

**APPENDIX E2
OPERATION AND MAINTENANCE PLAN SAMPLE**

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PREFACE

This Operation and Maintenance (O&M) Plan Sample is a modified version of a sample document developed by the DTSC Schools Program (dated October 2005) to address naturally-occurring asbestos response actions at school sites. The content has been modified and expanded to be appropriate for sites with metals-impacted soils. In general, the content of the O&M Plan should look similar to the content suggested in this Sample.

This Sample is for guidance only, and is applicable on a case-by-case basis. Some elements of this Sample may apply to your site, and others may not. Additional elements than are addressed by this Sample may also be needed.

Instructions for suggested content (denoted by boxed text) are included under most major headings. Some sections provide example text that could be applied to any site. The example text intended for general application is shown as normal text with brackets and underline to indicate locations for inserting site-specific information. Other sections provide example descriptions for specific cap types. These example descriptions are indicated by italics.

OPERATION AND MAINTENANCE PLAN SAMPLE

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FIGURES

Instructions: Include appropriate maps, cross sections, and other figures. The figures should appear in the order that they are mentioned in the plan. All maps should include standard map information, including a north arrow, scale, and map legend. Similarly, cross sections should include vertical and horizontal scale bars and legends. All figures should be shown at an appropriate scale such that text, labels, and patterns are clearly legible. Ideally, maps should be superimposed on the site layout map.

As appropriate, plan view maps should be based on a legal survey.

Site Plan Map*
Sampling Location Map*
Site Plan Map Showing Areas with Cap Systems*
Site Survey with Elevations*
Cross-Section Cap Designs

TABLES

Instructions: Include all tables referred to in the narrative of the plan. The tables should appear in the order that they are mentioned in the plan. They should be clearly labeled and prepared with an appropriate font size so that they are easily legible and understandable.

Annual O&M Cost Estimate
Summary of Cap Systems
Baseline Settlement Marker Data

APPENDICES

Instructions: Include appropriate information as appendices to the plan.

Legal Description and Assessor's Parcel Map
As-Built Drawings and Specifications
Cap System Inspection Form
Emergency Response Cap System Inspection Form
Table of Contents for Annual Summary Inspection Report
Table of Contents for Intrusive Work Completion Report
Table of Contents for Five-Year Review Report

1.0 OPERATION AND MAINTENANCE OVERVIEW

1.1 INTRODUCTION

Instructions: Provide a general statement of document purpose, name of site, effective date of document, DTSC authority to oversee site, and general prohibition of intrusive activities unless conducted in accordance with provisions of O&M Plan.

This Operation and Maintenance (O&M) Plan has been prepared by [name] on behalf of [name] for the cap remedy installed at [site name]. The site is located at [street address, city, county] as shown on Figure [#]. Investigations at the site have identified levels of [metals] in soil resulting from [activities that caused metals impact]. This O&M Plan outlines the inspection and maintenance program for maintaining the integrity of the [cap type] cap installed at the site in accordance with [title of cleanup decision document].

This O&M Plan presents the policies and procedures for long-term operation, maintenance, and monitoring of the cap remedy and management of metals-impacted soils at the site. Response actions and long-term O&M activities will continue to be conducted under DTSC oversight, as required by Health and Safety Code (H&SC), Division 20, Chapter 6.8, commencing with §25300 et seq. The property owner and DTSC have entered into an [title of DTSC oversight agreement] which requires the owner to implement an O&M Plan under DTSC oversight.

Activities that intrude into the metals-impacted soils are prohibited unless conducted in accordance with a DTSC-approved Soils Management Plan and site-specific Health and Safety Plan (see Section 6.0).

1.2 O&M PLAN GOAL AND OBJECTIVES

Instructions: State goal and provide general objectives of the O&M Plan, including protecting public health, maintaining engineering controls, and ensuring remedy effectiveness.

The primary goal of the O&M Plan is to prevent uncontrolled exposures to metals-impacted soils and to protect the health of persons at the site. In order to accomplish this goal, the O&M Plan will address the following objectives:

- Establish an inspection and monitoring program to identify damaged cap systems and evaluate remedy effectiveness;
- Provide for timely repair and replacement needed to restore damaged cap systems;
- Minimize disturbances of metals-impacted soils;
- Provide for record-keeping of inspections and repairs, and reporting to DTSC.

1.3 HAZARD SUMMARY

Instructions: Identify the metals of concern at the site. Provide a general summary of hazardous health effects.

[Identify metals of concern and provide brief description of hazardous health effects.]

1.4 O&M PERSONNEL ROLES AND RESPONSIBILITIES

Instructions: Identify the names, contact information (e.g., address, telephone and fax numbers, e-mail address), roles and responsibilities of O&M personnel associated with implementation of O&M activities. Specify responsibility to notify DTSC within a specified number of days of changes in designated personnel.

The site owner will employ or designate the following O&M personnel associated with implementation of the O&M Plan at the site: Project Coordinator and O&M Professional. The site owner will notify DTSC within [#] days of any changes in the names, addresses, or telephone numbers of key O&M personnel.

1.4.1 Project Coordinator

[Project Coordinator Name]

[Title, Affiliation]

[Contact Information]

The responsibilities of the Project Coordinator are to:

- Implement the O&M Plan;
- Be familiar with site conditions and cap systems installed at the site;
- Evaluate work orders to determine if work will intrude into metals-impacted soils or capped areas;
- Oversee implementation of a DTSC-approved plan for intrusive work;
- Receive and submit all notices, comments, documents, reports, approvals, decisions and other communications to and from DTSC on behalf of the site owner;
- Submit O&M Plan and all subsequent reports, including Annual Inspection Summary Reports, Five-Year Review Reports, and Intrusive Work Completion Reports;
- Sign off on Annual Inspection Summary Reports, Five-Year Review Reports, and Intrusive Work Completion Reports; and
- Ensure that issues pertaining to O&M are brought to the attention of the site owner as appropriate, including requests for ongoing appropriations of funds and notification in the event that any exposures occur at the site.

1.4.2 O&M Professional

[O&M Professional Consultant’s Name]

[Title, License Number]

[Company Name]

[Contact Information]

Pursuant to Business and Professions Code, Chapters 7 and 12.5, the O&M Professional is a California-registered civil engineer or engineering geologist having experience with the cap systems installed at the site. The O&M Professional has additional expertise and experience with slope stability (if applicable).

The responsibilities of the O&M Professional are to:

- Conduct routine and emergency inspections and five-year reviews;
- Provide recommendations for needed cap repairs;
- Prepare and sign Annual Inspection Summary Reports and Five-Year Review Reports; and
- Prepare and sign Completion Reports for intrusive activities and cap repairs.

1.5 O&M COST ESTIMATE

Instructions: Prepare an initial estimate of annual O&M costs in current dollars for implementation of the approved O&M Plan, to include but not be limited to, consultant costs, DTSC oversight costs, and O&M staff costs. Additionally, prepare an estimate of projected costs for routine or potential repairs and maintenance.

O&M care begins upon completion of remedy installation and, for the purpose of cost estimating, may continue for at least 30 years after that date. The routine annual O&M costs are estimated in current dollars in Table [#].

**TABLE [#]
Annual O&M Cost Estimate**

Item	Hours	Hourly Rate	Annual Cost
Scheduled Inspections			
Annual Inspection			
Report Preparation			
DTSC Oversight			
Projected Costs (periodic repairs and maintenance, unplanned inspections)			
Total Annual O&M Cost Estimate			

2.0 SITE DESCRIPTION

Instructions: Describe the location, ownership, and physical setting for the site. Provide the legal description for the site. Give relationship to public boundaries such as state, county, and city. Identify current property owner. Describe the general site geology and topography. Describe prior site usage.

[Provide site-specific description using information from existing reports.]

2.1 PREVIOUS SITE INVESTIGATIONS AND CLEANUP

Instructions: Give a brief chronology and summarize the regulatory history of the site, including investigations, cleanup actions, regulatory actions, orders, etc. Identify the metals-impacted areas, sampling results and concentrations of all contaminants of concern. Summarize cleanup measures taken. Cite applicable laws and regulations.

[Provide site-specific chronology and regulatory history.]

2.2 POST-CLEANUP SITE CONDITIONS

Instructions: Provide available information and a brief description of post-cleanup site conditions. Include a survey map (based on a legal survey) showing areas where cleanup has occurred and the location of cap systems.

[Provide site-specific summary of post-cleanup site conditions.]

3.0 SUMMARY OF CAP SYSTEMS

Instructions: Describe all cap systems, including the type of surfaces and materials, areal extent and thickness of covers used, and activities compatible with the cap design. Include maps depicting all buildings, utility line trenches, finished grade elevations, and thickness of clean fill soils throughout the site. Summarize actual onsite engineering specifications from the cap design document for each identified cap system. Provide appropriately-scaled figure of site. Provide cross-section figures and as-built drawings illustrating cap design and construction. Provide a site survey showing final elevations following grading and compaction.

The cleanup option selected in the [title of cleanup decision document] included implementation of engineering controls in the form of “caps” placed over the metal-impacted soils to create barriers to prevent or greatly reduce exposures. Engineering cap systems in use at the site are summarized in Table [#] and described below. The engineering design of the cap is specified in [document title]. A complete set of as-built drawings and specifications, including cross-section maps illustrating cap design and construction is included as Attachment [#]. See also Figures [#], [#], and [#] for Site Plan Map, Site Survey with Elevations, and Cross-Sections.

TABLE 2
Summary of Cap Systems

Area (Description)	Material	Extent (acres)	Thickness (inches)
Area A (e.g., parking lot)			
Area B (e.g., walkway)			

Note: Areas A and B are shown on Figure [#], Map of Areas with Cap Systems

[Provide a site-specific description of the cap systems, including cap, surface water drainage structures, settlement markers, vegetative cover, etc. Describe the appropriate activities for the capped areas (e.g., parking, light vehicles, light storage).]

4.0 O&M ACTIVITIES

4.1 ROUTINE INSPECTIONS

Instructions: State frequency with which routine inspections of caps will be scheduled and conducted to ensure that the caps remain intact and that no erosion or other material degradation has occurred which might result in exposures to metals-impacted soils. Identify all cap features to be inspected (e.g., cap, vegetation, surface water drainage structures, survey monuments). Describe all inspection and maintenance tasks, and specify the inspection and maintenance schedules required for proper care and efficient operation to maintain the effectiveness of each cap system. Refer to the inspection form. Indicate that DTSC will be notified at a specific number of days in advance of each inspection. Indicate the minimum inspection frequency for each component of the installed cap remedy. Indicate that inspections will be conducted by qualified O&M personnel, under the direction and supervision of the O&M Professional. Include requirement to notify DTSC of any failure of the cap that is not repaired within a specific number of days of discovery.

The cap systems will be inspected on a [frequency] basis for [duration] and [frequency] thereafter. Inspections will be conducted in [months] of each year by a licensed O&M Professional with specific technical expertise in the design or evaluation of [cap type]. The Project Coordinator will notify DTSC at least [#] days in advance of each inspection.

The cap inspection will consist of a walking survey of the entire cap system (e.g., capped area, surface water drainage features, fenced perimeter). The O&M Professional will document observations on the inspection from (Attachment [#] and in photographs. Each inspection will include a general evaluation as to whether the cap currently performs its intended function of [state remedial action objectives for the cap]. If the inspector believes the cap is not performing effectively as intended, appropriate corrective actions (see Section 4.3) will be implemented.

4.1.1 Cap

Example 1: For soil caps.

The O&M Professional will inspect the cap for the presence of any signs of damage, failure or disturbance, including:

- *Slope failure or slope stability,*
- *Cracks or rills larger than two inches wide or that penetrate through cap,*
- *Rodent holes,*
- *Seepage or ponding,*
- *Erosional damage or sloughing of edge materials, and*
- *Excessive or uneven settlement.*

Example 2: For asphalt caps.

The inspection will consist of a walking survey of the entire capped area and documenting observations of cap condition. If present, the following features will be noted on the inspection form and in photographs:

- *Cracking (longitudinal, alligator),*
- *Pull-apart from curb and gutters,*
- *Erosional damage,*
- *Excessive or uneven settlement,*
- *Sloughing of edge materials,*
- *Seepage,*
- *Evidence of ponded water, and*
- *Other signs of damage, failure, or disturbance.*

The inspection form will note the locations and dimensions of the damage (e.g., area, crack width, crack length). The observed damage will be photographed.

4.1.2 Surface Water Drainage System

The O&M Professional will evaluate surface water drainage structures and areas that channel surface water runoff at the site (e.g., ditches, slope edges). Each inspection will ensure that the structures remain free of damage and obstructions, are providing adequate runoff, and do not have excessive erosion.

4.1.3 Vegetation [if applicable]

The O&M Professional will survey the cap vegetation to evaluate whether there is stressed or missing vegetation and whether deep-root plants are present that could penetrate the cap. The inspection will also determine if dry grass is present that poses a fire hazard.

4.1.4 Survey Marker [if applicable]

During each inspection the O&M Professional will inspect each survey monument installed during the cover installation to determine if any damage has made its use questionable for survey.

Settlement marker locations will be surveyed at least every six months for the first year and annually thereafter. Once a settlement of [#] foot or less has been measured for [#] consecutive years, surveys can be scaled back to once every [#] years. The baseline northings, eastings, and elevations of the settlement markers are summarized in Table [#]. All surveying will be completed under the direction of a California-certified land surveyor.

**Table [#]
Baseline Survey Marker Data**

Description	Location	Northing (ft)	Easting (ft)	Elevation (ft msl)
Marker x				
Marker y				
Marker z				

4.1.5 Perimeter Fence [if applicable]

The O&M Professional will evaluate the perimeter fence to identify any damage or need to replace posted signs.

4.1.6 Reporting and Follow-up

The inspection findings will be documented in the inspection form (Attachment [#]) and summarized in the [Frequency, e.g., Annual] Inspection Summary Report. The summary report will be submitted to DTSC within [#] days of completing the final inspection for the reporting period.

If the O&M Professional believes the cap is not performing effectively as intended, appropriate corrective actions (see Section 4.3) will be implemented. The Project Coordinator is responsible for follow-up review to ensure that identified repairs are completed on schedule, and will sign-off on the completion blocks of the inspection reports. The Project Coordinator will notify DTSC of any damage that is not repaired within [#] days of discovery.

4.2 RESPONSE FOR UNPLANNED EVENTS

Instructions: State nature of unplanned events that will trigger inspections, and describe procedures to be followed, including completing an Inspection form. Indicate that DTSC will be notified of any failure of the cap.

Immediate and appropriate action will be taken to prevent, abate, or minimize an emergency related to any action or occurrence such as a fire, earthquake, explosion, or human exposure to hazardous substances caused by a release or threatened release of hazardous substances at the site. The Project Coordinator will notify DTSC within [#] hours of any such occurrence. The need for action will be identified by inspecting the cap after an unplanned event that has the potential to impact the cap integrity or based on a report of damage observed by persons at the site. Inspection observations will be documented on the Emergency Response Inspection Form (Attachment [#]).

The Project Coordinator will take appropriate action in consultation with DTSC and the O&M Professional, and in accordance with the applicable provisions of the [title of DTSC oversight agreement]. A report describing the events that occurred and response measures will be submitted to DTSC within [#] days of the event.

4.2.1 Earthquake

The closest fault to the site is [fault name] and is [#] miles away. The estimated Maximum Credible Earthquake on the [fault name] fault corresponds to a value of [#] on the Richter scale. In the event of an earthquake event of [#] or greater, the O&M Professional will visually inspect the cap system for signs of damage as soon as it is safe and practical to conduct the inspection.

4.2.2 Floods or Major Storms

In the event of a flood or major storm the O&M Professional will inspect the cap system to ensure its integrity within [#] hours of the event. The inspector will document his/her observations on the form included in Attachment [#]. For the purpose of this O&M Plan, a major storm is defined as a storm with a [#]-year return period (>[#]) of presentation or more over a 24-hour period.

4.2.3 Fire

In the event of a surface fire on or near the cap, the O&M Professional will inspect the cap system and document his/her observations on the form included in Attachment [#] as soon as it is safe and practical to conduct the inspection.

4.3 CAP MAINTENANCE AND REPAIR

Instructions: State that the intended cap function will be maintained. Describe the routine and anticipated maintenance activities. Describe anticipated repairs. Give examples of anticipated maintenance activities and repairs. Indicate that cap repairs will be in accordance with the approved cap design document. Indicate the timeframe for making repairs. Indicate that DTSC will be notified prior to conducting major repairs. Define what constitutes a major repair and a significant feature that requires repair.

Example 1. Asphalt caps.

The cap will be maintained in a manner that ensures its intended function: prevent exposure to impacted soils and minimize water infiltration through impacted soils. Examples of maintenance include sealing of cracks, patching of potholes, and regrading to ensure appropriate surface water drainage.

Repairs will be made in accordance with the cap design specifications established in the [title of cap design document]. Under no circumstances will the cap remain in disrepair more than [#] days after discovery of damage. Any major repair that requires significant disturbance of the cap will be performed only after review and approval by DTSC (see Section 6.0). A significant disturbance is defined as a repair that involves excavation to [#] feet or more below grade.

Example 2. Soil caps.

4.3.1 Cap

Typical maintenance will include backfilling of burrows with clean soil, removal of burrowing animals, filling or regrading of depressions, and revegetation or mulching of eroded areas.

For areas where the cap damage or disturbance appears to be continuous or excessive, the Project Coordinator will notify DTSC within [#] days of completing the inspection with recommended measures to correct the problem. Examples of such problems include slope stability issues, excessive erosion, and significant cracks or rills that have the potential to affect the cap function.

4.3.2 Surface Water Drainage System

Typical maintenance will include removal of debris, silt, or other obstructions from the surface water drainage system. If the O&M Professional identifies excessive erosion, inadequate runoff capacity, or other significant damage, the Project Coordinator will notify DTSC within [#] days of completing the inspection with recommended measures to correct the problem.

4.3.3 Vegetation

Maintenance will include removal of deep-root species that penetrate the cap, and seeding, watering, and mulching over barren or poorly vegetated area. Reseeding should take place in accordance with the specifications included in the [cap design document] and should be timed for the season that will optimize establishment of vegetation.

Periodic mowing will take place as needed after the rainy season and in the summer and late fall to ensure that the vegetation does not grow taller than [#] inches.

If the O&M Professional identifies areas that are persistently poorly vegetated, such that the cap integrity is affected, the Project Coordinator will notify DTSC within [#] days of completing the inspection with recommended measures to correct the problem.

4.3.4 Survey Markers

If a survey marker is missing or badly damaged, it will be replaced as soon as possible after discovery of the problem. The Project Coordinator will notify DTSC within [#] days of the problem.

4.3.5 Perimeter Fence

If the O&M Professional identifies fence damage, the Project Coordinator will notify DTSC within [#] days and will repair the fence within [#] days.

4.4 PERIODIC SEALING AND RESURFACING OF CAP [if applicable]

Instructions: Describe the provisions for sealing and resurfacing the cap. Indicate the design specifications and anticipated timeframes for sealing and resurfacing the cap.

The cap is expected to require re-sealing every [#] years and repaving every [#] years. These frequencies may be modified as recommended by the O&M Professional. The overlay thickness of a cap will be consistent with the thickness specified in the [cap design document].

5.0 FIVE-YEAR REVIEW

Instructions: Discuss five-year reviews of remedy effectiveness when hazardous substances remain in place. Identify the purpose of the five-year reviews. Indicate that the O&M Professional should conduct a review, cap inspection, and prepare a report of the cap status at least once every five years after DTSC issuance of site certification. Include a requirement to notify DTSC within a specified number of days in advance of the inspection. Indicate that O&M Professional and Project Coordinator should sign each Five-Year Review report. Indicate that the Five-Year Review Report will be

submitted to DTSC within a specified number of days after completion of inspection. Include a requirement for the Project Coordinator to perform additional investigation, monitoring, and/or mitigation in consultation with DTSC based upon the findings of each Five-Year Review Report.

Five-Year Reviews will be conducted to evaluate on-going remedy effectiveness. The purpose of the review is to determine whether the remedy: (a) remains protective of human health and the environment; (b) is functioning as designed; and (c) is maintained appropriately by O&M activities. Each Five-Year Review will be conducted by an O&M Professional. The Project Coordinator will notify DTSC at least [#] days in advance of each Five-Year Review inspection. The first Five-Year Review inspection will be completed by [date] and all subsequent inspections will be completed by the [month and day] of every fifth year.

The O&M Professional will inspect the cap systems in the same manner as in the routine inspections (see Section 4.1). The Five-Year inspection will identify and review completion of any required repairs, changes in site conditions or usage, or any other significant information relating to the caps that may have taken place over the previous five years.

The O&M Professional will prepare and sign a report that summarizes his/her findings, conclusions, and recommendations (see Section 7.4). The Project Coordinator will also sign the report. The Five-Year Review Report will be submitted to DTSC within [#] days after completion of the inspection.

The Project Coordinator is responsible for responding to recommendations made in the Five-Year Review Report and any additional requirements identified by DTSC. The DTSC requirements may include additional investigation, monitoring, and/or mitigation. The Project Coordinator is responsible for follow-up review to ensure that identified repairs are completed on schedule, and will sign-off on the completion blocks of the report.

6.0 INTRUSIVE WORK ACTIVITIES

Instructions: Indicate that the intrusive work should be conducted in accordance with a DTSC-approved Soil Management Plan and a site-specific Health and Safety Plan. Identify person responsible for reviewing work order requests to determine if impacted soils will be disturbed, and notifying DTSC prior to performance of intrusive work at the site. Include a requirement to prepare a Completion Report summarizing all intrusive work; incorporate Completion Reports into Annual Inspection Summary Report for submittal to DTSC.

Activities that disturb the soil under the cap will be conducted with a DTSC-approved Soil Management Plan and site-specific Health and Safety Plan. Examples of these

activities include excavation, grading, removal, trenching, filling, earth movement, and mining. In the event of such work, the Project Coordinator will:

1. Notify DTSC of the type, cause, location and date of any disturbances to the cap that could affect the ability of the cap to contain the underlying metals-impacted soil.
2. At least [#] days prior to any proposed modifications/disruptions of the cap, provide DTSC with written notification via certified mail. The written notice will include a detailed description of the work to be done, and will include a map showing the exact location of the proposed work and the reasons for the modifications/disruption. The written notice will include a draft Soil Management Plan and site-specific Health and Safety Plan for DTSC comment and approval. These documents should be prepared by qualified O&M Professionals with expertise in the work to be performed.
3. Provide notification to DTSC within [#] days after completion of modifications/repairs to the cap in an Intrusive Work Completion Report that summarizes all intrusive work and that certifies that the cap was restored to specified design requirements. Section 7.3 describes the appropriate report content.

7.0 REPORTING AND RECORDKEEPING

7.1 DTSC NOTIFICATION REQUIREMENTS

Instructions: Provide a listing of all required notifications. Indicate the format (e.g., written) and content of the notifications.

The site owner will notify DTSC in writing within [#] days of any changes in the names, addresses, or telephone numbers of the Project Coordinator or O&M Professional.

The Project Coordinator will notify DTSC in writing as follows:

- At least [#] days prior to a routine inspection or inspection for a Five-Year Review;
- Within [#] hours of an unplanned event that impacts or threatens to impact the integrity of the cap;
- Within [#] hours of identifying an impact or threat of impact to the integrity of the cap;
- At least [#] days prior to intrusive work activities that will affect the integrity of the cap or encounter impacted soils;
- At least [#] months prior to destroying any documents prepared to address O&M Plan requirements.

If appropriate, notifications should include a proposed schedule for completing required repairs and maintenance.

7.2 ANNUAL INSPECTION SUMMARY REPORTS

Instructions: Indicate that Annual Inspection Summary Reports should summarize reports from routine inspections during the preceding 12 months, and may also include recommendations regarding changes to maintenance procedures, etc. based on evaluation of effectiveness of cap systems. Within a specified number of days after each annual O&M inspection, indicate that the Annual Inspection Summary Reports will be submitted for DTSC review and approval. Indicate that each annual report should be signed by the O&M Professional and Project Coordinator.

Annual Inspection Summary Reports will summarize the findings of routine inspections, and will document completions, delays, or failures to repair any items identified as needing repairs. The Annual Inspection Summary Report will be signed by the O&M Professional and the Project Coordinator. The Project Coordinator will submit the report for DTSC review and approval no later than [#] calendar days after the annual inspection as been conducted.

Annual Inspection Summary Reports will follow the format outlined in Attachment D and will include the following content:

- Results of the visual inspections and any supporting data;
- Description of
 - actions taken during the reporting period, including any repairs to the cap that were identified and carried out,
 - any significant changes in site conditions and usage, and
 - any additional onsite construction or other information that may relate to the cap or impact cap function;
- Description of actions planned or expected to be undertaken in the next year that will impact the caps;
- Conclusions regarding the on-going effectiveness of the cap;
- Description of any maintenance or repairs identified as needed during the inspection;
- Description of any requirements under the [title of agreement for DTSC oversight] that were not completed;
- Identify any problems or anticipated problems in complying with the [title of agreement for DTSC oversight];
- Recommendations for O&M Plan modifications;
- Copies of signed inspection forms completed during the reporting period;
- Copies of all field logs completed during the reporting period;

- Photographs depicting site conditions with brief identifying captions or descriptions. Photographs will document inspection findings and demonstrate stability and/or failure of cap;
- Copies of any data generated under the [title of agreement for DTSC oversight] and any significant findings from the data;
- Copies of work orders and Completion Reports for any intrusive work conducted during the reporting period; and
- Documentation of additional investigation, monitoring, and/or mitigation activities required by DTSC.

The reports will be maintained in the site files as described in Section 7.5.

7.3 REPORTING OF INTRUSIVE WORK

Instructions: Indicate that intrusive work activities will be documented in an Intrusive Work Completion Report prepared by the O&M Professional. The report should summarize the dates of work performed, work location, work activities performed including restoration of cap systems where necessary, work practices taken to prevent potential exposures, any variances from the approved Soil Management Plan, and summary of finished site conditions. Indicate that the Completion Report will be submitted to DTSC within a specified number of days after completion of the intrusive work.

Work activities that contact impacted soils will be documented in a Completion Report prepared and signed by the O&M Professional. The report will follow the format provided in Attachment [#] and will include the following information:

- Dates work performed;
- Work location, with maps and figures;
- Work activities performed, including restoration of cap systems;
- Work practices taken to prevent potential exposures;
- Variance or modifications (if any) of the approved Soil Management Plan; and
- Summary of finished site conditions.

Additional report content may be specified by DTSC or identified in the Soil Management Plan. The Completion Report will be submitted within [#] days of completion of the intrusive work.

7.4 FIVE-YEAR REVIEW REPORTS

Instructions: Identify due dates for the Five-Year Review Reports. Indicate that the Five-Year Review Report will be a stand-alone document including a summary of site history and current conditions. Note that DTSC will review and approve each Five-Year Review report. Include a requirement to complete technical assessment of on-going remedy effectiveness. Indicate that Five-Year Review Reports should be submitted within a specified number of days after completion of each fifth year inspection.

The first Five-Year Review Report for the site will be completed five years from the date that DTSC issued site certification. All subsequent Five-Year Review Reports will be completed by [month and date] of every fifth year. The Project Coordinator will submit the Five-Year Review Report to DTSC for review and approval within [#] days after completion of each scheduled Five-Year inspection. Five-Year review reports will be maintained in the site files as described in Section 7.5.

The Five-Year Review Report will follow the format outlined in Attachment [#] and will summarize remedy effectiveness within the reporting period. The Report will identify any incidents or problems with the cap systems, and will evaluate system performance, effectiveness, and protectiveness. The Five-Year Review Report will include a technical assessment and evaluation of the on-going protectiveness of the remedy. This evaluation will address the following questions:

- Is the remedy functioning as intended by the remedy selection decision documents?
- Are the removal action objectives, goals, and criteria used at the time of remedy selection still valid?
- Have there been any significant changes in the distribution or concentration of the impacted soils at the site?
- Are any modifications needed to make the O&M Plan more effective?

The Five-Year Review Report will state conclusions and make recommendations for any changes needed to maintain remedy protectiveness.

The Five-Year Review Report will be prepared by the O&M Professional. Both the O&M Professional and Project Coordinator will sign the report. The report will be submitted to DTSC within [#] days of completing the site inspection.

7.5 RECORDKEEPING AND RETENTION

Instructions: Identify the record-keeping and retention requirements. Indicate that Site Coordinator is responsible for maintenance of all O&M records. Identify location of copies of O&M records and location of DTSC Administrative Record. Describe availability of records for public review and DTSC inspection.

All documentation records prepared under the O&M Plan will be maintained by the Project Coordinator at [location]. The records will be available for inspection upon request by the public and DTSC representatives. The records will include, but are not limited to:

- Inspection checklists and photographs;
- Annual Inspection Summary Reports;
- Five-Year Review Reports;
- Completion Reports for Intrusive Work;
- Records of public inquiries about the impacted soils at the site; and
- Investigation and cleanup-related documents.

Because of the potential volume of paper that could be generated or stored, the Project Coordinator may elect to maintain paper copies of the previous 12 months reports and the latest Five-Year Review Report, if applicable, and keep the rest of the documents as electronic files (in PDF format).

All records will be preserved by the Project Coordinator for a minimum of seven years after the completion of each activity. The Project Coordinator will notify DTSC in writing at least six months prior to destroying any documents prepared pursuant to the O&M Plan. If requested by DTSC, the Project Coordinator will make requested documents available to DTSC for review or copy.

The DTSC administrative record for the site is available for public inspection during office hours at the following DTSC location.

Department of Toxic Substances Control
[Street Address]
[City, State, Zip Code]
Attention: [Name of DTSC project manager]

8.0 SITE ACCESS

Upon request, site access for DTSC representatives and O&M personnel will be arranged and provided by the Project Coordinator at all reasonable times.

9.0 VARIANCE FROM, OR MODIFICATION OF, O&M PLAN

The Project Coordinator may seek variance and/or modification of the O&M Plan at any time during the life cycle of the cap remedy. “Variance” refers to possible release from specific individual O&M Plan requirements for a limited time period, while “modification” refers to permanent revision of specific individual O&M Plan requirements.

The Project Coordinator may apply to DTSC for a written variance from the provisions of the O&M Plan. DTSC will evaluate each request, and will grant a variance request only after determining that such as request would be protective of human health and the environment.

When long-term performance of the selected cap remedies has been confirmed, the Project Coordinator may apply to DTSC to modify the requirements of the O&M Plan based on site-specific monitoring results and conditions. Additionally, DTSC reserves the right to independently initiate appropriate O&M Plan modifications. As a result, DTSC may require the following O&M Plan modifications:

- Changes in the frequency of O&M activities;
- Modification, replacement, or addition of components to the O&M Plan if O&M activities fail to achieve the O&M objectives of protecting human health and the environment; and
- Evaluation, design, construction, and/or operation of additional remedial measures to achieve the O&M objectives.

10.0 REFERENCES

Instructions: List citations or document references for most current regulatory and site-specific requirements.

[DTSC oversight agreement (e.g., O&M Agreement).]

[Cleanup option decision document]

[Cap design document]

[Other appropriate references]

EXAMPLE CAP INSPECTION FORMS

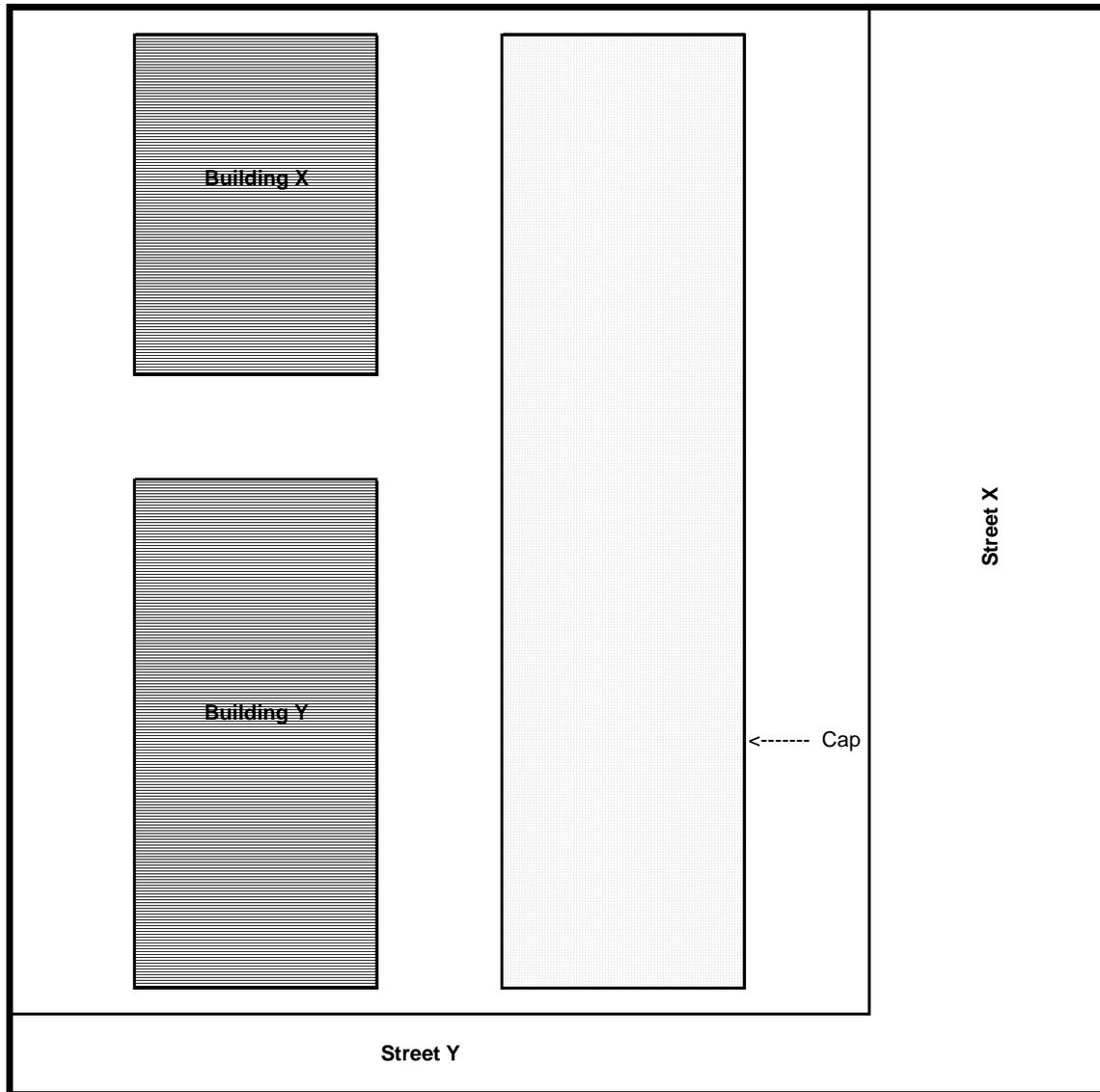
INSPECTION FORM

[SITE NAME]
[SITE ADDRESS]

O&M INSPECTION
[INSPECTION TYPE]

Inspector Information						Project No.	
Date/Time:						Weather:	
Inspector Name:							
Company:							
Address:							
Phone:							
Fax:							
E-mail:							
Description of Inspection Methods							
Observations							
Area Inspected	Evidence of Cracks?	Crack Description (location, type, dimensions)	Evidence of Ponding?	Ponding Description (location, areal extent)	Evidence of Erosion?	Erosion Description (location, characteristics)	Other Observations
	Y N		Y N		Y N		
	Y N		Y N		Y N		
	Y N		Y N		Y N		
Recommendations							
Inspector Signature: _____							

SITE PLAN MAP FOR [SITE NAME, ADDRESS]



CAP SYSTEM INSPECTION FORM

[SITE NAME]
[SITE ADDRESS]

O&M INSPECTION
[INSPECTION TYPE]

Inspector Information	Date/Time:
Inspector Name:	Project No.:
Company:	Weather:
Address:	
Phone:	
E-mail:	
<p>Are there cracks or rills in the soil cap more than 2-inches wide? Do the cracks extend through the cap? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comments:</p>	
<p>Are there noticeable depressions, ponding of surface water, or evidence of ponding on cap? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comments:</p>	
<p>Are there any signs of sliding or sloughing of the soil layer which might indicate slope failure? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comments:</p>	
<p>Are there open holes or animal burrows in the cap? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comments:</p>	
<p>Is there excessive debris, silt, or other deleterious material obstructing flow through the surface water control system? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comments:</p>	
<p>Is there evidence of erosion or damage associated with surface water control system? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comments:</p>	
<p>Are there areas of stressed or missing vegetation on the cap? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comments:</p>	

CAP SYSTEM INSPECTION FORM

[SITE NAME]

Date:

Have invasive or deep-rooting species taken root on the cap cover?

Yes No

Comments:

Are there areas with continual poor growth despite reseeding efforts?

Yes No

Comments:

Does the vegetation require mowing?

Yes No

Comments:

Is the perimeter fencing intact and in good condition?

Yes No

Comment:

Do the survey markers intact and legible? Have they shown any movement?

Yes No

Comments:

Other evidence of cap system damage or failure?

Yes No

Comments:

Additional Notes:

Inspector Signature:

EMERGENCY RESPONSE CAP SYSTEM INSPECTION FORM

[SITE NAME]
[SITE ADDRESS]

O&M INSPECTION
[INSPECTION TYPE]

Inspector Information	Date/Time:
Inspector Name:	Project No.:
Company:	Weather:
Address:	
Phone:	
E-mail:	
<p>Are there large cracks in the soil cover? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comments:</p>	
<p>Are there noticable depressions or ponding of surface water on the cover? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comments:</p>	
<p>Is there excessive debris, silt, or other deleterious material obstructing flow through the surface water control system? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comments:</p>	
<p>Are there any signs of sliding or sloughing of the soil layer which might indicate slope failure? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comments:</p>	
<p>Do the survey markers indicate any significant horizontal or vertical movement? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comments:</p>	
<p>Other evidence of cap damage or failure? <input type="checkbox"/> Yes <input type="checkbox"/> No</p>	
<p>Additional Notes:</p>	
<p>Inspector Signature:</p>	

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ANNUAL INSPECTION SUMMARY REPORT**

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 - 1.3 SUMMARY OF CAP SYSTEMS
- 2.0 NARRATIVE OF OBSERVATIONS
 - 2.1 SITE WALKTHROUGH
 - 2.2 INSPECTION CHECKLISTS AND FIELD LOGS
 - 2.3 DISCUSSION
(e.g., cap system integrity, corrective action schedule)
- 3.0 CONCLUSIONS AND RECOMMENDATIONS
- 4.0 SIGNATURES
- 5.0 REFERENCES

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- Site Plan Map
- Routine Inspection Checklists and Field Notes
- Intrusive Work Completion Reports (if applicable)
- Photo Log (include photographs depicting site conditions)

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- 3.0 SUMMARY OF WORK ORDER
 - 3.1 WORK LOCATION
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- Site Plan Map
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 - 1.1 PURPOSE OF CURRENT FIVE-YEAR REVIEW AND INSPECTION
 - 1.2 IDENTIFICATION OF KEY PROJECT DOCUMENTS
(e.g., previous five-year reviews, annual inspection summary reports, O&M Plan, remedy selection decision documents, DTSC oversight agreement)
 - 1.3 SUMMARY OF CAP SYSTEMS
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- 2.0 NARRATIVE OF OBSERVATIONS
 - 2.1 SITE WALKTHROUGH
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- 3.0 TECHNICAL ASSESSMENT
 - 3.1 REMEDY FUNCTIONING AS INTENDED?
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 - 3.3 SIGNIFICANT CHANGES IN DISTRIBUTION OR CONCENTRATION OF THE IMPACTED SOILS AT THE SITE?
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- 4.0 CONCLUSIONS AND RECOMMENDATIONS
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Appendices

- Site Location Map
- Site Plan Map
- Routine Inspection Checklists and Field Notes
- Intrusive Work Completion Reports (if applicable)
- Photo Log (include photographs depicting site conditions)