Appendix I
Long-Term Maintenance and Monitoring Plan Outline

Long-Term Maintenance and Monitoring Plan Outline

This appendix provides an outline of the Long-Term Maintenance and Monitoring Plan (LTMMP) for the Lower Duwamish Waterway (LDW). This outline is being developed as part of the upper reach remedial design (RD); however, the LTMMP will address the entire LDW in-water portion of the site. An annotated outline will be provided with the Pre-Final (90%) RD, and the LTMMP will remain as an annotated outline in the Final (100%) RD. The Implementing Entity will complete and implement the LTMMP after the RD for the upper reach is completed. It is expected that the LTMMP will be amended to include specific requirements for the middle and lower reaches following their construction.

The purpose of the LTMMP is to specify the actions that will be taken to assess the long-term remedy performance in terms of the Record of Decision criteria and the integrity of the remedial actions and to present maintenance or adaptive management activities that will be conducted in the event that performance objectives are not being met. The LTMMP will describe details of long-term monitoring and maintenance, including performance standards; sampling intervals, analytes, location density, and frequency; interim benchmarks; and associated follow-up actions.

The LTMMP will be developed in accordance with *Guidance for Management of Superfund Remedies in Post Construction* (EPA 2017) and will include elements from the baseline study designs and recommendations as described in the *Lower Duwamish Waterway Pre-Design Studies Data Evaluation Report* (Windward 2020). The LTMMP will include both LDW-wide monitoring elements and elements specific to the remedy in each reach, such as specific monitoring requirements for caps, enhanced natural recovery areas, and monitored natural recovery in benthic sediment cleanup objective areas. It is expected that the LTMMP will be amended to include specific requirements for the middle and lower reaches following their construction.

1. Introduction

- a. Purpose
- b. Project organization
- c. Project description
  - i. Remedial action objectives
  - ii. Remedial actions
    - (a) Upper reach
    - (b) Middle reach (to be determined)
    - (c) Lower reach (to be determined)
  - ii. Role of source control
  - iii. Role of ICs
  - iv. EPA 5-year reviews

d. Data quality objectives
    i. Measuring progress toward compliance with sediment cleanup levels
    ii. Measuring trends in fish tissue
    iii. Measuring trends in water quality
    iv. Technology-specific remedy performance
e. Relationship to other monitoring activities
    i. Baseline monitoring
    ii. Periodic monitoring during design and construction
    iii. Construction quality assurance monitoring
    iv. Source control monitoring

2. Long-term Monitoring Components

a. LDW-wide and area-specific monitoring
    i. Sediment
        (a) LDW-wide
        (b) Beach play areas
        (c) Clamming areas
    ii. Tissue
    iii. Surface water
b. Schedule of monitoring components

3. Technology-Specific Monitoring and Maintenance Requirements

a. Enhanced natural recovery areas
    i. Monitoring
    ii. Maintenance and contingency measures
b. Monitored natural recovery to benthic sediment cleanup objective areas
    i. Monitoring
    ii. Maintenance and contingency measures
c. Isolation cap areas
    i. Monitoring
        (a) Physical monitoring (e.g., bathymetric surveys)
        (b) Sediment chemistry
    ii. Maintenance and contingency measures
        (a) Vessel grounding
        (b) Seismic event
        (c) High-flow event
d. Area-specific technologies
    i. Monitoring
    ii. Maintenance and contingency measures

e. Mitigation sites (if applicable)
    i. Monitoring
    ii. Maintenance and contingency measures
f. Monitoring following rare and unexpected events
g. Coordination with source control efforts to minimize recontamination

5. Monitoring and Maintenance Documentation and Reporting

h. Data management
i. Quality control and quality assurance procedures
j. Communication Plan
k. Reporting
l. 5-year reviews

6. Estimated Annual and Periodic Costs

7. References

Appendices

A. LTMMP Quality Assurance Project Plan(s)
B. Health and Safety Plan
C. Monitoring and Inadvertent Discovery Plan
D. Dive plan, if needed

References

EPA (U.S. Environmental Protection Agency), 2017. *Guidance for Management of Superfund Remedies in Post Construction*. Office of Superfund Remediation and Technology Innovation. OLEM 9200.3-105. February 2017.

Windward (Windward Environmental LLC), 2020. *Lower Duwamish Waterway Pre-Design Studies Data Evaluation Report (Task 6)*. Prepared for Lower Duwamish Waterway Group.