



DEPARTMENT OF  
**ECOLOGY**  
State of Washington

# **MTCA Cleanup Rulemaking Chapter 173-340 WAC Preliminary Draft**

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*Sections 350, 360, and 370*

May 28, 2020

**Purpose of this document:**

This document provides a preliminary draft of Ecology's proposed changes to Sections 350, 360, and 370 of Chapter 173-340 WAC, Model Toxics Control Act (MTCA) Cleanup Regulations, for review and consideration by the Stakeholder and Tribal Advisory Group (STAG) in advance of STAG meetings scheduled for June 8 and 25, 2020. The document also includes background information and a list of questions that Ecology would like STAG members to consider when reviewing the preliminary draft to facilitate discussions at the meeting and written comments.

**For more information about the cleanup rulemaking:**

Visit Ecology's website at <http://www.ecy.wa.gov/programs/tcp/regs/wac173360/1602inv.html>.

**For more information about the Stakeholder and Tribal Advisory Group:**

Visit Ecology's website at [https://www.ezview.wa.gov/site/alias\\_1988/37514/overview.aspx](https://www.ezview.wa.gov/site/alias_1988/37514/overview.aspx).

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**Accommodation requests:**

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# Acronyms and Abbreviations

Acronym or Abbreviation	Definition
CSL	Contaminated Sites List
DCA	Disproportionate Cost Analysis
Ecology	Washington State Department of Ecology
FS	Feasibility Study
MTCA	Model Toxics Control Act
PLIA	Pollution Liability Insurance Agency
PLP	Potentially Liable Person
RAG	Remedial Action Grants
RCW	Revised Code of Washington
RI	Remedial Investigation
SMS	Sediment Management Standards
STAG	Stakeholder and Tribal Advisory Group
TCP	Toxics Cleanup Program
TEE	Terrestrial Ecological Evaluation
VCP	Voluntary Cleanup Program
U.S. EPA	United State Environmental Protection Agency
WAC	Washington Administrative Code

# **Background**

This chapter provides background information about the remedy selection process under the Model Toxics Control Act (MTCA), Chapter [70.105D](#) RCW. This information is intended to help facilitate review by the Stakeholder and Tribal Advisory Group (STAG) of the draft changes to the rules governing the remedy selection process. For additional background, please consult the following previous STAG briefing documents:

- [Remedy Selection and Disproportionate Cost Analysis](#) (January 30, 2020).
- [Environmental Justice in Remedy Selection](#) (March 5, 2020).

### Cleanup process

The basic steps of the cleanup process for contaminated sites under the Model Toxics Control Act (MTCA), Chapter [70.105D](#) RCW, were established in 1990 and included in Chapter [173-340](#) WAC (Cleanup Rule). These are:

1. Site discovery and reporting
2. Initial investigation
3. Site hazard assessment
4. Hazard ranking
5. Remedial investigation/feasibility study ← Focus of this review packet
6. Cleanup action selection ← Focus of this review packet
7. Site cleanup

Read more about the [cleanup process](#).

### Scope of this review packet

This review packet addresses **Steps 5 and 6** of the cleanup process shown above. WAC [173-340-350](#) through [173-340-390](#) of the MTCA Cleanup Rule provide detailed requirements and procedures for remedy selection. This review packet presents preliminary draft rule language for only the following rule sections, which define the principal structure of the remedy selection process:

- Section 350 – Remedial investigation and feasibility study.
- Section 360 – Requirements for cleanup actions.
- Section 370 – Expectations for cleanup actions.

Ecology did not include several other sections of the MTCA remedy selection process in this review packet. While Ecology does not plan on making any substantive changes to those sections, Ecology may make some clarifications and corrections. Any changes will be included in the comprehensive second draft, which Ecology will provide to the STAG for review late this year. These sections are:

- Section 355 – Development of cleanup alternatives that include remediation levels.
- Section 357 – Quantitative risk assessment of cleanup action alternatives.
- Section 380 – Cleanup action plan.
- Section 390 – Model remedies.

## Statutory authority and requirements

MTCA authorizes Ecology to:

- “Investigate, provide for investigating, or require potentially liable persons to investigate any releases or threatened releases of hazardous substances, including but not limited to inspecting, sampling, or testing to determine the nature or extent of any release or threatened release” (RCW [70.105D.030](#)(1)(a)).
- “Conduct, provide for conducting, or require potentially responsible persons to conduct remedial actions ... to remedy releases or threatened releases of hazardous substances.” When doing so, MTCA requires Ecology to “give preference to permanent solutions to the maximum extent practicable” (RCW [70.105D.030](#)(1)(b)).

## Remedial investigations

WAC [173-340-350](#) specifies the requirements and procedures for conducting a remedial investigation of the site. The purpose of the investigation is to adequately characterize the site to enable cleanup standards to be established and cleanup action alternatives to be developed and evaluated in a feasibility study.

## Feasibility studies

WAC [173-340-350](#) also specifies the requirements and procedures for conducting a feasibility study of alternatives for cleaning up the site. The purpose of the study is to develop and evaluate alternatives to enable a cleanup action to be selected. As outlined in the draft rule, a feasibility study includes the following steps:

- **Step 1:** Identify cleanup goals.
- **Step 2:** Identify cleanup action alternatives for evaluation in the study.
  - A cleanup action is the overall remedy for a site, and may include a combination of cleanup action components (such as treatment and monitored natural attenuation).
  - Cleanup action alternatives, which may include different combinations of components, constitute the various possible ways to clean up the contamination at a site.
- **Step 3:** Screen alternatives from further evaluation based on a preliminary analysis.
- **Step 4:** Conduct a detailed evaluation of each of the remaining alternatives to determine it meets the requirements for cleanup actions in WAC [173-340-360](#) and conforms (as appropriate) to the expectations in WAC [173-340-370](#). Typically, the evaluations are conducted as follows:
  - Determine which of the alternatives meets all of the requirements except for the one that requires the cleanup action to be “permanent to the maximum extent practicable.”
  - Conduct a disproportionate cost analysis to determine which of the remaining alternatives is permanent to the maximum extent practicable.
- **Step 5:** Select preferred alternative based on the detailed evaluation.



## Selection of cleanup actions

The cleanup action is selected based on the feasibility study of cleanup action alternatives. Who conducts the study and selects the cleanup action depends on the administrative option.

- For **Ecology-conducted remedial actions**, Ecology conducts the feasibility study and selects the cleanup action.
- For **Ecology-supervised remedial actions**, Ecology may either conduct or direct a potentially liable person (PLP) to conduct the feasibility study. If the PLP conducts, Ecology may require the PLP to consider one or more additional cleanup action alternatives in the study. Ecology may also determine that a PLP's evaluations are insufficient and require additional evaluation. In these cases, Ecology may also complete the feasibility study itself. Based on the study, Ecology selects the cleanup action.
- For **independent cleanups remedial actions**, the person conducting the actions conducts the feasibility study and selects the cleanup action. However, only Ecology and the [Pollution Liability Insurance Agency](#) (PLIA) are authorized to determine whether the remedial actions, including the feasibility study and cleanup, are sufficient under MTCA to delist the site. To be sufficient, the remedial actions must meet the substantive requirements of MTCA.

For Ecology-conducted and Ecology-supervised remedial actions, the cleanup action selected by Ecology is included in a draft cleanup action plan, which is submitted for public review and comment. After considering public comments, Ecology finalizes and issues the cleanup action plan. The availability of the plan is published in the [Site Register](#) and through other appropriate means. See [WAC 173-340-380](#).

Figure 1 provides a graphic summary of the overall remedy selection process. It is an updated version of the figure included in earlier briefing packets, with changes to conform to the preliminary draft rule.

## Requirements for cleanup actions

WAC [173-340-360](#) specifies the requirements for cleanup actions and the procedures for determining whether a cleanup action alternative evaluated in the feasibility study meets those requirements. As specified in WAC [173-340-360](#)(2) of the current rule, a cleanup action alternative must:

- Meet the “threshold” requirements in WAC [173-340-360](#)(2)(a):
  - Protect human health and the environment.
  - Comply with MTCA cleanup standards.
  - Comply with applicable state and federal laws.
  - Provide for compliance monitoring.
- Be permanent, or use permanent solutions to the maximum extent practicable (WAC [173-340-360](#)(2)(b)(i) and (3)). To make this determination, one must conduct a DCA and consider the following factors as part of the analysis:
  - Protectiveness.

- Permanence.
  - Cost.
  - Long-term effectiveness.
  - Short-term risk (i.e., risks related to construction and initial implementation).
  - Technical and administrative implementability.
  - Public concerns.
- Provide for a reasonable restoration timeframe (WAC [173-340-360](#)(2)(b)(ii) and (4)).
  - Consider public concerns raised during the public involvement process (WAC [173-340-360](#)(2)(b)(iii) and (3)(f)(vii)).
  - Comply with other media-specific (such as groundwater) or action-specific (such as dilution or dispersion) requirements (WAC [173-340-360](#)(2)(c) through (h)).

### Expectations for cleanup actions

WAC [173-340-370](#) specifies Ecology's expectations regarding the likely results of the remedy selection process. Selecting a cleanup action conforming to the expectations is not a substitute for conducting a feasibility study. Ecology also recognizes that conformance with the expectations may not be appropriate at some sites.

As specified in the draft rule, the expectations must be considered when evaluating cleanup action alternatives in the feasibility study. Any non-conformance of the preferred cleanup action alternative to the expectations must be documented and explained in the feasibility study report

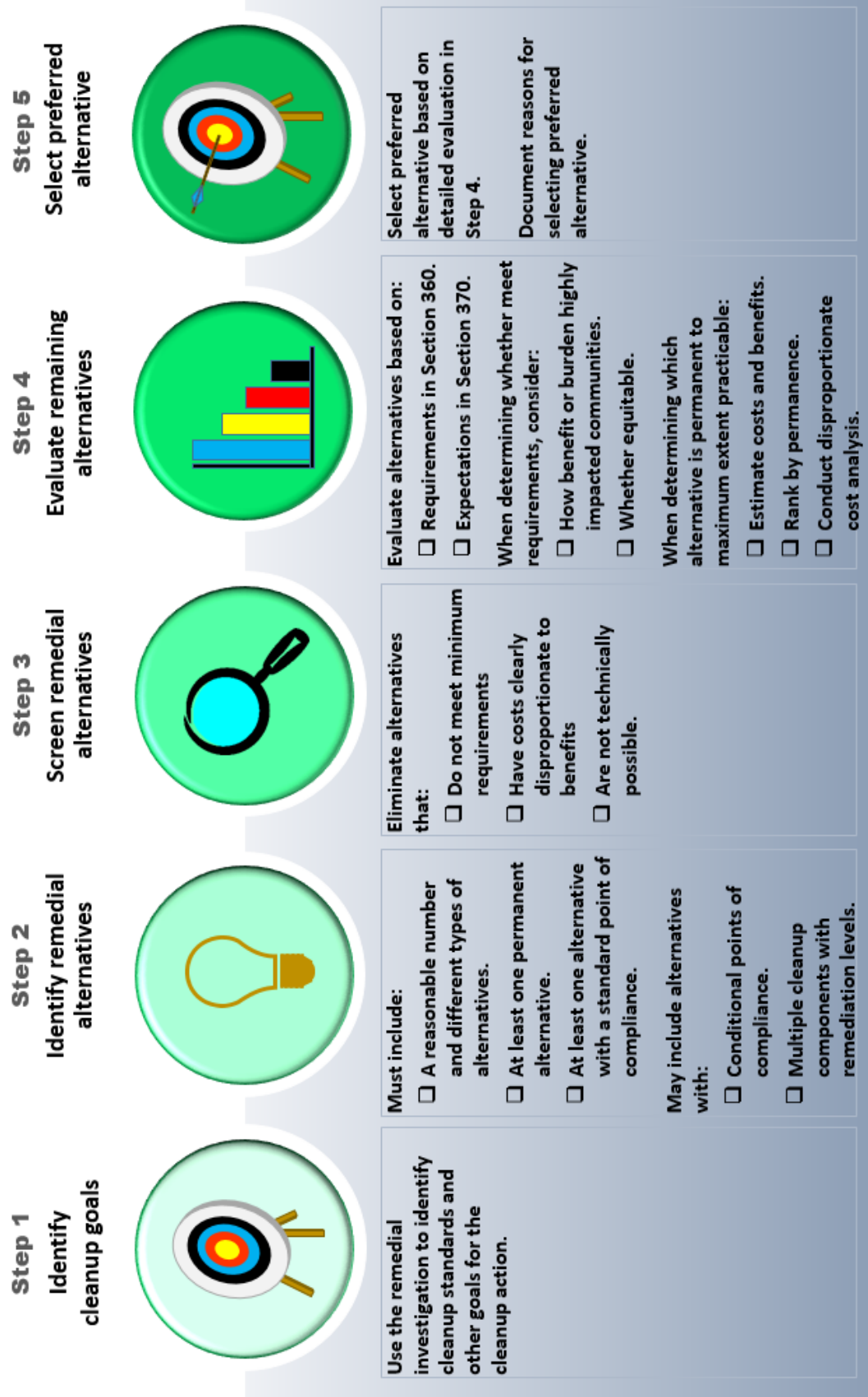
### Selected definitions

The following terms are used in the remedy selection process and are defined in WAC [173-340-200](#) of the current rule. The terms are presented here in logical, rather than alphabetical, order and with emphasis added to assist readers.

- **“Remedy” or “remedial action”** means any action or expenditure consistent with the purposes of chapter [70.105D](#) RCW to identify, eliminate, or minimize any threat posed by hazardous substances to human health or the environment including any investigative and monitoring activities with respect to any release or threatened release of a hazardous substance and any health assessments or health effects studies conducted in order to determine the risk or potential risk to human health.
- **“Site”** means the same as “facility,” which means ... any *site* or area where a hazardous substance, other than a consumer product in consumer use, has been deposited, stored, disposed of, or placed, or otherwise come to be located.
- **“Cleanup action”** means any *remedial action*, except interim actions, taken at a *site* to eliminate, render less toxic, stabilize, contain, immobilize, isolate, treat, destroy, or remove a hazardous substance that complies with WAC [173-340-350](#) through [173-340-390](#)

- **“Cleanup”** means the implementation of a **cleanup action** or interim action.
- **“Remedial investigation/feasibility study”** [often called **“RI/FS”**] means a **remedial action** that consists of activities conducted under WAC [173-340-350](#) to collect, develop, and evaluate sufficient information regarding a **site** to select a **cleanup action** under WAC [173-340-360](#) through [173-340-390](#).
- **“Cleanup action alternative”** means one or more treatment technology, containment action, removal action, engineered control, institutional control or other type of **remedial action** (**“cleanup action components”**) that, individually or, in combination, achieves a **cleanup action** at a **site**.
- **“Permanent solution”** or **“permanent cleanup action”** means a **cleanup action** in which **cleanup** standards of WAC [173-340-700](#) through [173-340-760](#) can be met without further action being required at the site being cleaned up or any other site involved with the **cleanup action**, other than the approved disposal of any residue from the treatment of hazardous substances.
- **“Practicable”** means capable of being designed, constructed and implemented in a reliable and effective manner including consideration of cost. When considering cost under this analysis, an **alternative** shall not be considered practicable if the incremental costs of the **alternative** are disproportionate to the incremental degree of benefits provided by the **alternative** over other lower cost **alternatives**.
- **“Cleanup action plan”** means the document prepared by the department under WAC [173-340-380](#) that selects the **cleanup action** and specifies cleanup standards and other requirements for the cleanup action.

Figure 1. MTCA remedy selection process under **preliminary draft**



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# **Overview of Proposed Changes**

The preliminary draft of proposed rule changes included in this packet reflect discussions and written comments received following with the Stakeholder & Tribal Advisory Group (STAG) meetings on January 30 and March 5, 2020, as well as a briefing for STAG members on environmental justice methods and metrics at Ecology on February 25, 2020. Written comments and responses to questions from STAG members are available on the [“Events” tab of the STAG web site](#). Changes in this draft also reflect comments received during the [2018 Exploratory Rulemaking](#) and from Ecology’s internal Toxics Cleanup Program Rule Team, who have reviewed and commented extensively on earlier versions of this draft.

### **Purpose of changes**

The purpose of the proposed changes in the preliminary drafts of Sections 350, 360, and 370 is to:

- Clarify and make targeted updates to the requirements governing remedial investigations, feasibility studies, and cleanup actions.
- Provide a framework for developing any needed guidance on how to conduct remedial investigations and feasibility studies.
- Improve the readability of the rule language.

Following this rulemaking, and as resources permit, Ecology plans to develop any needed policies or guidance to help Ecology site managers and the regulated community conduct remedial investigations and feasibility studies, including:

- How to evaluate impacts on highly impacted communities and consider equity.
- How to conduct disproportionate cost analyses.

### **Overview of changes**

In the preliminary drafts of Sections 350, 360, and 370 of Chapter 173-340 WAC, Model Toxics Control Act (MTCA) Cleanup Regulations, Ecology is proposing to make the following types of changes:

- Clarified the applicability of the sections, including to sediments sites and cleanup units.
- Separated performance and reporting requirements for remedial investigations and feasibility studies.
- Clarified and made targeted technical updates to performance requirements for remedial investigations, such as for vapor intrusion.
- Restructured and clarified the procedures for how to conduct a feasibility study, providing a step-by-step process.
- Clarified and updated requirements for documenting remedial investigations and feasibility studies based on other changes.
- Restructured and clarified the requirements for cleanup actions.

- Restructured and clarified the procedures for how to conduct a disproportionate cost analysis to determine whether a cleanup action is permanent to the maximum extent practicable, providing a step-by-step process.
- Clarified the role of Ecology's expectations for cleanup actions in feasibility studies and remedy selection.
- Added specific requirements on how to consider environmental justice as part of the remedy selection process, including what information must be collected and how the information must be considered when evaluating cleanup action alternatives. Also added definition of "highly impacted communities."
- Added specific requirements on how to consider climate change resilience as part of the remedy selection process, including what information must be collected and how the information must be considered when evaluating cleanup action alternatives.

The review packet includes two versions of the preliminary draft rules:

- A tracked change version. This version tracks changes with strikeouts and underlines, and footnotes notable changes.
- A clean version that is easy to read. This version does not track changes with strikeouts and underlines or footnote notable changes.

The review packet also excerpts provisions related to environmental justice and climate change resilience to make it easier to see how all of the related provisions work together.



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# **Review Materials, Meeting Schedule, and Questions for Discussion**

## Materials for review.

We would like you to review and comment on the preliminary drafts of the following sections of the Model Toxics Control Act (MTCA) Cleanup Rule, which are included in this packet:

- WAC 173-340-350.
- WAC 173-340-360.
- WAC 173-340-370.

## Deadline for written comments

Please submit any written comments on the preliminary drafts by **July 10, 2020**.

## Schedule and focus of STAG meetings

With the ongoing presence of COVID19, Ecology will convene all Stakeholder and Tribal Advisory Group (STAG) meetings as webinars (via Zoom) until further notice.

Due to the significant modification in the meeting format, the fifth STAG meeting on Thursday, May 28, 2020, has been reconstructed from an all-day in-person meeting, into three shorter webinar meetings.

- **Meeting 5A – Thursday, May 28, 2020, 9:00 am – Noon**

At this first meeting, we will brief you on what's included in the STAG packet and walk you through the draft rules. We will also brief you on our plan for the next two STAG meetings in June (Meetings 5B and 5C) to discuss the draft rules in the packet, and our longer term plans. During this meeting, we will respond to any clarifying questions from STAG members, as well as the public. Shortly after this meeting, we'll ask STAG members for input on which questions should be prioritized for discussion during the June meetings.

- **Meeting 5B – Monday, June 8, 2020, 8:00 am – 1:00 pm (tentative)**

The purpose of the second meeting is to start the discussion on the draft rule changes and questions posed by Ecology in the STAG packet. The planned focus of the meeting will be **WAC 173-340-350 (subject to change)**. There will be an opportunity for public comment. Ecology will provide additional details on the agenda before the meeting.

- **Meeting 5C – Thursday, June 25, 2020, 8:00 am – 1:00 pm (tentative)**

The purpose of the third meeting is to complete the discussion on the draft rule changes and questions posed by Ecology in the STAG packet. The planned focus of the meeting will be **WAC 173-340-360 and 173-340-370 (subject to change)**. There will be an opportunity for public comment. Ecology will provide additional details on the agenda before the meeting.

## Overview of questions for discussion during STAG meetings

Please come prepared to discuss the following questions about the preliminary drafts at the two meetings scheduled in June. The questions are organized by section and topic. Before each question, we provide some background information, reference relevant provisions in the draft rule, and identify any additional reference materials for additional context.

## Questions on WAC 173-340-350: Remedial investigation and feasibility study

### 1. Cleanup units

- **Background**

Under the current MTCA cleanup rule, Ecology may authorize the division of a site into administrative cleanup units to facilitate and stage the investigation and cleanup of the site. The division does not alter cleanup liability for the site. Ecology has established cleanup units for Ecology-supervised sites (such as military facilities with several distinct releases or sites with both upland and sediment contamination). Ecology has also allowed property-specific cleanup units under the [Voluntary Cleanup Program](#) (VCP).

While the MTCA cleanup rule does not preclude the use of cleanup units, it also does not directly address the technical and policy issues that arise when dividing a site into units. For example, to what extent do you need to investigate the larger site to establish cleanup standards for the site and select a cleanup action for the unit? For independent cleanups under the VCP, Ecology published detailed [Guidelines for Property Cleanups](#).

In 2013, Ecology amended Part V of Chapter [173-204](#) WAC, which governs the cleanup of sediment contamination. During that rulemaking, Ecology amended the rule to regulate the use of administrative cleanup units within sediment sites or at upland sites with a sediment component.

Ecology has decided to defer amending the MTCA cleanup rule to regulate the use of administrative cleanup units until a future rulemaking since it has implications throughout the rule, including cleanup standards.

- **Questions**

- Do you support the use, as appropriate, of administrative cleanup units within a site to facilitate site investigations and cleanups?
- If sites are separated into administrative cleanup units, do you have any concerns with how the cumulative impacts of the site or cleanup are considered?

### 2. Applicability to sediment sites and cleanup units

- **Background**

When investigating and cleaning up sites impacting sediments, you must comply with both the requirements in the MTCA cleanup rule and the more specific requirements for contaminated sediments in Part V of the Chapter [173-204](#) WAC, Sediment Management Standards (SMS). This includes requirements for remedial investigations and feasibility studies.

- **References**

See WAC 173-340-350(2) in the preliminary draft rule. For additional context, see Part V of Chapter [173-204](#) WAC, and WAC [173-204-550](#) in particular.

- **Question**

For sediment sites and cleanup units, does the draft rule sufficiently clarify that both rules apply?

### 3. Applicability to independent remedial actions

- **Background**

Under WAC 173-340-350, remedial investigations and feasibility studies may be conducted independently.

Independent investigations and studies must be conducted in accordance with the requirements of WAC 173-340-350.

However, independent investigations and studies do not need to meet the reporting and other administrative requirements in WAC 173-340-350. Independent remedial actions must be reported in accordance with the administrative requirements in WAC 173-340-515.

For example, if you are conducting a cleanup independently, you are not required to write a feasibility study report for Ecology review and approval before conducting your cleanup. However, you are required to submit an independent remedial action report after completing your cleanup. That report must include sufficient information to serve the same purpose as the feasibility study report. In particular, your report must include sufficient information for Ecology to determine whether the cleanup you selected meets the substantive requirements of MTCA.

- **References**

See WAC 173-340-350(2) through (4) in the preliminary draft rule. For additional context, see WAC [173-340-515](#) in the current rule and Ecology's [Guidelines for Property Cleanups under the Voluntary Cleanup Program](#).

- **Questions**

For independent remedial actions, does the draft rule sufficiently clarify:

- Whether the substantive requirements of this section apply (i.e., those that govern the sufficiency of the remedial investigation or feasibility study)?
- Whether the administrative requirements of this section apply (i.e., those that govern reporting, review and approval, and public involvement)?

If more specific direction is needed, should it be included in the rule or in guidance from Ecology? If in rule, should it be included in this section or in Section 515?

#### **4. Site-specific flexibility**

- **Background**

The purpose of the remedial investigation and feasibility study is limited to collecting and evaluating sufficient information to enable cleanup standards to be established and a cleanup action to be selected. Ecology recognizes that the scope of the investigation and study will be site-specific and vary depending on many factors.

- **References**

See WAC 173-340-350(5) in the preliminary draft rule.

- **Questions**

Does the draft rule provide adequate flexibility to avoid unnecessary investigations of the site and studies of cleanup action alternatives?

#### **5. Remedial investigation – vapor intrusion**

- **Background**

Ecology proposes updating the requirements governing the investigation of the vapor intrusion pathway to reflect changes in our understanding of this pathway since Ecology last amended the rule in 2001. Specifically, Ecology proposes that the investigation must adequately characterize the potential impacts of vapor migration on subsurface soil gas, on air quality within current and future buildings or other structures, and on outdoor ambient air. The investigation may require sampling, where appropriate.

**References**

See WAC 173-340-350(6)(c)(v) in the preliminary draft rule.

- **Questions**

Do you have any concerns with the changes in draft rule for investigating the vapor intrusion pathway?

#### **6. Remedial investigation – climate resilience**

- **Background**

Under the current rule, Ecology published guidance to help cleanup project managers understand the risks to cleanup sites associated with a changing climate and to provide guidance to those managers on how to increase the resilience of cleanups at each phase of the cleanup process: site investigations; remedy selection, design, and implementation; and operation and maintenance.

To explicitly incorporate consideration of climate resilience, the draft rule requires the collection of sufficient information during the investigation about climatological characteristics to help determine during the feasibility study whether a cleanup action

alternative will be resilient to the impacts of climate changes, and therefore effective in the long-term. The draft rule specifies certain characteristics that may be relevant, depending on site-specific factors, such as sea level rise and potential for wildfires.

### References

See WAC 173-340-350(6)(c)(vi) in the preliminary draft rule.

For additional context, see the climate resilience requirements for cleanup actions in WAC 173-340-360(3)(a)(v) and (5)(d)(iii)(A)(iii) in the preliminary draft rule.

See also Ecology's guidance on [Adaptation Strategies for Resilient Cleanups](#), Publication No. 17-09-052.

- **Questions**

- Does the draft rule adequately specify what information should be collected during the remedial investigation to evaluate the resilience of cleanup action alternatives to the impacts of climate change?
- Did Ecology strike the right balance between what is specified in rule versus guidance?
- Is any additional guidance needed, including definitions of terms?

## 7. Remedial investigation – definition of highly impacted communities

- **Background**

The draft rule defines a “highly impacted community” as one that “Ecology has determined is likely to bear a disproportionate burden of public health risks from environmental pollution, such as minority, low-income, tribal or indigenous populations.”

This definition is consistent with the current definition in WAC 173-322A-100(24), which applies to remedial actions grants and loans to local governments. In response to comments from STAG members, though, the draft rule goes further by adding examples of the types of populations that might suffer disproportionate burdens.

For the remedial action grant and loan program, Ecology already has guidance on how to identify highly impacted communities. Ecology currently identifies a highly impacted community as one where the population of the census tract exceeds the 80th percentile for one or more of the following five criteria:

- Low income;
- Less than a high school education;
- Minority;
- Under 5 years of age;
- Over 65 years of age.

Ecology also identifies a community as highly impacted if it is linguistically isolated. Ecology considers a community as linguistically isolated if more than 5% or 1,000 people within the census tract speak English “less than very well.” This approach mirrors the recommendations from the U.S. Environmental Protection Agency for including environmental justice concerns into environmental work. Section 4.5 of the [Remedial Action Grant and Loan Guidance for the 2021–23 Biennium](#). For additional background, see the [Handout for the Environmental Justice Map Tool Presentation](#) at the March 5, 2020, STAG Meeting.

The term “highly impacted community” is used in more than one context in the draft rule, including site prioritization and remedy selection. When selecting a remedy, the draft rule requires that you:

- Investigate whether and how a site affects such communities;
- Identify how cleanup action alternatives benefit or burden such communities; and whether those benefits and burdens are equitably distributed.

As specified in the draft rule, Ecology expects that the selected cleanup action will equitably distribute benefits and burdens.

- **References**

See definition in WAC 173-340-200 of the preliminary draft rule (included in this packet).

For additional background, see [WAC 173-322A-100\(24\)](#), Section 4.5 of the [Remedial Action Grant and Loan Guidance for the 2021–23 Biennium](#) (Publication No. 20-09-055), and the [Handout for the Environmental Justice Map Tool Presentation](#) at the March 5, 2020, STAG Meeting.

- **Questions**

- Does the expanded definition strike the right balance between what is specified in rule versus guidance?
- Should any other populations be identified explicitly in the rule?

## **8. Remedial investigation – effects on highly impacted communities**

- **Background**

The draft rule adds a requirement that the remedial investigation include an investigation of whether the site affects any “highly impacted communities” and, if so, how the site may impact those communities.

This includes a cumulative impact analysis based on existing and available data. Highly impacted communities are likely to experience cumulative impacts from multiple contaminated sites, environmental contamination from other sources, other kinds of public health risk, and exogenous cultural stressors.



Ecology intends to develop guidance on how to guide the investigations. To conduct this investigation, Ecology expects that you will:

- Use measures and data resources available online or in guidance from Ecology to determine and document whether the site may affect a highly impacted community; and
- Use existing information (available from Ecology or the Department of Health) to identify the likely impacts of the site on a highly impacted community, including cumulative impacts on those communities.

- **References**

See WAC 173-340-350(6)(c)(ix) in the preliminary draft rule.

Regarding the identification of highly impacted communities, see Section 4.5 of the [Remedial Action Grant and Loan Guidance for the 2021–23 Biennium](#) (Publication No. 20-09-055).

- **Questions**

- Does the draft rule strike the right balance between what is specified in rule (specificity) versus guidance (flexibility and adaptability)? Should anything else be specified in rule?
- Do you have any concerns with being able to conduct the required investigation?
- Should cumulative impacts on a highly impacted community be considered when assessing the effects of a site? If so, should only existing and available information about such impacts be considered?

## **9. Remedial investigation – ecological evaluations**

- **Background**

Remedial investigations must fully characterize threats to human health and the environment at the site. For sites with contaminated soil, the investigations must include a terrestrial ecological evaluation (TEE), as specified in WAC 173-340-7490 through 173-340-7494.

For some sites, it may be appropriate to base the TEE on conditions expected after completion of actions to protect humans and the aquatic environment. It may also be practical to defer the TEE to a second phase of remedial investigation, following investigations of human health and aquatic pathways.

However, in practice, particularly for independent cleanups, terrestrial ecological evaluations are often not conducted until after the feasibility study is completed. In effect, this practice excludes terrestrial environmental exposures from full consideration during the remedy selection process. For example, if a remedial investigation omits the

TEE assuming that land use controls will prevent future terrestrial environmental exposures, then the feasibility study may not fully consider more permanent alternatives that do not include such controls.

Ecology is considering whether and how the rule might be amended.

- **References**

See WAC 173-340-350(6)(c)(viii) in the preliminary draft rule.

- **Questions**

When should a terrestrial ecological evaluation be conducted during the remedial investigation and feasibility study (RI/FS)? Do you think the current rule should be changed or clarified? In particular:

- Is it appropriate to defer ecological evaluations until after the completion of human health evaluations and the selection of a preferred cleanup action alternative that is protective of human health (i.e., phase the RI/FS)?
- Is it appropriate to base ecological evaluations on the conditions anticipated to exist after a cleanup based on protection of human health?

## **10. Feasibility study – applicability**

- **Background**

The draft rule clarifies under what circumstances a feasibility study is not required and what must be reported to Ecology in those circumstances. A study is not required when prior remedial actions constitute a permanent cleanup action or when selecting a model remedy as the cleanup action or a component of a cleanup action. Studies are still required to select any remaining cleanup action components.

- **References**

See WAC 173-340-350(7)(b) in the preliminary draft.

- **Question**

Is the draft rule clear as to when a feasibility study is not required?

## **11. Feasibility study – procedural steps**

- **Background**

The draft rule seeks to clarify how to conduct a feasibility study by establishing the following procedural steps:

- Step 1: Identify cleanup goals.
- Step 2: Identify alternatives.
- Step 3: Screen alternatives and components.

- Step 4: Evaluate alternatives.
- Step 5: Select preferred alternative.

The steps reflect current requirements and practice. Any substantive changes are noted in the draft rule. Figure 1 in the background section of this document summarizes the updated MTCA remedy selection process.

Ecology expects to develop additional guidance for cleanup project managers on how to conduct feasibility studies.

- **References**

See WAC 173-340-350(7)(c) in the preliminary draft.

- **Questions**

Do you have any concerns with the steps for how to conduct a feasibility study specified in the draft rule? In particular:

- Does the draft rule strike the right balance between what is specified in rule (certainty and direction) versus guidance (flexibility and adaptability)?
- Do the steps inappropriately constrain how a study may be conducted?
- Did we omit or obscure any step in the study?

## **12. Feasibility study – Consideration of cleanup action expectations in Section 370**

- **Background**

In the draft rule, Ecology clarified the use of its expectations for cleanup actions in the feasibility study. The expectations represent the likely results of the study. The expectations must be considered when evaluating cleanup action alternatives in the study. If the preferred cleanup action alternative does not conform to the expectations, the basis for the non-conformance must be explained in the feasibility study report.

- **References**

See WAC 173-340-350(7)(c)(iv) and (v), 173-340-350(7)(d)(viii), and 173-340-370 in the preliminary draft.

- **Question**

Do you have any concerns with how Ecology's expectations for cleanup actions in Section 370 must be considered in the feasibility study and how any non-conformance must be documented in the report?

### **13. Feasibility study – Reporting hazardous substances eliminated or remaining behind**

- **Background**

In the draft rule, Ecology requires that the feasibility study report document the following additional information:

- The location and estimated amount of each hazardous substance to be removed or treated by the alternative and the estimated time frame in which removal or treatment will occur; and
- The location, estimated amount, and projected concentration distribution of each hazardous substance remaining above proposed cleanup levels after implementing the alternative.

This information is needed to conduct the required evaluations in the study. This requirement is also consistent with changes to WAC 173-204-550 (SMS rule) in 2013.

- **References**

See WAC 173-340-350(7)(d)(v)(D) and (E) in the preliminary draft.

- **Question**

Do you have any concerns with requiring that this information, which is necessary to conduct the study, be included in the report?

### **14. Regulatory impacts –**

- a. What, if any, economic effects might the following changes to the remedial investigation and feasibility study requirements have on you or your constituents:
  - i. Investigation of climatological characteristics that are likely to affect the resilience of cleanup action alternatives?
  - ii. Investigation of whether and how highly impacted communities may be affected by a site?
  - iii. Other changes to WAC 173-340-350?
- b. Can you identify a less burdensome regulatory approach to implement the draft rule changes that complies with statutory requirements?
- c. Would the draft rule changes have a disproportionate impact on small businesses or local governments?
- d. Would the draft rule changes provide an advantage or disadvantage to Washington businesses compared to businesses in other states?

## Questions on WAC 173-340-360: Requirements for cleanup actions

### 1. Applicability – sediment sites and cleanup units

- **Background**

When investigating and cleaning up sites impacting sediments, you must comply with both the requirements in the MTCA cleanup rule and the more specific requirements for contaminated sediments in Part V of the Chapter 173-204 WAC, Sediment Management Standards. This includes requirements for cleanup actions.

- **References**

See WAC 173-340-360(2) in the preliminary draft rule. See also WAC 173-204-570 in the Sediment Management Standards.

- **Question**

For sediment sites and cleanup units, does the draft rule sufficiently clarify that both rules apply?

### 2. Requirements – reorganization

- **Background**

The draft rule restructures and seeks to simplify the list of cleanup action requirements in WAC 173-340-360(3). Requirements are organized by whether they are:

- General requirements.
- Action-specific requirements.
- Media-specific requirements.

The draft rule eliminates the concept of “threshold requirements.” Substantive changes to the list of requirements are noted.

- **References**

See WAC 173-340-360(3) in the preliminary draft rule.

- **Question**

Do you have any concerns with how the draft rule restructures the list of requirements?

### 3. Requirements – climate resilience

- **Background**

Under the current rule, the resilience of a cleanup action alternative to the impacts of climate change should be considered under the following requirements:

- Protect human health and the environment.
- Permanent to the maximum extent practicable.

Ecology has published guidance on how climate resilience should be considered under these existing requirements. See section 5.3 of [Adaptation Strategies for Resilient Cleanup Remedies](#), Publication No. 17-09-052.

To ensure that climate resilience is adequately considered in the feasibility study, the draft rule:

- Creates a separate requirement that cleanup actions must be “resilient to climate change impacts that have a high likelihood of occurring and severely compromising its long-term effectiveness” (WAC 173-340-360(3)(a)(v)).
- Clarifies that, when determining whether an alternative is permanent to the maximum extent practicable, climate change resilience must be considered when assessing long-term effectiveness (WAC 173-340-360(5)(d)(iii)(A)(III)).
- Adds an expectation in WAC 173-340-370 that reflects these requirements (WAC 173-340-370(10)).

- **References**

See WAC 173-340-360(3)(a)(v) and (5)(d)(iii)(A)(III) and 173-340-370(10) in the preliminary draft rule.

For additional context, see section 5.3 of [Adaptation Strategies for Resilient Cleanup Remedies](#), Publication No. 17-09-052.

- **Questions**

- Is it appropriate to include climate change resilience as both a general (absolute) requirement for cleanup action alternatives, and in the long-term effectiveness (comparative) criterion in the disproportionate cost analysis?
- Is it appropriate to also include a separate expectation regarding climate change resilience in WAC 173-340-370?

#### **4. Requirements and expectations – environmental justice**

- **Background**

MTCA declares that “each person has a fundamental and inalienable right to a healthful environment” (RCW [70.105D.010](#)). The draft rule reflects Ecology’s commitment to pursue equity for highly impacted communities throughout the state.

- **Requirement: WAC 173-340-360(3)(d)**

The draft rule requires that, when determining whether a cleanup action alternative meets the requirements in this section (such as whether it is protective or whether the restoration time frame is reasonable), you must specifically consider and document both:

- How a cleanup action alternative benefits or burdens a highly impacted community.

When evaluating burdens, a cumulative impact analysis must be conducted based on existing and available data. Burdens may be health, social, cultural, or economic.

- The degree to which the alternative equitably distributes its benefits and burdens between highly impacted and other communities.

- **Expectation: WAC 173-340-370(9)**

The draft rule establishes the following expectations for the selected cleanup action:

- The cleanup action will provide an equitable distribution of benefits and avoid an inequitable distribution of burdens between any highly impacted and other communities; and
- Any inequitable distribution will be mitigated in consultation with highly impacted communities.

- **Reporting: WAC 173-340-350(7)(d)(vii) and (viii)(B).**

The draft rule requires that the feasibility study report document:

- How equity was considered in the evaluation of cleanup action alternatives; and
- The degree to which the benefits and burdens of the preferred cleanup action alternative are equitably distributed and the basis for any inequitable distribution (non-conformance with expectation).

- **References**

See WAC 173-340-360(3)(d), 173-340-370(9), and 173-340-350(7)(d)(vii) and (viii)(B) in the preliminary draft rule. See also RCW [70.105D.010](#).

- **Questions**

- Which of the following approaches is preferable:
  - As specified in the draft rule, make equity a factor that must be considered when evaluating the existing requirements in Section 360 (such as whether an alternative is protective or whether the restoration time frame is reasonable) and create an equity expectation in Section 370?
  - Make equity a separate, stand-alone requirement that must be evaluated in Section 360?

- What burdens should be considered when assessing the burdens of an alternative – health, social, cultural, economic?
- Do you have any concerns with being able to analyze cumulative impacts on a highly impacted community when assessing the effects of an alternative?
- Do you have any concerns with being able to consider equity in the feasibility study?
- What type of expertise do you think is needed to consider equity in the feasibility study?
- What type of guidance should Ecology develop for considering equity? What expertise or other resources does Ecology need to develop such guidance?

## **5. Disproportionate cost analysis – applicability**

- **Background**

The draft rule clarifies that a disproportionate cost analysis is not required whenever a permanent cleanup action alternative is selected as the cleanup action, regardless of whether the cleanup is conducted by Ecology, by a potentially liable person under Ecology supervision, or independently. The current rule only addresses Ecology-supervised cleanups.

- **References**

See WAC 173-340-360(5)(b) in the preliminary draft rule.

- **Question**

Is the draft rule clear as to when a feasibility study is not required?

## **6. Disproportionate cost analysis – procedures / steps**

- **Background**

The draft rule seeks to clarify how to determine whether a cleanup action alternative uses permanent solutions to the maximum extent practicable by establishing the following four procedural steps:

- Step 1: Determine the benefits and costs of each cleanup action alternative.
- Step 2: Rank the cleanup action alternatives by degree of permanence.
- Step 3: Identify the initial baseline alternative for use in the analysis.
- Step 4: Conduct a disproportionate cost analysis.

The draft rule also seeks to clarify how to use a disproportionate cost analysis to determine which alternative is permanent to the maximum extent practicable. The



draft rule outlines three possible outcomes for each iteration of the analysis, and specifies any next steps. Except as noted, no substantive changes are intended.

Ecology expects to develop additional guidance for cleanup project managers on how to conduct a disproportionate cost analysis and make these determinations, similar to the guidance established for sediment sites in the [Sediment Cleanup User's Manual](#)" Publication No. 12-09-057, December 2019.

- **References**

See WAC 173-340-360(5)(c) in the preliminary draft rule.

For additional background, also consult STAG Briefing Paper, "[Remedy Selection and Disproportionate Cost Analysis](#)," January 30, 2020. Also see the "[Sediment Cleanup User's Manual](#)," Publication No. 12-09-057, December 2019.

- **Questions**

Do you have any concerns with the steps for how to determine whether a cleanup action alternative uses permanent solutions to the maximum extent practicable or how to use a disproportionate cost analysis to make that determination? In particular:

- Does the draft rule strike the right balance between what is specified in rule (certainty and direction) versus guidance (flexibility and adaptability)?
- Do the steps inappropriately constrain how the analysis may be conducted?
- Did we omit or obscure any step in the analysis?

## 7. Disproportionate cost analysis – consideration of qualitative benefits / weighting

- **Background**

The draft rule clarifies the following statement in the current rule regarding the estimation and comparison of benefits and costs (changes tracked):

The [estimation and](#) comparison of benefits and costs may be quantitative, but will often be qualitative and require the use of best professional judgment. ~~In particular, the department may favor or disfavor~~ [Based on site-specific factors, Ecology may weight](#) qualitative benefits and use that information in the analysis.

This statement acknowledges that combining quantitative and qualitative methods to compare costs and benefits of cleanup action alternatives necessarily requires the use of "best professional judgement." The draft also states more clearly than the current rule that, reflecting established practice, Ecology may or may not use weightings to favor or disfavor certain benefits or costs relative to others in the disproportionate cost analysis.

- **References**

See WAC 173-340-360(5)(c)(i) in the preliminary draft rule.

- **Questions**

- Does the draft rule provide sufficient assurance that:
  - Best professional judgement must be applied consistently when conducting a disproportionate cost analysis?
  - The basis for judgements, including weightings, must be documented and supported by reasoned arguments?
- If additional requirements or conditions for professional judgement during the remedy selection process are needed, what might these be, and should these be provided in rule or in guidance?

## 8. Disproportionate cost analysis – test – “substantially exceed”

- **Background**

In the current rule, the test for determining whether costs are disproportionate to benefits is whether:

the incremental costs of the alternative over that of a lower cost alternative **exceed** the incremental degree of benefits achieved by the alternative over that of the other lower cost alternative (WAC 173-340-360(3)(e)(i)).

In the draft rule, Ecology revised the test for determining whether costs are disproportionate to benefits is whether:

the incremental costs of the baseline alternative over the next most permanent alternative **substantially exceed** the incremental degree of benefits of the baseline alternative over the next most permanent alternative (WAC 173-340-360(5)(c)(iv)(A)(II) in the draft rule).

By inserting “substantially” before the word “exceed,” Ecology plainly acknowledges the inherent uncertainty of the disproportionate cost analysis (DCA). This uncertainty arises from both 1) the usual uncertainty of most engineering costs estimates, and 2) the unusual degree of uncertainty and need for professional judgment when estimating benefits and comparing quantitative and qualitative costs and benefits (see WAC 173-340-360(5)(c)(i) in the draft rule).

The original MTCA cleanup rule included a “substantial and disproportionate” standard similar to the one proposed in this draft. Based on discussions by the Washington legislature’s Policy Advisory Committee (PAC) in 1995, Ecology removed the term “substantial” from the standard in 2001. The PAC argued that the term “substantial” was “subsumed” within the term “disproportionate.” See the [Concise Explanatory Statement for the 2002 Rule Amendments](#), GQ 5.4.10, p. 54, for further discussion. During the suspended 2010 rulemaking, Ecology considered reintroducing “substantial” in the interest of greater clarity and transparency.

- **References**

See WAC 173-340-360(5)(c)(i) and (iv)(A)(II) in the preliminary draft rule.

For additional context, see the [Concise Explanatory Statement for the 2002 Rule Amendments](#), GQ 5.4.10, p. 54.

- **Questions**

- Should the word “substantially” be re-introduced before the word “exceed” in the disproportionate cost analysis test to reflect the high degree of uncertainty and use of professional judgment in the analysis?
- Does Ecology need to provide additional guidance regarding uncertainty and the role of professional judgement when conducting a disproportionate cost analysis?

## **9. Disproportionate cost analysis – criteria – cost – descriptions**

- **Background**

For the disproportionate cost analysis (DCA), the draft rule restructures the description of the cost criterion, and expands and clarifies the types of construction and post-construction costs that may be considered. The draft rule also clarifies that redevelopment costs may not be considered as part of the analysis.

- **References**

See WAC 173-340-360(5)(d)(vii) in the preliminary draft rule.

- **Question**

Does the draft rule adequately describe the types of construction and post-construction costs that need to be identified and considered in the disproportionate cost analysis?

## **10. Disproportionate cost analysis – criteria – cost – design life and replacement costs**

- **Background**

For the disproportionate cost analysis (DCA), the draft rule clarifies when the costs of replacing or repairing a cleanup action component, including engineered controls, must be included in the cost estimate.

- **References**

See WAC 173-340-360(5)(d)(vii)(A) in the preliminary draft rule.

- **Questions**

- Should the draft rule specify a standard design life for cleanup action components necessary for removing or treating contaminants or for controlling contaminants remaining on site to protect human health and the environment?

- If so, what would be a realistic timeframe?

## **11. Disproportionate cost analysis – criteria – cost – discounting future costs**

- **Background**

For the disproportionate cost analysis (DCA), the draft rule regulates how future costs are estimated. In particular, the draft rule set standards for the use of present worth analysis, including what discount rates must be considered and what sources must be used for those rates, and cost escalation.

The draft rule follows accepted engineering economic and governmental cost analysis practice by allowing present worth analysis for comparing alternatives with significant and differing future costs. Present worth analysis calculates the present value of future costs and benefits using a discount rate. The analysis reflects the fact that future costs and benefits are worth less today. A higher discount rate lowers the present worth of a future costs and, conversely, a lower discount rate raises the present worth of future costs.

The draft rule incorporates language from the U.S. Office of Management and Budget (OMB) [Circular A-94](#) regarding the appropriate discount rate for government cost-effectiveness analyses. The OMB recommends a discount rate comparable to the current U.S. Treasury interest rate for bonds of comparable maturity to the life of the project. Projects with lives greater than 30 years should use the 30-year treasury rate. These discount rates are substantially lower than the rates of return commonly used to evaluate private and public investments.

- **References**

See WAC 173-340-360(5)(d)(vii)(B) in the preliminary draft rule.

For additional background on discount rates, see OMB [Circular A-94](#): Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Program. [Appendix C](#), as revised, includes discount rates for 2020.

- **Questions**

- Should the draft rule require the use of present worth analysis to estimate the present value of future costs in the disproportionate cost analysis? If so, under what circumstances?
- Should the rule specify what discount rates must be used in the present worth analysis?
- Do you have any concerns with the using the discount rates recommended by the U.S. Office of Management and Budget (OMB)?

**12. Regulatory impacts –**

- a. What, if any, economic effects might the following changes to the requirements for cleanup actions have on you or your constituents:
  - i. Consideration of the extent to which alternatives are resilient to the impacts of climate change?
  - ii. Consideration of how alternatives may benefit or burden highly impacted communities compared and whether the distribution of benefits and burdens is equitable?
  - iii. Other changes to WAC 173-340-360?
- b. Can you identify a less burdensome regulatory approach to implement the draft rule changes that complies with statutory requirements?
- c. Would the draft rule changes have a disproportionate impact on small businesses or local governments?
- d. Would the draft rule changes provide an advantage or disadvantage to Washington businesses compared to businesses in other states?

## **Current Rule**

**WAC 173-340-350 Remedial investigation and feasibility study**

- (1) **Purpose.** The purpose of a remedial investigation/feasibility study is to collect, develop, and evaluate sufficient information regarding a site to select a cleanup action under WAC [173-340-360](#) through [173-340-390](#).
- (2) **Timing.** Unless otherwise directed by the department, a remedial investigation/feasibility study shall be completed before selecting a cleanup action under WAC [173-340-360](#) through [173-340-390](#), except for an emergency or interim action.
- (3) **Administrative options.** A remedial investigation/feasibility study may be conducted under any of the procedures described in WAC [173-340-510](#) and [173-340-515](#).
- (4) **Submittal requirements.** For a remedial action conducted by the department or under a decree or order, a report shall be prepared at the completion of the remedial investigation/feasibility study. Additionally, the department may require reports to be submitted for discrete elements of the remedial investigation/feasibility study. Reports prepared under this section and under an order or decree shall be submitted to the department for review and approval. See also subsection (7)(c)(iv) of this section for information on the sampling and analysis plan and the safety and health plan. See WAC [173-340-515](#)(4) for submittal requirements for independent remedial actions.
- (5) **Public participation.** Public participation will be accomplished in a manner consistent with WAC [173-340-600](#).
- (6) **Scope.** The scope of a remedial investigation/feasibility study varies from site to site, depending on the informational and analytical needs of the specific facility. This requires that the process remain flexible and be streamlined when possible to avoid the collection and evaluation of unnecessary information so that the cleanup can proceed in a timely manner. Where information required in subsections (7)(c) and (8)(c) of this section is available in other documents for the site, that information may be incorporated by reference to avoid unnecessary duplication. However, in all cases sufficient information must be collected, developed, and evaluated to enable the selection of a cleanup action under WAC [173-340-360](#) through [173-340-390](#). In addition, for facilities on the federal national priorities list, a remedial investigation/feasibility study shall comply with federal requirements.
- (7) **Procedures for conducting a remedial investigation.**

  - (a) **Purpose.** The purpose of the remedial investigation is to collect data necessary to adequately characterize the site for the purpose of developing and evaluating cleanup action alternatives. Site characterization may be conducted in one or more phases to focus sampling efforts and increase the efficiency of the remedial investigation. Site characterization activities may be integrated with the development and evaluation of alternatives in the feasibility study, as appropriate.
  - (b) **Scoping activities.** To focus the collection of data and to assist the department in making the preliminary evaluation required under the State Environmental Policy Act

(see WAC [197-11-256](#)), the following scoping activities may be taken before conducting a remedial investigation:

- (i) Assemble and evaluate existing data on the site, including the results of any interim or emergency actions, initial investigations, site hazard assessments, and other site inspections;
- (ii) Develop a preliminary conceptual site model as defined in WAC [173-340-200](#);
- (iii) Begin to identify likely cleanup levels for the site;
- (iv) Begin to identify likely cleanup action components that may address the releases at the site;
- (v) Consider the type, quality and quantity of data necessary to support selection of a cleanup action; and
- (vi) Begin to identify likely applicable state and federal laws under WAC [173-340-710](#).

(c) **Content.** A remedial investigation shall include the following information as appropriate:

- (i) **General facility information.** General information, including: Project title; name, address, and phone number of project coordinator; legal description of the facility location; dimensions of the facility; present owner and operator; chronological listing of past owners and operators and operational history; and other pertinent information.
- (ii) **Site conditions map.** An existing site conditions map that illustrates relevant current site features such as property boundaries, proposed facility boundaries, surface topography, surface and subsurface structures, utility lines, well locations, and other pertinent information.
- (iii) **Field investigations.** Sufficient investigations to characterize the distribution of hazardous substances present at the site, and threat to human health and the environment. Where applicable to the site, these investigations shall address the following:
  - (A) **Surface water and sediments.** Investigations of surface water and sediments to characterize significant hydrologic features such as: Surface drainage patterns and quantities, areas of erosion and sediment deposition, surface waters, floodplains, and actual or potential hazardous substance migration routes towards and within these features. Sufficient surface water and sediment sampling shall be performed to adequately characterize the areal and vertical distribution and concentrations of hazardous substances. Properties of surface and subsurface sediments that are likely to influence the type and rate of hazardous substance migration, or are likely to affect the ability to implement alternative cleanup actions shall be characterized.



- (B) **Soils.** Investigations to adequately characterize the areal and vertical distribution and concentrations of hazardous substances in the soil due to the release. Properties of surface and subsurface soils that are likely to influence the type and rate of hazardous substance migration, or which are likely to affect the ability to implement alternative cleanup actions shall be characterized.
- (C) **Geology and groundwater system characteristics.** Investigations of site geology and hydrogeology to adequately characterize the areal and vertical distribution and concentrations of hazardous substances in the groundwater and those features which affect the fate and transport of these hazardous substances. This shall include, as appropriate, the description, physical properties and distribution of bedrock and unconsolidated materials; groundwater flow rate and gradient for affected and potentially affected groundwaters; groundwater divides; areas of groundwater recharge and discharge; location of public and private production wells; and groundwater quality data.
- (D) **Air.** An evaluation of air quality impacts, including sampling, where appropriate, and information regarding local and regional climatological characteristics which are likely to affect the hazardous substance migration such as seasonal patterns of rainfall, the magnitude and frequency of significant storm events, temperature extremes, prevailing wind direction, variations in barometric pressure, and wind velocity.
- (E) **Land use.** Information regarding present and proposed land and resource uses and zoning for the site and potentially affected areas and information characterizing human and ecological populations that are reasonably likely to be exposed or potentially exposed to the release based on such use.
- (F) **Natural resources and ecological receptors.**
  - (I) Information to determine the impact or potential impact of the hazardous substance from the facility on natural resources and ecological receptors, including any information needed to conduct a terrestrial ecological evaluation, under WAC [173-340-7492](#) or [173-340-7493](#), or to establish an exclusion under WAC [173-340-7491](#).
  - (II) Where appropriate, a terrestrial ecological evaluation may be conducted so as to avoid duplicative studies of soil contamination that will be remediated to address other concerns, such as protection of human health. This may be accomplished by evaluating residual threats to the environment after cleanup action alternatives for human health protection have been developed. If this approach is used, the remedial investigation

may be phased. Examples of sites where this approach may not be appropriate include: A site contaminated with a hazardous substance that is primarily an ecological concern and will not obviously be addressed by the cleanup action for the protection of human health, such as zinc; or a site where the development of a human health based remedy is expected to be a lengthy process, and postponing the terrestrial ecological evaluation would cause further harm to the environment.

(III) If it is determined that a simplified or site-specific terrestrial ecological evaluation is not required under WAC [173-340-7491](#), the basis for this determination shall be included in the remedial investigation report.

(G) **Hazardous substance sources.** A description of and sufficient sampling to define the location, quantity, areal and vertical extent, concentration within and sources of releases. Where relevant, information on the physical and chemical characteristics, and the biological effects of hazardous substances shall be provided.

(H) **Regulatory classifications.** Regulatory designations classifying affected air, surface water and groundwater, if any.

(iv) **Workplans.** A safety and health plan and a sampling and analysis plan shall be prepared as part of the remedial investigation/feasibility study. These plans shall conform to the requirements specified in WAC [173-340-810](#) and [173-340-820](#).

(v) **Other information.** Other information may be required by the department.

(8) **Procedures for conducting a feasibility study.**

(a) **Purpose.** The purpose of the feasibility study is to develop and evaluate cleanup action alternatives to enable a cleanup action to be selected for the site. If concentrations of hazardous substances do not exceed the cleanup level at a standard point of compliance, no further action is necessary.

(b) **Screening of alternatives.** An initial screening of alternatives to reduce the number of alternatives for the final detailed evaluation may be appropriate. The person conducting the feasibility study may initially propose cleanup action alternatives or components to be screened from detailed evaluation. The department shall make the final determination of which alternatives must be evaluated in the feasibility study. The following cleanup action alternatives or components may be eliminated from the feasibility study:

(i) Alternatives that, based on a preliminary analysis, the department determines so clearly do not meet the minimum requirements specified in WAC [173-340-360](#) that a more detailed analysis is unnecessary. This includes those alternatives for which costs are clearly disproportionate under WAC [173-340-360\(3\)\(e\)](#); and

- (ii) Alternatives or components that are not technically possible at the site.
- (c) **Content.** A feasibility study shall include the following information as appropriate.
  - (i) **General requirements.**
    - (A) The feasibility study shall include cleanup action alternatives that protect human health and the environment (including, as appropriate, aquatic and terrestrial ecological receptors) by eliminating, reducing, or otherwise controlling risks posed through each exposure pathway and migration route.
    - (B) A reasonable number and type of alternatives shall be evaluated, taking into account the characteristics and complexity of the facility, including current site conditions and physical constraints.
    - (C) Each alternative may consist of one or more cleanup action components, including, but not limited to, components that reuse or recycle the hazardous substances, destroy or detoxify the hazardous substances, immobilize or solidify the hazardous substances, provide for on-site or offsite disposal of the hazardous substances in an engineered, lined and monitored facility, on-site isolation or containment of the hazardous substances with attendant engineering controls, and institutional controls and monitoring.
    - (D) Alternatives may, as appropriate, include remediation levels to define when particular cleanup action components will be used. Alternatives may also include different remediation levels for the same component. For example, alternatives that excavate and treat soils at varying concentrations may be appropriate to evaluate. See WAC [173-340-355](#) for detailed information on establishing potential remediation levels to be evaluated in the feasibility study.
    - (E) If necessary, evaluate the residual threats that would accompany each alternative and determine if remedies that are protective of human health will also be protective of ecological receptors. See subsection (7)(c)(iii)(F) of this section.
    - (F) The feasibility study shall include alternatives with the standard point of compliance for each environmental media containing hazardous substances, unless those alternatives have been eliminated under (b) of this subsection, and may include, as appropriate, alternatives with conditional points of compliance.
    - (G) Each alternative shall be evaluated on the basis of the requirements and the criteria specified in WAC [173-340-360](#).
    - (H) A preferred cleanup action may be identified in the feasibility study, where appropriate.

- (I) Other information may be required by the department.
  - (ii) **Permanent alternatives.**
    - (A) Except as provided in (c)(ii)(B) of this subsection, the feasibility study shall include at least one permanent cleanup action alternative, as defined in WAC [173-340-200](#), to serve as a baseline against which other alternatives shall be evaluated for the purpose of determining whether the cleanup action selected is permanent to the maximum extent practicable. The most practicable permanent cleanup action alternative shall be included.
    - (B) The feasibility study does not need to include a permanent cleanup action alternative under any of the following circumstances:
      - (I) Where a model remedy is the selected cleanup action;
      - (II) Where a permanent cleanup action alternative is not technically possible; or
      - (III) Where the cost of the most practicable permanent cleanup action alternative is so clearly disproportionate that a more detailed analysis is not necessary, as determined through the screening process in (b)(i) of this subsection.
- (9) **Additional requirements.**
  - (a) **Cleanup levels.** Unless otherwise specified under this chapter, cleanup levels shall be established for hazardous substances in each medium and for each pathway where a release has occurred, using WAC [173-340-700](#) through [173-340-760](#). These are typically initially established during the scoping of the remedial investigation and may be further refined during the remedial investigation and/or feasibility study.
  - (b) **Compliance with other laws.** The department may require that a remedial investigation/feasibility study include additional information or analyses to comply with the State Environmental Policy Act or other applicable laws. This includes information necessary to make a threshold determination (see WAC [197-11-335](#)(1)), or information necessary to integrate the remedial investigation/feasibility study with an environmental impact statement (see WAC [197-11-262](#)).
  - (c) **Treatability studies.** The department may require treatability studies as necessary to provide sufficient information to develop and evaluate cleanup action alternatives for a site.
  - (d) **Other information.** Other information may be required by the department.

**WAC 173-340-360 Selection of cleanup actions**

- (1) Purpose.** This section describes the minimum requirements and procedures for selecting cleanup actions. This section is intended to be used in conjunction with the administrative principles for the overall cleanup process in WAC [173-340-130](#); the requirements and procedures in WAC [173-340-350](#) through [173-340-357](#) and WAC [173-340-370](#) through [173-340-390](#); and the cleanup standards defined in WAC [173-340-700](#) through [173-340-760](#).
- (2) Minimum requirements for cleanup actions.** All cleanup actions shall meet the following requirements. Because cleanup actions will often involve the use of several cleanup action components at a single site, the overall cleanup action shall meet the requirements of this section. The department recognizes that some of the requirements contain flexibility and will require the use of professional judgment in determining how to apply them at particular sites.

  - (a) Threshold requirements.** The cleanup action shall:

    - (i)** Protect human health and the environment;
    - (ii)** Comply with cleanup standards (see WAC [173-340-700](#) through [173-340-760](#));
    - (iii)** Comply with applicable state and federal laws (see WAC [173-340-710](#)); and
    - (iv)** Provide for compliance monitoring (see WAC [173-340-410](#) and [173-340-720](#) through [173-340-760](#)).
  - (b) Other requirements.** When selecting from cleanup action alternatives that fulfill the threshold requirements, the selected action shall:

    - (i)** Use permanent solutions to the maximum extent practicable (see subsection (3) of this section);
    - (ii)** Provide for a reasonable restoration time frame (see subsection (4) of this section); and
    - (iii)** Consider public concerns (see WAC [173-340-600](#)).
  - (c) Groundwater cleanup actions.**

    - (i)** Permanent groundwater cleanup actions. A permanent cleanup action shall be used to achieve the cleanup levels for groundwater in WAC [173-340-720](#) at the standard point(s) of compliance (see WAC [173-340-720](#)(8)) where a permanent cleanup action is practicable or determined by the department to be in the public interest.
    - (ii)** Nonpermanent groundwater cleanup actions. Where a permanent cleanup action is not required under (c)(i) of this subsection, the following measures shall be taken:

      - (A)** Treatment or removal of the source of the release shall be conducted for liquid wastes, areas contaminated with high concentrations of hazardous substances, highly mobile hazardous substances, or

hazardous substances that cannot be reliably contained. This includes removal free product consisting of petroleum and other light nonaqueous phase liquid (LNAPL) from the groundwater using normally accepted engineering practices. Source containment may be appropriate when the free product consists of a dense nonaqueous phase liquid (DNAPL) that cannot be recovered after reasonable efforts have been made.

- (B)** Groundwater containment, including barriers or hydraulic control through groundwater pumping, or both, shall be implemented to the maximum extent practicable to avoid lateral and vertical expansion of the groundwater volume affected by the hazardous substance.
- (d)** Cleanup actions for soils at current or potential future residential areas and for soils at schools and child care centers. For current or potential future residential areas and for schools and child care centers, soils with hazardous substance concentrations that exceed soil cleanup levels must be treated, removed, or contained. Property qualifies as a current or potential residential area if:

  - (i)** The property is currently used for residential use; or
  - (ii)** The property has a potential to serve as a future residential area based on the consideration of zoning, statutory and regulatory restrictions, comprehensive plans, historical use, adjacent land uses, and other relevant factors.
- (e) Institutional controls.**

  - (i)** Cleanup actions shall use institutional controls and financial assurances when required under WAC [173-340-440](#).
  - (ii)** Cleanup actions that use institutional controls shall meet each of the minimum requirements specified in this section, just as any other cleanup action. Institutional controls should demonstrably reduce risks to ensure a protective remedy. This demonstration should be based on a quantitative scientific analysis where appropriate.
  - (iii)** In addition to meeting each of the minimum requirements specified in this section, cleanup actions shall not rely primarily on institutional controls and monitoring where it is technically possible to implement a more permanent cleanup action for all or a portion of the site.
- (f) Releases and migration.** Cleanup actions shall prevent or minimize present and future releases and migration of hazardous substances in the environment.
- (g) Dilution and dispersion.** Cleanup actions shall not rely primarily on dilution and dispersion unless the incremental costs of any active remedial measures over the costs of dilution and dispersion grossly exceed the incremental degree of benefits of active remedial measures over the benefits of dilution and dispersion.

- (h) **Remediation levels.** Cleanup actions that use remediation levels shall meet each of the minimum requirements specified in this section, just as any other cleanup action.
    - (i) Selection of a cleanup action alternative that uses remediation levels requires, in part, a determination that a more permanent cleanup action is not practicable, based on the disproportionate cost analysis (see subsections (2)(b)(i) and (3) of this section).
    - (ii) Selection of a cleanup action alternative that uses remediation levels also requires a determination that the alternative meets each of the other minimum requirements specified in this section, including a determination that the alternative is protective of human health and the environment.
- (3) **Determining whether a cleanup action uses permanent solutions to the maximum extent practicable.**
  - (a) **Purpose.** This subsection describes the requirements and procedures for determining whether a cleanup action uses permanent solutions to the maximum extent practicable, as required under subsection (2)(b)(i) of this section. A determination that a cleanup action meets this one requirement does not mean that the other minimum requirements specified in subsection (2) of this section have been met. To select a cleanup action for a site, a cleanup action must meet each of the minimum requirements specified in subsection (2) of this section.
  - (b) **General requirements.** When selecting a cleanup action, preference shall be given to permanent solutions to the maximum extent practicable. To determine whether a cleanup action uses permanent solutions to the maximum extent practicable, the disproportionate cost analysis specified in (e) of this subsection shall be used. The analysis shall compare the costs and benefits of the cleanup action alternatives evaluated in the feasibility study. The costs and benefits to be compared are the evaluation criteria identified in (f) of this subsection.
  - (c) **Permanent cleanup action defined.** A permanent cleanup action or permanent solution is defined in WAC [173-340-200](#).
  - (d) **Selection of a permanent cleanup action.** A disproportionate cost analysis shall not be required if the department and the potentially liable persons agree to a permanent cleanup action that will be identified by the department as the proposed cleanup action in the draft cleanup action plan.
  - (e) **Disproportionate cost analysis.**
    - (i) **Test.** Costs are disproportionate to benefits if the incremental costs of the alternative over that of a lower cost alternative exceed the incremental degree of benefits achieved by the alternative over that of the other lower cost alternative.
    - (ii) **Procedure.**

- (A) The alternatives evaluated in the feasibility study shall be ranked from most to least permanent, based on the evaluation of the alternatives under (f) of this subsection and the definition of permanent solution in (c) of this subsection.
  - (B) The most practicable permanent solution evaluated in the feasibility study shall be the baseline cleanup action alternative against which cleanup action alternatives are compared. If no permanent solution has been evaluated in the feasibility study, the cleanup action alternative evaluated in the feasibility study that provides the greatest degree of permanence shall be the baseline cleanup action alternative.
  - (C) The comparison of benefits and costs may be quantitative, but will often be qualitative and require the use of best professional judgment. In particular, the department has the discretion to favor or disfavor qualitative benefits and use that information in selecting a cleanup action. Where two or more alternatives are equal in benefits, the department shall select the less costly alternative provided the requirements of subsection (2) of this section are met.
- (f) **Evaluation criteria.** The following criteria shall be used to evaluate and compare each cleanup action alternative when conducting a disproportionate cost analysis under (e) of this subsection to determine whether a cleanup action is permanent to the maximum extent practicable.
  - (i) **Protectiveness.** Overall protectiveness of human health and the environment, including the degree to which existing risks are reduced, time required to reduce risk at the facility and attain cleanup standards, on-site and offsite risks resulting from implementing the alternative, and improvement of the overall environmental quality.
  - (ii) **Permanence.** The degree to which the alternative permanently reduces the toxicity, mobility or volume of hazardous substances, including the adequacy of the alternative in destroying the hazardous substances, the reduction or elimination of hazardous substance releases and sources of releases, the degree of irreversibility of waste treatment process, and the characteristics and quantity of treatment residuals generated.
  - (iii) **Cost.** The cost to implement the alternative, including the cost of construction, the net present value of any long-term costs, and agency oversight costs that are cost recoverable. Long-term costs include operation and maintenance costs, monitoring costs, equipment replacement costs, and the cost of maintaining institutional controls. Cost estimates for treatment technologies shall describe pretreatment, analytical, labor, and waste management costs. The design life of the cleanup action shall be estimated and the cost of replacement or repair of major elements shall be included in the cost estimate.



- (iv) **Effectiveness over the long term.** Long-term effectiveness includes the degree of certainty that the alternative will be successful, the reliability of the alternative during the period of time hazardous substances are expected to remain on-site at concentrations that exceed cleanup levels, the magnitude of residual risk with the alternative in place, and the effectiveness of controls required to manage treatment residues or remaining wastes. The following types of cleanup action components may be used as a guide, in descending order, when assessing the relative degree of long-term effectiveness: Reuse or recycling; destruction or detoxification; immobilization or solidification; on-site or offsite disposal in an engineered, lined and monitored facility; on-site isolation or containment with attendant engineering controls; and institutional controls and monitoring.
  - (v) **Management of short-term risks.** The risk to human health and the environment associated with the alternative during construction and implementation, and the effectiveness of measures that will be taken to manage such risks.
  - (vi) **Technical and administrative implementability.** Ability to be implemented including consideration of whether the alternative is technically possible, availability of necessary offsite facilities, services and materials, administrative and regulatory requirements, scheduling, size, complexity, monitoring requirements, access for construction operations and monitoring, and integration with existing facility operations and other current or potential remedial actions.
  - (vii) **Consideration of public concerns.** Whether the community has concerns regarding the alternative and, if so, the extent to which the alternative addresses those concerns. This process includes concerns from individuals, community groups, local governments, tribes, federal and state agencies, or any other organization that may have an interest in or knowledge of the site.
- (4) **Determining whether a cleanup action provides for a reasonable restoration time frame.**
  - (a) **Purpose.** This subsection describes the requirements and procedures for determining whether a cleanup action provides for a reasonable restoration time frame, as required under subsection (2)(b)(ii) of this section. A determination that a cleanup action meets this one requirement does not mean that the other minimum requirements specified in subsection (2) of this section have been met. To select a cleanup action for a site, a cleanup action must meet each of the minimum requirements specified in subsection (2) of this section.
  - (b) **Factors.** To determine whether a cleanup action provides for a reasonable restoration time frame, the factors to be considered include the following:
    - (i) Potential risks posed by the site to human health and the environment;
    - (ii) Practicability of achieving a shorter restoration time frame;

- (iii) Current use of the site, surrounding areas, and associated resources that are, or may be, affected by releases from the site;
  - (iv) Potential future use of the site, surrounding areas, and associated resources that are, or may be, affected by releases from the site;
  - (v) Availability of alternative water supplies;
  - (vi) Likely effectiveness and reliability of institutional controls;
  - (vii) Ability to control and monitor migration of hazardous substances from the site;
  - (viii) Toxicity of the hazardous substances at the site; and
  - (ix) Natural processes that reduce concentrations of hazardous substances and have been documented to occur at the site or under similar site conditions.
- (c) A longer period of time may be used for the restoration time frame for a site to achieve cleanup levels at the point of compliance if the cleanup action selected has a greater degree of long-term effectiveness than on-site or offsite disposal, isolation, or containment options.
- (d) When area background concentrations (see WAC [173-340-200](#) for definition) would result in recontamination of the site to levels that exceed cleanup levels, that portion of the cleanup action which addresses cleanup below area background concentrations may be delayed until the offsite sources of hazardous substances are controlled. In these cases the remedial action shall be considered an interim action until cleanup levels are attained.
- (e) Where cleanup levels determined under Method C in WAC [173-340-706](#) are below technically possible concentrations, concentrations that are technically possible to achieve shall be met within a reasonable time frame considering the factors in subsection (b) of this section. In these cases the remedial action shall be considered an interim action until cleanup levels are attained.
- (f) Extending the restoration time frame shall not be used as a substitute for active remedial measures, when such actions are practicable.

**WAC 173-340-370      Expectations for cleanup action alternatives**

The department has the following expectations for the development of cleanup action alternatives under WAC [173-340-350](#) and the selection of cleanup actions under WAC [173-340-360](#). These expectations represent the types of cleanup actions the department considers likely results of the remedy selection process described in WAC [173-340-350](#) through [173-340-360](#); however, the department recognizes that there may be some sites where cleanup actions conforming to these expectations are not appropriate. Also, selecting a cleanup action that meets these expectations shall not be used as a substitute for selecting a cleanup action under the remedy selection process described in WAC [173-340-350](#) through [173-340-360](#).

- (1) The department expects that treatment technologies will be emphasized at sites containing liquid wastes, areas contaminated with high concentrations of hazardous substances, highly mobile materials, and/or discrete areas of hazardous substances that lend themselves to treatment.
- (2) To minimize the need for long-term management of contaminated materials, the department expects that all hazardous substances will be destroyed, detoxified, and/or removed to concentrations below cleanup levels throughout sites containing small volumes of hazardous substances.
- (3) The department recognizes the need to use engineering controls, such as containment, for sites or portions of sites that contain large volumes of materials with relatively low levels of hazardous substances where treatment is impracticable.
- (4) In order to minimize the potential for migration of hazardous substances, the department expects that active measures will be taken to prevent precipitation and subsequent runoff from coming into contact with contaminated soils and waste materials. When such measures are impracticable, such as during active cleanup, the department expects that site runoff will be contained and treated prior to release from the site.
- (5) The department expects that when hazardous substances remain on-site at concentrations which exceed cleanup levels, those hazardous substances will be consolidated to the maximum extent practicable where needed to minimize the potential for direct contact and migration of hazardous substances;
- (6) The department expects that, for facilities adjacent to a surface water body, active measures will be taken to prevent/minimize releases to surface water via surface runoff and groundwater discharges in excess of cleanup levels. The department expects that dilution will not be the sole method for demonstrating compliance with cleanup standards in these instances.
- (7) The department expects that natural attenuation of hazardous substances may be appropriate at sites where:
  - (a) Source control (including removal and/or treatment of hazardous substances) has been conducted to the maximum extent practicable;

- (b)** Leaving contaminants on-site during the restoration time frame does not pose an unacceptable threat to human health or the environment;
  - (c)** There is evidence that natural biodegradation or chemical degradation is occurring and will continue to occur at a reasonable rate at the site; and
  - (d)** Appropriate monitoring requirements are conducted to ensure that the natural attenuation process is taking place and that human health and the environment are protected.
- (8)** The department expects that cleanup actions conducted under this chapter will not result in a significantly greater overall threat to human health and the environment than other alternatives.

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# **Preliminary Draft of Proposed Rule: Tracked Change Version**

## **IMPORTANT**

This part of the document includes a tracked change version of the preliminary draft of the proposed changes to Sections 350, 360, and 370 of Chapter 173-340 WAC.

**This version tracks changes with strikeouts and underlines, and footnotes notable changes.**

**WAC 173-340-200 Definitions [excerpts]**

Ecology is proposing adding definitions for the following terms used in the preliminary draft rule:

- **“Ecology-conducted remedial action”** means remedial action conducted by Ecology.
- **“Ecology-supervised remedial action”** means remedial actions supervised by Ecology under an order or decree.
- **“Highly impacted community”** means a community that Ecology has determined is likely to bear a disproportionate burden of public health risks from environmental pollution, such as minority, low-income, tribal, or indigenous populations.

**WAC 173-340-350 Remedial investigation and feasibility study**

- (1) Purpose.** The purpose of a remedial investigation/feasibility study is to collect, develop, and evaluate sufficient information regarding a site to establish cleanup standards under Part VII of this chapter and to select a cleanup action under WAC [173-340-350](#) through [173-340-390](#). This section specifies the requirements and procedures for conducting and reporting remedial investigations and feasibility studies.
- (2) Applicability.** The requirements in this section apply to all contaminated sites.<sup>1</sup>

  - (a) Sediment sites and cleanup units.** For sites where there is a release or threatened release to sediment, a remedial investigation/feasibility study must also comply with the requirements in WAC [173-204-550](#).<sup>2</sup>
  - (b) National Priorities List sites.** For sites on the federal National Priorities List, a remedial investigation/feasibility study must also comply with applicable requirements under the federal cleanup law.
- (3) Administrative options.** A remedial investigation/feasibility study may be conducted under any of the administrative options described in WAC [173-340-510](#) and [173-340-515](#).
- 4) Administrative requirements.**

  - (a)** For Ecology-conducted and Ecology-supervised remedial actions:<sup>3</sup>

    - (i)** Unless otherwise directed by Ecology, a remedial investigation/feasibility study must be completed before a cleanup action is selected under WAC [173-340-350](#) through [173-340-390](#);
    - (ii)** Ecology may require that a remedial investigation and a feasibility study be conducted and reported as:

      - (A)** Separate steps in the cleanup process; or
      - (B)** A single step in the cleanup process;
    - (iii)** Ecology may require that a remedial investigation or a feasibility study be conducted and reported on:

      - (A)** Separate parts of a site, such as a sediment cleanup unit; or

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<sup>1</sup> Added provision clarifying the applicability of the section, which governs remedial investigations and feasibility studies. The section applies to all contaminated sites, regardless of the administrative option used to investigate and clean up the site.

<sup>2</sup> For sediment sites and cleanup units, added provision clarifying that remedial investigations and feasibility studies must comply with the requirements both in this section and in WAC [173-204-550](#) (SMS rule).

<sup>3</sup> For Ecology-conducted and Ecology-supervised remedial actions, consolidated and clarified existing administrative requirements for remedial investigations and feasibility studies. This includes timing, phasing, Ecology review and approval, and public participation. Also clarified that plans and reports must comply with general reporting requirements in WAC [173-340-840](#).



- (B) The entire site;
    - (iv) Ecology may require reports on discrete elements of a remedial investigation or a feasibility study. For example, Ecology may require additional investigation to determine the applicability of a model remedy or a treatability or pilot study to develop and evaluate a cleanup action alternative;
    - (v) Before conducting a remedial investigation, a work plan must be submitted to Ecology for review and approval;
    - (vi) Remedial investigation and feasibility study reports must be submitted to Ecology for review and approval;
    - (vii) All plans and reports required under this section must meet the general submittal requirements in WAC [173-340-840](#); and
    - ((viii) Public participation must be accomplished in a manner consistent with WAC [173-340-600](#).
  - (b) For independent remedial actions, see WAC [173-340-515](#) for reporting and other administrative requirements.
- ((5) **Scope of investigations and studies.**<sup>4</sup> The scope of a remedial investigation/feasibility study will vary depending on many factors, including the nature and extent of contamination, the exposure pathways of concern, the human and ecological receptors potentially impacted by the contamination, the characteristics of the site, the type of cleanup action alternatives likely to be evaluated, and information previously obtained about the site.<sup>5</sup> In all cases sufficient information must be collected, developed, and evaluated to enable cleanup standards to be established under Part VII of this chapter and a cleanup action to be selected under WAC [173-340-350](#) through [173-340-390](#).
- (a) **Using existing information.** Information obtained before conducting a remedial investigation/feasibility study, such as from an initial investigation or an emergency or other interim action, may be relied upon in the investigation or study and summarized and incorporated by reference in the report to avoid unnecessary duplication.<sup>6</sup>
  - (b) **Streamlining investigations and studies.** A remedial investigation/feasibility study should remain flexible and be streamlined when possible to avoid the collection and evaluation of unnecessary information. While it may be appropriate to phase investigations at some sites, Ecology encourages expedited investigations. For example,

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<sup>4</sup> Reorganized subsection governing the scope of RI/FS and consolidated relevant provisions. Highlighted the use of existing information and streamlining.

<sup>5</sup> Added a non-exclusive list of factors that may impact the scope of a RI/FS, consistent with changes to WAC [173-204-550](#) (SMS rule) in 2013.

<sup>6</sup> Added requirement that existing information relied upon in a RI or FS must be summarized, not just referenced, in the report. The summary will facilitate Ecology review and public participation.

using field screening methods to guide investigations and fast turnaround laboratory analyses to provide real-time feedback may be appropriate at some sites.<sup>7</sup>

**((6) Remedial investigations.**

- (a) Purpose.** The purpose of a remedial investigation is to adequately characterize the site to enable:
- (i)** Cleanup standards to be established under Part VII of this chapter; and
  - (ii)** Cleanup action alternatives to be developed and evaluated in a feasibility study under subsection (7) of this section.
- b) Work plans.**<sup>8</sup> A remedial investigation work plan must include all of the following:
- (i)** A summary of available information regarding the site and data gaps needing to be addressed by the remedial investigation;
  - (ii)** A preliminary conceptual site model, including current and potential human and ecological receptors and exposure pathways;
  - <sup>9</sup>**((iii))** Cleanup action alternatives that are likely to be considered in the feasibility study;
  - <sup>10</sup>**(iv)** A health and safety plan meeting the requirements in WAC [173-340-810](#);
  - (v)** A sampling and analysis plan meeting the requirements in WAC [173-340-820](#);
  - (vi)** A proposed schedule for completing the remedial investigation/feasibility study;<sup>11</sup>
  - (vii)** Sufficient information to enable Ecology to conduct the preliminary evaluation required under Chapter [43.21C](#) RCW, the State Environmental Policy Act, and WAC [197-11-256](#);
  - (viii)** Any other information required by Ecology.

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<sup>7</sup> Added guidance encouraging expedited investigations when appropriate. Multi-phased investigations can result in long delays in getting to cleanup.

<sup>8</sup> Refocused and restructured the subsection to consolidate requirements governing RI work plans, consistent with changes to WAC [173-204-550](#) (SMS rule) in 2013.

<sup>9</sup> For RI work plan, eliminated requirement to identify likely cleanup levels. A preliminary conceptual site model is still required. Proposed cleanup levels must be identified during the RI.

<sup>10</sup> For RI work plan, eliminated requirement to identify likely applicable state and federal laws. Such laws must be identified during the RI and FS.

<sup>11</sup> For RI work plan, added requirement to include a proposed schedule for completing the RI and FS.

- ((c) Investigations.**<sup>12</sup> Sufficient investigations must be performed to characterize the distribution of hazardous substances present at the site, and the threat they pose to human health and the environment. Ecology makes the final determination as to which investigations are needed at the site and the sufficiency of those investigations.<sup>13</sup> Where applicable to the site, these investigations must include the following:
- ((i) Hazardous substance sources.** Confirmed and suspected releases must be investigated to define the location, quantity, areal and vertical extent, concentration within, and sources of hazardous substances.<sup>14</sup> Where relevant, information on the physical and chemical characteristics and the biological effects of hazardous substances must be collected;
- ((ii) Soils.** Soils must be investigated to adequately characterize:
- (A)** The areal and vertical distribution and concentrations of hazardous substances in soils; and
- (B)** The properties of surface and subsurface soils that are likely to influence the type and rate of hazardous substance migration or to affect the ability to implement cleanup action alternatives;
- ((iii) Groundwater, geology, and hydrogeology.** Groundwater and the geology and hydrogeology of the site must be investigated to adequately characterize:
- (A)** The areal and vertical distribution and concentrations of hazardous substances in the groundwater;
- (B)** The geologic features affecting the fate and transport of hazardous substances, such as the type, physical properties (such as permeability, density, and fracture characteristics),<sup>15</sup> and distribution of bedrock and unconsolidated materials;
- (C)** The hydrogeological features affecting the fate and transport of hazardous substances, such as:
- (I)** Groundwater flow direction, rate, and vertical and horizontal gradients for affected and potentially affected groundwater;<sup>16</sup>

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<sup>12</sup> Restructured rule to separate out investigation requirements (what one must do) from reporting requirements (what one must report). This subsection specifies investigation requirements. Changed the order of provisions in this subsection, starting with the source of the release, to create a more logical flow. Also edited several provisions to better describe what is needed to characterize the site. Substantive changes are noted.

<sup>13</sup> Clarified that Ecology makes final determination as to which investigations are needed at a site and the sufficiency of the investigations. This applies to both Ecology-supervised and independent cleanups.

<sup>14</sup> For investigations of sources, clarified that both confirmed and suspected releases must be investigated.

<sup>15</sup> For investigations of geology, added examples of the physical properties of bedrock and unconsolidated materials.

<sup>16</sup> For investigations of groundwater, clarified that both horizontal and vertical groundwater flow needs to be identified.

- (II) Groundwater divides;
  - (III) Areas of groundwater recharge and discharge;
  - (IV) Location of public and private water supply wells; and
  - (V) Groundwater quality data;
- ((iv) **Surface water, sediments, and hydrology.** Surface water, sediments, and the hydrology of the site must be investigated to adequately characterize:<sup>17</sup>
  - (A) The areal and vertical distribution and concentrations of hazardous substances in surface water and sediments;
  - (B) Significant hydrologic features, such as:
    - (I) Surface drainage patterns and quantities;
    - (II) Areas of erosion and sediment deposition, including estimates of sedimentation rates;
    - (III) Surface waters, including flow rates;
    - (IV) Floodplains; and
    - (IV) Actual or potential hazardous substance migration routes towards and within these features; and
  - C) The properties of surface and subsurface sediments that are likely to affect the type and rate of hazardous substance migration, the potential for recontamination, or the ability to implement cleanup action alternatives;
- ((v) **Air and soil vapor.**<sup>18</sup> The air and soil vapor must be evaluated and, where appropriate, sampled to adequately characterize the potential impacts of vapor migration on subsurface soil gas, on air quality within current and future buildings or other structures, and on outdoor ambient air;
- ((vi) **Climate.**<sup>19</sup> Sufficient information must be collected on current and projected local and regional climatological characteristics that are likely to affect the migration of hazardous substances or the resilience of cleanup action alternatives. Relevant characteristics can include temperature extremes, rise in

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<sup>17</sup> For investigations of surface water and sediments, modified requirements to be consistent with changes to WAC [173-204-550](#) (SMS rule) in 2013.

<sup>18</sup> Created separate subsection for investigating air and soil vapor. Added more specific requirements to reflect increased understanding of vapor pathway. The investigation must adequately characterize the potential impacts of vapor migration on subsurface soil gas, on air quality within current and future buildings or other structures, and on outdoor ambient air.

<sup>19</sup> Created separate subsection for investigating climate to highlight the potential impact of climate change on the resilience and long-term effectiveness of cleanup action alternatives. Added specific characteristics relevant to climate change, such as sea level rise and potential for wildfires.

sea level, seasonal patterns of rainfall, the magnitude and frequency of extreme storm events, the potential for landslides, prevailing wind direction and velocity, variations in barometric pressure, and the potential for wildfires;

**((vii) Land use.** Sufficient information must be collected on:

- (A)** The present and proposed land and resource uses, comprehensive plan, and zoning for the site and potentially affected areas;<sup>20</sup> and
- (B)** Human and ecological populations that are reasonably likely to be exposed or potentially exposed to the release based on such uses;

**((viii) Natural resources and ecological receptors.** (Sufficient information must be collected to determine the impact or potential impact of hazardous substances on natural resources and ecological receptors, including any information needed to conduct a terrestrial ecological evaluation or establish an exclusion under WAC [173-340-7490](#) through [173-340-7494](#).

**((A)** Where appropriate, a terrestrial ecological evaluation may be conducted so as to avoid duplicative studies of soil contamination that will be remediated to address other concerns, such as protection of human health. This may be accomplished by evaluating residual threats to the environment after cleanup action alternatives for human health protection have been developed. If this approach is used, the remedial investigation may be phased. Examples of sites where this approach may not be appropriate include: A site contaminated with a hazardous substance that is primarily an ecological concern and will not obviously be addressed by the cleanup action for the protection of human health, such as zinc; or a site where the development of a human health based remedy is expected to be a lengthy process, and postponing the terrestrial ecological evaluation would cause further harm to the environment.

**((B)** If a simplified or site-specific terrestrial ecological evaluation is not required under WAC [173-340-7491](#), the basis for the determination must be included in the remedial investigation report;

**((ix) Effects on highly impacted communities.**<sup>21</sup> Sufficient information must be collected to identify whether and how the site may affect a highly impacted community. When identifying effects, a cumulative impacts analysis must be conducted based on existing and available data. Effects may be health, social, cultural, or economic.

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<sup>20</sup> For investigations of land use, added requirement that must include information from comprehensive plan on potential future land and resource uses.

<sup>21</sup> Added requirement that investigation must identify any “highly impacted communities” affected by the site and how the site may impact those communities. This includes a cumulative impact analysis based on existing data.

- (x) **Applicability of model remedies.**<sup>22</sup> Sufficient information to determine whether a model remedy established by Ecology may be used as a cleanup action or a cleanup action component at the site under WAC [173-340-390](#).
- ((d) **Reports.**<sup>23</sup> A remedial investigation report must include all of the following information:

  - (i) General information about the site, including:

    - (A) Project title;
    - (B) Name, address, and phone number of project coordinator;
    - (C) Legal description and dimensions of the site;
    - (D) Current owners and operators; and
    - (E) Chronological listing of past owners and operators and operational history;
  - (ii) Maps of existing site conditions illustrating relevant features, including:<sup>24</sup>

    - (A) Sources of releases;
    - (B) Property boundaries;
    - (C) Proposed site boundaries, as defined by where hazardous substances exceed the proposed cleanup levels identified in (d)(iv) of this subsection;
    - (D) Surface topography;
    - (E) Surface and subsurface structures;
    - (F) Surface water, wetlands, and undeveloped areas; and
    - (G) Utility lines and well locations;
  - (iii) A conceptual site model, including known or suspected:

    - (A) Sources of hazardous substances;
    - (B) Types and concentrations of hazardous substances;

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<sup>22</sup> Added requirement that investigation must include sufficient information to determine whether a model remedy may be used at the site. This analysis is only required if a model remedy is being considered for the cleanup action or a component of the cleanup action at the site.

<sup>23</sup> As noted above, restructured rule to separate out investigation requirements (what one must do) from reporting requirements (what one must report). This subsection specifies the reporting requirements. Edited several provisions to better describe what needs to be documented. Substantive changes are noted.

<sup>24</sup> For RI report, added requirement that site maps must include the location of release sources, surface water, wetlands, and undeveloped areas. Also clarified that the proposed site boundaries must be defined by where hazardous substances exceed proposed cleanups levels, consistent with WAC [173-204-550](#) (SMS rule).

- (C) Contaminated environmental media; and
    - (D) Human and ecological receptors and exposure pathways;<sup>25</sup>
  - (iv) For each current or potential exposure pathway identified in the conceptual site model:<sup>26</sup>
    - (A) A proposed cleanup level for each hazardous substance in the environmental medium;
    - (B) The basis for the proposed cleanup level;
    - (C) A comparison of the proposed cleanup level to the concentrations of the hazardous substance in the environmental medium; and
    - (D) Any regulatory designations for, or laws applicable to, the environmental medium (see WAC [173-340-710](#));
  - (v) The results of the remedial investigations and the information required under (c) of this subsection;
  - (vi) Documentation of the proper management of any waste materials generated as a result of the remedial investigations in accordance with applicable laws;<sup>27</sup>
  - ((vii) Any other information required by Ecology.

**((7) Feasibility studies.**

- a) **Purpose.** The purpose of the feasibility study is to develop and evaluate cleanup action alternatives to enable a cleanup action to be selected for the site.
- b) **Applicability.**<sup>28</sup> A feasibility study of cleanup action alternatives must be conducted and reported as specified in (c) and (d) of this subsection except in the following circumstances. Ecology makes the final determination as to whether a feasibility study is required.<sup>29</sup>

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<sup>25</sup> For RI report, added requirement that must include conceptual site model.

<sup>26</sup> For RI report, added requirement that must document proposed cleanup levels, the basis for the levels, a comparison of the levels with site concentrations, and any regulatory designations or laws applicable to the environmental medium.

<sup>27</sup> For RI report, added requirement that must document the management of any waste materials generated as a result of the investigations.

<sup>28</sup> For feasibility study, added subsection describing under what circumstances a study is not required and what must still be reported to Ecology in those circumstances. The provision consolidates and clarifies existing requirements. A study is not required when prior remedial actions constitute a permanent cleanup action or when selecting a model remedy as the cleanup action or a component of a cleanup action. Studies are still required to select any remaining cleanup action components.

<sup>29</sup> For feasibility study, clarified that Ecology makes the final determination as to which cleanup action alternatives or components need to be evaluated and the sufficiency of those evaluations. This applies to both Ecology-supervised and independent cleanups.

- (i) **Permanent cleanup action completed.** If prior remedial actions at the site constitute a permanent cleanup action, a feasibility study is not required. To qualify for this exemption, sufficient information must be collected and included in the remedial investigation report to demonstrate that the prior remedial actions at the site constitute a permanent cleanup action.
- (ii) **Model remedy selected.** If a model remedy is selected as the cleanup action or as a component of the cleanup action for a site, a feasibility study is not required to select the model remedy (see WAC [173-340-390](#)). However, a feasibility study is required to select any remaining cleanup action components for the site. To qualify for this exemption or partial exemption, sufficient information must be collected and included in the remedial investigation report to demonstrate that the site meets the conditions established by Ecology for using the model remedy (see subsection (6)(c)(x) of this section).
- <sup>30</sup><sup>31</sup>(c) **Study.**<sup>32</sup> A feasibility study of cleanup action alternatives must be conducted in accordance with the following steps, except as otherwise directed by Ecology. The study must be sufficient to enable the selection of a cleanup action that meets the requirements in WAC [173-340-360](#) and conforms, as appropriate, to the expectations in WAC [173-340-370](#).<sup>33</sup> Ecology makes the final determination as to which cleanup action alternatives or components need to be evaluated in the study and the sufficiency of the study.<sup>34</sup>
- (i) **Step 1: Identify cleanup goals.** Identify the goals for the cleanup action, in addition to compliance with the requirements in WAC [173-340-360](#).<sup>35</sup>

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<sup>30</sup> Deleted guidance as to the types of cleanup action components that one may consider as part of a cleanup action alternative.

<sup>31</sup> Deleted reminder that additional remedial investigation may be needed to determine whether a cleanup action alternative that is protective of human health is also protective of ecological receptors. The phasing of an investigation is discussed in Section 360(6)(c).

<sup>32</sup> For feasibility study, restructured the rule to separate out study requirements (what one must do) from reporting requirements (what one must report). This subsection specifies the requirements for the study. Also restructured the requirements for how to conduct the feasibility study by establishing distinct procedural steps. In general, the steps reflect current requirements and practice. Substantive changes are noted.

<sup>33</sup> For feasibility study, clarified the use of the expectations for cleanup actions. The expectations represent the likely results of the study. The expectations must be considered when evaluating cleanup action alternatives in the study (see Steps 4 and 5). Also added requirement that any non-conformance of the preferred cleanup action alternative to the expectations must be documented and explained in the FS report (see draft WAC 173-340-350(7)(d)(viii)).

<sup>34</sup> For feasibility study, clarified that Ecology makes the final determination as to which cleanup action alternatives or components need to be evaluated and the sufficiency of the study. This applies to both Ecology-supervised and independent cleanups.

<sup>35</sup> For feasibility study, added requirement that the first step is to identify the goals of the cleanup action apart from meeting the requirements in WAC 173-340-360.



- (ii) **Step 2: Identify alternatives.** Identify cleanup action alternatives for evaluation in the study. The alternatives must achieve the goals identified under Step 1 and comply with the requirements in WAC [173-340-360](#). Include:
    - (A) A reasonable number and type of alternatives, taking into account the characteristics and complexity of the site, including current site conditions and physical constraints;
    - (B) At least one permanent cleanup action alternative;
    - (C) For each environmental medium, at least one alternative with a standard point of compliance;
    - (D) As appropriate, alternatives with a conditional point of compliance for one or more environmental media (see Part VII of this chapter); and
    - (E) As appropriate, alternatives relying on a combination of cleanup action components for an environmental medium (such as treatment of some soil contamination and containment of the remainder). The alternatives must specify remediation levels for each component (see WAC [173-340-355](#) and [173-340-357](#) and Part VII of this chapter).
  - (iii) **Step 3: Screen alternatives and components.** Based on a preliminary analysis, eliminate from further evaluation the following cleanup action alternatives or components identified under Step 2:
    - (A) Alternatives that clearly do not meet the requirements for cleanup actions in WAC [173-340-360](#);
    - (B) Alternatives for which costs are clearly disproportionate to benefits under WAC [173-340-360](#)(4); and
    - (C) Alternatives or components that are not technically possible at the site.
  - (iv) **Step 4: Evaluate alternatives.** Conduct a detailed evaluation of each remaining cleanup action alternative to determine whether it meets the requirements in WAC [173-340-360](#) and conforms to the expectations in WAC [173-340-370](#).
  - (v) **Step 5: Select preferred alternative.** Based on the detailed evaluation in Step 4, select a preferred cleanup action alternative that meets the requirements in WAC [173-340-360](#) and conforms, as appropriate, to the expectations in WAC [173-340-370](#).
- (d) **Report.**<sup>36</sup> A feasibility study report must include all of the following information:

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<sup>36</sup> For feasibility study, as noted above, restructured the rule to separate out study requirements (what one must do) from reporting requirements (what one must report). This subsection specifies the requirements for the report. Restructured and clarified the reporting requirements based on the procedural steps of the study. Edited several provisions to better describe what needs to be documented. Substantive changes are noted.

- (i) If the remedial investigation report is not combined with the feasibility study report, a summary of remedial investigation results, including:<sup>37</sup>
  - (A) The conceptual site model used to develop and evaluate cleanup action alternatives;
  - (B) The proposed cleanup level for each hazardous substance within each affected environmental medium at the site, and the basis for the cleanup level; and
  - (C) Maps, cross-sections, and calculations illustrating the location, estimated amount, and concentration distribution of hazardous substances above the proposed cleanup levels for each affected environmental medium at the site;
- (ii) Results of any additional investigations conducted after completing the remedial investigation report;<sup>38</sup>
- (iii) Results of any treatability or pilot studies needed to develop or evaluate cleanup action alternatives;
- (iv) The cleanup goals identified in Step 1 of the feasibility study;
- (v) The cleanup action alternatives identified in Step 2 of the feasibility study. For each alternative, include:
  - (A) The cleanup action components relied on to clean up each affected environmental medium;
  - (B) For alternatives relying on a combination of cleanup action components to clean up an environmental medium, the proposed remediation levels and the basis for those levels;
  - (C) The proposed point of compliance for each hazardous substance within each affected environmental medium at the site, and the basis for any conditional points of compliance;
  - (D) The location and estimated amount of each hazardous substance to be removed or treated by the alternative and the estimated time frame in which removal or treatment will occur;<sup>39</sup> and

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<sup>37</sup> For FS report, added requirement that, if RI report is not combined with FS report, a summary of relevant RI results must be included in the FS report.

<sup>38</sup> For FS report, added requirement that the results of any additional investigations conducted after submission of the RI report must be included.

<sup>39</sup> For FS report, added requirement that must document the location and estimated amount of hazardous substances removed or treated by the alternative and the restoration time frame for the alternative. This information is needed to conduct the required evaluations. This requirement is consistent with changes to WAC [173-204-550](#) (SMS rule) in 2013.

- (E) The location, estimated amount, and projected concentration distribution of each hazardous substance remaining above proposed cleanup levels after implementing the alternative;<sup>40</sup>
- (vi) The cleanup action alternatives eliminated from further evaluation during the screening process in Step 3 of the feasibility study, and the basis for elimination;
- (vii) Documentation of the detailed evaluation process in Step 4 of the feasibility study, including how equity for any highly impacted community is considered in that process (see WAC [173-340-360](#)(3)(d)),<sup>41</sup> and the basis for eliminating any alternative from further evaluation;
- (viii) The preferred cleanup action alternative selected in Step 5 of the feasibility study, including:
  - (A) The basis for selecting the alternative and for any non-conformance to the expectations in WAC [173-340-370](#);<sup>42</sup>
  - (B) The degree to which the benefits and burdens of the alternative are equitably distributed between any highly impacted and other communities affected by the site and the basis for any inequitable distribution;<sup>43</sup>
  - (C) Any local, state, or federal laws applicable to the alternative, including any known permits or approval conditions (see WAC [173-340-710](#));
  - (D) As appropriate, proposed indicator hazardous substances for the alternative (see WAC [173-340-703](#));<sup>44</sup> and
  - (E) Sufficient information about the alternative to enable Ecology to conduct the evaluations and make the determinations required under chapter [43.21C](#) RCW, the State Environmental Policy Act, and chapter 197-11 WAC, the State Environmental Policy Act Rules;

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<sup>40</sup> For FS report, added requirement that must document the location, estimated amount, and projected concentration distribution of each hazardous substance remaining above proposed cleanup levels after implementing the alternative. This information is needed to conduct the required evaluations in the study. This requirement is consistent with changes to WAC [173-204-550](#) (SMS rule) in 2013.

<sup>41</sup> For FS report, added requirement that must document how equity for highly impacted communities is considered when conducting detailed evaluation of cleanup action alternatives in Step 3 of the study.

<sup>42</sup> For the preferred cleanup action alternative in the FS report, added requirement that must document any non-conformance with the expectations for cleanup actions in WAC [173-340-370](#) and the basis for such non-conformance.

<sup>43</sup> For the preferred cleanup action alternative in the FS report, added requirement that must document the degree to which the benefits and burdens of the alternative are equitably distributed between highly impacted and other communities and the basis for any inequitable distribution.

<sup>44</sup> For the preferred cleanup action alternative in the FS report, added requirement that must document proposed indicator hazardous substances.

- (ix) Documentation of the proper management of any waste materials generated as a result of the feasibility study in accordance with applicable laws;<sup>45</sup>
- (x) Any other information required by Ecology.

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<sup>45</sup> For FS report, added requirement that must document the management of any waste materials generated as a result of the study.

**WAC 173-340-360 Requirements for cleanup actions**

- (1) Purpose.** This section specifies requirements for cleanup actions and the procedures for determining whether a cleanup action alternative meets those requirements. This section is intended to be used in conjunction with the other remedy selection requirements and procedures in WAC [173-340-350](#) through [173-340-390](#).
- (2) Applicability.** The requirements in this section apply to all contaminated sites.<sup>46</sup>

  - (a) Sediment sites and cleanup units.** For sites where there is a release or threatened release to sediment, cleanup actions must also comply with the requirements in WAC [173-204-570](#).<sup>47</sup>
  - (b) National Priority List sites.** For sites on the federal National Priorities List, cleanup actions must also comply with applicable requirements under the federal cleanup law.<sup>48</sup>
- (3) Requirements.**<sup>49</sup> A cleanup action must meet all of the following requirements. When a cleanup action includes more than one cleanup action component, the overall cleanup action must meet these requirements. Ecology recognizes that some of these requirements contain flexibility and require the use of professional judgment in determining how to apply them at a particular site. Ecology makes the final determination as to whether a cleanup action meets these requirements.<sup>50</sup>

  - (a) General requirements.** A cleanup action must:

    - (i)** Protect human health and the environment;
    - (ii)** Comply with cleanup standards (see Part VII of this chapter);
    - (iii)** Comply with applicable state and federal laws (see WAC [173-340-710](#));
    - ((iv))** Prevent or minimize present and future releases and migration of hazardous substances in the environment;

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<sup>46</sup> Added provision clarifying the applicability of the section, which specifies the requirements of cleanup actions. The section applies to all contaminated sites, regardless of the administrative option used to investigate and clean up the site.

<sup>47</sup> For sediment sites and cleanup units, added provision clarifying that cleanup actions must comply with the requirements both in this section and in WAC [173-204-570](#) (SMS rule).

<sup>48</sup> For sites listed on the federal National Priorities List, added provision clarifying that cleanup actions must also comply with applicable requirements under the federal cleanup law. This provision parallels the provision included in WAC 173-340-350.

<sup>49</sup> Restructured the list of cleanup action requirements in subsection (3) of this section. General requirements are listed in (a) of this subsection. Action-specific requirements are listed in (b) of this subsection. Media-specific requirements are listed in (c) of this subsection. Edited some provisions to better describe the requirement. Substantive changes to the list of requirements are noted.

<sup>50</sup> Clarified that Ecology makes the final determination as to whether a cleanup action meets the requirements in this section.

- (v) Provide resilience to climate change impacts that have a high likelihood of occurring and severely compromising its long-term effectiveness;<sup>51</sup>
  - (vi) Provide for compliance monitoring (see WAC [173-340-410](#) and Part VII of this chapter);
  - ((vii) Provide for a reasonable restoration time frame (see subsection (4) of this section);
  - ((viii) Use permanent solutions to the maximum extent practicable (see subsection (5) of this section); and
  - ((ix) Consider public concerns (see WAC [173-340-600](#)).
- (b) **Action-specific requirements.** A cleanup action must:
- (i) Use remediation levels when and as required under WAC [173-340-355](#) and [173-340-357](#) and Part VII of this chapter;<sup>52</sup>
  - ((ii) Use institutional controls when and as required under WAC [173-340-440](#);
  - (iii) Use financial assurances when and as required by Ecology under WAC [173-340-440](#)(11);<sup>53</sup>
  - (iv) Provide for periodic reviews when and as required under WAC [173-340-420](#)(2);<sup>54</sup>
  - ((v) Not rely primarily on institutional controls and monitoring where it is technically possible to implement a more permanent cleanup action for all or a portion of the site; and
  - ((vi) Not rely primarily on dilution and dispersion unless the incremental costs of any active remedial measures over the costs of dilution and dispersion grossly exceed the incremental degree of benefits of active remedial measures over the benefits of dilution and dispersion.
- (c) **Media-specific requirements.**

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<sup>51</sup> Added separate requirement that cleanup actions must be resilient to climate change impacts that have a high likelihood of occurring and severely compromising its long-term effectiveness. Currently, climate resilience is considered under the protectiveness requirement. As noted below, under subsection (5) of this section, climate resilience is also be considered as factor when evaluating the relative long-term effectiveness of a cleanup action alternative in the disproportionate cost analysis.

<sup>52</sup> Clarified the requirement about the use of remediation levels as part of a cleanup action. Referenced applicable requirements about when remediation levels are needed and how they may be developed. Deleted duplicative statements that cleanup actions using remediation levels need to meet cleanup requirements in this section.

<sup>53</sup> For clarity, separated the financial assurance requirement from the institutional control requirement. One may be required when the other is not.

<sup>54</sup> Incorporated existing requirement that cleanup actions must provide for periodic reviews under specified circumstances. This is consistent with WAC [173-204-570](#) (SMS rule).

- (i) A soil cleanup action must treat, remove, or contain contaminated soils located on properties:<sup>55</sup>
  - (A) Where a school or child care center is located;
  - ((B) That qualify as a residential area based on current use; or
  - ((C) That qualify as a potential future residential area based on zoning, statutory and regulatory restrictions, comprehensive plans, historical use, adjacent land uses, and other relevant factors.
- (ii) A groundwater cleanup action must be permanent if:
  - (A) Such an action is practicable; or
  - (B) Ecology determines such an action is in the public interest.
- ((iii) A non-permanent groundwater cleanup action must:
  - (A) Treat or remove the source of groundwater contamination at sites where there are liquid wastes, areas contaminated with high concentrations of hazardous substances, highly mobile hazardous substances, or hazardous substances that cannot be reliably contained. This includes removal of free product consisting of petroleum and other light nonaqueous phase liquid (LNAPL) from the groundwater using normally accepted engineering practices. Source containment may be appropriate when the free product consists of a dense nonaqueous phase liquid (DNAPL) that cannot be recovered after reasonable efforts have been made;
  - (B) Contain contaminated groundwater to the maximum extent practicable to avoid lateral and vertical expansion of the groundwater volume affected by the hazardous substances and to avoid the migration of the hazardous substances. This includes barriers or hydraulic control through groundwater pumping, or both; and
  - (C) If the release impacts water users, provide an alternate water supply or treatment.<sup>56</sup>

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<sup>55</sup> Edited for clarity existing media-specific requirement for soils at current or potential future residential areas and at schools and child care centers. No changes are intended.

<sup>56</sup> Regarding non-permanent groundwater cleanup actions, added requirement that alternative water supplies must be provided if the release impacts water users.

<sup>57</sup><sup>58</sup><sup>59</sup>(d) **Equitable distribution of benefits and burdens.**<sup>60</sup> When determining whether a cleanup action alternative meets the requirements in this subsection, evaluate and document the following:

- (i) How the alternative may benefit or burden any highly impacted community affected by the site. When evaluating burdens, a cumulative impact analysis must be conducted based on existing and available data. Burdens may be health, social, cultural, or economic; and
- (ii) The degree to which the alternative equitably distributes its benefits and burdens between any highly impacted and other communities affected by the site.

**(4) Determining whether a cleanup action provides for a reasonable restoration time frame.**

- (a) Purpose.** The restoration time frame is the period of time needed for a cleanup action to achieve cleanup levels at the point of compliance (see WAC 173-340-200). This subsection specifies the requirements and procedures for determining whether a cleanup action alternative provides for a reasonable restoration time frame, as required under subsection (3)(a)(vii) of this section.<sup>61</sup>
- (b) Evaluation.** To determine whether a cleanup action alternative provides for a reasonable restoration time frame, the following factors must be considered:
  - (i) Potential risks posed by the site to human health and the environment;
  - (ii) Practicability of achieving a shorter restoration time frame. A restoration time frame is not reasonable if an active remedial measure with a shorter restoration time frame is practicable;<sup>62</sup>
  - (iii) Long-term effectiveness of the alternative. A longer restoration time frame may be reasonable if the alternative has a greater degree of long-term effectiveness

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<sup>57</sup> Deleted statement because it duplicates the general requirement that all cleanup actions must meet the requirements in this section, including those with institutional controls.

<sup>58</sup> Deleted statements about institutional controls reducing risks because they duplicate the provisions in referenced section, WAC 173-340-440(5), and because they are guidance, not requirements.

<sup>59</sup> Regarding remediation levels, replaced current provisions with single provision in (b)(i) of this subsection. Deleted remaining statements because they duplicate the general requirement that all cleanup actions must meet the requirements in this section, including those using remediation levels.

<sup>60</sup> Added requirement that, when determining whether a cleanup action alternative meets the requirements in this section, you must consider both how a cleanup action alternative impacts highly impacted communities and whether the impacts are equitably distributed. This includes conducting a cumulative impact analysis based on existing and available data.

<sup>61</sup> Deleted statements because they duplicate the general requirement that all cleanup actions must meet the requirements in this section.

<sup>62</sup> Integrated as part of the evaluation the existing requirement from subsection (4)(f) in the current rule. No change is intended.



than one that primarily relies on on-site or off-site disposal, isolation, or containment;<sup>63</sup>

- ((iv) Current use of the site, surrounding areas, and associated resources that are, or may be, affected by releases from the site;
- ((v) Potential future use of the site, surrounding areas, and associated resources that are, or may be, affected by releases from the site;
- ((vi) Availability of alternative water supplies;
- ((vii) Likely effectiveness and reliability of institutional controls;
- ((viii) Ability to control and monitor migration of hazardous substances from the site;
- ((ix) Toxicity of the hazardous substances at the site; and
- ((x) Natural processes that reduce concentrations of hazardous substances and have been documented to occur at the site or under similar site conditions.

- <sup>64</sup>((c) **Cleanup levels below area background concentrations.**<sup>65</sup> When area background concentrations, as defined in WAC [173-340-200](#), would result in recontamination of the site to levels that exceed cleanup levels:
- (i) The remedial action must achieve area background concentrations within a reasonable restoration time frame, as determined under (b) of this subsection.
  - (ii) Cleaning up the site below area background concentrations may be delayed until the off-site sources of hazardous substances are controlled.
  - (iii) The remedial action is considered an interim action until cleanup levels are attained.
- ((d) **Cleanup levels below technically possible concentrations.**<sup>66</sup> Where cleanup levels determined under Method C in WAC [173-340-706](#) are below concentrations that are technically possible to achieve:
- (i) The remedial action must achieve concentrations that are technically possible to achieve within a reasonable restoration time frame, as determined under (b) of this subsection.
  - (ii) The remedial action is considered an interim action until cleanup levels are attained.

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<sup>63</sup> Integrated as part of the evaluation the existing requirement from subsection (4)(c) in the current rule. No change is intended.

<sup>64</sup> As noted above, integrated this requirement as part of the evaluation in (b)(iii) of this subsection.

<sup>65</sup> Added header and edited provision for clarity. No changes are intended.

<sup>66</sup> Added header and edited provision for clarity. No changes are intended.

<sup>67</sup> (5) **Determining whether a cleanup action uses permanent solutions to the maximum extent practicable.**

- (a) **Purpose.** This subsection specifies the requirements and procedures for determining whether a cleanup action uses permanent solutions to the maximum extent practicable, as required under RCW [70.105D.030](#)(1) and subsection (3)(a)(viii) of this section. A permanent cleanup action or permanent solution is defined in WAC [173-340-200](#).<sup>68</sup>

<sup>69</sup><sup>70</sup><sup>71</sup> (b) **Applicability.** The evaluation required under this subsection must be conducted unless a permanent cleanup action alternative is selected as the cleanup action.<sup>72</sup>

- (c) **Procedure.**<sup>73</sup> To determine which cleanup action alternative included in the feasibility study uses permanent solutions to the maximum extent practicable, do the following:
- (i) **Step 1:** Determine the benefits and costs of each cleanup action alternative using the criteria in (d) of this subsection. The estimation and comparison of benefits and costs may be quantitative, but will often be qualitative and require the use of best professional judgment. Based on site-specific factors, Ecology may weight<sup>74</sup> qualitative benefits and costs<sup>75</sup> and use that information in the analysis.
  - (ii) **Step 2:** Rank the cleanup action alternatives by degree of permanence. To determine the relative permanence of an alternative, consider the definition of a permanent cleanup action in WAC [173-340-200](#) and the criteria in (d)(ii) of this subsection.
  - (iii) **Step 3:** Identify the initial baseline alternative for use in the disproportionate cost analysis in Step 4.<sup>76</sup>

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<sup>67</sup> As noted above, integrated this requirement as part of the evaluation in (b)(ii) of this subsection.

<sup>68</sup> Deleted statements because they duplicate the general requirement that all cleanup actions must meet the requirements in this section.

<sup>69</sup> Provision replaced by reference to statutory requirement in (a) of this subsection.

<sup>70</sup> Provisions consolidated in (c) of this subsection.

<sup>71</sup> Provision moved under (a) of this subsection.

<sup>72</sup> Clarified that a disproportionate cost analysis is not required whenever a permanent cleanup action alternative is selected as the cleanup action, regardless of whether the cleanup is conducted by Ecology, by a potentially liable person under Ecology supervision, or independently. The current rule only addresses Ecology-supervised cleanups.

<sup>73</sup> Restructured the requirements and procedures for how to determine whether a cleanup action alternative uses permanent solutions to the maximum extent practicable. Established distinct procedural steps. Clarified and expanded descriptions of Steps 3 and 4. Substantive changes are noted.

<sup>74</sup> Clarified that Ecology may, based on a site-specific basis, favor or disfavor qualitative benefits and costs (as allowed under current rule) by weighting.

<sup>75</sup> Acknowledged that cost estimates may also be qualitative, as noted in the previous statement in the paragraph.

<sup>76</sup> For Step 3, clarified how the initial baseline alternative is identified based on three scenarios. Added the first and most obvious scenario, which is where there is only one permanent alternative. The second and third scenarios (multiple permanent alternatives and no permanent alternative) are discussed in the current rule.

- (A) If the feasibility study includes only one permanent cleanup action alternative, use that alternative as the initial baseline.
  - (B) If the feasibility study includes more than one permanent cleanup action alternative, determine which one is the most practicable and use it as the initial baseline. Eliminate from further evaluation the less practicable permanent cleanup action alternatives.
  - (C) If all permanent cleanup action alternatives are eliminated from evaluation in the feasibility study during the screening process in WAC 173-340-350(7)(c)(iii), use the most permanent cleanup action alternative identified in Step 2 as the initial baseline.
- (iv) **Step 4:** Conduct a disproportionate cost analysis of the ranked list of cleanup action alternatives identified in Step 2. Use the cleanup action alternative identified in Step 3 as the initial baseline for the analysis.<sup>77</sup>
- (A) **Analysis.** To conduct the analysis, do the following:
    - (I) First, compare the costs and benefits of the baseline alternative with the costs and benefits of the next most permanent alternative; and
    - (II) Second, determine whether the incremental costs of the baseline alternative over the next most permanent alternative substantially exceed<sup>78</sup> the incremental degree of benefits of the baseline alternative over the next most permanent alternative.
  - (B) **Decision.** Based on the results of the analysis, do the following:
    - (I) If the incremental costs do not substantially exceed the incremental degree of benefits, the baseline alternative is permanent to the maximum extent practicable and the analysis under this subsection is complete.
    - (II) If the benefits of the two alternatives are the same or similar, the lower cost alternative is permanent to the maximum extent practicable and the analysis under this subsection is complete.
    - (III) If the incremental costs substantially exceed the incremental degree of benefits, eliminate the baseline alternative from

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<sup>77</sup> For Step 4, clarified and expanded the description of how one uses a disproportionate cost analysis to determine which alternative is permanent to the maximum extent practicable. Outlined three possible outcomes for each iteration of the analysis, including any next steps. Except as noted, no substantive changes are intended.

<sup>78</sup> Changed the test for the disproportionate cost analysis from “exceed” to “substantially exceed” to better reflect the original intent of the rule. The original rule included the qualifier “substantial.” Based on the Policy Advisory Committee (PAC) discussions in 1995, Ecology decided to remove the qualifier “substantial” from the rule in 2001. However, the PAC stated that the qualifier “substantial” was subsumed within the term “disproportionate.” See the [2001 Responsiveness Summary](#) (GQ 5.4.10, p. 54) for further discussion.

further analysis and make the next most permanent alternative the baseline for further analysis. Repeat Step 4. However, if the new baseline is the least permanent alternative on the ranked list of alternatives identified in Step 2, that alternative is permanent to the maximum extent practicable and the analysis under this subsection is complete.

- (d) **Criteria.** When conducting a disproportionate cost analysis under this subsection, use the following criteria to evaluate and compare the costs and benefits of each cleanup action alternative:
- (i) **Protectiveness.** The degree to which the alternative protects human health and the environment, including:
    - (A) The degree to which the alternative reduces existing risks;
    - (B) The time required for the alternative to reduce risks at the site and attain cleanup standards;
    - (C) The on-site and offsite risks resulting from implementing the alternative; and
    - (D) Improvement of the overall environmental quality;
  - (ii) **Permanence.** The degree to which the alternative permanently reduces the toxicity, mobility, mass, or volume of hazardous substances, including:
    - (A) The adequacy of the alternative in destroying the hazardous substances;
    - (B) The reduction or elimination of hazardous substance releases and sources of releases;
    - (C) The degree of irreversibility of waste treatment process; and
    - (D) The characteristics and quantity of treatment residuals generated;
  - ((iii) **Effectiveness over the long term.** The degree to which the alternative is effective over the long term.
    - (A) **Factors.** When assessing the long-term effectiveness of the alternative, consider the following at a minimum:
      - (I) The degree of certainty that the alternative will be successful;
      - (II) The reliability of the alternative during the period of time hazardous substances are expected to remain on-site at concentrations that exceed cleanup levels;

- (III) The resilience of the alternative to climate change impacts;<sup>79</sup>
  - (IV) The magnitude of residual risk with the alternative in place; and
  - (V) The effectiveness of controls required to manage treatment residues or remaining wastes.
- (B) **Hierarchy.** Except as provided for sediment sites and cleanup units in WAC [173-204-570](#)(4)(b),<sup>80</sup> when assessing the relative degree of long-term effectiveness of cleanup action components, the following types of components may be used as a guide, in descending order:
  - (I) Reuse or recycling;
  - (II) Destruction or detoxification;
  - (III) Immobilization or solidification;
  - (IV) On-site or offsite disposal in an engineered, lined and monitored facility;
  - (V) On-site isolation or containment with attendant engineering controls; and
  - (VI) Institutional controls and monitoring;
- ((iv) **Management of short-term risks.** The risk to human health and the environment associated with the alternative during construction and implementation, and the effectiveness of the alternative to manage such risks;
- ((v) **Technical and administrative implementability.** The ability to implement the alternative, including consideration of:
  - (A) Whether the alternative is technically possible;
  - (B) The availability of necessary offsite facilities, services, and materials;
  - (C) Administrative and regulatory requirements;
  - (D) Scheduling, size, and complexity;
  - (E) Monitoring requirements;
  - (F) Access for construction operations and monitoring; and

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<sup>79</sup> Clarified that, when assessing long-term effectiveness of a cleanup action alternative, you must consider the resilience of the alternative to climate change.

<sup>80</sup> Clarified that, when assessing the relative degree of long-term effectiveness of cleanup action components for sediment sites or cleanup units, you must use the hierarchy of components provided in WAC [173-204-570](#)(4)(b) as a guide instead of the hierarchy provided in this rule.

- (G) Integration with existing facility operations and other current or potential remedial actions;
- ((vi) **Consideration of public concerns.** Whether the community has concerns about the alternative and, if so, the extent to which the alternative addresses those concerns. Consider concerns from individuals, community groups, local governments, tribes, federal and state agencies, or any other organization that may have an interest in or knowledge of the site; and
- (vii) **Costs.** The costs of implementing the alternative. Do not include the costs of redeveloping the site. Include the following costs:<sup>81</sup>
  - (A) **Construction costs**, such as pre-construction engineering design and permitting, physical construction (including labor, equipment, and materials), compliance monitoring during construction (including sampling and analysis), construction management, establishment of institutional controls, regulatory oversight, and quality assurance and quality control; and
  - (B) **Post-construction costs**, such as operation and maintenance activities necessary to maintain the effectiveness of a constructed cleanup action component, replacement or repair of equipment (including labor, equipment, and materials), permit renewal, compliance monitoring (including sampling and analysis), maintaining institutional controls, financial assurances, periodic reviews, post-construction management, and regulatory oversight.
- (I) **Design life.** Estimate the design life of cleanup action components, including engineered controls. If the period of time in which a component is needed exceeds the design life of the component, include the cost of replacing or repairing the component in the cost estimate.<sup>82</sup>
- (II) **Present worth.**<sup>83</sup> If present worth analysis is used to estimate future costs, consider both of the following:
  - **Discount rate.** If project costs do not exceed thirty years, use the current U.S. Treasury interest rate for bonds of comparable maturity to the period of analysis.

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<sup>81</sup> Moved and restructured the description of the cost criterion. Expanded and clarified the types of construction and post-construction costs that may be considered as part of the analysis. Clarified that redevelopment costs may not be considered as part of the analysis.

<sup>82</sup> Clarified when the costs of replacing or repairing a cleanup action component, including engineered controls, must be included in the cost estimate.

<sup>83</sup> Added requirements governing the use of present worth analysis to estimate future costs, including what rates must be considered and what sources must be used for those rates.

If project costs exceed thirty years, use the current U.S. Treasury thirty-year interest rate.

- **Inflation of construction and maintenance costs.** Use an appropriate construction cost index.

**WAC 173-340-370      Expectations for cleanup actions**

Ecology has the following expectations for cleanup actions. The expectations represent the likely results of the remedy selection process described in WAC [173-340-350](#) through [173-340-390](#). Ecology recognizes that conformance with the expectations may not be appropriate at some sites. Selecting a cleanup action conforming to the expectations is not a substitute for conducting a feasibility study. The expectations must be considered when evaluating cleanup action alternatives in the feasibility study. Any non-conformance of the preferred cleanup action alternative to the expectations must be documented and explained in the feasibility study report.<sup>84</sup>

- (1) Ecology expects that treatment technologies will be emphasized at sites containing liquid wastes, areas contaminated with high concentrations of hazardous substances, highly mobile materials, and/or discrete areas of hazardous substances that lend themselves to treatment.
- (2) To minimize the need for long-term management of contaminated materials, Ecology expects that all hazardous substances will be destroyed, detoxified, and/or removed to concentrations below cleanup levels throughout sites containing small volumes of hazardous substances.
- (3) Ecology recognizes the need to use engineering controls, such as containment, for sites or portions of sites that contain large volumes of materials with relatively low levels of hazardous substances where treatment is impracticable.
- (4) To minimize the potential for migration of hazardous substances, Ecology expects that active measures will be taken to prevent precipitation and subsequent runoff from coming into contact with contaminated soils and waste materials. When such measures are impracticable, such as during active cleanup, Ecology expects that site runoff will be contained and treated prior to release from the site.
- (5) Ecology expects that when hazardous substances remain on-site at concentrations exceeding cleanup levels, those hazardous substances will be consolidated to the maximum extent practicable where needed to minimize the potential for direct contact and migration of hazardous substances.
- (6) Ecology expects that, for sites adjacent to a surface water body, active measures will be taken to prevent/minimize releases to surface water via surface runoff and groundwater discharges in excess of cleanup levels. Ecology expects that dilution will not be the sole method for demonstrating compliance with cleanup standards in these instances.
- (7) Ecology expects that natural attenuation of hazardous substances may be appropriate at sites where:

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<sup>84</sup> Clarified the use of Ecology's expectations for cleanup actions as part of the feasibility study. The expectations represent the likely results of the study. The expectations must be considered when evaluating cleanup action alternatives in the study (see draft WAC 173-340-350(7)(c)(iv) and (v)). Also added requirement that any non-conformance of the preferred cleanup action alternative to the expectations must be documented and explained in the feasibility study report (see draft WAC 173-340-350(7)(d)(viii)).



- (a) Source control (including removal and/or treatment of hazardous substances) has been conducted to the maximum extent practicable;
  - (b) Leaving contaminants on-site during the restoration time frame does not pose an unacceptable threat to human health or the environment;
  - (c) There is evidence that natural biodegradation or chemical degradation is occurring and will continue to occur at a reasonable rate at the site; and
  - (d) Appropriate monitoring requirements are conducted to ensure that the natural attenuation process is taking place and that human health and the environment are protected.
- (8) Ecology expects that cleanup actions conducted under this chapter will not result in a significantly greater overall threat to human health and the environment than other alternatives.
- (9) Ecology expects that cleanup actions conducted under this chapter will provide an equitable distribution of benefits and avoid an inequitable distribution of burdens between any highly impacted and other communities affected by the site. Ecology further expects that any inequitable distribution will be mitigated in consultation with highly impacted communities.<sup>85</sup>
- (10) Ecology expects that cleanup actions conducted under this chapter will be effective over the long-term and resilient to those climate change impacts that are both highly likely to occur and could severely compromise cleanup actions.<sup>86</sup>

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<sup>85</sup> Added expectation that cleanup actions conducted under this chapter will provide an equitable distribution of benefits and avoid an inequitable distribution of burdens between any highly impacted and other communities affected by the site. Ecology considers this the likely result of the feasibility study if equity is appropriately considered when evaluating whether cleanup action alternatives meet the requirements in WAC 173-340-360. The requirement to consider equity in the evaluation of alternatives is in draft WAC 173-340-360(3)(d).

<sup>86</sup> Added expectation that cleanup actions conducted under this chapter will be effective over the long-term and resilient to climate change. This expectation reflects draft changes to WAC 173-340-360. See the stand-alone requirement in draft WAC 173-340-360(3)(a)(v) and new factor in disproportionate cost analysis in draft WAC 173-340-360(5)(d)(iii)(A)(III).

# Preliminary Draft of Proposed Rule: Clean Version

## IMPORTANT

This part of the document includes a clean version of the preliminary draft of the proposed changes to Sections 350, 360, and 370 of Chapter 173-340 WAC.

This version **does not** track changes with strikeouts and underlines **or** footnote changes.

**WAC 173-340-200 Definitions [excerpts]**

Ecology is proposing adding definitions for the following terms used in the preliminary draft rule:

- **“Ecology-conducted remedial action”** means remedial action conducted by Ecology.
- **“Ecology-supervised remedial action”** means remedial actions supervised by Ecology under an order or decree.
- **“Highly impacted community”** means a community that Ecology has determined is likely to bear a disproportionate burden of public health risks from environmental pollution, such as minority, low-income, tribal, or indigenous populations.

**WAC 173-340-350 Remedial investigation and feasibility study**

- (1) **Purpose.** The purpose of a remedial investigation/feasibility study is to collect, develop, and evaluate sufficient information regarding a site to establish cleanup standards under Part VII of this chapter and to select a cleanup action under WAC [173-340-350](#) through [173-340-390](#). This section specifies the requirements and procedures for conducting and reporting remedial investigations and feasibility studies.
- (2) **Applicability.** The requirements in this section apply to all contaminated sites.

  - (a) **Sediment sites and cleanup units.** For sites where there is a release or threatened release to sediment, a remedial investigation/feasibility study must also comply with the requirements in WAC [173-204-550](#).
  - (b) **National Priorities List sites.** For sites on the federal National Priorities List, a remedial investigation/feasibility study must also comply with applicable requirements under the federal cleanup law.
- (3) **Administrative options.** A remedial investigation/feasibility study may be conducted under any of the administrative options described in WAC [173-340-510](#) and [173-340-515](#).
- (4) **Administrative requirements.**

  - (a) For Ecology-conducted and Ecology-supervised remedial actions:

    - (i) Unless otherwise directed by Ecology, a remedial investigation/feasibility study must be completed before a cleanup action is selected under WAC [173-340-350](#) through [173-340-390](#);
    - (ii) Ecology may require that a remedial investigation and a feasibility study be conducted and reported as:

      - (A) Separate steps in the cleanup process; or
      - (B) A single step in the cleanup process;
    - (iii) Ecology may require that a remedial investigation or a feasibility study be conducted and reported on:

      - (A) Separate parts of a site, such as a sediment cleanup unit; or
      - (B) The entire site;
    - (iv) Ecology may require reports on discrete elements of a remedial investigation or a feasibility study. For example, Ecology may require additional investigation to determine the applicability of a model remedy or a treatability or pilot study to develop and evaluate a cleanup action alternative;
    - (v) Before conducting a remedial investigation, a work plan must be submitted to Ecology for review and approval;

- (vi) Remedial investigation and feasibility study reports must be submitted to Ecology for review and approval;
    - (vii) All plans and reports required under this section must meet the general submittal requirements in WAC [173-340-840](#); and
    - (viii) Public participation must be accomplished in a manner consistent with WAC [173-340-600](#).
  - (b) For independent remedial actions, see WAC [173-340-515](#) for reporting and other administrative requirements.
- (5) **Scope of investigations and studies.** The scope of a remedial investigation/feasibility study will vary depending on many factors, including the nature and extent of contamination, the exposure pathways of concern, the human and ecological receptors potentially impacted by the contamination, the characteristics of the site, the type of cleanup action alternatives likely to be evaluated, and information previously obtained about the site. In all cases sufficient information must be collected, developed, and evaluated to enable cleanup standards to be established under Part VII of this chapter and a cleanup action to be selected under WAC [173-340-350](#) through [173-340-390](#).
- (a) **Using existing information.** Information obtained before conducting a remedial investigation/feasibility study, such as from an initial investigation or an emergency or other interim action, may be relied upon in the investigation or study and summarized and incorporated by reference in the report to avoid unnecessary duplication.
  - (b) **Streamlining investigations and studies.** A remedial investigation/feasibility study should remain flexible and be streamlined when possible to avoid the collection and evaluation of unnecessary information. While it may be appropriate to phase investigations at some sites, Ecology encourages expedited investigations. For example, using field screening methods to guide investigations and fast turnaround laboratory analyses to provide real-time feedback may be appropriate at some sites.
- (6) **Remedial investigations.**
- (a) **Purpose.** The purpose of a remedial investigation is to adequately characterize the site to enable:
    - (i) Cleanup standards to be established under Part VII of this chapter; and
    - (ii) Cleanup action alternatives to be developed and evaluated in a feasibility study under subsection (7) of this section.
  - (b) **Work plans.** A remedial investigation work plan must include all of the following:
    - (i) A summary of available information regarding the site and data gaps needing to be addressed by the remedial investigation;

- (ii) A preliminary conceptual site model, including current and potential human and ecological receptors and exposure pathways;
  - (iii) Cleanup action alternatives that are likely to be considered in the feasibility study;
  - (iv) A health and safety plan meeting the requirements in WAC [173-340-810](#);
  - (v) A sampling and analysis plan meeting the requirements in WAC [173-340-820](#);
  - (vi) A proposed schedule for completing the remedial investigation/feasibility study;
  - (vii) Sufficient information to enable Ecology to conduct the preliminary evaluation required under Chapter [43.21C](#) RCW, the State Environmental Policy Act, and WAC [197-11-256](#);
  - (viii) Any other information required by Ecology.
- (c) **Investigations.** Sufficient investigations must be performed to characterize the distribution of hazardous substances present at the site, and the threat they pose to human health and the environment. Ecology makes the final determination as to which investigations are needed at the site and the sufficiency of those investigations. Where applicable to the site, these investigations must include the following:
- (i) **Hazardous substance sources.** Confirmed and suspected releases must be investigated to define the location, quantity, areal and vertical extent, concentration within, and sources of hazardous substances. Where relevant, information on the physical and chemical characteristics and the biological effects of hazardous substances must be collected;
  - (ii) **Soils.** Soils must be investigated to adequately characterize:
    - (A) The areal and vertical distribution and concentrations of hazardous substances in soils; and
    - (B) The properties of surface and subsurface soils that are likely to influence the type and rate of hazardous substance migration or to affect the ability to implement cleanup action alternatives;
  - (iii) **Groundwater, geology, and hydrogeology.** Groundwater and the geology and hydrogeology of the site must be investigated to adequately characterize:
    - (A) The areal and vertical distribution and concentrations of hazardous substances in the groundwater;
    - (B) The geologic features affecting the fate and transport of hazardous substances, such as the type, physical properties (such as permeability, density, and fracture characteristics), and distribution of bedrock and unconsolidated materials;

- (C) The hydrogeological features affecting the fate and transport of hazardous substances, such as:
    - (I) Groundwater flow direction, rate, and vertical and horizontal gradients for affected and potentially affected groundwater;
    - (II) Groundwater divides;
    - (III) Areas of groundwater recharge and discharge;
    - (IV) Location of public and private water supply wells; and
    - (V) Groundwater quality data;
- (iv) **Surface water, sediments, and hydrology.** Surface water, sediments, and the hydrology of the site must be investigated to adequately characterize:
  - (A) The areal and vertical distribution and concentrations of hazardous substances in surface water and sediments;
  - (B) Significant hydrologic features, such as:
    - (I) Surface drainage patterns and quantities;
    - (II) Areas of erosion and sediment deposition, including estimates of sedimentation rates;
    - (III) Surface waters, including flow rates;
    - (IV) Floodplains; and
    - (IV) Actual or potential hazardous substance migration routes towards and within these features; and
  - (C) The properties of surface and subsurface sediments that are likely to affect the type and rate of hazardous substance migration, the potential for recontamination, or the ability to implement cleanup action alternatives;
- (v) **Air and soil vapor.** The air and soil vapor must be evaluated and, where appropriate, sampled to adequately characterize the potential impacts of vapor migration on subsurface soil gas, on air quality within current and future buildings or other structures, and on outdoor ambient air;
- (vi) **Climate.** Sufficient information must be collected on current and projected local and regional climatological characteristics that are likely to affect the migration of hazardous substances or the resilience of cleanup action alternatives. Relevant characteristics can include temperature extremes, rise in sea level, seasonal patterns of rainfall, the magnitude and frequency of extreme storm events, the potential for landslides, prevailing wind direction and velocity, variations in barometric pressure, and the potential for wildfires;

- (vii) **Land use.** Sufficient information must be collected on:
  - (A) The present and proposed land and resource uses, comprehensive plan, and zoning for the site and potentially affected areas; and
  - (B) Human and ecological populations that are reasonably likely to be exposed or potentially exposed to the release based on such uses;
- (viii) **Natural resources and ecological receptors.** Sufficient information must be collected to determine the impact or potential impact of hazardous substances on natural resources and ecological receptors, including any information needed to conduct a terrestrial ecological evaluation or establish an exclusion under WAC [173-340-7490](#) through [173-340-7494](#).
  - (A) Where appropriate, a terrestrial ecological evaluation may be conducted so as to avoid duplicative studies of soil contamination that will be remediated to address other concerns, such as protection of human health. This may be accomplished by evaluating residual threats to the environment after cleanup action alternatives for human health protection have been developed. If this approach is used, the remedial investigation may be phased. Examples of sites where this approach may not be appropriate include: A site contaminated with a hazardous substance that is primarily an ecological concern and will not obviously be addressed by the cleanup action for the protection of human health, such as zinc; or a site where the development of a human health based remedy is expected to be a lengthy process, and postponing the terrestrial ecological evaluation would cause further harm to the environment.
  - (B) If a simplified or site-specific terrestrial ecological evaluation is not required under WAC [173-340-7491](#), the basis for the determination must be included in the remedial investigation report;
- (ix) **Effects on highly impacted communities.** Sufficient information must be collected to identify whether and how the site may affect a highly impacted community. When identifying effects, a cumulative impacts analysis must be conducted based on existing and available data. Effects may be health, social, cultural, or economic.
- (x) **Applicability of model remedies.** Sufficient information to determine whether a model remedy established by Ecology may be used as a cleanup action or a cleanup action component at the site under WAC [173-340-390](#).
- (d) **Reports.** A remedial investigation report must include all of the following information:
  - (i) General information about the site, including:
    - (A) Project title;



- (B) Name, address, and phone number of project coordinator;
  - (C) Legal description and dimensions of the site;
  - (D) Current owners and operators; and
  - (E) Chronological listing of past owners and operators and operational history;
- (ii) Maps of existing site conditions illustrating relevant features, including:
  - (A) Sources of releases;
  - (B) Property boundaries;
  - (C) Proposed site boundaries, as defined by where hazardous substances exceed the proposed cleanup levels identified in (d)(iv) of this subsection;
  - (D) Surface topography;
  - (E) Surface and subsurface structures;
  - (F) Surface water, wetlands, and undeveloped areas; and
  - (G) Utility lines and well locations;
- (iii) A conceptual site model, including known or suspected:
  - (A) Sources of hazardous substances;
  - (B) Types and concentrations of hazardous substances;
  - (C) Contaminated environmental media; and
  - (D) Human and ecological receptors and exposure pathways;
- (iv) For each current or potential exposure pathway identified in the conceptual site model:
  - (A) A proposed cleanup level for each hazardous substance in the environmental medium;
  - (B) The basis for the proposed cleanup level;
  - (C) A comparison of the proposed cleanup level to the concentrations of the hazardous substance in the environmental medium; and
  - (D) Any regulatory designations for, or laws applicable to, the environmental medium (see WAC [173-340-710](#));
- (v) The results of the remedial investigations and the information required under (c) of this subsection;

- (vi) Documentation of the proper management of any waste materials generated as a result of the remedial investigations in accordance with applicable laws;
- (vii) Any other information required by Ecology.

**(7) Feasibility studies.**

- (a) **Purpose.** The purpose of the feasibility study is to develop and evaluate cleanup action alternatives to enable a cleanup action to be selected for the site.
- (b) **Applicability.** A feasibility study of cleanup action alternatives must be conducted and reported as specified in (c) and (d) of this subsection except in the following circumstances. Ecology makes the final determination as to whether a feasibility study is required.
  - (i) **Permanent cleanup action completed.** If prior remedial actions at the site constitute a permanent cleanup action, a feasibility study is not required. To qualify for this exemption, sufficient information must be collected and included in the remedial investigation report to demonstrate that the prior remedial actions at the site constitute a permanent cleanup action.
  - (ii) **Model remedy selected.** If a model remedy is selected as the cleanup action or as a component of the cleanup action for a site, a feasibility study is not required to select the model remedy (see WAC [173-340-390](#)). However, a feasibility study is required to select any remaining cleanup action components for the site. To qualify for this exemption or partial exemption, sufficient information must be collected and included in the remedial investigation report to demonstrate that the site meets the conditions established by Ecology for using the model remedy (see subsection (6)(c)(x) of this section).
- (c) **Study.** A feasibility study of cleanup action alternatives must be conducted in accordance with the following steps, except as otherwise directed by Ecology. The study must be sufficient to enable the selection of a cleanup action that meets the requirements in WAC [173-340-360](#) and conforms, as appropriate, to the expectations in WAC [173-340-370](#). Ecology makes the final determination as to which cleanup action alternatives or components need to be evaluated in the study and the sufficiency of the study.
  - (i) **Step 1: Identify cleanup goals.** Identify the goals for the cleanup action, in addition to compliance with the requirements in WAC [173-340-360](#).
  - (ii) **Step 2: Identify alternatives.** Identify cleanup action alternatives for evaluation in the study. The alternatives must achieve the goals identified under Step 1 and comply with the requirements in WAC [173-340-360](#). Include:
    - (A) A reasonable number and type of alternatives, taking into account the characteristics and complexity of the site, including current site conditions and physical constraints;

- (B) At least one permanent cleanup action alternative;
  - (C) For each environmental medium, at least one alternative with a standard point of compliance;
  - (D) As appropriate, alternatives with a conditional point of compliance for one or more environmental media (see Part VII of this chapter); and
  - (E) As appropriate, alternatives relying on a combination of cleanup action components for an environmental medium (such as treatment of some soil contamination and containment of the remainder). The alternatives must specify remediation levels for each component (see WAC [173-340-355](#) and [173-340-357](#) and Part VII of this chapter).
- (iii) **Step 3: Screen alternatives and components.** Based on a preliminary analysis, eliminate from further evaluation the following cleanup action alternatives or components identified under Step 2:
  - (A) Alternatives that clearly do not meet the requirements for cleanup actions in WAC [173-340-360](#);
  - (B) Alternatives for which costs are clearly disproportionate to benefits under WAC [173-340-360](#)(4); and
  - (C) Alternatives or components that are not technically possible at the site.
- (iv) **Step 4: Evaluate alternatives.** Conduct a detailed evaluation of each remaining cleanup action alternative to determine whether it meets the requirements in WAC [173-340-360](#) and conforms to the expectations in WAC [173-340-370](#).
- (v) **Step 5: Select preferred alternative.** Based on the detailed evaluation in Step 4, select a preferred cleanup action alternative that meets the requirements in WAC [173-340-360](#) and conforms, as appropriate, to the expectations in WAC [173-340-370](#).
- (d) **Report.** A feasibility study report must include all of the following information:
  - (i) If the remedial investigation report is not combined with the feasibility study report, a summary of remedial investigation results, including:
    - (A) The conceptual site model used to develop and evaluate cleanup action alternatives;
    - (B) The proposed cleanup level for each hazardous substance within each affected environmental medium at the site, and the basis for the cleanup level; and
    - (C) Maps, cross-sections, and calculations illustrating the location, estimated amount, and concentration distribution of hazardous

substances above the proposed cleanup levels for each affected environmental medium at the site;

- (ii) Results of any additional investigations conducted after completing the remedial investigation report;
- (iii) Results of any treatability or pilot studies needed to develop or evaluate cleanup action alternatives;
- (iv) The cleanup goals identified in Step 1 of the feasibility study;
- (v) The cleanup action alternatives identified in Step 2 of the feasibility study. For each alternative, include:
  - (A) The cleanup action components relied on to clean up each affected environmental medium;
  - (B) For alternatives relying on a combination of cleanup action components to clean up an environmental medium, the proposed remediation levels and the basis for those levels;
  - (C) The proposed point of compliance for each hazardous substance within each affected environmental medium at the site, and the basis for any conditional points of compliance;
  - (D) The location and estimated amount of each hazardous substance to be removed or treated by the alternative and the estimated time frame in which removal or treatment will occur; and
  - (E) The location, estimated amount, and projected concentration distribution of each hazardous substance remaining above proposed cleanup levels after implementing the alternative;
- (vi) The cleanup action alternatives eliminated from further evaluation during the screening process in Step 3 of the feasibility study, and the basis for elimination;
- (vii) Documentation of the detailed evaluation process in Step 4 of the feasibility study, including how equity for any highly impacted community is considered in that process (see WAC [173-340-360](#)(3)(d)), and the basis for eliminating any alternative from further evaluation;
- (viii) The preferred cleanup action alternative selected in Step 5 of the feasibility study, including:
  - (A) The basis for selecting the alternative and for any non-conformance to the expectations in WAC [173-340-370](#);
  - (B) The degree to which the benefits and burdens of the alternative are equitably distributed between any highly impacted and other

- communities affected by the site and the basis for any inequitable distribution;
- (C) Any local, state, or federal laws applicable to the alternative, including any known permits or approval conditions (see WAC [173-340-710](#));
  - (D) As appropriate, proposed indicator hazardous substances for the alternative (see WAC [173-340-703](#)); and
  - (E) Sufficient information about the alternative to enable Ecology to conduct the evaluations and make the determinations required under chapter [43.21C](#) RCW, the State Environmental Policy Act, and chapter 197-11 WAC, the State Environmental Policy Act Rules;
- (ix) Documentation of the proper management of any waste materials generated as a result of the feasibility study in accordance with applicable laws;
  - (x) Any other information required by Ecology.

**WAC 173-340-360 Requirements for cleanup actions**

- (1) Purpose.** This section specifies requirements for cleanup actions and the procedures for determining whether a cleanup action alternative meets those requirements. This section is intended to be used in conjunction with the other remedy selection requirements and procedures in WAC [173-340-350](#) through [173-340-390](#).
- (2) Applicability.** The requirements in this section apply to all contaminated sites.

  - (a) Sediment sites and cleanup units.** For sites where there is a release or threatened release to sediment, cleanup actions must also comply with the requirements in WAC [173-204-570](#).
  - (b) National Priority List sites.** For sites on the federal National Priorities List, cleanup actions must also comply with applicable requirements under the federal cleanup law.
- (3) Requirements.** A cleanup action must meet all of the following requirements. When a cleanup action includes more than one cleanup action component, the overall cleanup action must meet these requirements. Ecology recognizes that some of these requirements contain flexibility and require the use of professional judgment in determining how to apply them at a particular site. Ecology makes the final determination as to whether a cleanup action meets these requirements.

  - (a) General requirements.** A cleanup action must:

    - (i)** Protect human health and the environment;
    - (ii)** Comply with cleanup standards (see Part VII of this chapter);
    - (iii)** Comply with applicable state and federal laws (see WAC [173-340-710](#));
    - (iv)** Prevent or minimize present and future releases and migration of hazardous substances in the environment;
    - (v)** Provide resilience to climate change impacts that have a high likelihood of occurring and severely compromising its long-term effectiveness;
    - (vi)** Provide for compliance monitoring (see WAC [173-340-410](#) and Part VII of this chapter);
    - (vii)** Provide for a reasonable restoration time frame (see subsection (4) of this section);
    - (viii)** Use permanent solutions to the maximum extent practicable (see subsection (5) of this section); and
    - (ix)** Consider public concerns (see WAC [173-340-600](#)).
  - (b) Action-specific requirements.** A cleanup action must:

    - (i)** Use remediation levels when and as required under WAC [173-340-355](#) and [173-340-357](#) and Part VII of this chapter;

- (ii) Use institutional controls when and as required under WAC [173-340-440](#);
  - (iii) Use financial assurances when and as required by Ecology under WAC [173-340-440](#)(11);
  - (iv) Provide for periodic reviews when and as required under WAC [173-340-420](#)(2);
  - (v) Not rely primarily on institutional controls and monitoring where it is technically possible to implement a more permanent cleanup action for all or a portion of the site; and
  - (vi) Not rely primarily on dilution and dispersion unless the incremental costs of any active remedial measures over the costs of dilution and dispersion grossly exceed the incremental degree of benefits of active remedial measures over the benefits of dilution and dispersion.
- (c) **Media-specific requirements.**
- (i) A soil cleanup action must treat, remove, or contain contaminated soils located on properties:
    - (A) Where a school or child care center is located;
    - (B) That qualify as a residential area based on current use; or
    - (C) That qualify as a potential future residential area based on zoning, statutory and regulatory restrictions, comprehensive plans, historical use, adjacent land uses, and other relevant factors.
  - (ii) A groundwater cleanup action must be permanent if:
    - (A) Such an action is practicable; or
    - (B) Ecology determines such an action is in the public interest.
  - (iii) A non-permanent groundwater cleanup action must:
    - (A) Treat or remove the source of groundwater contamination at sites where there are liquid wastes, areas contaminated with high concentrations of hazardous substances, highly mobile hazardous substances, or hazardous substances that cannot be reliably contained. This includes removal of free product consisting of petroleum and other light nonaqueous phase liquid (LNAPL) from the groundwater using normally accepted engineering practices. Source containment may be appropriate when the free product consists of a dense nonaqueous phase liquid (DNAPL) that cannot be recovered after reasonable efforts have been made;
    - (B) Contain contaminated groundwater to the maximum extent practicable to avoid lateral and vertical expansion of the groundwater volume affected by the hazardous substances and to avoid the migration of the

hazardous substances. This includes barriers or hydraulic control through groundwater pumping, or both; and

- (C) If the release impacts water users, provide an alternate water supply or treatment.

- (d) **Equitable distribution of benefits and burdens.** When determining whether a cleanup action alternative meets the requirements in this subsection, evaluate and document the following:

- (i) How the alternative may benefit or burden any highly impacted community affected by the site. When evaluating burdens, a cumulative impact analysis must be conducted based on existing and available data. Burdens may be health, social, cultural, or economic; and
- (ii) The degree to which the alternative equitably distributes its benefits and burdens between any highly impacted and other communities affected by the site.

**(4) Determining whether a cleanup action provides for a reasonable restoration time frame.**

- (a) **Purpose.** The restoration time frame is the period of time needed for a cleanup action to achieve cleanup levels at the point of compliance (see WAC 173-340-200). This subsection specifies the requirements and procedures for determining whether a cleanup action alternative provides for a reasonable restoration time frame, as required under subsection (3)(a)(vii) of this section.

- (b) **Evaluation.** To determine whether a cleanup action alternative provides for a reasonable restoration time frame, the following factors must be considered:

- (i) Potential risks posed by the site to human health and the environment;
- (ii) Practicability of achieving a shorter restoration time frame. A restoration time frame is not reasonable if an active remedial measure with a shorter restoration time frame is practicable;
- (iii) Long-term effectiveness of the alternative. A longer restoration time frame may be reasonable if the alternative has a greater degree of long-term effectiveness than one that primarily relies on on-site or off-site disposal, isolation, or containment;
- (iv) Current use of the site, surrounding areas, and associated resources that are, or may be, affected by releases from the site;
- (v) Potential future use of the site, surrounding areas, and associated resources that are, or may be, affected by releases from the site;
- (vi) Availability of alternative water supplies;
- (vii) Likely effectiveness and reliability of institutional controls;



- (viii) Ability to control and monitor migration of hazardous substances from the site;
    - (ix) Toxicity of the hazardous substances at the site; and
    - (x) Natural processes that reduce concentrations of hazardous substances and have been documented to occur at the site or under similar site conditions.
  - (c) **Cleanup levels below area background concentrations.** When area background concentrations, as defined in WAC [173-340-200](#), would result in recontamination of the site to levels that exceed cleanup levels:
    - (i) The remedial action must achieve area background concentrations within a reasonable restoration time frame, as determined under (b) of this subsection.
    - (ii) Cleaning up the site below area background concentrations may be delayed until the off-site sources of hazardous substances are controlled.
    - (iii) The remedial action is considered an interim action until cleanup levels are attained.
  - (d) **Cleanup levels below technically possible concentrations.** Where cleanup levels determined under Method C in WAC [173-340-706](#) are below concentrations that are technically possible to achieve:
    - (i) The remedial action must achieve concentrations that are technically possible to achieve within a reasonable restoration time frame, as determined under (b) of this subsection.
    - (ii) The remedial action is considered an interim action until cleanup levels are attained.
- (5) **Determining whether a cleanup action uses permanent solutions to the maximum extent practicable.**
  - (a) **Purpose.** This subsection specifies the requirements and procedures for determining whether a cleanup action uses permanent solutions to the maximum extent practicable, as required under RCW [70.105D.030](#)(1) and subsection (3)(a)(viii) of this section. A permanent cleanup action or permanent solution is defined in WAC [173-340-200](#).
  - (b) **Applicability.** The evaluation required under this subsection must be conducted unless a permanent cleanup action alternative is selected as the cleanup action.
  - (c) **Procedure.** To determine which cleanup action alternative included in the feasibility study uses permanent solutions to the maximum extent practicable, do the following:
    - (i) **Step 1:** Determine the benefits and costs of each cleanup action alternative using the criteria in (d) of this subsection. The estimation and comparison of benefits and costs may be quantitative, but will often be qualitative and require the use of best professional judgment. Based on site-specific factors, Ecology

may weight qualitative benefits and costs and use that information in the analysis.

- (ii) **Step 2:** Rank the cleanup action alternatives by degree of permanence. To determine the relative permanence of an alternative, consider the definition of a permanent cleanup action in WAC [173-340-200](#) and the criteria in (d)(ii) of this subsection.
- (iii) **Step 3:** Identify the initial baseline alternative for use in the disproportionate cost analysis in Step 4.
  - (A) If the feasibility study includes only one permanent cleanup action alternative, use that alternative as the initial baseline.
  - (B) If the feasibility study includes more than one permanent cleanup action alternative, determine which one is the most practicable and use it as the initial baseline. Eliminate from further evaluation the less practicable permanent cleanup action alternatives.
  - (C) If all permanent cleanup action alternatives are eliminated from evaluation in the feasibility study during the screening process in WAC 173-340-350(7)(c)(iii), use the most permanent cleanup action alternative identified in Step 2 as the initial baseline.
- (iv) **Step 4:** Conduct a disproportionate cost analysis of the ranked list of cleanup action alternatives identified in Step 2. Use the cleanup action alternative identified in Step 3 as the initial baseline for the analysis.
  - (A) **Analysis.** To conduct the analysis, do the following:
    - (I) First, compare the costs and benefits of the baseline alternative with the costs and benefits of the next most permanent alternative; and
    - (II) Second, determine whether the incremental costs of the baseline alternative over the next most permanent alternative substantially exceed the incremental degree of benefits of the baseline alternative over the next most permanent alternative.
  - (B) **Decision.** Based on the results of the analysis, do the following:
    - (I) If the incremental costs do not substantially exceed the incremental degree of benefits, the baseline alternative is permanent to the maximum extent practicable and the analysis under this subsection is complete.
    - (II) If the benefits of the two alternatives are the same or similar, the lower cost alternative is permanent to the maximum extent practicable and the analysis under this subsection is complete.

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- (IV) The magnitude of residual risk with the alternative in place; and
  - (V) The effectiveness of controls required to manage treatment residues or remaining wastes.
- (B) **Hierarchy.** Except as provided for sediment sites and cleanup units in WAC [173-204-570](#)(4)(b), when assessing the relative degree of long-term effectiveness of cleanup action components, the following types of components may be used as a guide, in descending order:
  - (I) Reuse or recycling;
  - (II) Destruction or detoxification;
  - (III) Immobilization or solidification;
  - (IV) On-site or offsite disposal in an engineered, lined and monitored facility;
  - (V) On-site isolation or containment with attendant engineering controls; and
  - (VI) Institutional controls and monitoring;
- (iv) **Management of short-term risks.** The risk to human health and the environment associated with the alternative during construction and implementation, and the effectiveness of the alternative to manage such risks;
- (v) **Technical and administrative implementability.** The ability to implement the alternative, including consideration of:
  - (A) Whether the alternative is technically possible;
  - (B) The availability of necessary offsite facilities, services, and materials;
  - (C) Administrative and regulatory requirements;
  - (D) Scheduling, size, and complexity;
  - (E) Monitoring requirements;
  - (F) Access for construction operations and monitoring; and
  - (G) Integration with existing facility operations and other current or potential remedial actions;
- (vi) **Consideration of public concerns.** Whether the community has concerns about the alternative and, if so, the extent to which the alternative addresses those concerns. Consider concerns from individuals, community groups, local governments, tribes, federal and state agencies, or any other organization that may have an interest in or knowledge of the site; and

- (vii) **Costs.** The costs of implementing the alternative. Do not include the costs of redeveloping the site. Include the following costs:
- (A) **Construction costs**, such as pre-construction engineering design and permitting, physical construction (including labor, equipment, and materials), compliance monitoring during construction (including sampling and analysis), construction management, establishment of institutional controls, regulatory oversight, and quality assurance and quality control; and
  - (B) **Post-construction costs**, such as operation and maintenance activities necessary to maintain the effectiveness of a constructed cleanup action component, replacement or repair of equipment (including labor, equipment, and materials), permit renewal, compliance monitoring (including sampling and analysis), maintaining institutional controls, financial assurances, periodic reviews, post-construction management, and regulatory oversight.
- (I) **Design life.** Estimate the design life of cleanup action components, including engineered controls. If the period of time in which a component is needed exceeds the design life of the component, include the cost of replacing or repairing the component in the cost estimate.
- (II) **Present worth.** If present worth analysis is used to estimate future costs, consider both of the following:
- **Discount rate.** If project costs do not exceed thirty years, use the current U.S. Treasury interest rate for bonds of comparable maturity to the period of analysis. If project costs exceed thirty years, use the current U.S. Treasury thirty-year interest rate.
  - **Inflation of construction and maintenance costs.** Use an appropriate construction cost index.

**WAC 173-340-370      Expectations for cleanup actions**

Ecology has the following expectations for cleanup actions. The expectations represent the likely results of the remedy selection process described in WAC [173-340-350](#) through [173-340-390](#). Ecology recognizes that conformance with the expectations may not be appropriate at some sites. Selecting a cleanup action conforming to the expectations is not a substitute for conducting a feasibility study. The expectations must be considered when evaluating cleanup action alternatives in the feasibility study. Any non-conformance of the preferred cleanup action alternative to the expectations must be documented and explained in the feasibility study report.

- (1) Ecology expects that treatment technologies will be emphasized at sites containing liquid wastes, areas contaminated with high concentrations of hazardous substances, highly mobile materials, and/or discrete areas of hazardous substances that lend themselves to treatment.
- (2) To minimize the need for long-term management of contaminated materials, Ecology expects that all hazardous substances will be destroyed, detoxified, and/or removed to concentrations below cleanup levels throughout sites containing small volumes of hazardous substances.
- (3) Ecology recognizes the need to use engineering controls, such as containment, for sites or portions of sites that contain large volumes of materials with relatively low levels of hazardous substances where treatment is impracticable.
- (4) To minimize the potential for migration of hazardous substances, Ecology expects that active measures will be taken to prevent precipitation and subsequent runoff from coming into contact with contaminated soils and waste materials. When such measures are impracticable, such as during active cleanup, Ecology expects that site runoff will be contained and treated prior to release from the site.
- (5) Ecology expects that when hazardous substances remain on-site at concentrations exceeding cleanup levels, those hazardous substances will be consolidated to the maximum extent practicable where needed to minimize the potential for direct contact and migration of hazardous substances.
- (6) Ecology expects that, for sites adjacent to a surface water body, active measures will be taken to prevent/minimize releases to surface water via surface runoff and groundwater discharges in excess of cleanup levels. Ecology expects that dilution will not be the sole method for demonstrating compliance with cleanup standards in these instances.
- (7) Ecology expects that natural attenuation of hazardous substances may be appropriate at sites where:
  - (a) Source control (including removal and/or treatment of hazardous substances) has been conducted to the maximum extent practicable;
  - (b) Leaving contaminants on-site during the restoration time frame does not pose an unacceptable threat to human health or the environment;
  - (c) There is evidence that natural biodegradation or chemical degradation is occurring and will continue to occur at a reasonable rate at the site; and

- (d)** Appropriate monitoring requirements are conducted to ensure that the natural attenuation process is taking place and that human health and the environment are protected.
- (8)** Ecology expects that cleanup actions conducted under this chapter will not result in a significantly greater overall threat to human health and the environment than other alternatives.
- (9)** Ecology expects that cleanup actions conducted under this chapter will provide an equitable distribution of benefits and avoid an inequitable distribution of burdens between any highly impacted and other communities affected by the site. Ecology further expects that any inequitable distribution will be mitigated in consultation with highly impacted communities.
- (10)** Ecology expects that cleanup actions conducted under this chapter will be effective over the long-term and resilient to those climate change impacts that are both highly likely to occur and could severely compromise cleanup actions.

## **Excerpts of Preliminary Draft Rule on Environmental Justice**

### **IMPORTANT**

This part of the document includes excerpts of preliminary draft changes to Sections 350 through 370 of Chapter 173-340 WAC pertaining to how environmental justice is considered in the remedy selection process.

These provisions are excerpted for your convenience and are the same provisions included in the preliminary draft of Sections 350 through 370.



**DEFINITIONS: WAC 173-340-200**

**"Highly impacted community"** means a community that Ecology has determined is likely to bear a disproportionate burden of public health risks from environmental pollution, such as minority, low-income, tribal, or indigenous populations.

**REMEDIAL INVESTIGATIONS: WAC 173-340-350(6)(c)(ix)**

- (c) **Investigations.** Sufficient investigations must be performed to characterize the distribution of hazardous substances present at the site, and the threat they pose to human health and the environment. Ecology makes the final determination as to which investigations are needed at the site and the sufficiency of those investigations. Where applicable to the site, these investigations must include the following:

...

- (ix) **Effects on highly impacted communities.** Sufficient information must be collected to identify whether and how the site may affect a highly impacted community. When identifying effects, a cumulative impacts analysis must be conducted based on existing and available data. Effects may be health, social, cultural, or economic;

**REQUIREMENTS FOR CLEANUP ACTIONS: WAC 173-340-360(3)(d)**

- (3) **Requirements.** A cleanup action must meet all of the following requirements. When a cleanup action includes more than one cleanup action component, the overall cleanup action must meet these requirements. Ecology recognizes that some of these requirements contain flexibility and require the use of professional judgment in determining how to apply them at a particular site. Ecology makes the final determination as to whether a cleanup action meets these requirements.

- (a) **General requirements.** ...
- (b) **Action-specific requirements.** ...
- (c) **Media-specific requirements.** ...
- (d) **Equitable distribution of benefits and burdens.** When determining whether a cleanup action alternative meets the requirements in this subsection, evaluate and document the following:
  - (i) How the alternative may benefit or burden any highly impacted community affected by the site. When evaluating burdens, a cumulative impact analysis must be conducted based on existing and available data. Burdens may be health, social, cultural, or economic; and
  - (ii) The degree to which the alternative equitably distributes its benefits and burdens between any highly impacted and other communities affected by the site.

**EXPECTATIONS FOR CLEANUP ACTIONS: WAC 173-340-370(9)**

Ecology has the following expectations for cleanup actions. The expectations represent the likely results of the remedy selection process described in WAC [173-340-350](#) through [173-340-390](#). Ecology recognizes that conformance with the expectations may not be appropriate at some sites. Selecting a cleanup action conforming to the expectations is not a substitute for [conducting a feasibility study](#). The expectations must be considered when evaluating cleanup action alternatives in the feasibility study. Any non-conformance of the preferred cleanup action alternative to the expectations must be documented and explained in the feasibility study report.

...

- (9) Ecology expects that cleanup actions conducted under this chapter will provide an equitable distribution of benefits and avoid an inequitable distribution of burdens between any highly impacted and other communities affected by the site. Ecology further expects that any inequitable distribution will be mitigated in consultation with highly impacted communities.

**DOCUMENTATION – FEASIBILITY STUDY REPORT: WAC 173-340-350(7)(d)(vii) and (viii)(B)**

- (c) **Study.** A feasibility study of cleanup action alternatives must be conducted in accordance with the following steps, except as otherwise directed by Ecology. ...
- ...
- (iv) **Step 4: Evaluate alternatives.** Conduct a detailed evaluation of each remaining cleanup action alternative to determine whether it meets the requirements in WAC [173-340-360](#) and conforms to the expectations in WAC [173-340-370](#).
- (v) **Step 5: Select preferred alternative.** Based on the detailed evaluation in Step 4, select a preferred cleanup action alternative that meets the requirements in WAC [173-340-360](#) and conforms, as appropriate, to the expectations in WAC [173-340-370](#).
- (d) **Report.** A feasibility study report must include all of the following information:
- ...
- (vii) Documentation of the detailed evaluation process in Step 4 of the feasibility study, including how equity for any highly impacted community is considered in that process (see WAC 173-340-360(3)(d)), and the basis for eliminating any alternative from further evaluation;
- (viii) The preferred cleanup action alternative selected in Step 5 of the feasibility study, including:
- (A) The basis for selecting the alternative and for any non-conformance to the expectations in WAC [173-340-370](#);
- (B) The degree to which the benefits and burdens of the alternative are equitably distributed between any highly impacted and other communities affected by the site and the basis for any inequitable distribution;

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## **Excerpts of Preliminary Draft Rule on Climate Change Resilience**

### **IMPORTANT**

This part of the document includes excerpts of preliminary draft changes to Sections 350 through 370 of Chapter 173-340 WAC pertaining to how climate change resilience is considered in the remedy selection process.

These provisions are excerpted for your convenience and are the same provisions included in the preliminary draft of Sections 350 through 370.

**REMEDIAL INVESTIGATION: WAC 173-340-350(6)(c)(vi)**

- (c) **Investigations.** Sufficient investigations must be performed to characterize the distribution of hazardous substances present at the site, and the threat they pose to human health and the environment. Ecology makes the final determination as to which investigations are needed at the site and the sufficiency of those investigations. Where applicable to the site, these investigations must include the following:

...

- (vi) **Climate.** Sufficient information must be collected on current and projected local and regional climatological characteristics that are likely to affect the migration of hazardous substances **or the resilience of the cleanup action.** Relevant characteristics can include temperature extremes, rise in sea level, seasonal patterns of rainfall, the magnitude and frequency of extreme storm events, the potential for landslides, prevailing wind direction and velocity, and the potential for wildfires.

**REQUIREMENTS FOR CLEANUP ACTIONS: WAC 173-340-360(3)(a) and (5)(d)(iii)(A)(III)**

- (3) **Requirements.** A cleanup action must meet all of the following requirements. When a cleanup action includes more than one cleanup action component, the overall cleanup action must meet these requirements. Ecology recognizes that some of these requirements contain flexibility and require the use of professional judgment in determining how to apply them at a particular site. Ecology makes the final determination as to whether a cleanup action meets these requirements.

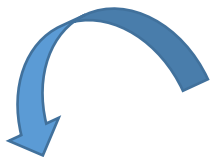
- (a) **General requirements.** A cleanup action must:

...

- (v) Provide resilience to climate change impacts that have a high likelihood of occurring and severely compromising its long-term effectiveness;

...

- (viii) Use permanent solutions to the maximum extent practicable (see subsection (5) of this section); and



- (5) **Determining whether a cleanup action uses permanent solutions to the maximum extent practicable.**

- (a) **Purpose.** This subsection specifies the requirements and procedures for determining whether a cleanup action uses permanent solutions to the maximum extent practicable, as required under RCW [70.105D.030](#)(1) and subsection (3)(a)(viii) of this section. A permanent cleanup action or permanent solution is defined in WAC [173-340-200](#).

...

- (d) **Criteria.** When conducting a disproportionate cost analysis under this subsection, use the following criteria to evaluate and compare the costs and benefits of each cleanup action alternative:

...

- (iii) **Effectiveness over the long term.** The degree to which the alternative is effective over the long term.

- (A) **Factors.** When assessing the long-term effectiveness of the alternative, consider the following at a minimum:

- (I) The degree of certainty that the alternative will be successful;
- (II) The reliability of the alternative during the period of time hazardous substances are expected to remain on-site at concentrations that exceed cleanup levels;
- (III) The resilience of the alternative to climate change impacts;
- (IV) The magnitude of residual risk with the alternative in place; and
- (V) The effectiveness of controls required to manage treatment residues or remaining wastes.

#### EXPECTATIONS FOR CLEANUP ACTIONS: WAC 173-340-370(10)

Ecology has the following expectations for cleanup actions. The expectations represent the likely results of the remedy selection process described in WAC [173-340-350](#) through [173-340-390](#). Ecology recognizes that conformance with the expectations may not be appropriate at some sites. Selecting a cleanup action conforming to the expectations is not a substitute for [conducting a feasibility study](#). The expectations must be considered when evaluating cleanup action alternatives in the feasibility study. Any non-conformance of the preferred cleanup action alternative to the expectations must be documented and explained in the feasibility study report.

...

- (10) Ecology expects that cleanup actions conducted under this chapter will be effective over the long-term and resilient to those climate change impacts that are both highly likely to occur and could severely compromise cleanup actions.

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## References

Reference	Web Page
Cleanup Program	<a href="https://ecology.wa.gov/Spills-Cleanup/Contamination-cleanup">https://ecology.wa.gov/Spills-Cleanup/Contamination-cleanup</a>
Cleanup Process	<a href="https://ecology.wa.gov/Spills-Cleanup/Contamination-cleanup/Cleanup-process">https://ecology.wa.gov/Spills-Cleanup/Contamination-cleanup/Cleanup-process</a>
Site Register	<a href="https://fortress.wa.gov/ecy/publications/UIPages/PublicationList.aspx?IndexTypeName=Program&amp;NameValue=Toxics+Cleanup&amp;DocumentTypeName=Newsletter">https://fortress.wa.gov/ecy/publications/UIPages/PublicationList.aspx?IndexTypeName=Program&amp;NameValue=Toxics+Cleanup&amp;DocumentTypeName=Newsletter</a>
Voluntary Cleanup Program	<a href="https://ecology.wa.gov/Spills-Cleanup/Contamination-cleanup/Cleanup-process/Cleanup-options/Voluntary-cleanup-program">https://ecology.wa.gov/Spills-Cleanup/Contamination-cleanup/Cleanup-process/Cleanup-options/Voluntary-cleanup-program</a>
Pollution Liability Insurance Agency	<a href="https://plia.wa.gov/">https://plia.wa.gov/</a>
Chapter 70.105D RCW	<a href="https://apps.leg.wa.gov/RCW/default.aspx?cite=70.105D">https://apps.leg.wa.gov/RCW/default.aspx?cite=70.105D</a>
RCW 70.105D.010	<a href="https://app.leg.wa.gov/RCW/default.aspx?cite=70.105D.010">https://app.leg.wa.gov/RCW/default.aspx?cite=70.105D.010</a>
RCW 70.105D.030	<a href="https://app.leg.wa.gov/RCW/default.aspx?cite=70.105D.030">https://app.leg.wa.gov/RCW/default.aspx?cite=70.105D.030</a>
Chapter 173-340 WAC	<a href="https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340">https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340</a>
WAC 173-340-200	<a href="https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-200">https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-200</a>
WAC 173-340-350	<a href="https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-350">https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-350</a>
WAC 173-340-360	<a href="https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-360">https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-360</a>
WAC 173-340-370	<a href="https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-370">https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-370</a>
WAC 173-340-380	<a href="https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-380">https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-380</a>
WAC 173-340-390	<a href="https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-390">https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-390</a>
WAC 173-340-515	<a href="https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-515">https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-515</a>
Chapter 173-204 WAC	<a href="https://apps.leg.wa.gov/WAC/default.aspx?cite=173-204">https://apps.leg.wa.gov/WAC/default.aspx?cite=173-204</a>
WAC 173-204-550	<a href="https://apps.leg.wa.gov/WAC/default.aspx?cite=173-204-550">https://apps.leg.wa.gov/WAC/default.aspx?cite=173-204-550</a>
WAC 173-204-570	<a href="https://apps.leg.wa.gov/WAC/default.aspx?cite=173-204-570">https://apps.leg.wa.gov/WAC/default.aspx?cite=173-204-570</a>
Chapter 173-322A WAC	<a href="https://app.leg.wa.gov/WAC/default.aspx?cite=173-322A">https://app.leg.wa.gov/WAC/default.aspx?cite=173-322A</a>



Reference	Web Page
WAC 173-322A-100	<a href="https://app.leg.wa.gov/WAC/default.aspx?cite=173-322A-100">https://app.leg.wa.gov/WAC/default.aspx?cite=173-322A-100</a>
Adaptation Strategies for Resilient Cleanup Remedies	<a href="https://fortress.wa.gov/ecy/publications/SummaryPages/1709052.html">https://fortress.wa.gov/ecy/publications/SummaryPages/1709052.html</a>
Concise Explanatory Statement for 2001 Rule Amendments	<a href="https://fortress.wa.gov/ecy/publications/summarypages/0109043.html">https://fortress.wa.gov/ecy/publications/summarypages/0109043.html</a>
Guidelines for Property Cleanups under the Voluntary Cleanup Program	<a href="https://fortress.wa.gov/ecy/publications/SummaryPages/0809044.html">https://fortress.wa.gov/ecy/publications/SummaryPages/0809044.html</a>
OMB Circular A-94: Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Program	<a href="https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/circulars/A94/a094.pdf">https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/circulars/A94/a094.pdf</a>
OMB Circular A-94, Appendix C: Discount Rates for 2020	<a href="https://www.whitehouse.gov/wp-content/uploads/2019/12/M-20-07.pdf">https://www.whitehouse.gov/wp-content/uploads/2019/12/M-20-07.pdf</a>
Remedial Action Grant and Loan Guidance for the 2021–23 Biennium	<a href="https://fortress.wa.gov/ecy/publications/summarypages/2009055.html">https://fortress.wa.gov/ecy/publications/summarypages/2009055.html</a>
Sediment Cleanup User's Manual	<a href="https://fortress.wa.gov/ecy/publications/SummaryPages/1209057.html">https://fortress.wa.gov/ecy/publications/SummaryPages/1209057.html</a>
STAG Web Page	<a href="https://www.ezview.wa.gov/site/alias_1988/37514/overview.aspx">https://www.ezview.wa.gov/site/alias_1988/37514/overview.aspx</a>
STAG Briefing Paper: Remedy Selection and Disproportionate Cost Analysis (January 30, 2020)	<a href="https://www.ezview.wa.gov/Portals/_1988/Documents/Documents/Sections350-360MemoForSTAGReview_01-30-2020.pdf">https://www.ezview.wa.gov/Portals/_1988/Documents/Documents/Sections350-360MemoForSTAGReview_01-30-2020.pdf</a>
STAG Packet: Environmental Justice in Remedy Selection (March 5, 2020)	<a href="https://www.ezview.wa.gov/Portals/_1988/Documents/Documents/Memo_EnvironmentalJusticeInRemedySelection_ForSTAGReview_03-05-2020.pdf">https://www.ezview.wa.gov/Portals/_1988/Documents/Documents/Memo_EnvironmentalJusticeInRemedySelection_ForSTAGReview_03-05-2020.pdf</a>
STAG Presentation Handout: Environmental Justice Map Tool (March 5, 2020)	<a href="https://www.ezview.wa.gov/Portals/_1988/Documents/Documents/03-05-2020_STAG_EJMapToolPresentationHandout.pdf">https://www.ezview.wa.gov/Portals/_1988/Documents/Documents/03-05-2020_STAG_EJMapToolPresentationHandout.pdf</a>