rs and on plat notes to ensure that future homebuilders and owners are notified of the cleanup. Cap monitoring reports will not be required for submittal to Ecology (see the *Cleanup Notification* section below for additional details).

Excavation

Contaminated soil can be removed through excavation to a depth at which concentrations of lead and arsenic are no longer above cleanup levels (typically 2 to 3 feet below ground surface).

If it is not desired that a record of the contamination be placed on CC&Rs and plat notes, confirmation sampling must be performed to demonstrate that contamination has adequately been removed. Confirmation sampling after excavation is only required if the excavation base will remain exposed without backfill or a cap (see the *Considerations for Cleanup Selection* section below).⁵ If confirmation sampling indicates that contamination remains in place, additional excavation and confirmation sampling is required or a cap may be placed on the area (see the *Soft Capping* and *Hard Capping* subsections above).

Excavation likely will require off-site disposal of contaminated soil.⁶ Contaminated soil may require testing by the toxicity characteristic leaching procedure (TCLP) for disposal at an appropriate landfill or other facility. Testing requirements are typically determined in coordination with the landfill receiving the soil (see the *Considerations for Cleanup Selection* section below).

If post-excavation confirmation sampling is performed and concentrations of lead or arsenic do not remain above State cleanup levels, CC&Rs/plat notes will not be required; however, a remedy completion report (RCR) will still be required (see the *Cleanup Notification* section below).

Mixing

Mixing contaminated soil with clean soil (soil that does not have concentrations of lead or arsenic above cleanup levels) can reduce the concentrations of the soil to below cleanup levels. Implementation of this cleanup is limited by the magnitude of lead and arsenic concentrations present in the contaminated soil. For example, if clean soil is assumed to have concentrations of lead and arsenic at statewide background levels (i.e., 17 and 7 mg/kg, respectively), lead and arsenic concentrations in the top 6 inches of the contaminated soil should generally not exceed 483 and 33

⁵ If soft or hard capping cleanup technologies are used in combination with excavation, confirmation sampling should not be required. For example, a soft or hard cap placed over a graded area would not require confirmation sampling.

⁶ Excavated soil may be combined with a consolidation cleanup action and gathered in a specific area to be capped (see the *Consolidation* section below). If excavated soil is consolidated on site, it will not require off site disposal sampling.

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mg/kg, respectively, in order to effectively reduce the contaminated soil concentrations, assuming a placement of 6 inches of clean soil fill and a 1:1 mixing scenario.

Mixing requires availability of enough clean soil, on site or imported, to cover the contaminated soil. Any soil used must be sampled to ensure that it is not contaminated. See the *Considerations for Cleanup Selection* section below. Sampling of the top 1 foot of the mixed soil (containing contaminated and clean soil) after the cleanup has been completed will be required to ensure that lead and arsenic concentrations are sufficiently reduced to below cleanup levels. See the *Considerations for Cleanup Selection* section below.

As with *Excavation*, a mixing cleanup would not require CC&Rs or plat notes if concentrations in soil were sufficiently reduced to below cleanup levels. However, a RCR would still be required (see the *Cleanup Notification* section below).

Consolidation

Consolidation may be used in combination with excavation. Consolidation involves moving excavated contaminated soil to a specific area(s) on site to reduce the need for off-site soil disposal and to reduce the area requiring capping. Consolidation would require covering contaminated soil with a soft or hard capping cleanup technology, including the previously described requirements.

In addition to the capping requirements, the confirmation sampling requirements for excavation would be applicable in areas where soil was graded or excavated and ground surface was left exposed. Once an area has been graded or excavated, it should be treated consistent with the *Excavation* subsection. See the *Considerations for Cleanup Selection* section below.

As with soft and hard capping cleanup technologies, if a consolidation cleanup is implemented, a record of the consolidation cleanup will be recorded in the CC&Rs and on plat notes to ensure that future homebuilders and owners are notified of the completed remedy (see the *Cleanup Notification* section below for additional details).

CONSIDERATIONS FOR CLEANUP SELECTION

Confirmation Sampling

Confirmation soil sampling will be required for cleanup technologies that leave potentially contaminated soil exposed at the surface. This sampling confirms that the contamination has been removed (excavation) or reduced to below cleanup levels (mixing). It is recommended that Ecology provide guidance on the frequency of samples required per area and the sample depths (e.g., top 6 inches for excavation and top 1 foot for mixing) for confirmation sampling.

Imported Soil Fill Sampling

If fill soil is brought to a site to be used as a cap (soft capping) or mixed into the existing soil (mixing), sampling of the imported soil will be required. This ensures that soil brought into a site as a cleanup is not contaminated. It is recommended that Ecology provide guidance on the frequency of samples required per volume of imported fill (e.g., one composite sample per 500 cubic yards).

Contaminated Soil Disposal Sampling

Contaminated soil that is removed from a site (excavation) may require TCLP sampling to ensure proper disposal at an appropriate landfill or other facility. Testing requirements are typically determined in coordination with the landfill receiving the soil.

All remedy options listed in the model remedy selection may apply to a property. However, it is likely that some remedies will be more applicable or more easily applied, depending on the type of property. Figure 3-4 of the Final Report provides a comparison of the cleanup technologies included in the Model Remedy. Figure 3-5 of the Final Report provides the most likely remedies to apply to various developments or properties.

Potential Permits

The following permits are often required as part of a proposed new residential subdivision and/or multifamily development project. Ecology's Model Remedy should list these permits and identify standard, preapproved components of the permits issued by Ecology that can be included as part of the Model Remedy.

- Grading Permit: This permit is typically required for ground-disturbing activities and is often required if the area disturbed encompasses than 1 acre. Grading permits are typically obtained through a local jurisdiction and require general information on the project. They are relatively easy to prepare and are a component of standard development projects.
- SEPA Requirement: The requirement for a SEPA review process is jurisdiction-specific. See the *Permitting Process* section in Chapter 2 of the Final Report.

Construction Stormwater General Permit: The construction stormwater general permit (CSGP), applied for through Ecology, is prepared for development projects to reduce the potential for stormwater runoff from construction sites. The CSGP authorizes stormwater discharges associated with construction activities. Construction activity refers to clearing, grading, excavating, and other land-disturbing activities that result in the disturbance of at least 1 acre. There are additional requirements for the CSGP if there is known contamination on a property. The process for preparing and submitting the permit applications is often time-consuming and complex. For example, for some sites with contaminated soils, Ecology issues an Administrative Order that specifies measures and BMPs to which the applicant must certify adherence in order to receive permit approval. Therefore, it is recommended that Ecology provide one of the following:

- Coordination of a programmatic process that allows for Ecology to issue to applicants a standardized approach and requirements specific to arsenic and lead contamination management practices.
- Allowing an exclusion of the requirement for a CSGP administrative order specific to the contamination, if the model remedy and construction BMPs for reducing turbidity are implemented. A list of required BMPs to control erosion and sediment generated during construction would minimize potential for contaminated soil discharges to surface water.

Construction Best Management Practices

Construction BMPs are focused on reducing the potential exposure of the worker and the larger community to contaminated soil during construction activities. Standard construction BMPs for arsenic- and lead-impacted sites should be identified in the model remedy so that contractors can easily incorporate them into their operations. Recommended BMPs applicable to construction projects with arsenic and lead contamination focus on reducing soil migration and dust generation. Additionally, employing the BMPs outlined in Ecology's Stormwater Management Manual for Eastern Washington will reduce the likelihood of runoff from a construction site. The following are the recommended construction BMPs:

- Minimize dust generation by watering down construction area, as needed.
- Ensure that significant soil is not tracked off site (e.g., manual removal of mud from tires, dedicated construction entrance).
- Place catch basin filter inserts into catch basins to reduce the number of particulates entering the stormwater system

In addition to construction BMPs, it is recommended that the model remedy guidance reference applicable Washington State Labor & Industries requirements related to worker safety to safeguard against exposure to potential lead and arsenic in soil. Recommended worker safety defenses could also be included such as the following elements:

- Requirements to wash hands before eating or drinking on site and to wash boots at the end of the day, before leaving the site
- Requirements for workers to wear gloves while handling contaminated soil
- Assessment of requirements for complying with federal and state safety regulations

Best Management Practices for Existing Developments

It is not recommended that sampling at existing developments and residences be required. Recommendations for implementing BMPs at properties within the historical orchard footprint should be provided in the model remedy guidance. The following BMPs are suggested for these properties:

- Wash hands with soap after working or playing in the dirt.
- Ensure grass is kept up so no bare patches of soil are present
- Remove shoes before entering the home.
- Wash children's toys and pacifiers frequently.
- Wear shoes and gloves when gardening and working outdoors.
- Wash all fruits and vegetables before eating.
- Wash dirt off pets frequently.

- Create children's play areas (for example, raised sandboxes or rubber mats below play areas).
- Vacuum and dust the home at least weekly.

Cleanup Notification

REMEDY COMPLETION REPORT

For all completed cleanup, certification of a completed remedy (referred to as an RCR form) will be required. The RCR form will apply to all subdivisions, to be submitted prior to final subdivision approval; and to larger multifamily developments that are subject to SEPA, to be submitted prior to issuance of a certificate of occupancy. The intention of the RCR form is to provide clear, concise information on how the model remedy approach was implemented on a property. It is intended that the RCR form be filled out and signed by a qualified professional. The following components are suggested for the RCR form and could be listed on a form with check boxes indicating completion:

- Map of the property (obtained from assessor database or similar) with sample locations
- Photos showing components of the completed cleanup action (maximum of ten)
- Analytical lab reports and tabulated data
- Brief description of implemented remedy (anticipated to be 1 to 2 pages in length)
- Signature of qualified professional confirming that the model remedy was used to complete the actions on the property

CC&RS AND PLAT NOTES

If a completed cleanup action leaves contamination in place (soft capping, hard capping, and consolidation), the following notes are required on the face of the plat, and the CC&Rs outlined below will be recorded with the County Auditor's office prior to final plat approval (for all subdivisions) or before a certificate of occupancy is issued for a multifamily development project.

The following notes shall be placed on the face of the plat prior to final subdivision approval:

- a) The subject property has been reviewed for potential legacy pesticides in the soil by the State of Washington Department of Ecology. The State Department of Ecology has either not identified the subject property as containing legacy pesticides, or has confirmed to its satisfaction that applicable remedies to remove and/or mitigate potential harmful effects of legacy pesticides have been implemented.
- b) Soils included on the areas identified as "Historical Orchard Area" likely contain lead and arsenic at concentrations exceeding Washington State cleanup standards. To prevent exposure, these soils have been covered with an orange marker material followed by a selected capping technique authorized by Ecology's *"Model Remedy for Central Washington LA Pesticide Contamination on Historical Orchards"* in areas that are not covered by a permanent surface (buildings, asphalt, concrete, rock or compacted gravel).

- c) If you must dig into soils beneath the marker material, set aside the clean surface soil and use it to re-cover the area at the completion of your project.
- d) All builders and future owners of homes located within the Historical Orchard areas identified hereon must comply with the conditions set forth in the *Covenants, Conditions and Restrictions* regarding activities within the Historical Orchard.

The following CC&Rs shall be recorded with the County Auditor's office prior to final subdivision approval:

- a) During construction of residences on the Historical Orchard, the Developer will (or the Developer will require the builder to) implement the following:
 - i. Implement "Construction Best Management Practices" identified in the Model Remedy for Central Washington LA Pesticide Contamination on Historical Orchards".
 - ii. Implement the following safeguards to protect workers against exposure to potential lead and arsenic in soil:
 - (a) Requirements to wash hands before eating or drinking on site and to wash boots at the end of the day, before leaving the site
 - (b) Requirements for workers to wear gloves while handling contaminated soil
 - (c) Assessment of requirements for complying with federal and state safety regulations
 - iii. Place 6 inches of clean soil cover on top of soils in all landscaped areas that will be used by residents (e.g., grass lawns, play areas, parks, and developed common areas).
 - iv. Use clean dirt from the stockpile made available by the Developer, or other topsoil that has been tested for an appropriate suite of contaminants, including lead and arsenic, and approved by Ecology.
 - v. All areas of each residential lot within the Historical Orchard must be covered with one of the following surfaces:
 - (a) Permanent impermeable surfaces such as concrete, asphalt, building foundations or other permanent surfaces of at least 3 inches in thickness.
 - (b) 6 inches of clean soil on top of a marker material such as Tenax Guardian Visual Barrier.
 - (c) 6 inches of rock, compacted gravel, or other material approved by Ecology on top of a marker material as described above.
- b) Based on historical agricultural use of the Property, the soil within that portion of the Property identified as Historical Orchard areas is likely to contain lead and/or arsenic

contamination in shallow soils due to pesticide management practices that were legal prior to 1950. The following best management practices are important for managing risks associated with long-term regular contact with contaminated soil.

- i. All fruit and vegetable gardens shall be in raised beds, with imported clean soil.
- ii. Following the completion of each residence, including landscaping, further excavation and ground disturbing activities are prohibited, unless the area disturbed is properly capped with clean soil on top of a marker material or otherwise encapsulated with impervious surfaces.
- iii. A marker has been placed on top of soils in areas that are capped with 6 inches of clean soil. If an Owner encounters the marker, all soil beneath that marker potentially contains impacted soils and must be buried, at depth, below 6 inches of clean soil.
- iv. Wash hands with soap after working or playing in the dirt.
- v. Remove shoes prior to entering the home.
- vi. Wash children's toys and pacifiers frequently.
- vii. Wear shoes and gloves when gardening and working outdoors.
- viii. Wash all fruits and vegetables before eating.
- ix. Wash dirt off pets frequently.
- x. Create children's play areas (for example, raised sand boxes or rubber mats below play areas).
- xi. Vacuum and dust the home at least weekly.

SELF-CERTIFICATION

It is recommended that there be an option for self-certification of completed Model Remedy cleanup actions completed for smaller projects (single-family building permits and those smaller multifamily development projects that are exempt from SEPA) that would be required before a certificate of occupancy can be issued. These self-certification statements would be notarized and include the following:

- A statement of the awareness that the property is in an area affected by historical orchard practices and potential lead and arsenic contamination.
- And, either:
 - The requirements of CC&Rs and plat notes required by the model remedy have been implemented during construction; or

- A cleanup technology as outlined in the recommended model remedy for on-site building construction has been implemented (for those existing lots that were subdivided and developed before our proposed new process went into effect)
- An acknowledgement that the presence of potential lead and arsenic contamination is required by state law to be disclosed at the point in time the property is sold.
- Signature of the property owner (for spec houses, this would be the builder/contractor; if it is a custom build, the homeowner and builder/contractor would have to sign)

APPENDIX C

SAMPLE SEPA COMMENTS & INFORMATIONAL LETTERS



Introduction

The following are SEPA comments and informational letters that Ecology has provided as examples of their communication that may be supplied to potential applicants for development projects. Once the recommended approach is finalized and ready for implementation, Ecology will develop a letter describing the new model remedy approach to local government permitting agencies to help with implementation of the new program. This letter will outline the new process including timeline and next steps, as well as providing information on how jurisdictions and applicants can access available resources and tools. It is also anticipated the below templates for SEPA comments and applicant letters will be provided to the jurisdiction so they can be shared with applicants as early as possible in their development permit process.

SEPA Comments

Below are sample comment letters that Ecology would submit during the development permit review process for projects subject to a review under the provisions of the State Environmental Policy Act (SEPA). The first example would be for a project application where the project proponent has not been in contact prior to submitting their applications to the local government, and/or that does not include any of the new Model Remedy provisions. The second example would be for a project application where the project proponent has been in contact with Ecology and has included the Model Remedy components in their application materials.

NO PRE APPLICATION CONTACT WITH ECOLOGY

“Thank you for the opportunity to comment on your proposed project.

Our information shows your project is located on a historical orchard where lead arsenate was frequently used as a pesticide, often resulting in shallow soil contamination from lead and/or arsenic. Before proceeding, your project is **required to conduct soil sampling** under the Model Toxics Control Act (Chapter 173-340 WAC).

The Department of Ecology has adopted a Model Remedy for lead and arsenic pesticide contamination in historical areas of Central Washington that outlines soil sampling and cleanup techniques, as well as providing additional measures to adequately manage human health impacts from exposure to contaminated soil. Ecology provides free initial sampling as well as free technical assistance to help with efficient and cost effective cleanup for your project, if necessary.

Compliance with the Model Remedy will ensure your project meets the minimum standards of the Model Toxics Control Act, and if implemented as described, your property will be successfully remediated to Washington State standards.

Please contact Jeff Newschwander, Project Coordinator, at 509-388-5223, to schedule your initial sampling and for further information.”

PRE APPLICATION CONTACT WITH ECOLOGY/MODEL REMEDY INCLUDED

“Thank you for the opportunity to comment on your proposed project.

Our information shows your project is located on a historical orchard where lead arsenate was frequently used as a pesticide, often resulting in shallow soil contamination from lead and/or arsenic. The provided project application materials demonstrate compliance with the Department of Ecology Model Remedy for lead and arsenic pesticide contamination in historical areas of Central Washington.

Compliance with the Model Remedy ensure your project meets the minimum standards of the Model Toxics Control Act, and if implemented as described, your property will be successfully remediated to Washington State standards.

Please contact Jeff Newschwander Project Coordinator, at 509-388-5223 for further information.”

INFORMATIONAL LETTERS

The example letters below are those that could be provided to a lender to assist with securing a mortgage, based on any Model Remedy actions that may have been completed on the site.

Remediation Plan Developed

“Dear property owner:

Soil sampling results show that your property located at XXXXXXXXXXXXX has concentrations of lead and arsenic above state cleanup levels.

We appreciate the submittal of your soil remediation plan.

Your soil remediation plan meets the minimum standards of the Model Toxics Control Act. If your soil remediation plan is implemented as described, your property will be successfully remediated to Washington State standards.

Please contact Jeff Newschwander, Project Coordinator, at 509-388-5223 for further information.”

Soil Sampling Has Occurred

“Dear property owner:

Thank you for sampling your property. Lead and/or arsenic are above state cleanup levels, and require cleanup.

We will work with you to make sure your property has a plan for cleanup that meets state regulations.

Please contact Jeff Newschwander, Project Coordinator, at 509-388-5223 for further information.”

Soil Cleanup Has Occurred

“Dear property owner:

Thank you for completing cleanup of the property located at XXXXXXXX. We have reviewed the report describing the cleanup, and find that it meets the standards of the Model Toxics Control Act.

Regulations require that you disclose this information to future buyers. It will also be available on Ecology’s website at: <https://apps.ecology.wa.gov/dirtalert/>

We appreciate your commitment and willingness to address this issue.

Should you have additional questions, please contact Jeff Newschwander, Project Coordinator, at 509-388-5223.

APPENDIX D

SOIL BANK COST ESTIMATES



DRAFT

Table 1
Clean Soil Bank Order of Magnitude Cost Estimate
Chelan County Department of Natural Resources



Item	Cost (low)	Cost (High)
Office	\$5,000	\$70,000
Basic soil testing equipment	\$1,000	\$15,000
Loader	\$30,000	\$100,000
Concrete eco blocks	\$50,000	\$50,000
Stormwater infrastructure	\$3,000	\$10,000
Perimeter fence and gates	\$15,000	\$25,000
Onsite gravel roads	\$30,000	\$30,000
Stabilization (winterizing)	\$5,000	\$10,000
Subtotal	\$139,000	\$310,000
Contingency (50%)	\$69,500	\$155,000
Total	\$200,000	\$475,000

DRAFT

Table 2
Soil Repository Order of Magnitude Cost Estimate
Chelan County Department of Natural Resources



Item	Cost (low)	Cost (High)
Office	\$5,000	\$70,000
Loader	\$30,000	\$100,000
Excavator	\$40,000	\$80,000
Compactor	\$5,000	\$40,000
Concrete Eco Blocks	\$50,000	\$50,000
Perimeter fence and gates	\$15,000	\$25,000
Onsite gravel roads	\$30,000	\$30,000
Winterizing and Stabilization	\$5,000	\$5,000
Wheel Wash	\$15,000	\$15,000
Top Liner	\$150,000	\$300,000
Stormwater	\$3,000	\$10,000
Bottom Liner	None	\$300,000
Subtotal	\$348,000	\$1,025,000
Total with contingency (50%)	\$174,000	\$512,500
Total	\$525,000	\$1,600,000

DRAFT

Table 3
Soil Treatment Order of Magnitude Cost Estimate
Chelan County Department of Natural Resources



Item	Cost (low)	Cost (High)
Office	\$5,000	\$70,000
Basic Soil Testing Equipment	\$1,000	\$15,000
Loader	\$30,000	\$100,000
Excavator	\$40,000	\$80,000
Concrete eco blocks	\$50,000	\$50,000
Stormwater infrastructure	\$3,000	\$10,000
Perimeter Fence and Gates	\$15,000	\$25,000
Onsite gravel roads	\$30,000	\$30,000
Winterizing and Stabilization	\$5,000	\$10,000
Cover Structure	\$7,000	\$15,000
Truck Scales	\$150,000	\$250,000
Soil Hopper	\$30,000	\$60,000
Leaching Tank	\$20,000	\$40,000
Acid Tanks	\$20,000	\$40,000
Precipitation Tanks	\$40,000	\$60,000
Wash water Tanks	\$20,000	\$40,000
Sand Screws	\$10,000	\$45,000
Log Washers	\$20,000	\$45,000
Jigs	\$10,000	\$20,000
Filter press	\$30,000	\$60,000
Subtotal	\$536,000	\$1,065,000
Contingency (50%)	\$268,000	\$532,500
Total	\$800,000	\$1,600,000

APPENDIX E

DETAILED COMPARATIVE SCENARIO COST ESTIMATES



Table 1
Comparative Scenario Cost Estimate
Chelan County Department of Natural Resources


New Single Family Home - MTCA Baseline Scenario				
Project: Legacy Pesticide Working Group				
Client: Chelan County Department of Natural Resources				
Project #/Task #: 1938.01.01				
Prepared By: Evelyn Lundeen, EIT				
Checked By: Michael Tarbert, EIT				
Date: 12/3/2020				
Revision #:				
 MAUL FOSTER ALONG I 2815 2nd Avenue, Suite 540 Seattle, WA 98121 (206) 858-7620 www.maulfooster.com				
Direct Construction Costs	Units	Unit Cost	No. of Units	Total
Mobilization/Demobilization	LS	\$13,000	1	\$13,000
Temporary Erosion and Sediment Controls	LS	\$1,000	1	\$1,000
Excavation				
Excavation and Material Handling	BCY	\$10	740	\$7,400
Confirmation Sampling	EA	\$40	4	\$160
Off-site Waste Transportation and Disposal	TON	\$70	1,200	\$84,000
Import and Place Backfill	LCY	\$42	850	\$35,700
Direct Construction Cost Subtotal				\$141,260
Indirect Costs	Units	Unit Cost	No. of Units	Total
Tier II Sampling	LS	\$200	1	\$200
Project Management	LS	\$8,000	1	\$8,000
Remedial Design	LS	\$21,000	1	\$21,000
Construction Management	LS	\$14,000	1	\$14,000
Indirect Cost Subtotal				\$43,200
Subtotal				\$184,460
CONSTRUCTION SUBTOTAL (rounded to the nearest thousand)				\$185,000

Table 1
Comparative Scenario Cost Estimate
Chelan County Department of Natural Resources

NOTES:

BCY = bank cubic yard.

EA = each.

LCY = loose cubic yard.

LS = lump sum.

Table 2
Comparative Scenario Cost Estimate
Chelan County Department of Natural Resources


New Single Family Home - Model Remedy Scenario				
Project: Legacy Pesticide Working Group				
Client: Chelan County Department of Natural Resources				
Project #/Task #: 1938.01.01				
Prepared By: Evelyn Lundeen, EIT				
Checked By: Michael Tarbert, EIT				
Date: 12/3/2020				
Revision #:				
 MAUL FOSTER ALONGI 2815 2nd Avenue, Suite 540 Seattle, WA 98121 (206) 858-7620 www.maulfooster.com				
Direct Construction Costs	Units	Unit Cost	No. of Units	Total
Soft Cap				
Demarcation fabric	SY	\$2	250	\$500
Import and place clean soil cap	LCY	\$42	90	\$3,800
Import and place sod	MSF	\$410	6.7	\$2,700
Direct Construction Cost Subtotal				\$7,000
Indirect Costs	Units	Unit Cost	No. of Units	Total
Tier II Sampling	LS	\$200	1	\$200
Construction Management	LS	\$700	1	\$700
Indirect Cost Subtotal				\$900
Subtotal				\$7,900
CONSTRUCTION SUBTOTAL (rounded to the nearest thousand)				\$8,000

Table 2
Comparative Scenario Cost Estimate
Chelan County Department of Natural Resources

NOTES:

LCY = loose cubic yard.

LS = lump sum.

MSF = thousand square feet.

SY = square yard.

Table 3
Comparative Scenario Cost Estimate
Chelan County Department of Natural Resources


New Small Subdivision - MTCA Baseline Scenario					 MAUL FOSTER ALONGI 2815 2nd Avenue, Suite 540 Seattle, WA 98121 (206) 858-7620 www.maulfooster.com			
Project: Legacy Pesticide Working Group								
Client: Chelan County Department of Natural Resources								
Project #/Task #: 1938.01.01								
Prepared By: Evelyn Lundeen, EIT								
Checked By: Michael Tarbert, EIT								
Date: 12/3/2020								
Revision #:								
Direct Construction Costs					Units	Unit Cost	No. of Units	Total
Mobilization/Demobilization					LS	\$45,400	1	\$45,400
Temporary Erosion and Sediment Controls					LS	\$6,000	1	\$6,000
Excavation								
Excavation and Material Handling					BCY	\$10	7,780	\$77,800
Confirmation Sampling					LS	\$40	20	\$800
Off-site Waste Transportation and Disposal					TON	\$70	11,670	\$816,900
Import and Place Backfill					LCY	\$42	8,940	\$375,480
Direct Construction Cost Subtotal								\$1,322,400
Indirect Costs					Units	Unit Cost	No. of Units	Total
Tier II Sampling					LS	\$800	1	\$800
Project Management					LS	\$27,000	1	\$27,000
Remedial Design					LS	\$54,000	1	\$54,000
Construction Management					LS	\$36,000	1	\$36,000
Indirect Cost Subtotal								\$117,800
Subtotal								\$1,440,200
CONSTRUCTION SUBTOTAL (rounded to the nearest thousand)								\$1,440,000

Table 3
Comparative Scenario Cost Estimate
Chelan County Department of Natural Resources

NOTES:

BCY = bank cubic yard.

EA = each.

LCY = loose cubic yard.

LS = lump sum.

Table 4
Comparative Scenario Cost Estimate
Chelan County Department of Natural Resources


New Small Subdivision - Model Remedy Scenario				
Project: Legacy Pesticide Working Group				
Client: Chelan County Department of Natural Resources				
Project #/Task #: 1938.01.01				
Prepared By: Evelyn Lundeen, EIT				
Checked By: Michael Tarbert, EIT				
Date: 12/3/2020				
Revision #:				
 MAUL FOSTER ALONGI 2815 2nd Avenue, Suite 540 Seattle, WA 98121 (206) 858-7620 www.maulfooster.com				
Direct Construction Costs	Units	Unit Cost	No. of Units	Total
Soft Capping				
Demarcation Fabric	SY	\$2	7,400	\$12,580
Import and place clean soil cap	LCY	\$42	940	\$39,480
Import and place sod	MSF	\$410	66.2	\$27,100
Direct Construction Cost Subtotal				\$52,100
Indirect Costs	Units	Unit Cost	No. of Units	Total
Design-Phase Sampling	LS	\$800	1	\$800
Project Management	LS	\$3,000	1	\$3,000
Remedial Design	LS	\$5,000	1	\$5,000
Construction Management	LS	\$5,200	1	\$5,200
Indirect Cost Subtotal				\$14,000
Subtotal				\$66,100
CONSTRUCTION SUBTOTAL (rounded to the nearest thousand)				\$66,000

Table 4
Comparative Scenario Cost Estimate
Chelan County Department of Natural Resources

NOTES:

LCY = loose cubic yard.

LS = lump sum.

MSF = thousand square feet.

SY = square yard.

Table 5
Comparative Scenario Cost Estimate
Chelan County Department of Natural Resources


New Large Subdivision - MTCA Baseline Scenario					 MAUL FOSTER ALONGI 2815 2nd Avenue, Suite 540 Seattle, WA 98121 (206) 858-7620 www.maulfooster.com			
Project: Legacy Pesticide Working Group								
Client: Chelan County Department of Natural Resources								
Project #/Task #: 1938.01.01								
Prepared By: Evelyn Lundeen, EIT								
Checked By: Michael Tarbert, EIT								
Date: 12/3/2020								
Revision #:								
Direct Construction Costs					Units	Unit Cost	No. of Units	Total
Mobilization/Demobilization					LS	\$570,300	1	\$570,300
Temporary Erosion and Sediment Controls					LS	\$100,000	1	\$100,000
Excavation								
Excavation and Material Handling					BCY	\$10	97,800	\$978,000
Confirmation Sampling					LS	\$40	60	\$2,400
Off-site Waste Transportation and Disposal					TON	\$70	146,670	\$10,266,900
Import and Place Backfill					LCY	\$42	112,440	\$4,722,480
Direct Construction Cost Subtotal								\$16,640,100
Indirect Costs					Units	Unit Cost	No. of Units	Total
Tier II Sampling					LS	\$2,500	1	\$2,500
Project Management					LS	\$285,000	1	\$285,000
Remedial Design					LS	\$342,000	1	\$342,000
Construction Management					LS	\$342,000	1	\$342,000
Indirect Cost Subtotal								\$971,500
Subtotal								\$17,611,600
CONSTRUCTION SUBTOTAL (rounded to the nearest thousand)								\$17,612,000

Table 5
Comparative Scenario Cost Estimate
Chelan County Department of Natural Resources

NOTES:

BCY = bank cubic yard.

EA = each.

LCY = loose cubic yard.

LS = lump sum.

Table 6
Comparative Scenario Cost Estimate
Chelan County Department of Natural Resources


New Large Subdivision - Model Remedy Scenario				
Project: Legacy Pesticide Working Group				
Client: Chelan County Department of Natural Resources				
Project #/Task #: 1938.01.01				
Prepared By: Evelyn Lundeen, EIT				
Checked By: Michael Tarbert, EIT				
Date: 12/3/2020				
Revision #:				
 MAUL FOSTER ALONGI 2815 2nd Avenue, Suite 540 Seattle, WA 98121 (206) 858-7620 www.maulfooster.com				
Direct Construction Costs	Units	Unit Cost	No. of Units	Total
Soil Consolidation				
Excavation and Material Handling	BCY	\$10	1,200	\$12,000
Soft Capping				
Place Demarcation Fabric	SY	\$2	85,000	\$144,500
Import and Place Backfill	LCY	\$42	18,740	\$787,080
Import and place sod	MSF	\$410	765.2	\$313,700
Direct Construction Cost Subtotal				\$943,600
Indirect Costs	Units	Unit Cost	No. of Units	Total
Design-Phase Sampling	LS	\$2,500	1	\$2,500
Project Management	LS	\$28,000	1	\$28,000
Remedial Design	LS	\$15,000	1	\$15,000
Construction Management	LS	\$56,700	1	\$56,700
Indirect Cost Subtotal				\$102,200
Subtotal				\$1,045,800
CONSTRUCTION SUBTOTAL (rounded to the nearest thousand)				\$1,046,000

Table 6
Comparative Scenario Cost Estimate
Chelan County Department of Natural Resources

NOTES:

BCY = bank cubic yard.

LCY = loose cubic yard.

LS = lump sum.

MSF = thousand square feet.

SY = square yard.

Table 7
Comparative Scenario Cost Estimate
Chelan County Department of Natural Resources


New Multifamily Development - MTCA Baseline Scenario				 MAUL FOSTER ALONGI 2815 2nd Avenue, Suite 540 Seattle, WA 98121 (206) 858-7620 www.maulfooster.com
Project: Legacy Pesticide Working Group				
Client: Chelan County Department of Natural Resources				
Project #/Task #: 1938.01.01				
Prepared By: Evelyn Lundeen, EIT				
Checked By: Michael Tarbert, EIT				
Date: 12/3/2020				
Revision #:				
Direct Construction Costs				
	Units	Unit Cost	No. of Units	Total
Mobilization/Demobilization	LS	\$37,700	1	\$37,700
Temporary Erosion and Sediment Controls	LS	\$6,000	1	\$6,000
Excavation				
Excavation and Material Handling	BCY	\$10	6,450	\$64,500
Confirmation Sampling	LS	\$40	20	\$800
Off-site Waste Transportation and Disposal	TON	\$70	9,680	\$677,600
Import and Place Backfill	LCY	\$42	7,420	\$311,640
Direct Construction Cost Subtotal				\$1,098,200
Indirect Costs				
	Units	Unit Cost	No. of Units	Total
Tier II Sampling	LS	\$800	1	\$800
Project Management	LS	\$23,000	1	\$23,000
Remedial Design	LS	\$45,000	1	\$45,000
Construction Management	LS	\$30,000	1	\$30,000
Indirect Cost Subtotal				\$98,800
Subtotal				\$1,197,000
CONSTRUCTION SUBTOTAL (rounded to the nearest thousand)				\$1,197,000

Table 7
Comparative Scenario Cost Estimate
Chelan County Department of Natural Resources

NOTES:

BCY = bank cubic yard.

EA = each.

LCY = loose cubic yard.

LS = lump sum.

Table 8
Comparative Scenario Cost Estimate
Chelan County Department of Natural Resources


New Multifamily Development - Model Remedy Scenario				
Project: Legacy Pesticide Working Group				
Client: Chelan County Department of Natural Resources				
Project #/Task #: 1938.01.01				
Prepared By: Evelyn Lundeen, EIT				
Checked By: Michael Tarbert, EIT				
Date: 12/3/2020				
Revision #:				
 MAUL FOSTER ALONGI 2815 2nd Avenue, Suite 540 Seattle, WA 98121 (206) 858-7620 www.maulfooster.com				
Direct Construction Costs	Units	Unit Cost	No. of Units	Total
Soft Capping				
Demarcation Fabric	SY	\$2	4,800	\$8,160
Import and place clean soil cap	LCY	\$42	610	\$25,620
Import and place sod	MSF	\$410	43.1	\$17,700
Direct Construction Cost Subtotal				\$33,800
Indirect Costs	Units	Unit Cost	No. of Units	Total
Design-Phase Sampling	LS	\$800	1	\$800
Project Management	LS	\$2,000	1	\$2,000
Remedial Design	LS	\$5,000	1	\$5,000
Construction Management	LS	\$3,400	1	\$3,400
Indirect Cost Subtotal				\$11,200
Subtotal				\$45,000
CONSTRUCTION SUBTOTAL (rounded to the nearest thousand)				\$45,000

Table 8
Comparative Scenario Cost Estimate
Chelan County Department of Natural Resources

NOTES:

LCY = loose cubic yard.

LS = lump sum.

MSF = thousand square feet.

SY = square yard.

APPENDIX F

EXAMPLE CONDITIONS OF APPROVAL



Below is language that is integral to success of the proposed recommended model remedy approach described in Chapter 3. This language is proposed to be included in the local government land use and building permit approval process.

Preliminary Approval Conditions Language: The following conditions of approval are included in the Notice of Decision for all subdivision applications (short and long),¹ and for each multifamily development project that is subject to SEPA review.²

1. The subject property is located in an area of known historical orchards and is likely to contain lead and/or arsenic contamination in shallow soils due to pesticide management practices that were legal prior to 1950. The boundary of the historical orchard that may contain the legacy pesticides, as identified by the Washington State Department of Ecology (Ecology) mapping resources, has been delineated on Exhibit “A” (“Historical Orchard Areas”). The project is required to comply with the *“Model Remedy for Central Washington LA Pesticide Contamination on Historical Orchards.”* A Remedy Completion Report (Self Certification for short subdivision) shall be completed and submitted prior to final subdivision approval (Certificate of Occupancy for multifamily developments).
2. The following notes shall be placed on the face of the plat prior to final subdivision approval:
 - A. The subject property has been reviewed for potential legacy pesticides in the soil by the State of Washington Department of Ecology. The State Department of Ecology has either not identified the subject property as containing legacy pesticides or has confirmed to its satisfaction that applicable remedies to remove and/or mitigate potential harmful effects of legacy pesticides have been implemented.
 - B. Soils included on the areas identified as “Historical Orchard Area” likely contain lead and arsenic at concentrations exceeding Washington State cleanup standards. To prevent exposure, these soils have been covered with an orange marker material followed by a selected capping technique authorized by Ecology’s *“Model Remedy for Central Washington LA Pesticide Contamination on Historical Orchards”* in areas that are not covered by a permanent surface (buildings, asphalt, concrete, rock or compacted gravel).
 - C. If you must dig into soils beneath the marker material, set aside the clean surface soil and use it to re-cover the area at the completion of your project.
 - D. All builders and future owners of homes located within the Historical Orchard areas identified hereon must comply with the conditions set forth in the *Covenants, Conditions and Restrictions* (CC&Rs) regarding activities within the Historical Orchard.
3. The following CC&Rs shall be recorded with the County Auditor’s office prior to final subdivision approval:
 - A. During construction of residences on the Historical Orchard, the Developer will (or the Developer will require the builder to) implement the following:

¹ Regulatory Authority for including conditions of approval for short and long subdivisions is based in part on [RCW 58.17.110\(1\)\(a\)](#), “...appropriate provisions are made for, but not limited to, the public health, safety, and general welfare...”

² Regulatory Authority for including conditions of approval for multifamily development projects subject to SEPA review is based in part on [RCW 43.21C.030](#).

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- i. Implement “Construction Best Management Practices” identified in the Model Remedy for Central Washington LA Pesticide Contamination on Historical Orchards”.
- ii. Implement the following safeguards to protect workers against exposure to potential lead and arsenic in soil:
 - a. Requirements to wash hands before eating or drinking on site and to wash boots at the end of the day, before leaving the site.
 - b. Requirements for workers to wear gloves while handling contaminated soil
 - c. Assessment of requirements for complying with federal and state safety regulations
- iii. Place 6 inches of clean soil cover on top of soils in all landscaped areas that will be used by residents (e.g., grass lawns, play areas, parks, and developed common areas).
- iv. Use clean dirt from the stockpile made available by the Developer, or other topsoil that has been tested for an appropriate suite of contaminants, including lead and arsenic and approved by Ecology.
- v. All areas of each residential lot within the Historical Orchard must be covered with one of the following surfaces:
 - a. Permanent impermeable surfaces such as concrete, asphalt, building foundations or other permanent surfaces.
 - b. 6 inches of clean soil on top of a marker material such as Tenax Guardian Visual Barrier.
 - c. 6 inches of rock, compacted gravel, or other material approved by Ecology on top of a marker material as described above.
- vi. Based on historical agricultural use of the Property, the soil within that portion of the Property identified as Historical Orchard Areas is likely to contain lead and/or arsenic contamination in shallow soils due to pesticide management practices that were legal prior to 1950. The following best management practices are important for managing risks associated with long-term regular contact with contaminated soil.
 - a. All fruit and vegetable gardens shall be in raised beds, with imported clean soil.
 - b. Following the completion of each residence, including landscaping, further excavation and ground disturbing activities are prohibited, unless the area disturbed is properly capped with clean soil on top of a marker material or otherwise encapsulated with impervious surfaces.
 - c. A marker has been placed on top of soils in areas that are capped with 6 inches of clean soil. If an Owner encounters the marker, all soil beneath that marker potentially contains impacted soils and must be buried, at depth, below 6 inches of clean soil.
 - d. Wash hands with soap after working or playing in the dirt
 - e. Ensure grass layer is kept up so no bare patches of soil are present
 - f. Remove shoes prior to entering the home.
 - g. Wash children’s toys and pacifiers frequently.
 - h. Wear shoes and gloves when gardening and working outdoors.
 - i. Wash all fruits and vegetables before eating.
 - j. Wash dirt off pets frequently.
 - k. Create children’s play areas (for example, raised sand boxes or rubber mats below play areas).
 - l. Vacuum and dust the home at least weekly.