Lower Duwamish Waterway
Remedial Investigation/Feasibility Study

STATEMENT OF WORK

Prepared for

Lower Duwamish Waterway Group
Port of Seattle
City of Seattle
King County
The Boeing Company

For submittal to

U.S. Environmental Protection Agency
Region 10, Seattle, WA
Washington Department of Ecology
Northwest Regional Office, Bellevue, WA

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INTRODUCTION

This Statement of Work (SOW) is attached to the Lower Duwamish Waterway joint Ecology/EPA Administrative Order on Consent (AOC). The respondents to the AOC are the City of Seattle, King County, The Boeing Company, and the Port of Seattle. The purpose of this SOW is to identify the tasks required to complete a river-wide remedial investigation (RI) and prepare a feasibility study (FS) work plan for the Lower Duwamish Waterway (LDW; see map, Figure 1) (figures and tables are located following the text). To maximize the utility of existing data, the RI will be conducted in two phases. The first phase of the RI will use existing data to provide a framework and process in which to identify locations within the LDW that may be candidates for early action. Early actions may be taken following Phase I. The second phase of the RI will consist of investigations to fill data gaps for the completion of the RI.

A proposed overall process for an LDW Remedial Investigation/Feasibility Study (RI/FS) is presented in Figure 2. The LDW has been the target of extensive environmental sampling. Over the last 5 years, more than 1,000 sediment samples have been collected from the LDW by multiple entities, including the EPA, the National Oceanic and Atmospheric Administration (NOAA), The Boeing Company, King County, the Port of Seattle, the Elliott Bay/Duwamish River Restoration Program (EB/DRP), and the U.S. Army Corps of Engineers (ACOE).

This SOW describes the specific objectives of the Phase I RI, the general objectives of the Phase II RI, and deliverables to be provided for the RI by the respondents. The objectives of the RI are summarized in Table 1.

A proposed schedule for completion of the Phase I RI is presented in Figure 3. This figure also shows the estimated time allotted for agency review of each deliverable. Due to the uncertainty in the specific elements of the Phase II RI, no schedule is shown for this phase in Figure 3. It is anticipated that the Phase II RI could be completed within 18 months following approval of the Phase I RI report. The study objectives for both phases of the RI are identified in Table 1. The RI is broken down into 12 discrete tasks; each is described in a separate section below. Work described in Task 1 will be ongoing throughout the RI process; Tasks 2 to 7 will be completed during Phase I of the RI; Tasks 8 to 13 will be completed during Phase II of the RI. Table 2 gives the list of proposed deliverables for both phases of the RI and the anticipated scheduled agency review time for each Phase I deliverable.

TASK 1 COMMUNICATION

It is anticipated that regularly scheduled meetings of the respondents and the regulatory agencies will be held to review progress during the RI. As appropriate, natural resource trustees will be included in technical meetings. Following each meeting, email will be sent to all participating parties summarizing the topics discussed.

TASK 2 HISTORICAL REVIEW, SITE CHARACTERIZATION, AND DATA COMPILATION

Prior to beginning data analysis, a comprehensive review of site history, previous and ongoing environmental investigations, physiographic and oceanographic features, biological resources, and demographic characteristics will be conducted for the LDW. This review has several objectives:

- Identify studies in which data usable for the RI were collected
- Document investigations of potential chemical sources, source control, and chemical fate and transport
- Provide a basis for developing the site conceptual model for the ecological risk assessment (ERA) and human health risk assessment (HHRA)

The Phase I RI will use existing chemistry and biological effects data to initially evaluate the nature and extent of contamination in the LDW and to identify potential early action areas. It is anticipated that sufficient data exist to complete the Phase I RI.

The following types of data will be assembled from relevant studies and databases and evaluated for possible inclusion in the RI:

- Sediment chemistry (both bulk and porewater)
- Summary of pertinent Quality Assurance/Quality Control information from each study
- Sediment toxicity bioassays
- Benthic community analyses
- Salmon life history data
- Abundance and distribution of biological resources
- Sensitive and special habitat areas
- Fish and marine invertebrate home range data/projections
- Demographic data including socio-economic and ethnicity information

- Site use information (i.e., public access, commercial, recreational, fish and shellfish consumption, etc.)
- Potential sources of contamination, including a summary of individual outfalls, surface water, groundwater, stormwater, CSO discharges, and identification of contaminated shoreline fill
- Tissue chemistry
- Fish histopathology and biomarker data

Many of the relevant environmental data for the LDW are readily available in electronic format from the Sediment Quality Information System database (SEDQUAL), the Dredge Analysis Information System database (DAIS), and from the electronic archives of the respondents. Data records from these sources will be combined into a single relational database. For this task, the respondents will: 1) develop and submit for agency approval a list of reports to be reviewed for data relevant to the purposes of this RI/FS, 2) develop and submit for agency approval a conceptual design for the database, 3) develop and submit for agency approval criteria for evaluating and accepting data sets, and 4) select data sets to be included in the final database. Electronic copies of the final database, compatible with agency software, will be submitted once a thorough quality assurance review is complete. A memorandum will be prepared and submitted that summarizes the environmental data in the database. This memorandum will also include a list of the datasets excluded from the final database and the reasons for their exclusion.

Geographical information system (GIS) tools will be extensively utilized for data analysis; therefore, all data to be included in the final database must be associated with accurate geographical coordinates. GIS-based maps of station locations and chemical distributions will be prepared as deliverables. The results of the historical review, initial site characterization, and identification of potential early action areas will be included in the Phase I RI report (Task 6). The data file, GIS shapefiles, and meta data will also be provided to the agencies as deliverables.

TASK 3 STUDY DESIGN FOR SCOPING-PHASE RISK ASSESSMENTS

The primary goals of the Phase I RI are to: 1) summarize the existing information concerning the nature and extent of contamination within the LDW, 2) use the existing data, to the extent practical, to identify high priority areas (Task 4), and 3) identify candidate areas for early action (Task 5). These priorities will be established within a framework based on scoping-phase risk assessments for human and ecological health.

The first step in the risk assessments will be to create site conceptual models. Separate models will be created for human and ecological health, although they will be based on

similar assumptions. The models will graphically portray the relationships among sources, chemicals, transport mechanisms, and receptors.[1]

The conceptual site model for the ERA will include many different organisms that could potentially be impacted by sediment contamination and shows the relationships among species and potential exposure pathways. The conceptual site model for the HHRA will include all potential exposure pathways.

The scoping-phase HHRA and ERA will be conducted in parallel. Study design considerations for each risk assessment are presented in separate sections below.

Scoping-phase human health risk assessment

The scoping-phase HHRA will determine whether chemicals of potential concern found in sediments in the LDW pose unacceptable health risks through fish and shellfish consumption, dermal contact with sediment, and/or direct ingestion of sediment. A key objective will be to develop an exposure assessment that is reasonable, yet protective of the potentially exposed population. At the scoping-phase of the HHRA, site-specific values for many exposure variables may be difficult to determine without additional data collection. For example, exposure parameters used for the fish consumption pathway, such as exposure frequency, exposure duration, and ingestion rates, have not been quantified specifically for the LDW. The scoping-phase assessment will use previously conducted risk assessments from the vicinity of the LDW (Environmental Solutions Group 1999; King County DNR 1999; Weston 1994, 1998) as starting points in assessing risk for the LDW.

Exposure scenarios for adults and children will be evaluated. The representative population groups within each scenario will be those whose potential exposure to site-related chemicals is greatest. For the LDW, these groups are those who consume above-average amounts of fish and shellfish (e.g., members of the Muckleshoot and Suquamish tribes, and Asian and Pacific Islanders) or who fish in the LDW (i.e., Native Americans). In the absence of site-specific data collection, conservative values will be selected for the exposure assessment. Within the exposure assessment, exposure point concentrations (EPCs) will be developed for each exposure pathway evaluated. In general, the area over which EPCs are averaged will reflect spatial use by potential receptors. PCBs and other contaminants of potential concern (COPCs) will be addressed in the scoping-phase HHRA. PCBs in sediments from the LDW have been measured as Aroclors and selected congeners. While the congener data will be used to the extent possible, the primary focus of the scoping-phase risk assessment will be total PCB data as measured by Aroclors.

[1] In risk assessment language, receptors refer to the potentially exposed humans, animals, or plants

The conceptual site model, the exposure assessment, and the toxicity values will be submitted to the agencies as an interim deliverable before the completion of the scoping-phase risk assessment. The exposure assessment will include values for all exposure parameters, including EPCs for chemicals of potential concern.

Scoping-phase ecological risk assessment

Traditionally, the objective of a scoping-phase ERA is to use existing data and conservative assumptions to determine if resident species may be subject to adverse effects from stressors at the site. The ERA, which includes a problem formulation[2], an analysis phase[3], and a risk characterization and uncertainty analysis, provides the basis for focusing further analysis, if justified, on a subset of species, stressors, and pathways by eliminating those that do not appear to be subject to unacceptable risk. Based on the ecological site model, representative species inhabiting the LDW will be selected from each of the key exposure pathways. The process for selecting representative species and endpoints will follow EPA (1998) and other relevant guidance. EPA (1998) outlines three principal criteria for selecting resident species: 1) their ecological relevance, 2) their potential susceptibility to the known or potential stressors, and 3) whether they represent management goals. At a minimum, one or more individual species from each of the following major taxonomic groups will be selected: fish, birds, benthic macroinvertebrates, and mammals.

For each representative species, measures of effect and exposure will be proposed for chemicals of potential concern. For benthic invertebrates, measures of effect and exposure for the scoping phase will be the numerical chemical criteria of the Washington Sediment Management Standards (SMS)[4] and all relevant benthic tissue effects data. For fish, appropriate technical studies will be reviewed to determine potential associations of chemical concentrations with effects and to assess measures of exposure. For birds and mammals, a simple food-web model will be constructed to calculate potential doses. The model will be based on previous efforts conducted by King County DNR (1999). These doses will be compared to toxicity reference values (TRVs) to estimate risk.

Measures of exposure refer to how exposure is occurring, and are related to chemical fate and transport and life history characteristics of the particular species. Where existing data are insufficient to provide accurate site-specific measures of exposure, conservative assumptions will be made. The measures of exposure are likely to be different for each representative species. For relatively immobile species such as benthic invertebrates, point

[2] The problem formulation includes the development of assessment endpoints, a conceptual model, and an analysis plan

[3] The analysis phase consists of characterizing both ecological exposure and effects

[4] Chapter 173-204 Washington Administrative Code

estimates of exposure equivalent to a single station location may be appropriate. For mobile species, such as fish and birds, larger spatially averaged concentrations or site usage considerations may be appropriate.

Measures of effect refer to potential adverse impacts to receptor species associated with stressors. Agency databases, peer-reviewed literature, and other relevant toxicological data with appropriate QA/QC documentation will be considered for each of the receptor/stressor combinations. Selected TRVs obtained from secondary sources will be checked using the original primary literature.

PCBs and other COPCs will be addressed in the scoping-phase assessment, particularly for birds and mammals. Total PCBs measured as Aroclors will be used in the scoping-phase assessment, although existing PCB congener data will be used to the extent possible.

The problem formulation for the scoping-phase ecological risk assessment will be submitted to the agencies as an interim deliverable. The problem formulation will consist of a conceptual site model, assessment endpoints, receptors of concern, COPCs and any other stressors under consideration, and the analysis plan for measures of effect and exposure for each representative species. Subsequent to the completion of the problem formulation, draft effect and exposure assessments will be submitted, with proposed exposure concentrations and toxicity data ranges for each receptor species.

Prioritization Methodology for Potential Early Action Areas

A technical memorandum describing the risk-based sediment site prioritization methodology will be submitted to the agencies for review and approval. In identifying high priority areas, the respondents will review sediment site prioritization methodologies that have been used in other similar applications, and will develop a prioritization scheme that adequately represents the range of conditions associated with the potential current risks to human health and the environment. It is anticipated that the selected prioritization methodology will rely on existing environmental data and the results of the scoping-phase risk assessments. Models for prioritizing sediment areas to be evaluated include, among others, those developed by Ecology, EB/DRP, King County, and the Bellingham Bay Pilot Project. The respondents will summarize these approaches and make recommend alternative approaches.

TASK 4 RISK CHARACTERIZATION AND PRIORITY AREA IDENTIFICATION

Following agency approval of the interim deliverables described in Task 3, the scoping-phase risk assessments will be conducted. For each receptor evaluated, the manner in

which risks will be characterized and presented is dependent on the specific measures of exposure. The following approaches will be considered, as will other appropriate approaches:

- For human health, risk estimates will be calculated for both non-carcinogenic and carcinogenic endpoints, depending on the chemical. Separate estimates will be made for each exposure pathway and exposure scenario. In addition, cumulative risk will be evaluated.
    - Risk estimates for human health from the fish and shellfish consumption pathway will be based on chemical concentrations in muscle or whole-body tissue, as appropriate.
- For ecological health, the hazard quotient approach[5] will be used to evaluate potential risk to benthic organisms, fish, birds, and mammals.
    - For benthic invertebrates, hazard quotients will be calculated using Sediment Quality Standards[6] and tissue-based risk analysis, as appropriate.
    - For fish, risk may be characterized based largely on tissue residue values for many of the chemicals of potential concern. Other measures, such as the potential association between chemical concentrations in other environmental media and effects and biological indicators of chemical exposure, may also be considered.
    - For birds and mammals, risks will be calculated based on predicted doses of chemicals of potential concern compared to TRVs.

The results of the risk characterizations will be used with other risk-based information to make recommendations of high priority areas following the risk-based sediment site prioritization methodology. An uncertainty analysis for each scoping-phase risk assessment will also be conducted.

Priority areas based on the scoping-phase risk assessments will not necessarily be identical for each receptor type, but they are likely to converge on the areas with highest bulk sediment chemical concentrations. The GIS will be used to portray high-priority areas for each receptor simultaneously. Risk-based high priority areas will be considered for potential early action pursuant to Task 5. The scoping-phase risk assessment reports will be finalized within the Phase I RI report (Task 6).

[5] Hazard quotients are calculated by dividing the measure of exposure by the measure of effect; both must be in the same units

[6] Chapter 173-204 Washington Administrative Code

TASK 5 IDENTIFICATION OF CANDIDATE AREAS FOR EARLY ACTIONS

Following completion of the sediment prioritization process described in Task 4, management criteria for identifying high priority areas as candidate areas for early action will be developed. Selection criteria will include, but not be limited to, factors such as the priority relative to areas with lower potential ecological and human health risks, the degree of uncertainty in prioritization, the potential for recontamination, and the potential qualitative impact on LDW-wide risks if the area were remediated. Impediments to early action, including habitat alteration issues and landowner constraints, will also be considered. Two technical memoranda will be submitted to the agencies for review and comment: 1) description of selection criteria and 2) data analysis and identification of candidate areas for early remedial action.

TASK 6 PHASE I RI REPORT PRODUCTION

A Phase I RI report will be finalized following completion of all data analyses and the identification of potential areas for early action. The Phase I RI report will:

- Summarize the characteristics and history of the LDW
- Summarize previous environmental investigations, including studies related to groundwater and source control
- Summarize the nature, extent, and sources of contamination affecting the LDW, to the extent possible using existing data
- Summarize the quantity and quality of data collected and reviewed
- Present the results of the scoping-phase HHRA and ERA
- Summarize the process and methods used to determine high priority areas within the LDW based on sediment quality and the scoping-phase HHRA and ERA
- Identify areas classified as high priority and candidate areas for early action
- Present an initial identification of ARARs

Deliverables for Task 6 include a draft Phase I RI Report, which will be submitted to the agencies for review and comment, and a final version of the report, once all comments have been addressed.

TASK 7 IDENTIFICATION OF DATA NEEDED TO COMPLETE THE RI

Upon completion of the Phase I RI report and approval of the report by EPA and Ecology, the respondents will identify additional data that may be required to complete the RI.

Data gaps will be identified based on an analysis of the uncertainties associated with summarizing the nature and extent of contamination, HHRA exposure parameters, and the results of the scoping-phase risk assessments. In addition, the scoping-phase risk assessments will be used to assess residual risks at the completion of proposed early actions. Data gaps related to addressing risk characterization uncertainties and data that may be needed for management decisions will be prioritized. Costs for collecting these data will also be a consideration. A technical memorandum will be prepared that will identify data gaps in detail, and discuss whether the data gaps should be further investigated. The memorandum will be submitted to the agencies for review and comment.

TASK 8 PREPARE PHASE II RI WORK PLANS

After receiving comments from the agencies on the technical memorandum addressing data gaps, the respondents will prepare draft and final Work Plans describing the studies to be conducted as part of the Phase II RI. One component of these studies will be high-resolution analysis for dioxin-like PCB congeners on a subset of environmental samples that will be required to make final risk-based management decisions.

TASK 9 PREPARATION OF PROJECT PLANS FOR CONDUCTING ADDITIONAL STUDIES

Study designs and methods for additional data collection efforts will be documented in project plans, including Sampling and Analysis Plans (SAPs), Quality Assurance Project Plans (QAPPs), and Health and Safety Plans (HSPs), as appropriate. These plans will be submitted for agency review and approval. Preparation of these plans will follow guidance produced by EPA (1999) and Ecology (1991, 1995).

TASK 10 IMPLEMENT ADDITIONAL STUDIES

Once the appropriate project plans are approved by the agencies, the studies will be conducted. Following the completion of each study, a report will be completed and submitted to the agencies, which describes the specific activities accomplished, noting any deviation from the project plans. All deviations from project plans must be approved by EPA and Ecology in advance. Once the data are reviewed and validated, a data report for each study will be prepared and submitted to the agencies.

TASK 11 CONDUCT BASELINE AND RESIDUAL RISK ASSESSMENTS

Baseline and residual HHRAs and baseline and residual ERAs will be conducted once the needed data identified in Task 7 have been collected. The risk assessments will be conducted for two exposure regimes: 1) baseline sediment conditions as they exist at the time the RI assessments are done and 2) residual sediment conditions accounting for the effects of the planned early action projects. The latter assessment will be conducted by using characteristics that the sediments will have following planned early actions, as well as characteristics of sediments is unremediated areas, for the exposure assessment. This assessment will provide an estimate of residual risks following early actions , and will be used to determine whether remedial actions, beyond the early actions, are warranted. Because some of the early actions may not be completed when the residual risk assessment is conducted, some uncertainty will remain regarding associated ecological and human health risk reduction. An interim deliverable will be submitted to the agencies to outline an approach for predicting exposures in the post-early action exposure regime.

These risk assessments will refine risk estimates made during the scoping-phase risk assessments through a variety of techniques, including:

- increased sample size for estimating exposure
- direct, rather than estimated, measurements of exposure and effect
- additional exposure scenarios
- more sophisticated food web modeling
- probabilistic risk characterization and uncertainty analysis

The fundamental study design will be similar to the scoping-phase risk assessments, but there will be added complexity in some areas. Accordingly, the deliverables specified in Task 3 (conceptual site models, exposure assessments, and problem formulation) will be revised and submitted to the agencies for review.

Draft baseline and residual HHRA and ERA reports will be submitted to the agencies for review and comment. The final baseline and residual risk assessment reports will be included in the Phase II RI report (Task 12).

TASK 12 PHASE II RI REPORT PRODUCTION

The Phase II RI report will include a presentation of all data collected during Phase II and a complete evaluation of the nature and extent of contamination. The final baseline and residual risk assessments for human and ecological health will also be included. The report will describe a process for identifying potential ARARs and remedial actions

beyond the early actions identified in the Phase I RI. In addition, the report will specify the risk-based ARARs and other ARARs directly related to the completion of the RI. The draft Phase II RI report will be submitted to the agencies for review and comment. A final version of the report will be submitted once all comments have been addressed.

TASK 13 RIVER-WIDE FEASIBILITY STUDY WORK PLAN

As part of the RI, respondents will prepare a work plan to conduct a river-wide FS. The work plan will be based on the appropriate EPA and Ecology guidance documents for conducting a FS. The FS will include identifying and screening remedial alternatives based on the general range of Duwamish Waterway sediment characteristics (e.g., sediment grain size and TOC), waterway conditions (e.g., water depth, range of flow, and salinity range), and contaminants of concern. The FS work plan will also include a task to develop a detailed comparative analysis of the alternatives to identify those that might be candidates for remedial activities that might be undertaken at the site.

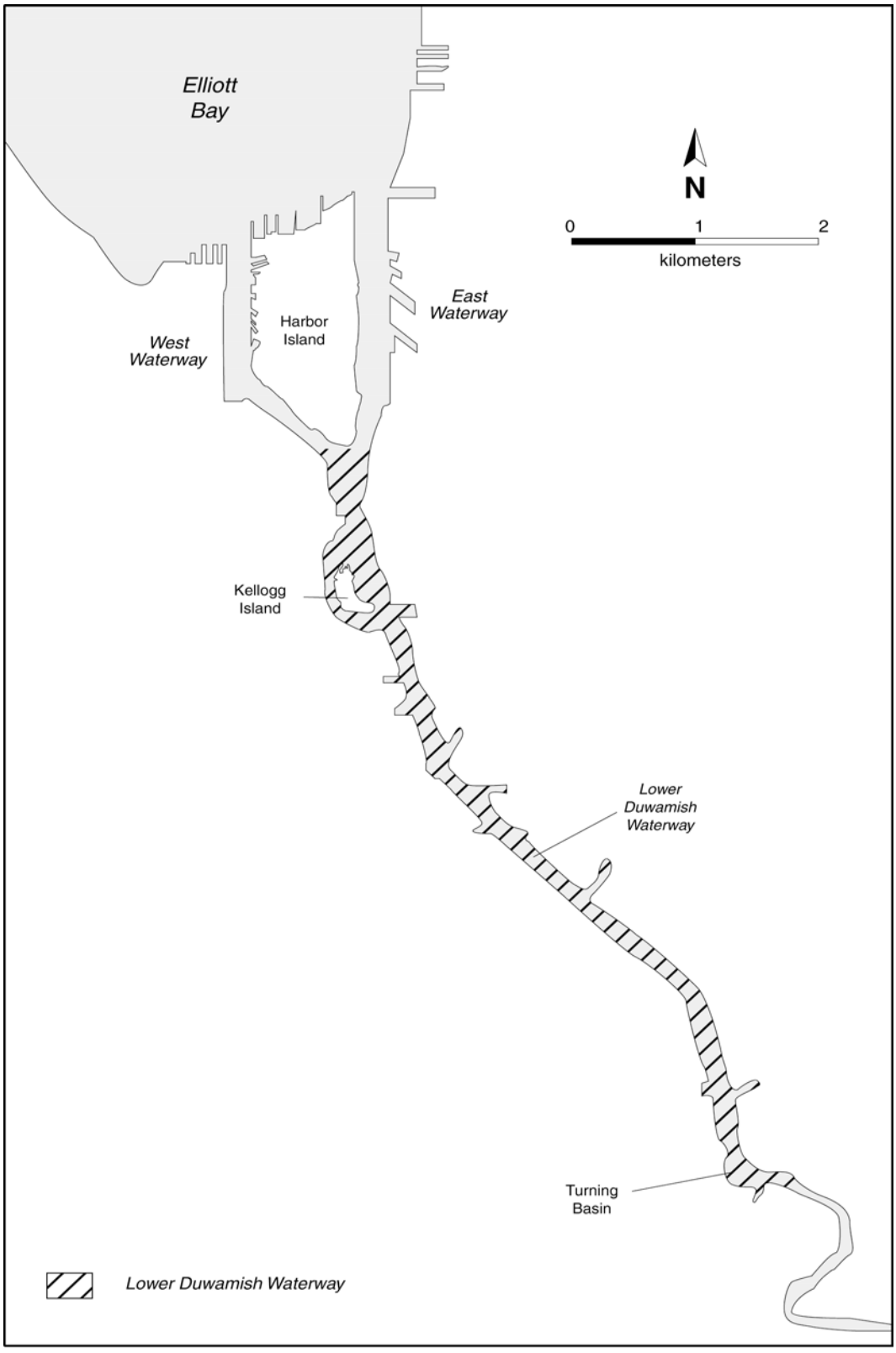

Figure 1. Lower Duwamish Waterway (LDW)

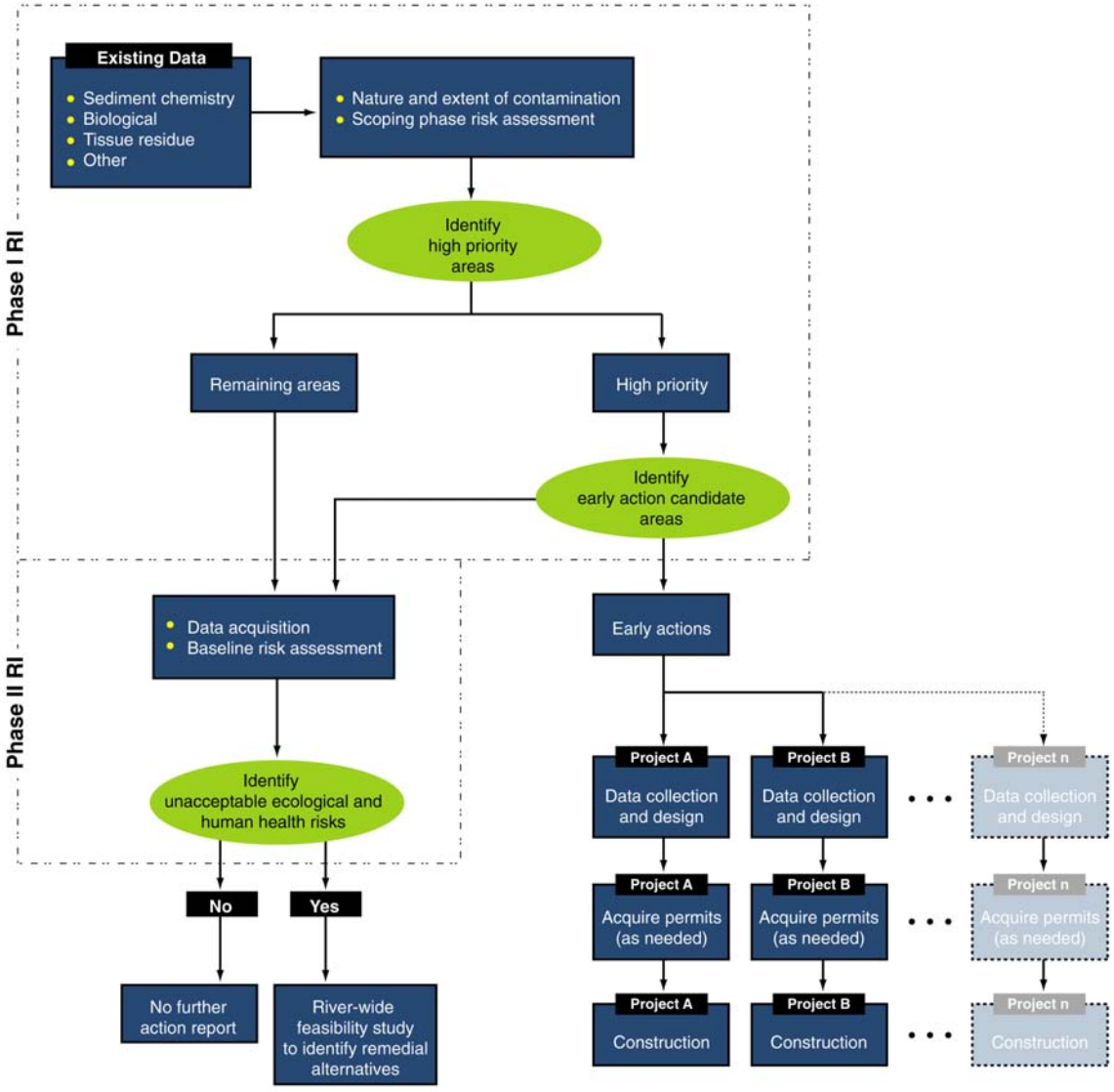

Figure 2. Flowchart of tasks for the Lower Duwamish Waterway RI/FS

Lower Duwamish Waterway
Remedial Investigation
Phase I Timeline

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Months from Project Inception

TASK	PROJECT STEP	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Communication														
2	Historical review, site characterization, and data compilation														
	Conceptual design for the database														
	Criteria and QA procedures for evaluating and accepting datasets														
	Summary information of environmental data in the database														
	GIS maps of stations and chemical distributions within the study area														
	Electronic copy of the final database and GIS files														
3	Study design for scoping-phase risk assessments														
	Conceptual site model, exposure and toxicity assessment for scoping-phase HHRA														
	Problem formulation for scoping-phase ERA														
	Effects and exposure assessments for scoping-phase ERA														
	Risk-based sediment site prioritization methodology														
4	Risk characterization and priority area identification														
	Scoping-phase risk assessment report														
5	Identification of candidate sites for early remedial action														
	Technical memorandum on selection criteria for identification of candidate sites														
	Technical memorandum on data analysis and identification of candidate sites														
6	Phase I RI report production														
7	Identification of data needed to complete the RI														

Start End Deliverable Estimated agency review and approval timeframe

Figure 3. Anticipated schedule for the Lower Duwamish Waterway Phase I RI
[timeline edited and reinserted]

Table 1. Remedial Investigation objectives

Phase I	• Summarize and compile existing data concerning historical environmental investigations and the source, nature, and extent of contamination within the LDW • Use existing data to conduct scoping-phase ERA and HHRA • Identify areas potentially suitable for early actions • Identify additional data necessary to complete the river-wide RI • Prepare Work Plans as needed to complete the river-wide RI
Phase II	• Prepare documentation (SAP, QAPP, HSP) for any additional studies • Implement additional studies to fill data gaps • Use data from additional studies to determine baseline risk in the absence of any early actions, and to determine residual risks assuming all early actions have been conducted • Identify areas where residual risks are above acceptable levels • Prepare Work Plan for river-wide FS

Table 2. List of deliverables[7]

TASK 1: COMMUNICATION

No work products are anticipated for this task

PHASE I RI

TASK 2: HISTORICAL REVIEW, SITE CHARACTERIZATION, AND DATA COMPILATION

Conceptual design for database – 10 working days for agency review

Criteria for evaluating and accepting data sets – 10 working days for agency review

List of reports for historical site characterization – 10 working days for agency review

Summary information of environmental data in the database

GIS-based maps of stations and chemical distributions within the LDW

Electronic copy of the final database and GIS files

TASK 3: STUDY DESIGN FOR SCOPING-PHASE RISK ASSESSMENTS

Draft conceptual site model, exposure assessment, and toxicity values for scoping-phase HHRA – 10 working days for agency review

Draft problem formulation for scoping-phase ERA – 20 working days for agency review

Draft effects and exposure assessments for scoping-phase ERA – 10 working days for agency review

Risk-based sediment prioritization methodology – 10 working days for agency review

TASK 4: RISK CHARACTERIZATION AND PRIORITY AREAS IDENTIFICATION

Draft scoping-phase risk assessment report – 30 working days for agency review

TASK 5 IDENTIFICATION OF CANDIDATE AREAS FOR EARLY ACTION

Technical memorandum on selection criteria for identification of candidate areas – 10 working days for agency review

Technical memorandum on data analysis and identification of candidate areas – 10 working days for agency review

TASK 6 PHASE I RI REPORT PRODUCTION

Draft and final Phase I RI report – 45 working days for agency review

TASK 7 IDENTIFICATION OF DATA NEEDED TO COMPLETE THE RI

Draft technical memorandum identifying additional data needs for RI

TASK 8 PREPARATION OF PHASE II RI WORK PLANS

Draft and final Phase II RI Work Plans describing additional studies to be conducted

PHASE II RI

TASK 9 PREPARATION OF PROJECT PLANS FOR CONDUCTING ADDITIONAL STUDIES

Draft and final project plans, as necessary (SAPs, QAPPs, HSPs)

TASK 10 IMPLEMENT ADDITIONAL STUDIES

Field report for each study

Data report for each study

[continues overleaf]

[7] Anticipated agency review time for planning purposes only

Table 2, continued

TASK 11 CONDUCT BASELINE AND RESIDUAL RISK ASSESSMENTS
Approach for estimating post early action exposure regime
Conceptual site model and exposure assessment for baseline and residual HHRA
Problem formulation for baseline and residual ERA
Baseline and residual risk assessment reports
TASK 12 PHASE II RI REPORT PRODUCTION
Draft and final Phase II RI report
TASK 13 RIVER-WIDE FS WORK PLAN
Draft and final river-wide FS work plan

REFERENCES

Ecology. 1991. Guidelines and specifications for preparing Quality Assurance Project Plans. Washington State Department of Ecology, Environmental Investigations and Laboratory Services Program, Quality Assurance Section, Manchester, WA. May 1991. 91-16.

Ecology. 1995. Sediment sampling and analysis plan appendix. Washington State Department of Ecology, Sediment Management Unit, Lacey, WA. Prepared by PTI Environmental Services, Bellevue, WA. December 1995.

Environmental Solutions Group. 1999. Waterway Sediment Operable Unit, Harbor Island Superfund Site. Assessing human health risks from the consumption of seafood: human health risk assessment report. Prepared for Port of Seattle, Lockheed Martin, Todd Pacific Shipyards. Environmental Solutions Group, Seattle, WA.

EPA. 1998. Guidelines for ecological risk assessment. EPA/630/R-95/002-F. U.S. Environmental Protection Agency, Risk Assessment Forum, Washington, D.C.

EPA. 1999. EPA requirements for Quality Assurance Project Plans. EPA QA/R-5. Interim final, November 1999. U.S. Environmental Protection Agency, Quality Staff, Washington, D.C.

King County DNR. 1999. King County combined sewer overflow water quality assessment for the Duwamish River and Elliott Bay. Prepared by King County Department of Natural Resources Wastewater Treatment Division and Water and

Weston. 1994. Remedial investigation report, Harbor Island (Part 2 – Sediment). Volume I. Prepared for the U.S. Environmental Protection Agency, Region 10, Seattle, WA. Roy F. Weston, Seattle, WA.

Weston. 1998. Remedial investigation report, Pacific Sound Resources, Marine Sediments Unit, Seattle, Washington. Volume I. Prepared for the U.S. Environmental Protection Agency, Region 10, Seattle, WA. Roy F. Weston, Seattle, WA.

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