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Cleanup Action Plan
NPDES Ponds

Goldendale, Washington

July 2008

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NPDES Ponds

Goldendale, Washington

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ARCADIS

Figures

Appendices

µg/kg	microgram per kilogram
ASTM	American Society of Testing and Materials
CAP	Cleanup Action Plan
CFR	Code of Federal Regulation
CGA	Columbia Gorge Aluminum
COCs	Constituents of Concern
cPAH	Carcinogenic Polynuclear Aromatic Hydrocarbons
cy	cubic yard
Ecology	Washington Department of Ecology
EHW	Extremely Hazardous Wastes
NPDES	NPDES Ponds
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HDPE	High Density Polyethylene
HEPA	High-Efficiency Particulate Air
LMC	Lockheed Martin Corporation
mg/kg	milligram per kilogram
mg/m^3	milligrams per cubic meter
msl	mean sea level
MTCA	Model Toxics Control Act
NPDES	National Pollutant Discharge Elimination System
PAH	Polynuclear Aromatic Hydrocarbons
PLS	Professional Licensed Surveyor
PPE	Personal Protective Equipment
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington
RI/FS	Remedial Investigation/Feasibility Study
SAP	Sampling and Analysis Plan
SW-846	Test Methods for Evaluating Solid Waste, SW-846
SWMU	Solid Waste Management Unit
TEF	Toxicity Equivalency Factor
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds
WAC	Washington Administrative Code
WISHA	Washington Industrial Safety and Health Act
Work Plan	Cleanup Work Plan

1.0 INTRODUCTION

1.1 Project Introduction

This Cleanup Action Plan (CAP) has been prepared for Lockheed Martin Corporation (LMC) to address contaminated sludge and soil in the vicinity of the Columbia Gorge Aluminum (CGA) reduction facility at Goldendale, Washington. Preparation of the CAP was done in accordance with Washington Administrative Code (WAC) 173-340-350 through 173-340-390, as administered by the Washington Department of Ecology (Ecology). In particular, it reflects the requirements of WAC 173-340-380, the regulations describing the development of a cleanup action plan.

The NPDES ponds (Figure 1) are four ponds that were used for detention of wastewaters from the aluminum plant. All four ponds were constructed by installing earthen dikes across a natural surface water drainage that extended from the plant to the Columbia River. Ponds A and B were installed to remove suspended sediments from plant wastewater in 1971. In 1972 and 1973, Ponds C and D were installed downstream from Ponds A and B. Sediment loading rates to the ponds was reduced by a series of waste treatment improvements in the late 1970s and 1980s, most notably the change from wet to dry scrubbers in 1978.

This Cleanup Action Plan (CAP) describes cleanup measures proposed at the NPDES Ponds (NPDES) in the vicinity of the Goldendale Aluminum Reduction facility. In consultation with Ecology, LMC evaluated cleanup alternatives for the site which include the no action alternative, capping in place, and removal to an off-site licensed disposal site. LMC has selected removal to off-site approved landfill(s) as the proposed cleanup alternative for the NPDES project. The pond sludge will be segregated into material that is characterized as solid waste and material that is characterized as hazardous waste for transport and disposal. Some additional sampling may be required from hazardous waste stockpiles prior to transport and disposal (transport and disposal of hazardous waste will be conducted under a separate contract).

The CAP contains a description of the proposed cleanup action, a summary of the rationale for selecting the proposed alternative, a summary of the other cleanup action alternatives, cleanup standards and remediation levels for PAHs, the project schedule, and institutional controls which will be required as part of the cleanup action.

1.2 Purpose and Objectives

The CAP identifies the preferred cleanup method and specifies cleanup standards and other requirements at the site. Once the plan is submitted to Ecology, a draft of the plan will be subject to public review and comment before it is finalized. The CAP has been developed through coordination with personnel in the department.

The objectives of the NPDES cleanup action are to:

- Remove contaminated sludge and soil with elevated levels of PAHs from the NPDES ponds to an approved landfill or landfills;
- Improve protection of human and ecological receptors from unacceptable risks due to ingestion, or contact with potential chemicals of concern in contaminated sludge and soil from the NPDES ponds;
- Improve protection of surface water, groundwater and air quality as a result of this Cleanup;
- Remediate contaminated soils from the NPDES ponds to an industrial cleanup level;
- Maximize long-term use of the NPDES Ponds parcel for industrial purposes and reduce the surface acreage affected by past aluminum processing operations; and
- Minimize the effects of the Cleanup on the public (human health and safety) and the environment through appropriate engineering practices and controls.

1.3 Site Investigation

In July, 2007, a sampling team from ARCADIS U.S., Inc. (ARCADIS) conducted an investigation of the NPDES ponds. The objectives of the investigation were to:

1. Determine the horizontal and vertical extent of contaminated surface deposits (sludge);

2. Determine the physical properties of the surface deposits; and

3. Provide a representative waste characterization for the pond sludge.

The investigation included sample collection, chemical and physical analyses, surveying, pond mapping and delineation, and volume calculations. The Remedial Investigation / Feasibility Study (RI/FS) (ARCADIS, 2007) accepted by Ecology (Mike Gallagher, pers. comm. 2008), was developed from that investigation. The RI/FS included Closure Alternative Analyses (Sections 3 and 4) with cost estimates for site closure options.

In 2008, ARCADIS conducted additional depth of sludge coring (Appendix A) and field sampling (Appendix B) to fill several data gaps from the previous investigation. The coring was conducted to better define sludge volumes; supplemental samples were collected to more accurately define the cleanup boundaries. Based on the supplemental data, pond sludge volumes were revised from the 2007 estimates.

2.0 DESCRIPTION OF PROPOSED CLEANUP ACTION

The Cleanup Action Plan objectives will be met by following the removal criteria set forth in this CAP. The work to be completed includes:

1. Project Preparation;

2. De-watering / Water Management;

3. Site Preparation, Grubbing and Clearing;

4. Development of Lined Sludge Staging / Drying Pad(s);

5. Excavation, Consolidation, and De-watering of Contaminated Sludge and Soil;

6. Profiling Stockpiled Materials;

7. Disposal of Contaminated Sludge, Soil, and / or Water;

8. Post Removal Sampling and Additional Removal;

9. Closure Documentation Report

10. Reclamation and Revegetation of Excavated Areas;

11. Engineering Practices and Engineering Controls; and

12. Health and safety requirements.

This CAP is sufficiently detailed to allow Ecology to review and evaluate the LMC removal procedures. The CAP also provides essential field discretion for the on-site removal contractors to adjust operations for site-specific conditions, within the scope as defined below.

2.1 Project Preparation

According to Section 710 WAC 173-340 of MTCA, all cleanup actions conducted under Model Toxic Control Act (MTCA), including those conducted under Agreed Orders, must identify and comply with applicable state and federal laws. Ecology will make the final interpretation on whether these requirements have been correctly identified and are legally applicable or relevant and appropriate. The applicable state and federal laws have been identified, and pending approval by Ecology prior to project start up, will be complied with by the contractor.

Main roads to the site should be adequate for haul trucks, but may require some grading (Figures 2 and 3). Pond access roads may require minor improvements such as adding gravel and cutting roadside brush. The pond access roads will allow direct loading of the trucks, although some local consolidation or drying of pond sludge may be required to facilitate loading. Near ponds C and D, a temporary stockpile and dewatering area may be placed in the area shown in Figure 3. Temporary stockpile(s), if any, will be constructed with a high density polyethylene (HDPE) or similar lining material to separate the native soil from the sludge. Separate stockpiles will be created for solid waste and hazardous waste. Best management practices will be employed to minimize stormwater runoff and windblown dispersion of stockpiled material.

2.2 De-watering / Water Management

The remediation contractor will be responsible for evaluating the need for and preparing a plan to manage stormwater, sub-flows (springs), and water derived from the sludge. As described in the characterization report (ARCADIS U.S., Inc., 2007b), wet sludge was encountered during core sampling in Ponds A and B. Piezometers were installed in June 2008 that revealed a water level 4 feet beneath the surface in Pond A. The Pond B piezometer produced no measurable water, but it is presumed that wet sludge will be encountered. At the lower ponds in both 2007 and July 2008, a large portion of Pond C had standing water, which averaged 3-4 feet deep, and Pond D had pooled water of an undetermined depth. In addition, storm water may be present during the excavation / removal project. These conditions vary seasonally, therefore the need for and type of dewatering is best determined by the remediation contractor at the beginning of the construction phase.

Sources of the water in the ponds as of July 2008 are:

- The concrete pipe at the north end of Pond A was observed as recently as July 2008 carrying 3-5 gallons per minute (gpm) into the pond. The source is unknown, but thought to be from an underground spring that drains into the pipe;

- CGA currently discharges storm water from the plant that reports to Ponds C and D; and

- Storm runoff and local springs.

The inflow to Pond A will be controlled prior to removal activities. The contractor will be responsible for taking over management of this water on initiation of the removal activities. Surface water in Ponds C and D will also be removed prior to initiation of sludge removal activities. In addition, CGA is planning to have a new pipeline in place prior to sludge removal that will convey plant stormwater discharges around Ponds C and D. It will be the contractor's responsibility to manage sources of remaining water during the excavation. These include, but are not limited to:

- Continued seepage from the concrete pipeline entering Pond A;

- Water removed from in-place sludge (by sump installation or pumping excavation areas, etc.); and

- Storm water.

Contact water (standing water in the ponds, spring water in the ponds footprints, or free water that drains from the sludge) will be managed until properly disposed of as described in Section 2.7. One proposed location for contact water management (on-site tanks, etc.) is shown as the "water management area" on Figure 3. Disposal will be implemented under the NPDES discharge permit or local wastewater disposal facilities. Non-contact stormwater will also be managed by the contractor.

After dewatering, further drying of the sludge may be necessary to meet landfill moisture content requirements and project tonnage estimates. Wet sludge may be mixed with drier sludge within the ponds to meet the moisture content requirements. If additional drying is necessary outside of the ponds, it may be performed by mechanical mixing or tilling of the sludge. Any such areas will be underlain by a relatively impermeable surface such as HDPE or asphalt.

2.3 Site Preparation, Grubbing and Clearing

Prior to initiating the excavation action, standard construction equipment will be employed to improve access roads and prepare for the removal action.

- Temporary roads will be improved as needed to access all removal areas. Care will be taken to minimize disturbance areas, control air quality, and prevent storm water erosion.

- Only necessary vegetation will be cleared and grubbed from the pond areas and embankment areas to be excavated. Any woody material will be chipped and scattered on site or stored temporarily to be used in post removal reclamation.

Removal of some debris will be required prior to and during the removal action. Debris will include, but not be limited to shacks on the dams of the lower ponds, oil booms, and concrete piping in the upper ponds. All debris will be hauled to a local, approved landfill.

2.4 Development of Sludge Staging / Drying Pads

Temporary staging areas for sludge storage and drying, sized appropriately to match contractor production, will be constructed in or adjacent to pond areas as needed. Separate sludge staging/drying pads will be constructed to segregate solid and hazardous waste. At the contractor's discretion, more than one staging and drying area may be constructed throughout the project area. If using a staging and drying area outside the pond footprints, the selected area(s) will be leveled as possible in the basalt outcrops and surrounding grasslands, appropriate bedding or base material will be placed and leveled, berms constructed, and the pad area lined with an appropriate sized HPDE or equivalent liner. The pad(s) will be constructed with a slope toward one end to manage and control storm water and incidental drainage from the sludge. This water is the contractor's responsibility.

The temporary staging and drying area(s) will allow for the safe and efficient preparation of materials to be transported for off-site disposal. The contractor will ultimately determine the space required to sequence contaminated soil and sludge removal and drying. Management of the stockpile areas after excavation and disposal of sludge is detailed in Section 2.8.

2.5 Excavation, Consolidation, and De-watering of Contaminated Sludge and Soil

The attached Figures 2 and 3 show the locations of the four NPDES ponds from which sludge is proposed to be excavated and shipped off-site for disposal. Removal volumes presented below are based on lateral and vertical "bounding" samples that were at or below the MTCA Method A industrial standard. Estimated removal information is summarized below.

Pond	Area (acres)	Volume (cy)	Tonnage	Waste
A	1.1 (46,354 sq ft)	5,192	7,269	Non-Haz
B	1.5 (66,903 sq ft)	11,800	16,520	Haz [1]
Ditch	0.07 (3020 sq ft)	560	784	Non-Haz
C	2.5 (109,320 sq ft)	18,900	26,459	Haz [1]
D	2.0 (85,997 sq ft)	7,633	10,686	Non-Haz
Total	**7.2**	**44,084**	**61,717**	

Volumes revised from 2007 investigation.
Non-Haz / Haz – Solid Waste / Hazardous Waste
[1] Materiel listed as hazardous waste will be stockpiled and sampled prior to removal.

The site investigation indicates that sludge from Ponds A and D and the Ditch meet solid waste requirements in Washington. The sludge and soil in these areas will be disposed of at a solid waste facility. Analytical results reveal that the sludge in Ponds B and C exceed the solid waste requirements. This material will be treated as hazardous until it is stockpiled and sampled to determine final disposition to an off-site facility, then removed from site to an appropriate landfill. Hazardous waste material will be removed by a transport and disposal (T&D) operator, under separate bid to Lockheed Martin.

Density tests of the sludge during 2007 indicated a conversion factor of 1.2 tons per cy for the in place material; however, a more conservative factor of 1.4 tons per cubic yard was applied due to fluctuating water levels in the ponds. Because of the additional water observed in the ponds during May and June of 2008, appropriate measures will be taken to dewater and dry the sludge if necessary to achieve landfill requirements (paint filter test) and to minimize tonnage.

The site investigation indicates that contamination from the overlying sludge into native soil is minimal (less than 6 inches), and the sludge material is visually distinct from the underlying soil. During construction, 4 to 6 inches of soil will be excavated beneath the base of the sludge to ensure that adequate material is removed to meet MTCA standards. Because of tribal interest, the U.S. Army Corps of Engineers may require an archeologist to be present during key parts of the underlying soils excavation. Experience from work on similar projects indicated that this approach is successful in achieving the desired objective.

The contaminated sludge will be removed based on the areas and cross sections developed from the survey and site investigation, analytical results, and on a visually guided basis. Grid points, presented in Appendix A, Tables A1 and A2, can be easily replicated for placement of grade cut stakes. Based on field observations noted during previous investigations, the PAH-contaminated sludge is light to dark gray in color and is composed primarily of clayey silts. Non contaminated soils tended to be brown or black with some gravel (laboratory analysis indicated that contamination was not found when gravel was encountered). The contaminated sludge that exhibits these color and textural properties will be excavated. At all pond areas, the overlying sludge and four to six inches of underlying soil will be excavated. In addition, the pond embankments and benches that exhibit the visual and textural characteristics of PAH contaminated soil will be excavated to four to six inches (Extended Perimeter Areas, Figures 2 and 3). Lateral extent sample locations will aid in determining the extended perimeters, which are typically 15-20 feet out from the sludge perimeter of the ponds in the areas shown. For all excavation areas, if competent rock is encountered, no further excavation will be performed.

Contaminated soil and sludge will be placed on the temporary staging area(s) for drying and conditioning if needed. Temporary staging will allow for effective drying of the sludge, profile sampling (Ponds B and C material), water management and loading of the materials. If drying is not required for the non-hazardous material from Ponds A, D and the Ditch, then sludge will be directly loaded and transported to the disposal facility when possible to avoid double handling of the materials. Certain conditions must be met prior to transport of excavated sludge:

- Landfill specifications for sludge and soil moisture content and analytical characterization must be complied with;

- Tarped trucks will be used for transporting sludge and soil (liners will be used as necessary); and

- Stockpiled sludge to be left overnight will be protected from wind erosion through physical (tarping) or chemical means (surfactant or water).

2.6 Profiling Stockpiled Materials

Analytical data, presented in the characterization report (ARCADIS U.S., Inc., 2007b) indicates the material to be excavated is a combination of solid waste and hazardous waste. Ponds A, D and the Ditch are all characterized as solid waste and may be removed directly to a solid waste facility provided it is de-watered and meets requirements in Section 2.6. Sampling of stockpiled and conditioned sludge from Ponds B and C will be conducted to determine final disposition to an off-site facility. The number of profile samples will be determined by the receiving landfill.

2.7 Disposal of Contaminated Sludge, Soil, and Water

Process knowledge, along with analytical data from site investigations, indicates that the contaminated soil and sludge is a combination of solid and hazardous waste (see Section 2.6). For the purpose of the NPDES cleanup project, all excavated soil and sludge that meets solid waste requirements will be transported to an approved landfill for disposal. Manifests and weighing documentation will be provided for all material disposed of at the landfill facility. Due to the haul distance on public roads and because of the physical nature of the sludge, haul trucks will be covered or tarped from the loading zone to the disposal facility.

Water collected during sludge dewatering activities will be collected for disposal off site, for disposal through the CGA NPDES discharge (Permit, Appendix D), or evaporated, depending on water quality analyses. Discharging through the NPDES is dependent on permission from CGA and on NPDES Permit discharge criteria. Current water sample data indicates that the water is not suitable for dust control unless treated on site prior to application.

2.8 Post Removal Sampling and Additional Removal

Post removal sampling (often called “confirmatory sampling”) in the excavation areas will be conducted once an area is designated "clean" (based on field observations, removal depth, or other information). Post removal samples will be collected from within the excavation footprints to confirm that soils affected with constituents above the cleanup standards have been removed to industrial standards. Post removal samples will be analyzed for PAHs (see Appendix C, 2008 Post Removal Sampling and Analysis Plan [SAP]).

Data from the post removal soil samples will be evaluated to confirm that contaminated soil has been adequately excavated to achieve the removal criteria described in Section 5. Documentation of the post removal characterization effort will be prepared by the entity responsible for sampling and analysis. The documentation will identify the location at which samples were collected, any deviations from SAP procedures, an assessment of data quality and adequacy for intended uses, statistical data evaluation, and recommendations for areas of additional excavation needed to achieve cleanup standards. The document will be submitted to the Project Engineer who will seek approval of the documentation and any additional excavation from LMC and Ecology. As a result of this preliminary review of post excavation samples results, additional sludge or soil excavation may be directed by the Project Engineer after receiving approval from both LMC and Ecology.

Once the staging area(s) is no longer needed and staged materials have been removed, the liner material will be removed and disposed of at an off-site landfill. Liner used for staging hazardous waste may be decontaminated and disposed of at a solid waste landfill or removed directly to a hazardous waste landfill at the contractor's discretion. At least one soil sample in each staging area will be collected after the contaminated soil is removed to ensure that no cross-contamination occurred as described for the excavation area. Details of the confirmation sampling will be provided in the field verification sampling and analysis procedure (Appendix C).

2.9 Closure Documentation Report

A Closure Documentation Report will be submitted to Ecology and Lockheed Martin after completion of field work. The contents of the report will contain a similar outline as the CAP, except all the details of the cleanup action will be provided. The report will include as-builts with post-removal topography, archeological reports (if necessary), copies of permits, if any; copies of waste manifests; and verification data such as results of confirmation sampling. The Closure Documentation Report will also include documentation of the Stormwater Pollution Prevention Plan BMPs and their effectiveness. Projections of when BMPs are to be removed will be based on soil stability, revegetation diversity and vigor. The Closure Documentation Report will be a deliverable to Ecology and post-removal work will be complete when the agency issues No Further Action, or requests a post-remediation O&M period or administrative controls.

2.10 Reclamation and Revegetation of Excavated Areas

Once all contaminated soil has been removed and Ecology and LMC have agreed that confirmation data demonstrate that the areas are clean, the excavations will be reclaimed. Approximately four to six inches of clean fill material will be placed in areas without adequate soils. All areas will be scarified and seeded to promote revegetation of the pond and embankment areas.

Portions of the earthen dams that had been placed to construct the ponds will be locally modified, as necessary, to achieve free drainage. Restoration of disturbed areas, including excavation areas, temporary roads and laydown yards, will include scarifying and seeding with a native seed mixture. The removal areas will be regraded and recontoured to physically stabilize the work areas and minimize erosion potential. All disturbed areas and roads constructed for this project will be scarified and seeded with a locally appropriate and commercially available dryland pasture mix to prevent the development of noxious weeds.

2.11 Engineering Practices and Engineering Controls

2.11.1 Types of Equipment

Based on observations from site investigations, dozers, front-end loaders, vacuum trucks, excavators, and off road haul trucks will all be appropriate for transporting and handling material on site. Commercial end dumps or transfer dumps will be used for transporting the solid waste sludge and soils from the site to the disposal facility. Other standard construction equipment will be employed to improve access roads, install stormwater control measures, manage draindown water, and maintain a safe site, as appropriate. The necessary equipment will ultimately be determined by the contractor.

2.11.2 Decontamination Procedures

A decontamination area will be constructed to safely and efficiently decontaminate equipment. Haul trucks will be inspected prior to leaving the project work zone. Work crews will be responsible for physically removing visible soil deposits on the vehicles. Other machinery will be decontaminated upon completion of project specific activities. Decontamination equipment will be maintained in the staging area(s), as needed. Access roads will be decontaminated as needed. A visual inspection of the access roads will be conducted prior to cessation of the work activities. Decontamination will consist of removing any material that may have spilled enroute. Contaminated soils from decontamination procedures will be included in the consolidated materials and disposed of at an appropriate waste disposal facility.

2.11.3 Dust Suppression

During transportation, excavation, dumping, grading and compacting operations, engineering controls such as water application will be implemented as appropriate. Dust abatement materials may be applied to dirt haul roads. These controls will ensure that occupational exposures and airborne emissions are below acceptable levels for the constituents of concern (COCs) and total airborne dust.

Water collected from sludge dewatering activities may be used for dust management of stockpiled soils. The draindown water will not be used for dust abatement in areas that are considered clean. If beneficial reuse is not practical, then the water will be disposed of in accordance with state waste disposal regulations.

2.11.4 Stormwater Management Practices

A detailed Stormwater Pollution Prevention Plan (Appendix D) has been developed based on the Ecology SWPPP template. Storm water management will consist of the installation of sediment traps, sediment fence and other temporary sediment reduction measures which will prevent the migration of sediment off site.

Erosion and sediment control BMPs for this project have been designed based on the following principles:

- Design the project to fit the existing topography, soils, and drainage patterns.
- Emphasize erosion control rather than sediment control.
- Minimize the extent and duration of the area exposed.
- Keep runoff velocities low.
- Retain sediment on site.

- Thoroughly monitor site and maintain all erosion and sediment control measures.
- Schedule major earthwork during the dry season.

2.12 Health and Safety Requirements

The selected removal contractor will be required to develop a site-specific health and safety plan in accordance with Washington Industrial Safety and Health Act (WISHA) guidelines (Chapter 49.17. RCW).

2.12.1 Air Monitoring and Personal Protection

A site-specific air monitoring program will be implemented per WISHA regulations WAC 296-843-130, if necessary, to monitor the effectiveness of engineering controls and work practices used to suppress particulate emissions, and to document worker exposure to airborne physical and chemical hazards. Engineering controls may include:

- Application of water or commercial road treatment on haul roads and excavation areas;
- Application of water or dust surfactant on stockpiles and soil reclamation areas;
- Increased level of Personal Protective Equipment (PPE); and
- Washing down of contaminated equipment.

Any additional controls will be initiated as necessary to ensure that worker protection will be adequate and to reduce the chance of employee exposure to potentially harmful physical or chemical hazards. Proper usage of personal protective equipment (PPE) and good personal hygiene will be required during all work on site.

Level D PPE (basic WISHA construction safety equipment) will be appropriate for all workers engaged in excavation, transportation, placement and recontouring activities. PPE will be upgraded from Level D, if necessary, based on site conditions.

2.12.2 Personnel Training

General site workers (such as equipment operators, general laborers and supervisory personnel) engaged in hazardous substance removal or other activities which expose or potentially expose workers to hazardous substances and health hazards fall under the scope of WAC 296-843-200. These workers must work under the direction of an on-site supervisor and a site-specific safety and health plan, and must be fully trained and protected pursuant to the Hazardous Waste Operations and Emergency Response (HAZWOPER) standard. These individuals shall also receive eight hours of refresher training annually.

Workers on site only occasionally for a specific limited task (such as, but not limited to, groundwater monitoring or land surveying) and who are unlikely to be exposed over permissible exposure limits and published exposure limits shall receive a minimum of 24 hours of instruction off site, and the minimum of one day actual field experience under the direct supervision of a trained, experienced supervisor.

Workers regularly on site who work in areas which have been monitored and fully characterized indicating that exposures are under permissible exposure limits and published exposure limits where respirators are not necessary, and the characterization indicates that there are no health hazards or the possibility of an emergency developing, shall receive a minimum of 24 hours of instruction off site, and the minimum of one day actual field experience under the direct supervision of a trained, experienced supervisor.

When site characterization shows that the area to be serviced by workers is free of potential exposure, or the proposed work assignments would not expose any of the work crew to hazardous substances, the activity can be carried out as a normal maintenance or construction operation.

3.0 RATIONALE FOR SELECTING PROPOSED ALTERNATIVE

Lockheed Martin selected the Complete Removal to Off-Site Landfill (Assumes One-Third Solid Waste and Two-Thirds Hazardous Waste) alternative as the best option for future property use and removal of environmental liability. Ecology has concurred with that selection (Mike Gallagher, pers. comm. 2008). This alternative was selected because it provides the greatest level of long-term protection to human health and the environment with the highest reduction in long term risk for LMC.

PAHs have been identified as COCs at this site (Ecology 2008); however concentrations of PAHs in site soil samples do not meet the criteria for Extremely Hazardous Waste. Therefore, removal criteria for soils will be based on concentrations of these constituents that exceed screening levels for industrial exposure pathways. Removal areas and depths have been identified (Appendix A).

4.0 SUMMARY OF ALTERNATIVES EVALUATED BUT NOT SELECTED

Each option listed in the NPDES Ponds Site Investigation Report and Closure Alternatives Analysis, (ARCADIS, January 2008) was evaluated in terms of the overall effectiveness, protection to human and ecological receptors, as well as potential short-and long-term impacts to the environment. MTCA also provides for the consideration of practicable cost as a consideration in evaluating closure alternatives (WAC 173-340-200). “Practicable” means an alternative would be 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 was not considered practicable if the incremental cost of the alternative was disproportionate to the incremental degree of benefits provided by the alternative over other lower cost alternatives. Alternatives which were not considered practicable were not carried forward for further analysis.

Options evaluated during the development of the document but not selected include:

A. No Action;

B. Consolidate and Cap All Material in Place; or

C. Complete Removal and Off-site Landfill Disposal (Assumes All Material is Solid Waste).

Other options considered but rejected included Capping in Place, Complete Removal to an On-site landfill, and Excavation to Residential Standards/Off-site Disposal. The Capping in Place option would leave waste in drainages and not meet LMC risk management criteria, and creation of an on-site landfill would create additional long-term liability and cost considerations compared to removal to an off-site licensed landfill. Cleanup to residential standards may not be possible due to background PAH conditions.

4.1 No Action Alternative

This option was ranked lowest in terms of protectiveness of human and ecological receptors in comparison to other options.

4.2 Consolidate and Cap All Material on Site

This option was ranked unacceptable by LMC in terms of protectiveness of human and ecological receptors in comparison to other options. The alternative of partially leaving the waste in place, re-establishing original drainage ways and placement of an impermeable cap, would also fail to meet LMC internal risk management criteria. In addition, this alternative would not address the risk of catastrophic failure resulting in waste eroding into the Columbia River.

4.3 Complete Removal to Off-Site Landfill (all Solid Waste)

This option was not selected because the analytical results indicated that all of the sludge could not be classified as solid waste.

5.0 CLEANUP STANDARDS AND REMEDIATION LEVELS

MTCA provides three options for cleanup levels (Methods A, B and C). The most stringent, meeting a residential post-cleanup standard, allows land managers unrestricted land use. If post-cleanup contaminant concentrations are above residential limits, MTCA requires institutional controls in the form of deed restrictions placed on cleanup sites. Negotiations with Ecology have resulted in the clean up goal determination of MTCA Method A Industrial; which for PAH's is 2 mg/kg calculated on a potency equivalency factor (Ecology, 2008). PAHs are the sole constituent that drives remediation; therefore, we propose the 2 mg/kg level for PAHs as the closure performance standard at this site.

The MTCA Method A soil cleanup level for industrial properties (WAC 173-340-745, Table 745-1) was selected as the cleanup level, based on negotiations with Ecology. PAHs were identified as site soil COPCs based on a determination by Ecology. Per WAC Table 745-1, the MTCA Method A soil cleanup level for industrial properties for PAHs is based on benzo(a)pyrene. If other carcinogenic PAHs are present on a site, the concentration of benzo(a)pyrene and these other PAHs must be summed using the potency equivalency method in WAC 173-340-708(8). For this site, the list of carcinogenic PAHs is: benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene. The soil cleanup level for PAHs will be 2 mg/kg using the toxicity equivalency method (Ecology, 2007).

6.0 IMPLEMENTATION SCHEDULE

Schedule to be determined by LMC and Ecology.

7.0 APPLICABLE STATE AND FEDERAL LAWS

Under the agreed order, Lockheed Martin is required to comply with the intent of applicable rules and regulations (ARARs), but is not required to obtain specific permits as described below.

According to Section 710 WAC 173-340 of MTCA, all cleanup actions conducted under MTCA, including those conducted under Agreed Orders, must comply with applicable state and federal laws. The person conducting a cleanup action is required to identify all applicable state and federal laws. Ecology will then make the final interpretation on whether these requirements have been correctly identified and are legally applicable or relevant and appropriate.

Subsection (7)(a) of the regulations, Water Discharge Requirements, further states that hazardous substances that are directly or indirectly released or proposed to be released to waters of the state shall be provided with all known, available and reasonable methods to treatment consistent with Chapters 90.48 RCW [Water Pollution Control]) and 90.54 RCW (Water Resources Act) and their subsequent regulations.

Subsection (9)(b), Permits and Exemptions, further states that under Revised Codes of Washington (RCW) 70.105D.090, remedial actions conducted under a consent decree or agreed order are exempt from the procedural requirements of certain laws, including 90.48 among other laws.

However, the Toxics Cleanup Program management recently determined that due to some legal challenges that can be brought by citizens under the Federal Clean Water Act law, that NPDES permits are required on MTCA cleanups done either by the agency or under a formal agreement. Columbia Gorge Aluminum has a current NPDES permit and has agreed to allow Lockheed Martin to utilize the discharge capacities of that permit. Lockheed Martin or their remediation contractor will coordinate the monitoring requirements, including water quality analyses and flow measurements, of the current NPDES permit.

Joint Aquatic Resources Permits Application

The state of Washington has a One-Stop Permitting Service application form for several aquatic resource permits, the Joint Aquatic Resource Permits Application (JARPA). Ecology (Mike Gallagher, Ecology, pers. comm. 2008) has provided an initial determination regarding the potential applicability of the permits covered under JARPA which include:

Federal

- U.S. Army Corps of Engineers(Corps): Section 10 and 404 permits
- U.S. Coast Guard: General Bridge permits and Private Aids to Navigation permits (PATON)

State

- Washington Department Ecology: 401 Water Quality Certifications
- Washington Department of Fish and Wildlife: Hydraulic Project Approvals
- Washington Department of Natural Resources: Use Authorizations for State-Owned Aquatic Lands

Local (City or County)

- Shoreline Conditional Use Permit
- Shoreline Substantial Development Permit
- Shoreline Variance
- Shoreline Exemption
- Shoreline Revision

Ecology has determined that these are also permits that would be covered under Subsection 9(b) of MTCA; their intent would have to be met by the remediation action, but specific permits would not be required.

National Pollution Discharge Elimination System (NDPES)

As authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Columbia Gorge Aluminum (CGA) currently holds an NPDES permit for the site (Appendix E). Water collected during sludge dewatering activities will be collected for disposal off site, for disposal through the CGA NPDES discharge, or evaporated, depending on water quality analyses. Discharging through the NPDES is dependent on permission from CGA and on the monitoring requirements of the NPDES permit being maintained during the cleanup. Monitoring requirements include sampling for water quality as well as flow during periods of active discharge. Any water discharged through the NPDES Permit is dependent on permission from CGA and on compliance with NPDES Permit discharge criteria.

Stormwater Discharge Permit

Based on the scope of work developed by LMC, as reviewed and approved by Ecology prior to implementation, it has been determined that a Stormwater Discharge Permit is not required to implement this scope of work. A Stormwater Pollution Prevention Plan (SWPPP) has been prepared that presents the Best Management Practices (BMPs) that will be employed and plans for preventing stormwater discharges from Ponds A, B, C, and D and the stockpile and dewatering areas in the scope of the CAP. All other stormwater for the site will be managed under the site's stormwater discharge NPDES permit.

As described in the SWPPP (Appendix D), all temporary and permanent erosion and sediment control BMPs shall be maintained and repaired as needed to assure continued performance of their intended function. Maintenance and repair shall be conducted in accordance with each particular BMP's specifications. Visual monitoring of the BMPs will be conducted at least once every calendar week and within 24 hours of any rainfall event that causes a discharge from the site. If the site becomes inactive, and is temporarily stabilized, the inspection frequency will be reduced to once every month.

All temporary erosion and sediment control BMPs shall be removed within 30 days after the final site stabilization is achieved or after the temporary BMPs are no longer needed. Trapped sediment shall be removed or stabilized on site. Disturbed soil resulting from removal of BMPs or vegetation shall be permanently stabilized. The final determination of BMP effectiveness and evaluation for removal will be documented in the Closure Documentation Report to be submitted as a deliverable at the completion of the cleanup action.

Tribal

The U.S. Army Corps of Engineers (Corps) have indicated to Lockheed Martin that local Tribes have expressed interest in the potential presence of artifacts of cultural interest in the vicinity of the NPDES ponds. A brief description of the project has been submitted to the Corps for the purpose of further consultation with tribal entities. Lockheed Martin may be required to have a tribal observer on site during pond excavation to ensure any items of cultural interest would be adequately protected.

Klickitat County

Klickitat County was contacted regarding compliance with local ordinances and regulations. Klickitat County's responded that if the applicant is working with the Department of Ecology, it was assumed Ecology would be taking lead status on the project (Joe Sheridan, Klickitat County, pers. comm. 2008). The county will want to see a copy of the final CAP when it is routed for comment in July. If the project is outside the shoreline of the Columbia, i.e. outside of 200' from the Ordinary High Water Mark (OHWM), the county would verify that the proposal is mitigated adequately through Ecology conditions to meet the intent of the County's Critical Areas Ordinance and any related traffic/safety issues. It is anticipated the county would issue a compliance letter and offer any comments during the comment period.

Washington State Department of Transportation

Washington State Department of Transportation (WA DOT) was contacted regarding notification and compliance for use of state highways to haul highway-legal materials and weights. No issues regarding special notifications or traffic control were identified.

U.S. Department of Energy Bonneville Power Administration Application for Proposed Use of BPA Right-of-Way (ROW)

ARCADIS has submitted an Application for Proposed Use of BPA Right-of-Way (ROW) to the Bonneville Power Administration for the dewatering and cleanup activities. A corner of Pond A as well as the access road to the ponds falls within the 532.5 foot easement for the BPA transmission lines which transect the Goldendale property. Authorization for use within the ROW easement will be required. BPA requires two mitigations for work of this nature; one, a safety presentation by a BPA representative prior to initiation of work in the field, and two, the presence of a contracted BPA "spotter" during periods when the presence of heavy equipment poses the greatest risk during construction.

BPA inspected the sludge removal area at Ponds A and B and determined that a full time spotter on site during removal activities provided that the scope of work described in this CAP is followed. The overhead power lines are approximately 75 feet above the work zone and pose no threat.

8.0 REFERENCES

ARCADIS U.S., Inc. 2007a. Remedial Investigation/Feasibility Study.

ARCADIS U.S., Inc. 2007b. Characterization Report.

ARCADIS. 2008. NPDES Ponds Site Investigation Report and Closure Analysis.

Gallagher, Mike. 2008. Personal communication.

Gallagher, Mike. 2008. Personal communication.

Gallagher, Mike. 2008. Personal communication.

Sheridan, Joe. 2008. Personal communication.

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Appendix A

Removal Data (Survey & Sludge Depths)

Appendix B

RIFS Addenda Tables

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Appendix C

2008 Post Removal Sampling and Analysis Plan

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Appendix D

Storm Water Pollution Prevention Plan

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Appendix E

Columbia Gorge Aluminum NPDES Permit

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SITE LOCATION MAP

GOLDENDALE, WASHINGTON

Project Number: MH000978.0001

Drawing Date: 4/21/2008

Figure: 1

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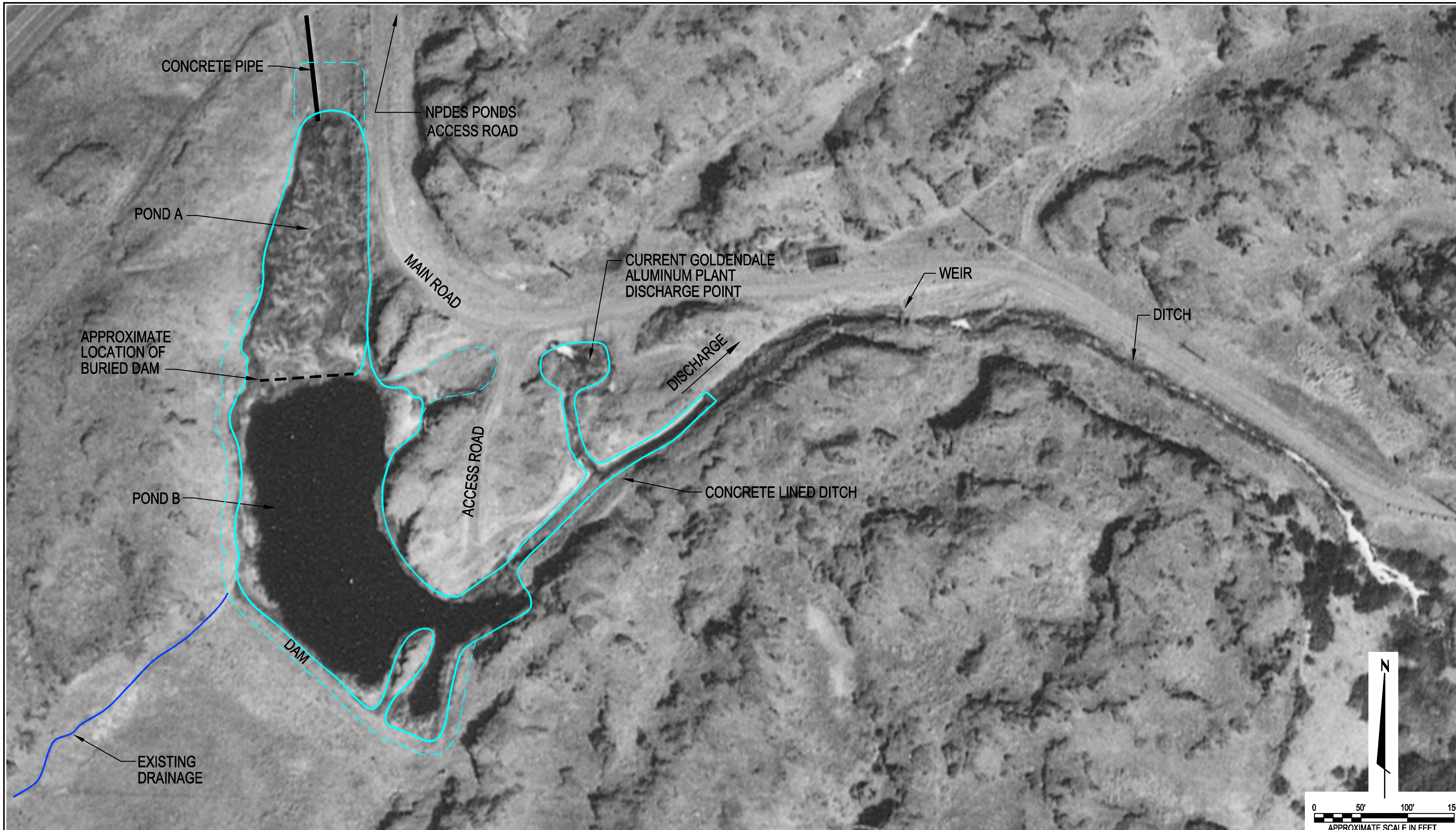

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LEGEND:
POND SLUDGE PERIMETER
EXTENDED PERIMETER (THIN LAYER OF SLUDGE OUTSIDE POND PERIMETER)

NPDES PONDS A AND B
PROJECT AREA

GOLDENDALE, WASHINGTON

Project Number: MH000978.0001
Drawing Date: 06/20/2008
Figure: 2

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LEGEND:

POND SLUDGE PERIMETER

EXTENDED PERIMETER (THIN LAYER OF SLUDGE OUTSIDE POND PERIMETER)

NPDES PONDS C AND D
PROJECT AREA

GOLDENDALE, WASHINGTON

Project Number	MH000978.0001
Drawing Date	06/20/2008
Figure	3

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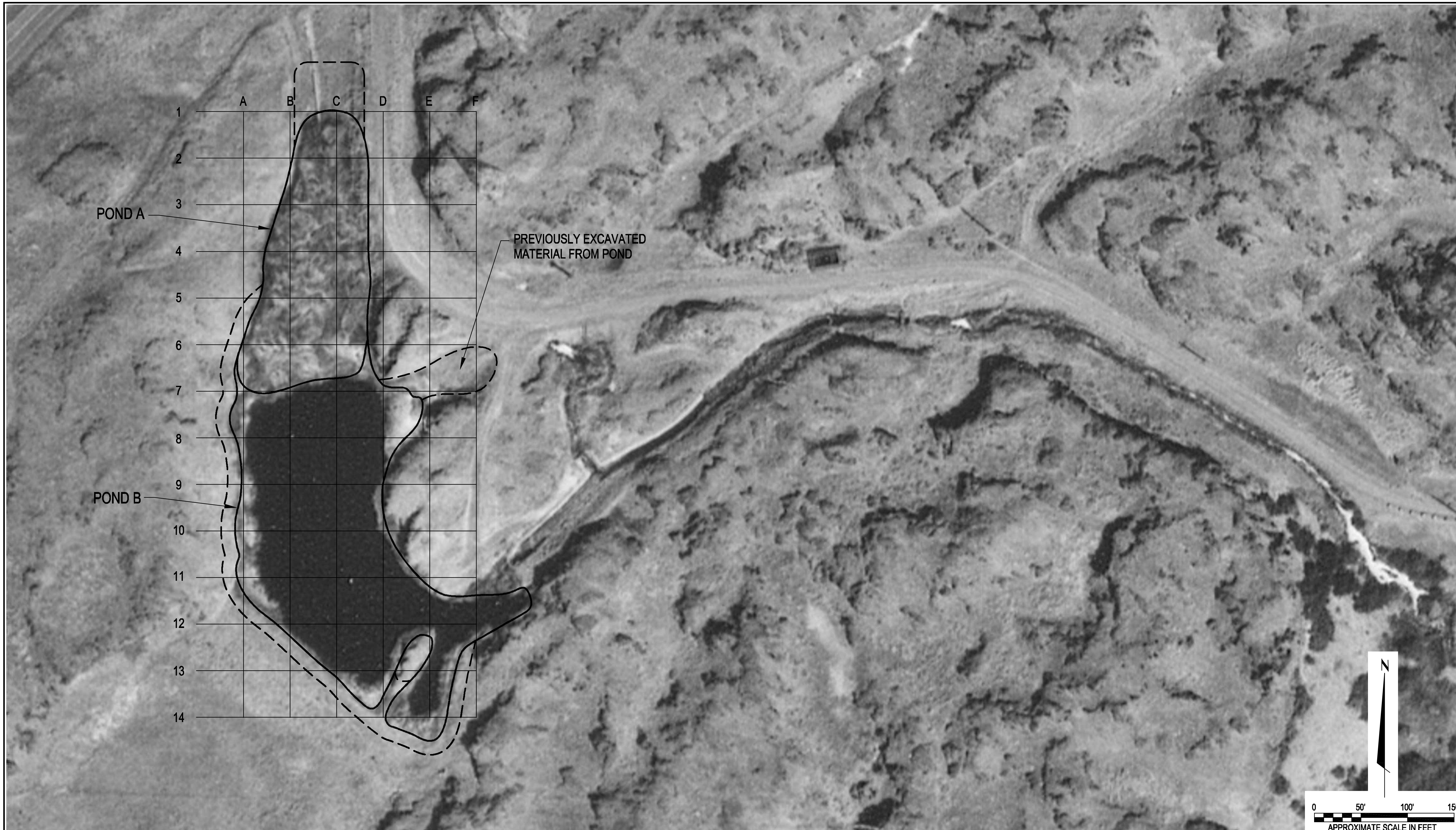

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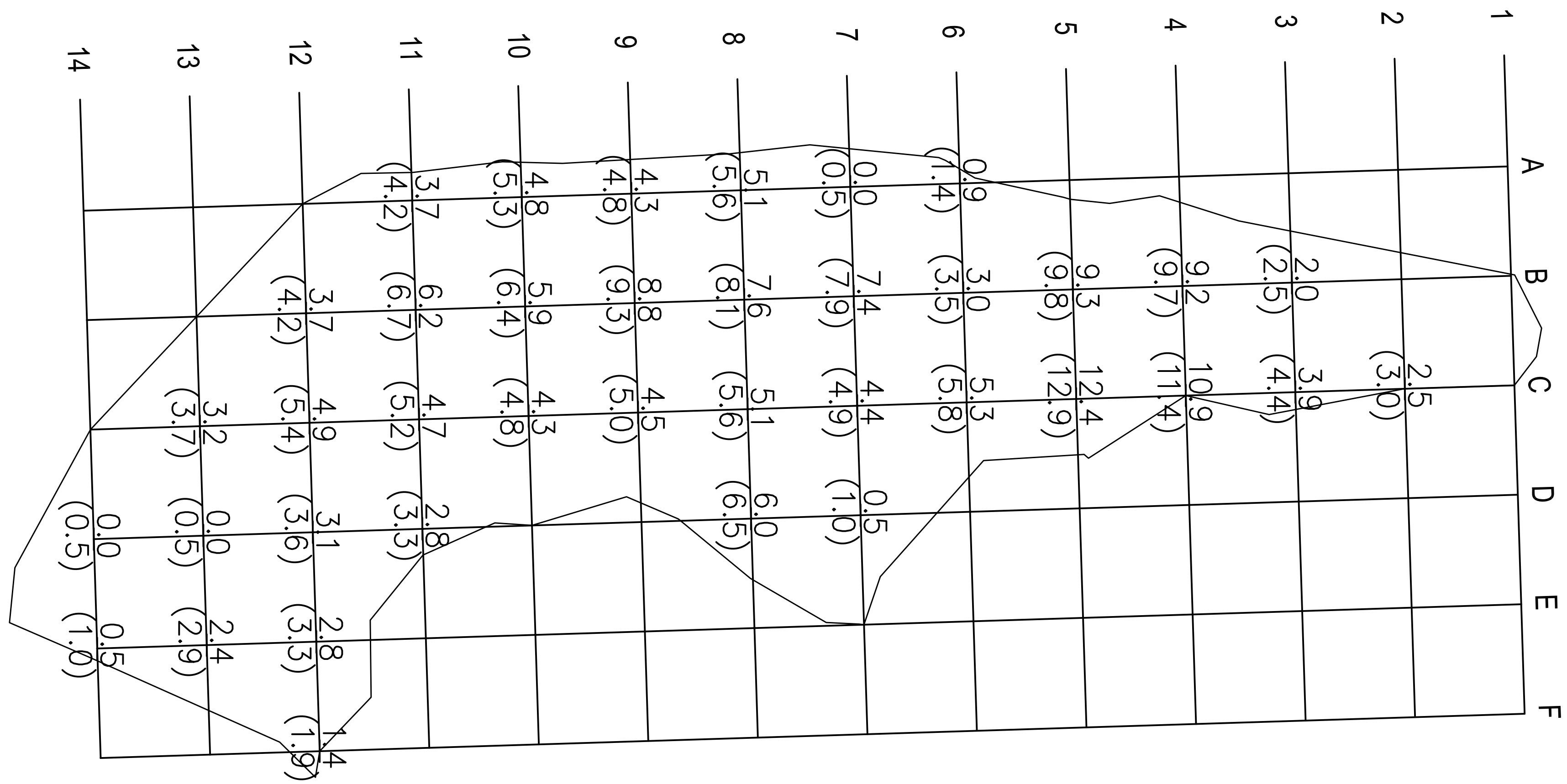
LEGEND:
POND SLUDGE PERIMETER
EXTENDED PERIMETER (THIN LAYER OF SLUDGE OUTSIDE POND PERIMETER)

NPDES PONDS A AND B
GRID POINTS

GOLDENDALE, WASHINGTON

Project Number
MH000978.0001
Drawing Date
6/23/2008
Figure
A1



LEGEND:

2.8 ACTUAL SLUDGE DEPTH
(3.3) MAX EXCAVATION CUT (SLUDGE DEPTH PLUS 6 INCHES)

NOTE: EXTENDED AREAS NOT SHOWN

N

0 40' 80' 120'
APPROXIMATE SCALE IN FEET

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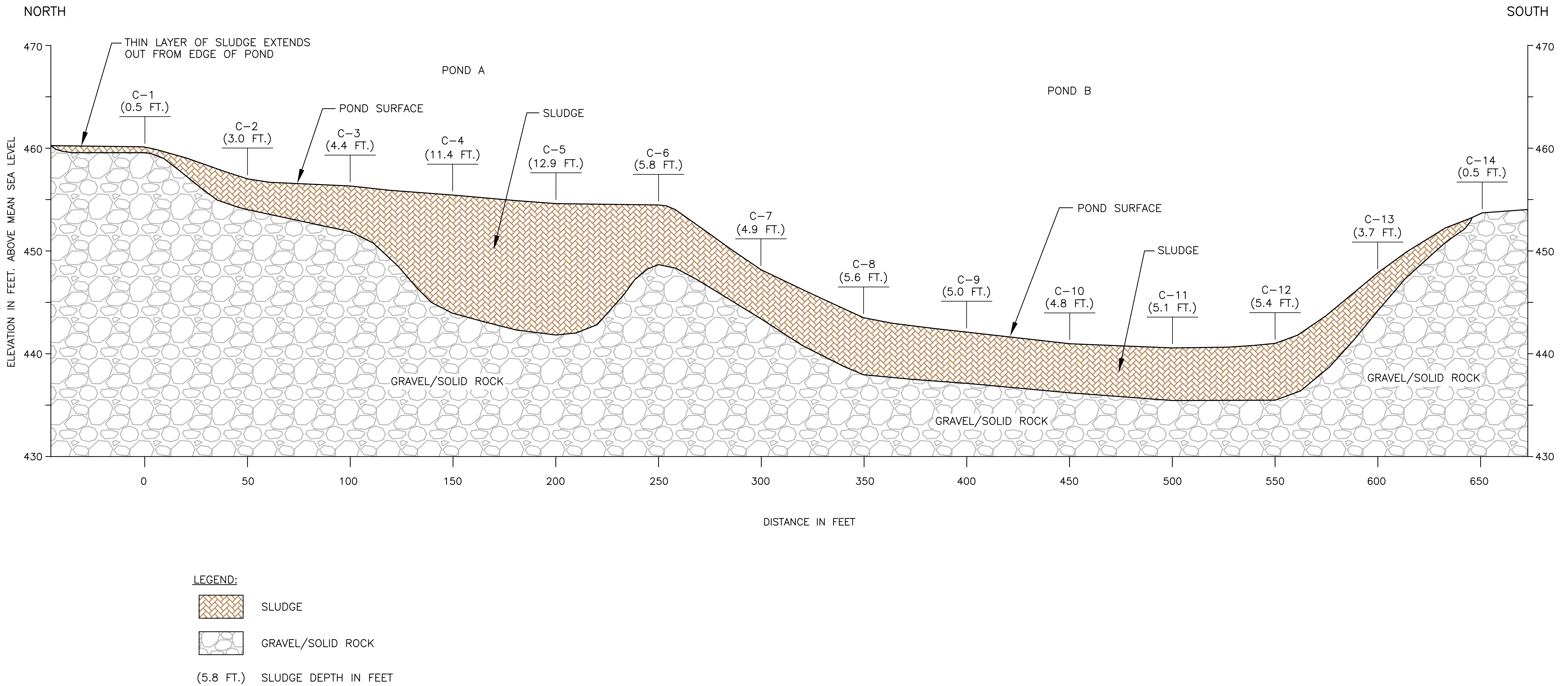
NPDES PONDS A AND B

SLUDGE DEPTHS

GOLDENDALE, WASHINGTON

Project Number	MH000978.0001
Drawing Date	06/23/2008
Figure	A2



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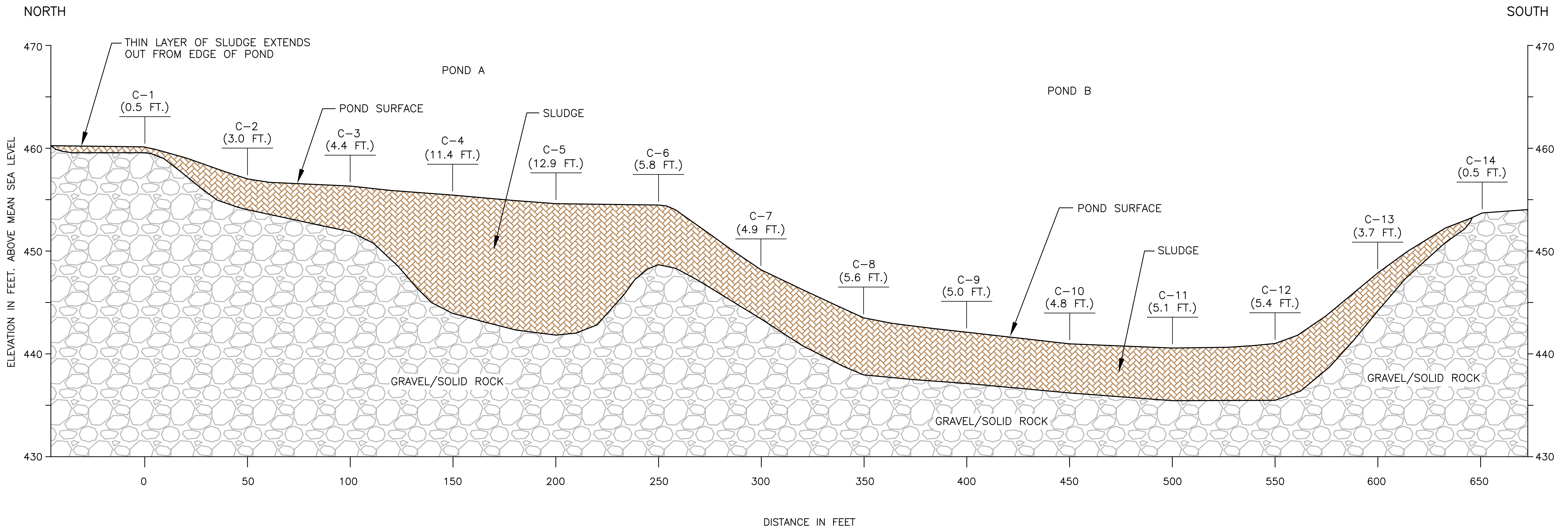
GRID LINE C CROSS SECTION (SEE FIGURE 2)
NPDES PONDS A AND B

GOLDENDALE, WASHINGTON

Project Number	MH000968.0001
Drawing Date	9/4/2007
Figure	A2a



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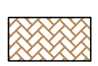
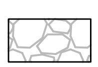
 SLUDGE

 GRAVEL/SOLID ROCK

(5.8 FT.) SLUDGE DEPTH IN FEET

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User Name : mhoefer

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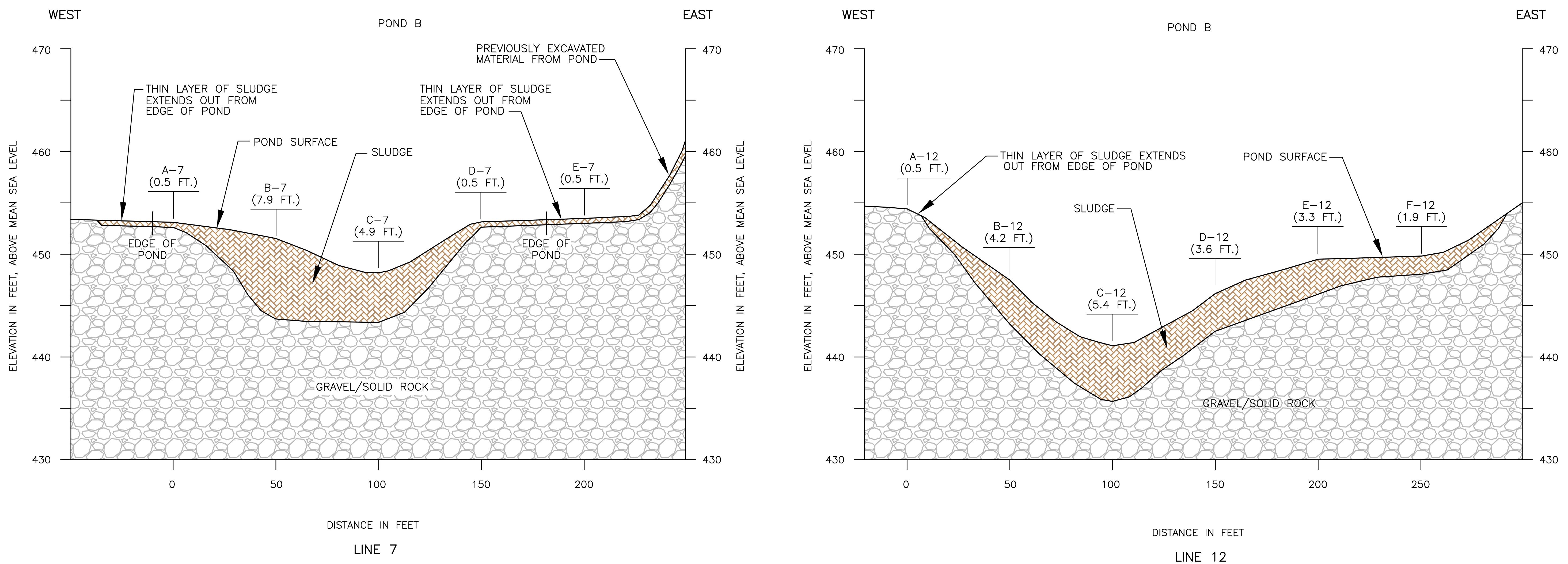
GRID LINE C CROSS SECTION (SEE FIGURE 2)
NPDES PONDS A AND B

GOLDENDALE, WASHINGTON

Project Number	MH000968.0001
Drawing Date	9/4/2007
Figure	A2a



LEGEND:

SLUDGE

GRAVEL/SOLID ROCK

(4.9 FT.) SLUDGE DEPTH IN FEET

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GRID LINES 7 AND LINE 12 CROSS SECTIONS (SEE FIGURE 2)
NPDES PONDS A AND B

GOLDENDALE, WASHINGTON

Project Number	MH000968.0001
Drawing Date	9/4/2007
Figure	A2b

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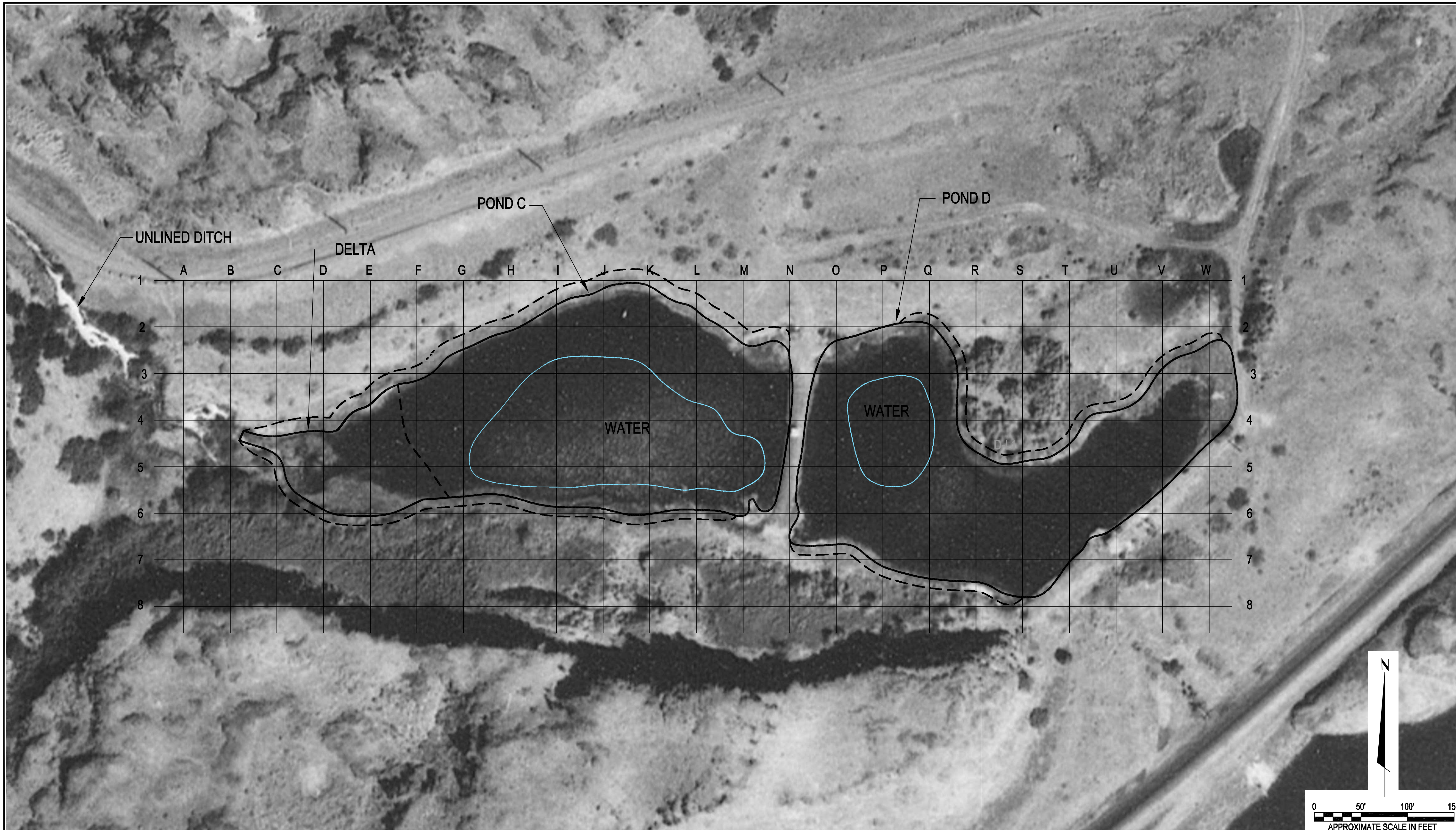

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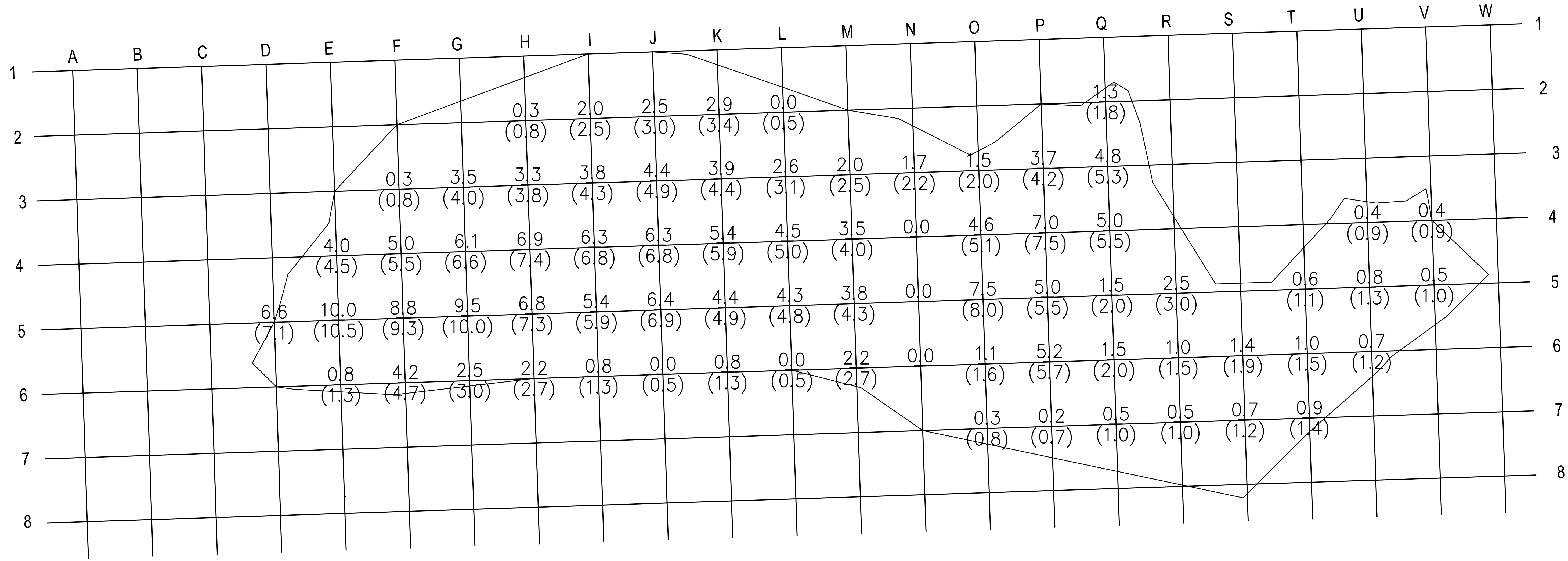
LEDGEND:

- POND SLUDGE PERIMETER
- EXTENDED PERIMETER (THIN LAYER OF SLUDGE (OUTSIDE POND PERIMETER)
- WATER LEVEL ON JULY 13, 2007

NPDES PONDS C AND D
GRID POINTS

GOLDENDALE, WASHINGTON

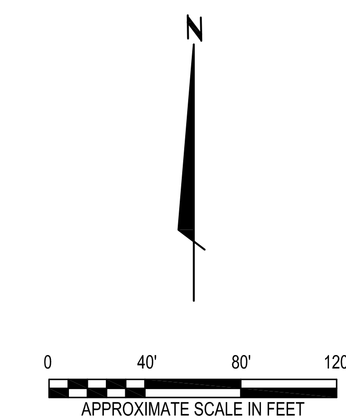
Project Number: MH000978.0001
Drawing Date: 6/23/2008
Figure: A3



LEGEND:

2.8 ACTUAL SLUDGE DEPTH
(3.3) MAX EXCAVATION CUT (SLUDGE DEPTH PLUS 6 INCHES)

NOTE: EXTENDED AREAS NOT SHOWN



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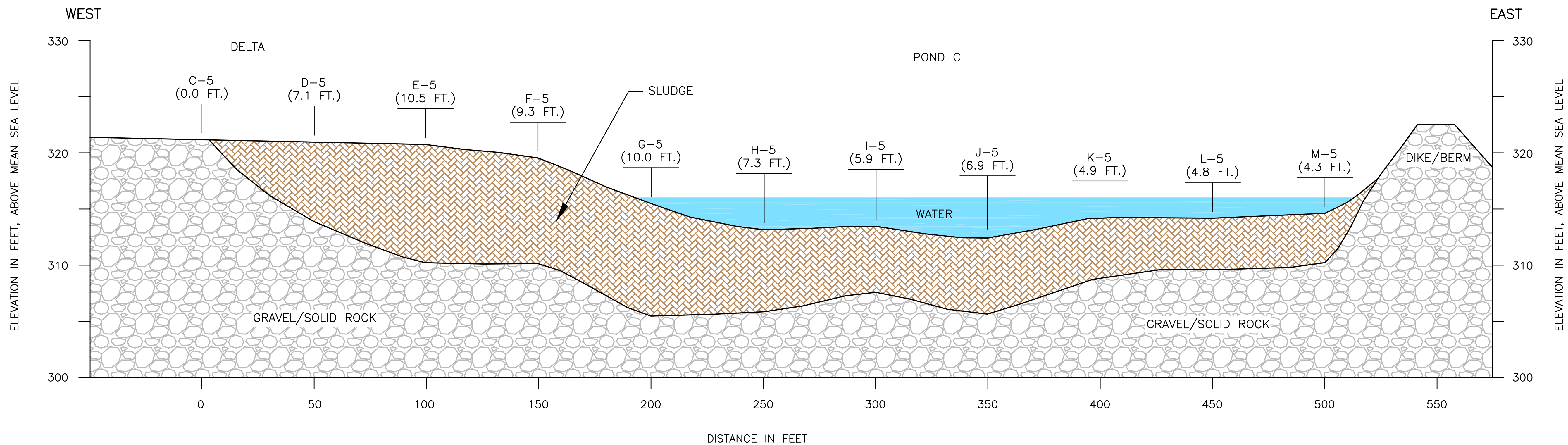
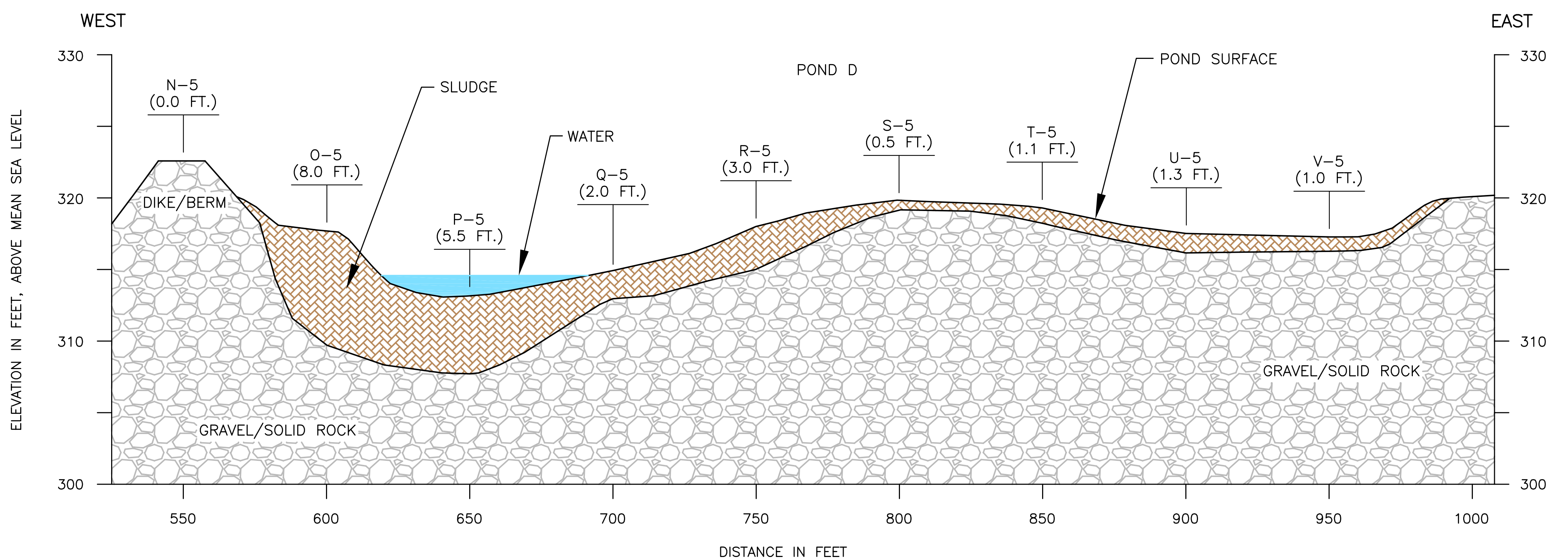
NPDES PONDS C AND D

SLUDGE DEPTHS

GOLDENDALE, WASHINGTON

Project Number	MH000978.0001
Drawing Date	06/23/2008
Figure	A4





LEGEND:

SLUDGE

GRAVEL/SOLID ROCK

(5.5 FT.) SLUDGE DEPTH IN FEET

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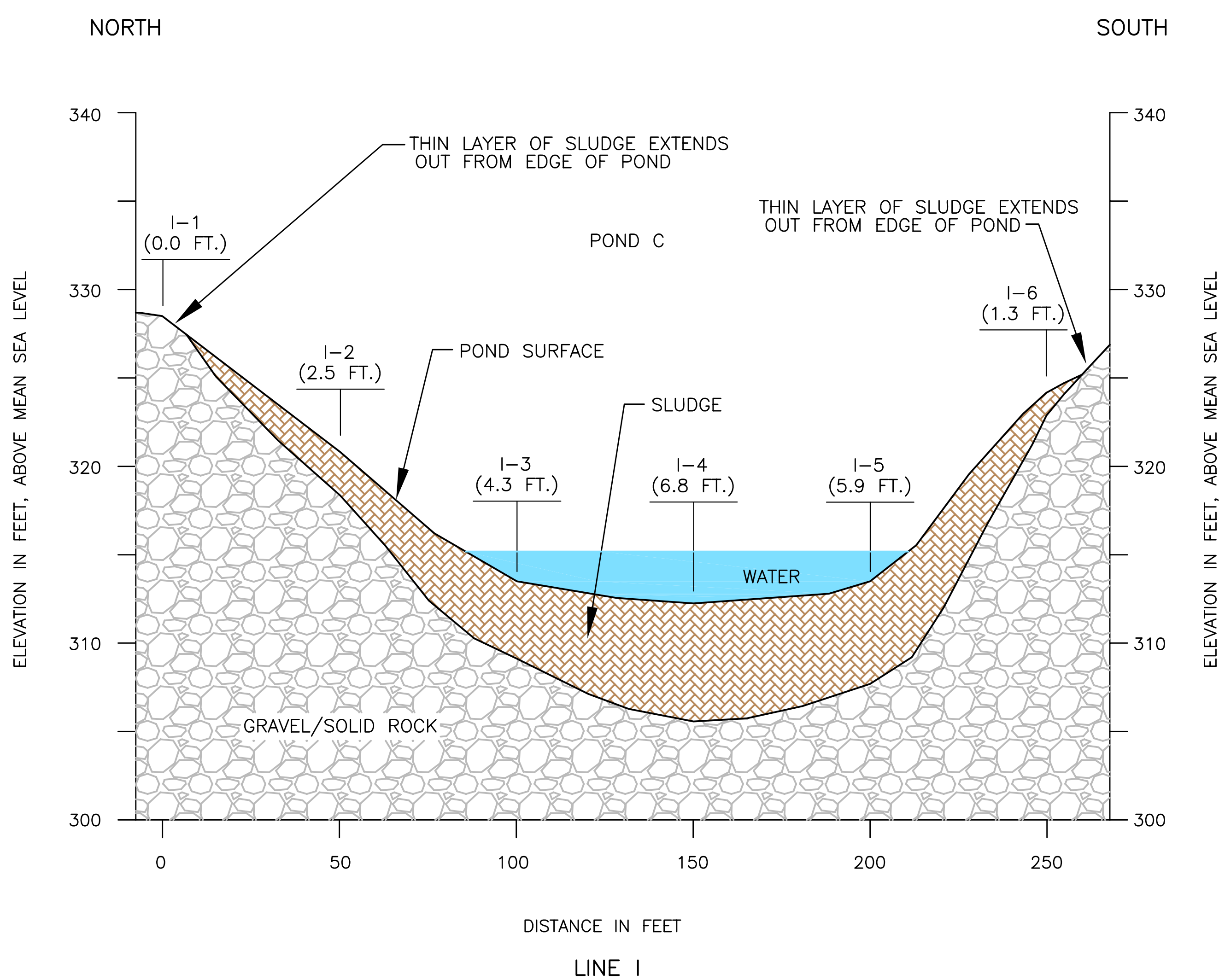
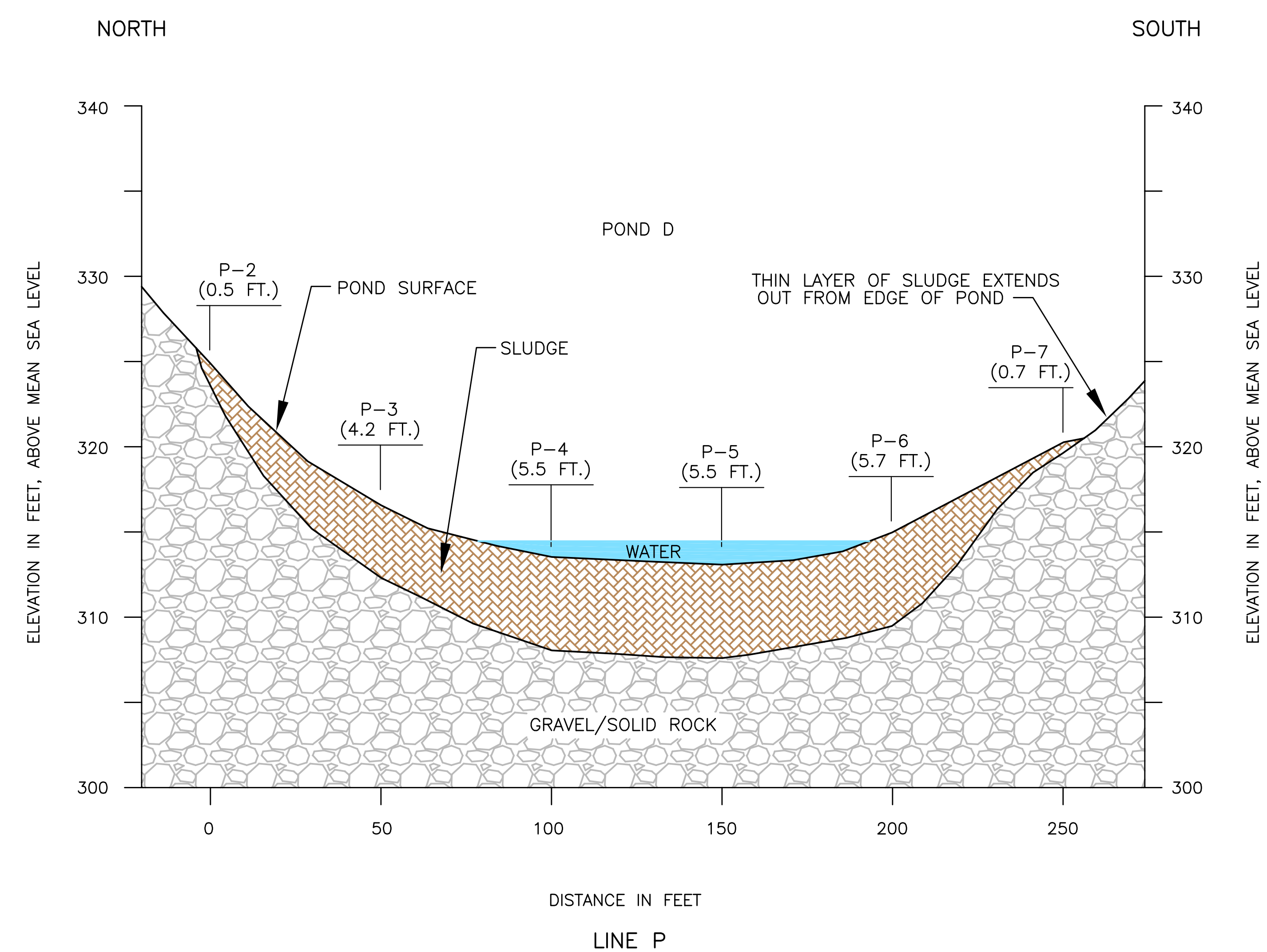
GRID LINE 5 CROSS SECTION (SEE FIGURE 3)
NPDES PONDS C AND D

GOLDENDALE, WASHINGTON

Project Number	MH000968.0001
Drawing Date	9/4/2007
Figure	A4a





LEGEND:

SLUDGE

GRAVEL/SOLID ROCK

(4.3 FT.) SLUDGE DEPTH IN FEET

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Drafter: M. HOEFER
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GRID LINES I AND LINE P CROSS SECTIONS (SEE FIGURE 3)
NPDES PONDS C AND D

GOLDENDALE, WASHINGTON

Project Number: MH000968.0001
Drawing Date: 9/4/2007
Figure: A4b

Table 1. NPDES PONDS SURVEY DATA - PONDS A & B
Goldendale, Washington

Shot	northing	easting	surface elevation	grid location	sludge depth (ft)	Bottom Elev (ft) plus	0.5	Notes:	
Pond shots									
615	145252.1	1591202.3	454.18	A-6	0.92	453.26	452.76		
616	145202.1	1591203.9	453.07	A-7					About at perimeter. Excavate to 6 inches deep seven feet past A-7 toward rocks (west).
6123	145152.2	1591204.7	450.98	A-8	5.13	445.86	445.36		
618	145102.1	1591207.0	451.08	A-9	4.33	446.75	446.25		
619	145052.2	1591208.6	450.96	A-10	4.79	446.17	445.67		
620	145002.2	1591210.1	450.33	A-11	3.67	446.67	446.17		
621	144952.2	1591211.7	454.38	A-12					TOP OF DAM - ELEVATION LIMIT OF SEDIMENTS
6111	145505.2	1591244.1	459.32	B-1					
624	145453.5	1591246.1	457.92	B-2				B-2	Is 1 ft over and 1.5 ft up in elevation from pond perimeter.
625	145403.6	1591247.6	455.99	B-3	2.04	453.95	453.45		
626	145353.6	1591249.2	454.95	B-4	9.21	445.74	445.24		
627	145303.6	1591250.8	454.20	B-5	9.25	444.95	444.45		
628	145253.6	1591252.3	454.05	B-6	2.96	451.10	450.60		
629	145203.7	1591253.9	451.50	B-7	7.38	444.12	443.62		
630	145153.7	1591255.4	443.60	B-8	7.58	436.02	435.52		
631	145103.7	1591257.0	441.23	B-9	8.83	432.40	431.90		
632	145053.7	1591258.5	440.65	B-10	5.85	434.80	434.30		
633	145003.7	1591260.1	440.88	B-11	6.17	434.71	434.21	05/08/08	Rechecked this depth - came up with 70" = 5.83 ft. Stick with worst case.
634	144953.8	1591261.6	447.51	B-12	3.71	443.80	443.30		
635	144903.8	1591263.2	454.54	B-13					TOP OF DAM - ELEVATION LIMIT OF SEDIMENTS
607	145505.1	1591294.5	460.13	C-1				C-1	Is at end of windblown sediments.
637	145455.1	1591296.1	457.02	C-2	2.46	454.56	454.06		
638	145405.1	1591297.6	456.20	C-3	3.94	452.26	451.76		
639	145355.1	1591299.2	455.41	C-4	10.88	444.53	444.03		
640	145305.2	1591300.7	454.55	C-5	12.42	442.13	441.63		
641	145255.2	1591302.3	454.22	C-6	5.27	448.95	448.45		
642	145205.2	1591303.8	448.15	C-7	4.35	443.79	443.29		
643	145155.2	1591305.4	443.39	C-8	5.08	438.31	437.81		
644	145105.3	1591307.0	442.16	C-9	4.46	437.70	437.20		
645	145055.3	1591308.5	441.02	C-10	4.31	436.70	436.20		
646	145005.3	1591310.1	440.57	C-11	4.65	435.92	435.42		
647	144955.3	1591311.6	441.05	C-12	4.88	436.18	435.68		
648	144905.4	1591313.2	447.98	C-13	3.17	444.82	444.32		
649	144855.4	1591314.7	453.73	C-14					TOP OF DAM - ELEVATION LIMIT OF SEDIMENTS
655	145206.8	1591353.8	453.28	D-7	0.5	452.78	452.28	D-7	Is about 2 feet to rock cliff
656	145156.8	1591355.4	450.80	D-8	6	444.80	444.30		
657	145106.8	1591356.9 *		D-9				D-9	On top of cliff east of pond B.
658	145056.8	1591358.5	454.03	D-10	0	454.03	453.53	D-10	Is 2 ft out (west) from rock cliff, and appears to be the perimeter. Extend perimeter to cliff.
659	145006.9	1591360.0	449.13	D-11	2.83	446.30	445.80		
660	144956.9	1591361.6	446.10	D-12	3.13	442.98	442.48		
661	144906.9	1591363.2	452.97	D-13	0.00	452.97	452.47	D-13	On rocky knob (end of peninsula).

Table 1. NPDES PONDS SURVEY DATA - PONDS A & B
Goldendale, Washington

Shot	northing	easting	surface elevation	grid location	sludge depth (ft)	Bottom Elev (ft) plus	0.5	Notes:	
Pond Shots									
662	144856.9	1591364.7	453.64	D-14		453.64	453.14	D-14	Excavate 6 inches across the peninsula (except for the rocky knob on the end).
668	145208.3	1591403.8	453.68	E-7	0.5	453.18	452.68	E7 - D8	Midpoint on this diagonal line the sludge is 4.0 ft deep.
671	145058.4	1591408.5	470.54	E-10					
673	144958.4	1591411.6	449.54	E-12	2.81	446.73	446.23		
674	144908.5	1591413.1	449.65	E-13	2.38	447.27	446.77		
675	144858.5	1591414.7	451.62	E-14	0.54	451.08	450.58		
685	145010.0	1591460.0	458.09	F-11					
686	144960.0	1591461.5	449.88	F-12	1.42	448.46	447.96		

Lateral Extent Sample Locations

6113	145550.5	1591293.2	462.46	A-LE1
6105	145320.4	1591211.4	455.77	A-LE2
6152	144941.7	1591457.4	453.01	BLE-1
6173	145202.5	1591554.9	455.58	DITCH-LE1

Perimeter Shots

6100	145208.7	1591200.8	452.37	PAINT
6101	145218.8	1591201.3	452.96	PAINT
6102	145245.4	1591191.8	455.48	PAINT
6103	145259.0	1591199.9	455.79	PAINT
6104	145299.3	1591208.6	456.36	PAINT
6106	145343.1	1591208.0	456.09	PONDA
6107	145379.3	1591219.5	456.67	PONDA
6108	145418.2	1591239.2	458.51	PONDA
6109	145468.4	1591247.9	458.34	PONDA
6110	145501.0	1591247.1	458.28	PONDA
6112	145517.5	1591268.4	459.11	PONDA
6114	145515.1	1591281.4	459.31	PONDA
6115	145500.0	1591291.6	458.35	PONDA
6116	145393.2	1591307.9	457.21	PONDA
6117	145310.8	1591327.8	455.62	PONDA
6118	145262.9	1591328.9	455.56	PONDA
6119	145242.4	1591331.3	456.10	DAM
6120	145242.4	1591190.5	455.64	DAM
6121	145193.8	1591196.4	452.80	PONDB
6122	145183.6	1591184.7	453.12	PONDB
6124	145147.3	1591188.8	452.53	PONDB
6125	145104.2	1591194.1	452.51	PONDB
6126	145070.7	1591193.2	452.53	PONDB
6127	145043.4	1591192.4	452.71	PONDB

Perimeter Shots (continued)

6128	145002.4	1591197.3	452.36	PONDB
6129	144978.9	1591197.8	452.16	PONDB
6130	144965.0	1591212.3	452.57	PONDB
6131	144929.3	1591251.9	452.71	PONDB
6132	144903.3	1591282.3	453.08	PONDB
6133	144868.6	1591319.7	452.62	PONDB
6134	144848.8	1591345.7	452.97	PONDB
6135	144873.3	1591362.3	453.55	PONDB
6136	144913.3	1591361.9	452.26	PONDB
6137	144935.3	1591372.2	452.43	PONDB
6138	144943.3	1591388.4	452.43	PONDB
6139	144946.0	1591400.8	452.21	PONDB
6140	144942.5	1591407.3	452.26	PONDB
6141	144925.2	1591407.1	452.57	PONDB
6142	144907.6	1591413.2	449.44	E-13449.65
6143	144902.9	1591399.9	451.84	PONDB
6144	144868.7	1591369.1	452.92	PONDB
6145	144839.9	1591357.3	452.34	PONDB
6146	144820.9	1591377.8	452.22	PONDB
6147	144818.5	1591402.8	452.31	PONDB
6148	144856.3	1591419.3	452.48	PONDB
6149	144901.3	1591428.9	451.95	PONDB
6150	144924.0	1591435.8	451.96	PONDB
6151	144939.0	1591450.4	452.29	PONDB
6153	144958.1	1591473.5	452.12	POND-B
6154	144992.0	1591499.9	452.50	POND-B
6155	145015.2	1591474.4	452.23	POND-B
6156	145001.3	1591464.0	452.74	POND-B
6157	144983.5	1591436.9	452.27	POND-B
6158	144975.4	1591419.9	451.92	POND-B

Perimeter Shots (continued)

6159	144983.1	1591401.7	451.14	POND-B
6160	145007.1	1591372.0	451.94	POND-B
6161	145039.9	1591357.3	451.72	POND-B
6162	145065.2	1591347.5	452.67	POND-B
6163	145100.0	1591345.4	452.13	POND-B
6164	145123.6	1591355.5	452.62	POND-B
6165	145156.5	1591382.7	452.41	POND-B
6166	145191.1	1591402.8	452.60	POND-B
6167	145206.2	1591403.5	452.58	POND-B
6168	145215.7	1591381.9	452.50	POND-B
6169	145205.1	1591353.7	452.04	POND-B
6170	145207.4	1591341.6	451.96	POND-B
6171	145217.6	1591337.6	452.22	POND-B
6172	145231.9	1591333.3	453.79	POND-B

Miscellaneous Shots

50002	145304.3	1591250.0	454.34	HUB@B-5
50003	145298.6	1591106.1	485.08	G
50004	145298.5	1591132.3	482.50	TOP
50005	145300.4	1591162.4	474.34	BRK
50006	145302.5	1591209.6	456.48	TOE
50007	145303.2	1591219.2	454.61	G
50008	145304.4	1591270.9	454.35	G
50009	145305.8	1591300.2	454.69	HUB@C-5
50010	145308.7	1591326.1	454.98	TOE
50012	145305.9	1591358.2	486.76	TOP
50013	145306.5	1591375.3	487.90	TOP
50014	145311.0	1591387.8	475.76	TOE

* TOE or TOP - of ROCK BLUFF

Table 2. NPDES PONDS SURVEY DATA - PONDS C & D
Goldendale, Washington

Shot	northing	easting	surface elevation	grid location	sludge depth (ft)	Bottom Elev (ft)	plus 6 in	Notes:	
Pond shots									
8107	144956.5	1592633	331.062	C4					
83	144906.6	1592635 *		C-5				C-5	Is near upper limit of delta sludge. See shot 8099.
94	144958.2	1592683 *		D-4				D-4	Perimeter of pond is 7 ft in and 2 ft drop in elevation from stake D-4 (towards D-5).
8104	144908.3	1592685	323.224	D-5	6.58	316.64	316.14		
8105	144858.1	1592686	325.914	D-6				D-6	Perimeter of pond is 2 ft in and 1 ft drop in elevation from stake D-6 (towards D-5).
54	145009.7	1592731	327.972	E-3				05/07/08	Perimeter of pond is ~ 25 ft in from E3 (toward E4).
8103	144959.8	1592733	321.92	E-4	4.0	317.92	317.42	05/07/08	Depth of sludge at 31 ft from E4 (toward E5) is 11 ft.
180	144909.8	1592735	320.922	E-5	10.00	310.92	310.42	05/07/08	U sample from 2007 at 9' 6" was 3.1 ppm - go to depth of 10 ft to clean.
181	144859.8	1592736	324.565	E-6	0.75	323.82	323.32		
35	145061.3	1592780	330.237	F-2				F-2	Depth of sludge at 43' from F2 (toward F3) is 0.75 ft.
55	145011.4	1592781	324.405	F-3	0.3	324.16	323.66		
308	144961.4	1592783	318.821	F-4	5.04	313.78	313.28	05/07/08	F-4 48.5 " to sand 78.5 " to refusal.
309	144911.4	1592785	319.599	F-5	8.83	310.77	310.27		Depth of sludge at ~25' from F5 (toward F6) is 4.58 ft.
8106	144861.4	1592786	324.272	F-6	4.17	320.11	319.61	F-6	Sand and rocks beneath the 50" depth. F6 plus 10 ft is LE sample.
56	145013	1592831	320.528	G-3	3.50	317.03	316.53	water elev	water depth
314	144963	1592833	315.18	G-4	6.08	309.09	308.59	315.55	0.38 ft under water - elevation 315.40, depth of water = 4.5".
487	144913	1592835	315.551	G-5	9.50	306.05	305.55		**Note: Use consistent 315.55 for elevation of water.**
8069	144863	1592836	323.764	G-6	2.46	321.31	320.81		
17	145114.5	1592878 *		H-1				H-1	Is limit of windblown or wave action sediments.
37	145064.6	1592880	324.678	H-2	0.33	324.34	323.84		
57	145014.6	1592881	316.802	H-3	3.33	313.47	312.97	water elev	water depth
315	144964.6	1592883	313.05	H-4	6.92	306.13	305.63	315.55	2.5 Under water.
545	144914.6	1592885	313.55	H-5	6.75	306.80	306.30	315.55	2.0 Under water.
546	144864.7	1592886	322.997	H-6	2.17	320.83	320.33		
18	145116.1	1592928	328.44	I-1					
38	145066.2	1592930	320.874	I-2	2.00	318.87	318.37	water elev	water depth
58	145016.2	1592931	314.05	I-3	3.83	310.22	309.72	315.55	1.50 Under water.
316	144966.2	1592933	312.55	I-4	6.25	306.30	305.80	315.55	3.00 Under water.
550	144916.2	1592935	314.05	I-5	5.42	308.63	308.13	315.55	1.50 Under water.
551	144866.3	1592936	324.108	I-6	0.79	323.32	322.82		
19	145117.7	1592978	326.25	J-1				J-1	About at edge of windblown perimeter and ~ 10 ft up from pond perimeter.
39	145067.8	1592980	318.797	J-2	2.46	316.34	315.84	05/07/08	Seven ft to waters edge from J-2 toward J-3 - about a 6 inch drop in elev.
59	145017.8	1592981	314.13	J-3	4.42	309.72	309.22	315.55	1.42 Under water.
317	144967.8	1592983	312.63	J-4	6.33	306.30	305.80	315.55	2.92 Under water.
555	144917.8	1592985	312.80	J-5	6.42	306.38	305.88	315.55	2.75 Under water.
556	144867.9	1592986	327.43	J-6	0.00				
40	145069.4	1593030	318.846	K-2	2.92	315.93	315.43	water elev	water depth
60	145019.4	1593031	315.18	K-3	3.88	311.30	310.80	315.55	0.38 Under water - elevation 315.72, depth of water = 4.5".
318	144969.4	1593033	312.72	K-4	5.42	307.30	306.80	315.55	2.83 Under water.
560	144919.5	1593035	315.189	K-5	4.42	310.77	310.27		

Table 2. NPDES PONDS SURVEY DATA - PONDS C & D
Goldendale, Washington

Shot	northing	easting	surface elevation	grid location	sludge depth (ft)	Bottom Elev (ft)	plus 6 in	Notes:		
Pond shots										
41	145071	1593080	322.196	L-2	0	322.20	321.70	L-2	Near perimeter. Clean sand on top, rocks at 2 inches. Extend perimeter 5 more ft.	
61	145021	1593081	317.641	L-3	2.63	315.02	314.52	water elev	water depth	
319	144971	1593083	314.72	L-4	4.50	310.22	309.72	315.55	0.83	Under water.
565	144921.1	1593085	314.63	L-5	4.25	310.38	309.88	315.55	0.92	Under water.
566	144871.1	1593086	329.106	L-6					Top of rock up from pond.	
42	145072.6	1593130	327.461	M-2				M-2	About 12 ft out from LE sample, which was clean.	
62	145022.6	1593131	321.253	M-3	2.00	319.25	318.75			
320	144972.7	1593133	317.133	M-4	3.54	313.59	313.09	water elev	water depth	
570	144922.7	1593134	315.05	M-5	3.83	311.22	310.72	315.55	0.50	Under water.
571	144872.7	1593136	322.051	M-6	2.17	319.88	319.38			
23	145124.2	1593178	333.734	N-1						
63	145024.2	1593181	321.561	N-3	1.71	319.85	319.35			
321	144974.3	1593183	320.193	N-4				N-4	Low on dike between ponds on C side.	
575	144924.3	1593184	322.699	N-5				N-5	High on dike between ponds on C side.	
8049	144874.4	1593186	325.519	N-6				N-6	On top of dike between ponds.	
577	144824.3	1593188	325.329	N-7						
24	145125.8	1593228	335.062	O-1						
64	145025.8	1593231	319.164	O-3	1.50	317.66	317.16			
322	144975.9	1593233	313.594	O-4	4.63	308.97	308.47			
580	144925.9	1593234	317.811	O-5	7.50	310.31	309.81			
581	144875.9	1593236	317.77	O-6	1.08	316.69	316.19			
582	144825.9	1593238	321.038	O-7	0.33	320.70	320.20			
25	145127.4	1593278	336.225	P-1						
45	145077.4	1593280	324.965	P-2						
65	145027.5	1593281	316.58	P-3	3.69	312.89	312.39	water elev	water depth	
323	144977.5	1593283	309.55	P-4	7.00	302.55	302.05	315.55	6	Under water - estimate water and sludge depths.
585	144927.5	1593284	312.55	P-5	5.00	307.55	307.05	315.55	3	Under water - estimate water and sludge depths.
586	144877.5	1593286	315.157	P-6	5.21	309.95	309.45			
587	144827.6	1593288	320.271	P-7	0.17	320.10	319.60			
46	145079	1593330	320.814	Q-2	1.25	319.56	319.06			
66	145029.1	1593331	312.908	Q-3	4.79	308.12	307.62	water elev	water depth	
324	144979.1	1593333	313.55	Q-4	5.00	308.55	308.05	315.55	2	Under water - estimate water and sludge depths.
590	144929.1	1593334	315.064	Q-5	1.46	313.61	313.11			
591	144879.1	1593336	315.538	Q-6	1.50	314.04	313.54			
592	144829.2	1593338	317.964	Q-7	0.46	317.51	317.01			
595	144930.7	1593384	318.034	R-5	2.50	315.53	315.03			
596	144880.8	1593386	316.55	R-6	1.04	315.51	315.01			
597	144830.8	1593388	317.903	R-7	0.54	317.36	316.86			
600	144932.3	1593434	320.509	S-5	0.00	320.51	320.01			
601	144882.4	1593436	316.728	S-6	1.42	315.31	314.81			

Table 2. NPDES PONDS SURVEY DATA - PONDS C & D
Goldendale, Washington

Shot	northing	easting	surface elevation	grid location	sludge depth (ft)	Bottom Elev (ft)	plus 6 in	Notes:		
Pond shots										
603	144782.4	1593439	320.099	S-8						
89	144933.9	1593484	319.263	T-5	0.58	318.68	318.18			
90	144884	1593486	316.782	T-6	0.96	315.82	315.32			
91	144834	1593488	316.98	T-7	0.92	316.06	315.56	V4	0.38	Sludge depth data, but no survey data. Minimal volume.
697	144985.5	1593533	319.623	U-4	0.38	319.25	318.75	V5	0.46	Sludge depth data, but no survey data. Minimal volume.
698	144935.6	1593534	317.49	U-5	0.83	316.66	316.16	W3	0.04	Sludge depth data, but no survey data. Minimal volume.
700	144885.6	1593536	316.712	U-6	0.67	316.05	315.55	W4	0.33	Sludge depth data, but no survey data. Minimal volume.

Perimeter Shots

8051	145048.6	1593136	324.068	POND-C
8052	145047.8	1593120	323.793	POND-C
8053	145088.2	1593086	324.606	POND-C
8054	145115.9	1593005	324.117	POND-C
8055	145094.6	1592944	323.566	POND-C
8056	145050	1592857	323.795	POND-C
8057	145015.9	1592777	324.888	POND-C
8058	144984.9	1592727	324.221	POND-C
8059	144945.2	1592695	323.438	POND-C
8060	144946	1592658	324.166	POND-C
8062	144876.7	1592668	322.246	POND-C
8063	144906.1	1592701	322.401	POND-C
8064	144924.1	1592690	322.727	POND-C
8065	144880.1	1592717	323.253	POND-C
8066	144887.7	1592706	322.944	POND-C
8067	144870	1592773	323.355	POND-C
8070	144871.3	1592837	323.025	POND-C
8071	144871.8	1592918	322.012	POND-C
8072	144879.5	1592977	323.4	POND-C
8073	144873.5	1593024	323.398	POND-C
8074	144873.6	1593063	322.138	POND-C
8075	144880	1593079	323.124	POND-C
8076	144872.2	1593122	322.811	POND-C
8077	144857.5	1593140	323.232	POND-C
8078	144855.8	1593164	323.727	POND-C
8079	144878.9	1593178	323.132	POND-C
8080	144938.4	1593188	323.261	POND-C
8081	145032.3	1593190	323.836	POND-C
8082	145038.1	1593178	324.383	POND-C
8083	145051.9	1593176	323.944	POND-C
8084	145066.1	1593169	324.289	POND-C

8002	144977	1593370	320.823	POND-D
8003	145016	1593366	321.612	POND-D
8004	145062	1593356	321.326	POND-D
8005	145088	1593347	322.737	POND-D
8006	145094	1593336	323.851	POND-D
8007	145076	1593310	321.906	POND-D
8008	145064	1593279	321.443	POND-D
8009	145048	1593244	319.959	POND-D
8010	145038	1593225	321.331	POND-D
8011	145019	1593220	320.442	POND-D
8012	144965	1593215	318.831	POND-D
8013	144909	1593209	319.582	POND-D
8014	144837	1593197	321.694	POND-D
8015	144824	1593236	320.916	POND-D
8016	144829	1593260	320.991	POND-D
8017	144811	1593292	321.174	POND-D
8018	144804	1593342	320.332	POND-D
8019	144795	1593387	320.467	POND-D
8020	144772	1593436	321.365	POND-D
8021	144801	1593458	318.669	POND-D
8022	144824	1593488	318.568	POND-D
8023	144854	1593513	317.24	POND-D
8024	144867	1593522	317.585	POND-D
8025	144869	1593540	317.931	POND-D
8026	144882	1593551	317.725	POND-D
8027	144908	1593574	318.314	POND-D
8028	144912	1593594	321.382	POND-D
8029	144945	1593627	321.29	POND-D
8030	144980	1593659	321.606	POND-D
8031	144997	1593670	321.322	POND-D
8032	145015	1593673	321.662	POND-D

8034	145074.2	1593654	320.913	POND-D
8035	145053.9	1593622	320.911	POND-D
8036	145039.6	1593587	321.322	POND-D
8037	145011.8	1593578	321.084	POND-D
8038	145002.2	1593563	321.116	POND-D
8039	145000.6	1593539	321.133	POND-D
8040	145004.3	1593515	321.177	POND-D
8041	144988.5	1593504	320.947	POND-D
8042	144970.3	1593501	321.025	POND-D
8043	144951.4	1593484	321.039	POND-D
8044	144939.4	1593458	321.002	POND-D
8045	144935	1593432	320.872	POND-D

Lateral Extent Sample Locations

8050	145064	1593122	324.894	C-LE-2
8000	144938	1593415	320.615	D-LE1
8068	144938	1592778	324.647	POND-C-LE-2

Miscellaneous Shots

8085	144947.7	1592664	323.411	DELTA
8086	144934	1592638	325.195	DELTA
8087	144934.5	1592616	329.271	DELTA
8101	144856.3	1592701	325.061	DELTA
8099	144921.2	1592629	325.493	DELTA-START
715	145037.1	1593581	322.55	dike Ponds C-D
723	145038.7	1593631	319.974	dike Ponds C-D
717	144937.2	1593584	317.301	Pond D
716	144987.1	1593583	318.636	Pond D
724	144988.7	1593633	319.597	Pond D

TABLE 1. 2007 Goldendale NPDES Ponds Soil Sampling - PAH Dry Wt and Metals Analyses
Lockheed Martin Corporation, Goldendale, WA

Pond A

Sample ID / Date Collected	Pond A - C [1] 07/13/07 (mg/kg)	Lab Note RL7	Pond A - U1 07/13/07 (mg/kg)	Lab Note RL3	Pond A - U2 07/13/07 (mg/kg)	Lab Note RL3	Pond A - LE1 07/13/07 (mg/kg)		Pond A - LE2 07/13/07 (mg/kg)		Cleanup Standard (mg/kg)
Acenaphthene	1.34	nd* (2.67)	0.083	nd* (0.166)	0.081	nd* (0.162)	0.008	nd*(0.016)	0.007	nd*(0.014)	-
Acenaphthylene	5.76	2.67	0.083	nd* (0.166)	0.081	nd* (0.162)	0.008	nd*(0.016)	0.007	nd*(0.014)	-
Anthracene	19.9	2.67	0.294	0.166	0.081	nd* (0.162)	0.008	nd*(0.016)	0.007	nd*(0.014)	-
Benzo(a)anthracene	145	26.7	3.71	0.831	0.351	0.162	0.0485	0.016	0.0197	0.014	-
Benzo(a)pyrene	182	26.7	2.57	0.831	0.820	0.162	0.0718	0.016	0.0262	0.014	-
Benzo(b)fluoranthene	375	26.7	6.37	0.831	1.550	0.162	0.101	0.016	0.0492	0.014	-
Benzo(g,h,i)perylene	177	26.7	2.06	0.831	0.571	0.162	0.0301	0.016	0.0246	0.014	-
Benzo(k)fluoranthene	161	26.7	2.90	0.831	1.010	0.162	0.0768	0.016	0.0227	0.014	-
Chrysene	392	26.7	6.95	0.831	1.230	0.162	0.063	0.016	0.0489	0.014	-
Dibenzo(a,h)anthracene	55.9	26.7	0.416	RL1, nd* (0.831)	0.190	0.162	0.008	nd*(0.016)	0.007	nd*(0.014)	-
Fluoranthene	408	26.7	11.0	0.831	0.709	0.162	0.0722	0.016	0.0482	0.014	-
Fluorene	6.37	2.67	0.083	nd* (0.166)	0.081	nd* (0.162)	0.008	nd*(0.016)	0.007	nd*(0.014)	-
Indeno(1,2,3-cd)pyrene	148	26.7	1.74	0.831	0.537	0.162	0.0318	0.016	0.0205	0.014	-
Naphthalene	1.34	nd* (2.67)	0.083	nd* (0.166)	0.081	nd* (0.162)	0.008	nd*(0.016)	0.007	nd*(0.014)	-
Phenanthrene	130	2.67	0.586	0.166	0.206	0.162	0.0324	0.016	0.0177	0.014	-
Pyrene	310	26.7	8.69	0.831	0.590	0.162	0.068	0.016	0.0415	0.014	-
PAH Totals	2,519		47.6		8.2		0.6		0.4		-

PEF Calculations	PEF	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Benzo(a)anthracene	0.10	0.37	0.04	0.00	0.00	-
Benzo(a)pyrene	1.00	2.57	0.82	0.07	0.03	-
Benzo(b)fluoranthene	0.10	0.64	0.16	0.01	0.00	-
Benzo(k)fluoranthene	0.10	0.29	0.10	0.01	0.00	-
Chrysene	0.01	0.07	0.01	0.00	0.00	-
Dibenzo(a,h)anthracene	0.10	0.04	0.02	0.00	0.00	-
Indeno(1,2,3-cd)pyrene	0.10	0.17	0.05	0.00	0.00	-
PEF Totals [2]	-	4.15	1.20	0.10	0.04	2

Sample ID / Date Collected	Pond A - C 07/13/07 (mg/kg)	Pond A - U1 07/13/07 (mg/kg)	Pond A - U2 07/13/07 (mg/kg)	Pond A - LE1 07/13/07 (mg/kg)	Pond A - LE2 07/13/07 (mg/kg)	Cleanup Standard (mg/kg)
Aluminum	48,300	-	13,200	-	-	-
Arsenic	34.8	-	15.9	-	-	-
Cyanide (total)	nd	-	0.710	-	-	-
Fluoride	129	-	136	-	-	-
Sulfate	1010	-	2020	-	-	-

mg/kg - milligrams per kilogram (dry)
MRL - Method Reporting Limit
nd* - Sample result for analyte was non-detectable. The reported number is one-half the MRL (mg/kg). Due to the range of sample dilution requirements, the detection limit may vary between sample analyses.
[1] "C" denotes Composite sample; "U1" denotes Underlying soil sample; "LE1" denotes Lateral Extent sample.
[2] PEF - Potency Equivalency Factors (WAC 173-340-900); potency equivalency factors (PEFs) for carcinogenic PAHs adopted by the California Environmental Protection Agency. Method A Industrial Cleanup Standard is the sum of the cPAHs after the PEF has been applied.
RL1 - Reporting limit raised due to sample matrix effects.
RL3 - Reporting limit raised due to high concentrations of non-target analytes.
RL7 - Sample required dilution due to high concentrations of target analyte.

TABLE 1. 2007 Goldendale NPDES Ponds Soil Sampling - PAH Dry Wt and Metals Analyses
Lockheed Martin Corporation, Goldendale, WA

Pond B

Sample ID	**Pond B - C** [1]	Lab Note	**Pond B - U1**	Lab Note	**Pond B - U2**		**Pond B - U3**	Lab Note	**Pond B - LE1**	Lab Note	**Cleanup**
Date Collected	07/13/07	RL7	07/13/07	RL7	07/13/07		07/13/07	RL3	07/13/07	RL7	**Standard**
	(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)
Acenaphthene	81	nd* (161)	2.87	nd* (5.73)	0.0082	nd*(0.0163)	0.0400	nd*(0.0799)	16.9	nd* (33.8)	-
Acenaphthylene	81	nd* (161)	2.87	nd* (5.73)	0.0082	nd*(0.0163)	0.0400	nd*(0.0799)	16.9	nd* (33.8)	-
Anthracene	170	161	40.3	5.73	0.0974	0.0163	0.0400	nd*(0.0799)	16.9	nd* (33.8)	-
Benzo(a)anthracene	850	161	360	115	1.230	0.650	0.217	0.0799	63.8	33.8	-
Benzo(a)pyrene	635	161	265	5.73	0.806	0.0163	0.187	0.0799	88.7	33.8	-
Benzo(b)fluoranthene	1,290	161	611	115	2.190	0.650	0.362	0.0799	89.4	33.8	-
Benzo(g,h,i)perylene	427	161	181	5.73	0.612	0.0163	0.154	0.0799	72.6	33.8	-
Benzo(k)fluoranthene	647	161	300	115	1.150	0.650	0.230	0.0799	78.8	33.8	-
Chrysene	1,700	161	871	115	3.220	0.650	0.516	0.0799	81.7	33.8	-
Dibenzo(a,h)anthracene	81	nd* (161)	53.3	5.73	0.189	0.0163	0.0400	nd*(0.0799)	16.9	nd* (33.8)	-
Fluoranthene	3,080	161	1,830	115	5.800	0.650	0.717	0.0799	105	33.8	-
Fluorene	81	nd* (161)	15.4	5.73	0.0339	0.0163	0.0400	nd*(0.0799)	16.9	nd* (33.8)	-
Indeno(1,2,3-cd)pyrene	347	161	148	5.73	0.509	0.0163	0.121	0.0799	62.1	33.8	-
Naphthalene	81	nd* (161)	2.87	nd* (5.73)	0.0082	nd*(0.0163)	0.0400	nd*(0.0799)	132	33.8	-
Phenanthrene	1,240	161	222	5.73	0.519	0.0163	0.246	0.0799	42.8	33.8	-
Pyrene	2,380	161	1,330	115	3.94	0.650	0.615	0.0799	86.9	33.8	-
PAH Totals	13,169		6,236		20.3		3.6		988		-

PEF Calculations	PEF	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Benzo(a)anthracene	0.10	36.0	0.12	0.02	6.4	-
Benzo(a)pyrene	1.00	265.0	0.81	0.19	88.7	-
Benzo(b)fluoranthene	0.10	61.1	0.22	0.04	8.9	-
Benzo(k)fluoranthene	0.10	30.0	0.12	0.02	7.9	-
Chrysene	0.01	8.7	0.03	0.01	0.8	-
Dibenzo(a,h)anthracene	0.10	5.3	0.02	0.00	1.7	-
Indeno(1,2,3-cd)pyrene	0.10	14.8	0.05	0.01	6.2	-
PEF Totals [2]	-	421	1.37	0.29	121	2

Sample ID	**Pond B - C**	**Pond B - U1**	**Pond B - U2**	**Pond B - U3**	**Pond B - LE1**	**Cleanup**
Date Collected	07/13/07	07/13/07	07/13/07	07/13/07	07/13/07	**Standard**
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Aluminum	-	-	-	11,300	34,100	-
Arsenic	-	-	-	4.10	1.63	-
Cyanide (total)	-	-	-	nd	nd	-
Fluoride	-	-	-	128	70.8	-
Sulfate	-	-	-	751	48.4	-

mg/kg - milligrams per kilogram (dry)
MRL - Method Reporting Limit
nd* - Sample result for analyte was non-detectable. The reported number is one-half the MRL (mg/kg). Due to the range of sample dilution requirements, the detection limit may vary between sample analyses.
[1] "C" denotes Composite sample; "U1" denotes Underlying soil sample; "LE1" denotes Lateral Extent sample.
[2] PEF - Potency Equivalency Factors (WAC 173-340-900); potency equivalency factors (PEFs) for carcinogenic PAHs adopted by the California Environmental Protection Agency. Method A Industrial Cleanup Standard is the sum of the cPAHs after the PEF has been applied.
RL3 - Reporting limit raised due to high concentrations of non-target analytes.
RL7 - Sample required dilution due to high concentrations of target analyte.

TABLE 1. 2007 Goldendale NPDES Ponds Soil Sampling - PAH Dry Wt and Metals Analyses
Lockheed Martin Corporation, Goldendale, WA

Ditch and Pond C Delta

Sample ID / Date Collected	**Ditch - C** [1] 07/13/07 (mg/kg)	Lab Note RL7	**Ditch - LE1** 07/13/07 (mg/kg)	Lab Note RL7	**Pond C DL** [3] **- C** 07/13/07 (mg/kg)	Lab Note RL7	**Pond C DL - U1** 07/13/07 (mg/kg)	Lab Note RL3	**Pond C DL-LE1** 07/13/07 (mg/kg)	Lab Note RL3	**Cleanup Standard** (mg/kg)
Acenaphthene	28.4	nd* (56.8)	1.46	nd* (2.91)	147	nd* (293)	0.226	0.171	0.0353	nd*(0.0706)	-
Acenaphthylene	28.4	nd* (56.8)	1.46	nd* (2.91)	147	nd* (293)	0.086	nd* (0.171)	0.0353	nd*(0.0706)	-
Anthracene	28.4	nd* (56.8)	1.46	nd* (2.91)	326	293	0.564	0.171	0.0353	nd*(0.0706)	-
Benzo(a)anthracene	175	56.8	7.69	2.91	656	293	3.90	0.171	0.126	0.0706	-
Benzo(a)pyrene	232	56.8	10.50	2.91	504	293	2.02	0.171	0.289	0.0706	-
Benzo(b)fluoranthene	264	56.8	9.92	2.91	817	293	2.89	0.171	0.335	0.0706	-
Benzo(g,h,i)perylene	186	56.8	8.27	2.91	328	293	0.912	0.171	0.551	0.0706	-
Benzo(k)fluoranthene	181	56.8	8.89	2.91	590	293	2.11	0.171	0.240	0.0706	-
Chrysene	242	56.8	9.65	2.91	1,250	293	5.66	0.171	0.216	0.0706	-
Dibenzo(a,h)anthracene	28.4	nd* (56.8)	1.46	nd* (2.91)	147	nd* (293)	0.289	0.171	0.115	0.0706	-
Fluoranthene	287	56.8	13.20	2.91	2,810	293	15.70	1.71	0.164	0.0706	-
Fluorene	28.4	nd* (56.8)	1.46	nd* (2.91)	147	nd* (293)	0.558	0.171	0.0353	nd*(0.0706)	-
Indeno(1,2,3-cd)pyrene	158	56.8	7.19	2.91	147	nd* (293)	0.799	0.171	0.474	0.0706	-
Naphthalene	60.1	56.8	1.46	nd* (2.91)	147	nd* (293)	0.086	nd* (0.171)	0.0353	nd*(0.0706)	-
Phenanthrene	99.6	56.8	5.66	2.91	662	293	0.485	0.171	0.0353	nd*(0.0706)	-
Pyrene	229	56.8	10.60	2.91	2,670	293	11.70	1.71	0.138	0.0706	-
PAH Totals	2,256		100		11,492		48.0		2.9		-

PEF Calculations	PEF	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Benzo(a)anthracene	0.10	0.77	-	0.39	0.01	-
Benzo(a)pyrene	1.00	10.50	-	2.02	0.29	-
Benzo(b)fluoranthene	0.10	0.99	-	0.29	0.03	-
Benzo(k)fluoranthene	0.10	0.89	-	0.21	0.02	-
Chrysene	0.01	0.10	-	0.06	0.00	-
Dibenzo(a,h)anthracene	0.10	0.15	-	0.03	0.01	-
Indeno(1,2,3-cd)pyrene	0.10	0.72	-	0.08	0.05	-
PEF Totals [2]	-	14.1		3.08	0.42	2

Sample ID / Date Collected	**Ditch - C** 07/13/07 (mg/kg)	**Ditch - LE1** 07/13/07 (mg/kg)	**Pond C DL - C** 07/13/07 (mg/kg)	**Pond C DL - U1** 07/13/07 (mg/kg)	**Pond C DL - LE1** 07/13/07 (mg/kg)	**Cleanup Standard** (mg/kg)
Aluminum	47,200	-	-	12,300	-	-
Arsenic	8.83	-	-	3.29	-	-
Cyanide (total)	nd	-	-	nd	-	-
Fluoride	35.1	-	-	38.4	-	-
Sulfate	89.8	-	-	44.2	-	-

mg/kg - milligrams per kilogram (dry)
MRL - Method Reporting Limit

nd* - Sample result for analyte was non-detectable. The reported number is one-half the MRL (mg/kg). Due to the range of sample dilution requirements, the detection limit may vary between sample analyses.

[1] "C" denotes Composite sample; "U1" denotes Underlying soil sample; "LE1" denotes Lateral Extent sample.

[2] PEF - Potency Equivalency Factors (WAC 173-340-900); potency equivalency factors (PEFs) for carcinogenic PAHs adopted by the California Environmental Protection Agency. Method A Industrial Cleanup Standard is the sum of the cPAHs after the PEF has been applied.

[3] "DL" denotes Delta area.

RL3 - Reporting limit raised due to high concentrations of non-target analytes.

RL7 - Sample required dilution due to high concentrations of target analyte.

TABLE 1. 2007 Goldendale NPDES Ponds Soil Sampling - PAH Dry Wt and Metals Analyses
Lockheed Martin Corporation, Goldendale, WA

Pond C

Sample ID Date Collected	**Pond C - C** [1] 07/14/07 (mg/kg)	Lab Note RL7	**Pond C - U1** 07/14/07 (mg/kg)		**Pond C - U2** 07/14/07 (mg/kg)	Lab Note RL3	**Pond C - LE1** 07/14/07 (mg/kg)	Lab Note RL3	**Pond C - LE2** 07/14/07 (mg/kg)	Lab Note RL3	**Cleanup Standard** (mg/kg)
Acenaphthene	190	nd* (380)	0.0295	0.0153	0.0361	nd*(0.0721)	0.0336	nd*(0.0672)	0.0338	nd*(0.0676)	-
Acenaphthylene	190	nd* (380)	0.0077	nd*(0.0153)	0.0361	nd*(0.0721)	0.0336	nd*(0.0672)	0.0338	nd*(0.0676)	-
Anthracene	190	nd* (380)	0.217	0.0153	0.0361	nd*(0.0721)	0.0336	nd*(0.0672)	0.0338	nd*(0.0676)	-
Benzo(a)anthracene	972	380	0.053	0.0153	0.221	0.0721	0.117	0.0672	0.0933	0.0676	-
Benzo(a)pyrene	718	380	0.0178	0.0153	0.161	0.0721	0.187	0.0672	0.191	0.0676	-
Benzo(b)fluoranthene	1,290	380	0.0303	0.0153	0.385	0.0721	0.274	0.0672	0.353	0.0676	-
Benzo(g,h,i)perylene	513	380	0.0077	nd*(0.0153)	0.0925	0.0721	0.297	0.0672	0.336	0.0676	-
Benzo(k)fluoranthene	709	380	0.0176	0.0153	0.214	0.0721	0.177	0.0672	0.197	0.0676	-
Chrysene	1,810	380	0.0829	0.0153	0.456	0.0721	0.213	0.0672	0.229	0.0676	-
Dibenzo(a,h)anthracene	190	nd* (380)	0.0077	nd*(0.0153)	0.0361	nd*(0.0721)	0.0336	nd*(0.0672)	0.0338	nd*(0.0676)	-
Fluoranthene	5,510	380	4.00	0.307	0.570	0.0721	0.177	0.0672	0.130	0.0676	-
Fluorene	190	nd* (380)	0.0667	0.0153	0.0361	nd*(0.0721)	0.0336	nd*(0.0672)	0.0338	nd*(0.0676)	-
Indeno(1,2,3-cd)pyrene	423	380	0.0077	nd*(0.0153)	0.0832	0.0721	0.216	0.0672	0.260	0.0676	-
Naphthalene	190	nd* (380)	0.0077	nd*(0.0153)	0.0361	nd*(0.0721)	0.0336	nd*(0.0672)	0.0338	nd*(0.0676)	-
Phenanthrene	898	380	0.391	0.0153	0.0361	nd*(0.0721)	0.0811	0.0672	0.0338	nd*(0.0676)	-
Pyrene	4,120	380	2.82	0.307	0.487	0.0721	0.150	0.0672	0.114	0.0676	-
PAH Totals	18,103		7.76		2.92		2.09		2.14		-

PEF Calculations	PEF	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Benzo(a)anthracene	0.10	0.01	0.02	0.01	0.01	-
Benzo(a)pyrene	1.00	0.02	0.16	0.19	0.19	-
Benzo(b)fluoranthene	0.10	0.00	0.04	0.03	0.04	-
Benzo(k)fluoranthene	0.10	0.00	0.02	0.02	0.02	-
Chrysene	0.01	0.00	0.00	0.00	0.00	-
Dibenzo(a,h)anthracene	0.10	0.00	0.00	0.00	0.00	-
Indeno(1,2,3-cd)pyrene	0.10	0.00	0.01	0.02	0.03	-
PEF Totals [2]	-	0.03	0.26	0.27	0.29	2

Sample ID Date Collected	**Pond C - C** 07/14/07 (mg/kg)	**Pond C - U1** 07/14/07 (mg/kg)	**Pond C - U2** 07/14/07 (mg/kg)	**Pond C - LE1** 07/14/07 (mg/kg)	**Pond C - LE2** 07/14/07 (mg/kg)	**Cleanup Standard** (mg/kg)
Aluminum	155,000	-	-	-	-	-
Arsenic	29.8	-	-	-	-	-
Cyanide (total)	nd	-	-	-	-	-
Fluoride	488	-	-	-	-	-
Sulfate	1130	-	-	-	-	-

mg/kg - milligrams per kilogram (dry)
MRL - Method Reporting Limit
nd* - Sample result for analyte was non-detectable. The reported number is one-half the MRL (mg/kg). Due to the range of sample dilution requirements, the detection limit may vary between sample analyses.
[1] "C" denotes Composite sample; "U1" denotes Underlying soil sample; "LE1" denotes Lateral Extent sample.
[2] PEF - Potency Equivalency Factors (WAC 173-340-900); potency equivalency factors (PEFs) for carcinogenic PAHs adopted by the California Environmental Protection Agency. Method A Industrial Cleanup Standard is the sum of the cPAHs after the PEF has been applied.
RL3 - Reporting limit raised due to high concentrations of non-target analytes.
RL7 - Sample required dilution due to high concentrations of target analyte.

TABLE 1. 2007 Goldendale NPDES Ponds Soil Sampling - PAH Dry Wt and Metals Analyses
Lockheed Martin Corporation, Goldendale, WA

Pond D

Sample ID / Date Collected	Pond D - C [1] 07/14/07 (mg/kg)	Lab Note RL7	Pond D - U1 07/14/07 (mg/kg)	Lab Note RL3	Pond D - U2 07/14/07 (mg/kg)	Lab Note RL3	Pond D - LE1 07/14/07 (mg/kg)	Lab Note RL3	Cleanup Standard (mg/kg)
Acenaphthene	189	nd* (377)	0.0326	nd*(0.0651)	0.083	nd* (0.166)	0.136	nd* (0.272)	-
Acenaphthylene	189	nd* (377)	0.0326	nd*(0.0651)	0.083	nd* (0.166	0.136	nd* (0.272)	-
Anthracene	189	nd* (377)	0.0326	nd*(0.0651)	0.083	nd* (0.166	0.136	nd* (0.272)	-
Benzo(a)anthracene	189	nd* (377)	0.122	0.0651	0.083	nd* (0.166	0.136	nd* (0.272)	-
Benzo(a)pyrene	407	377	0.101	0.0651	0.269	0.166	0.363	0.272	-
Benzo(b)fluoranthene	844	377	0.192	0.0651	0.568	0.166	0.377	0.272	-
Benzo(g,h,i)perylene	385	377	0.0789	0.0651	0.243	0.166	0.326	0.272	-
Benzo(k)fluoranthene	189	nd* (377)	0.101	0.0651	0.266	0.166	0.280	0.272	-
Chrysene	603	377	0.236	0.0651	0.459	0.166	0.327	0.272	-
Dibenzo(a,h)anthracene	189	nd* (377)	0.0326	nd*(0.0651)	0.083	nd* (0.166	0.136	nd* (0.272)	-
Fluoranthene	728	377	0.448	0.0651	2.23	0.166	0.376	0.272	-
Fluorene	189	nd* (377)	0.0326	nd*(0.0651)	0.083	nd* (0.166	0.136	nd* (0.272)	-
Indeno(1,2,3-cd)pyrene	189	nd* (377)	0.0326	nd*(0.0651)	0.209	0.166	0.281	0.272	-
Naphthalene	189	nd* (377)	0.0326	nd*(0.0651)	0.083	nd* (0.166	0.136	nd* (0.272)	-
Phenanthrene	189	nd* (377)	0.0326	nd*(0.0651)	0.083	nd* (0.166	0.136	nd* (0.272)	-
Pyrene	424	377	0.247	0.0651	1.23	0.166	0.331	0.272	-
PAH Totals	5,276		1.79		6.14		3.75		-

PEF Calculations	PEF	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Benzo(a)anthracene	0.10	0.01	0.01	0.01	-
Benzo(a)pyrene	1.00	0.10	0.27	0.36	-
Benzo(b)fluoranthene	0.10	0.02	0.06	0.04	-
Benzo(k)fluoranthene	0.10	0.01	0.03	0.03	-
Chrysene	0.01	0.00	0.00	0.00	-
Dibenzo(a,h)anthracene	0.10	0.00	0.01	0.01	-
Indeno(1,2,3-cd)pyrene	0.10	0.00	0.02	0.03	-
PEF Totals [2]	-	0.15	0.39	0.49	2

Sample ID / Date Collected	Pond D - C 07/14/07 (mg/kg)	Pond D - U1 07/14/07 (mg/kg)	Pond D - U2 07/14/07 (mg/kg)	Pond D - LE1 07/14/07 (mg/kg)	Cleanup Standard (mg/kg)
Aluminum	-	-	-	10,300	-
Arsenic	-	-	-	4.01	-
Cyanide (total)	-	-	-	nd	-
Fluoride	-	-	-	nd	-
Sulfate	-	-	-	673	-

mg/kg - milligrams per kilogram (dry)
MRL - Method Reporting Limit
nd* - Sample result for analyte was non-detectable. The reported number is one-half the MRL (mg/kg). Due to the range of sample dilution requirements, the detection limit may vary between sample analyses.
[1] "C" denotes Composite sample; "U1" denotes Underlying soil sample; "LE1" denotes Lateral Extent sample.
[2] PEF - Potency Equivalency Factors (WAC 173-340-900); potency equivalency factors (PEFs) for carcinogenic PAHs adopted by the California Environmental Protection Agency. Method A Industrial Cleanup Standard is the sum of the cPAHs after the PEF has been applied.
RL3 - Reporting limit raised due to high concentrations of non-target analytes.
RL7 - Sample required dilution due to high concentrations of target analyte.

TABLE 1a. 2008 Goldendale NPDES Ponds Soil Sampling - PAH Dry Wt Analyses

	Pond A Sludge and Underlying Soils						Ditch Lateral Extent		
Sample ID	**Pond A - C** [1] **BC-5. 0-11 ft.** [1a]		**Pond A - U** [1] **BC-5. 12 ft.** [1a]		**Pond A - U** [1] **BC-5. 13.5 ft.** [1a]		**Ditch - LE** [1]		**Cleanup Standard**
Date Collected	05/07/08 (mg/kg)	MRL (mg/kg)	05/07/08 (mg/kg)	MRL (mg/kg)	05/07/08 (mg/kg)	MRL	06/10/08 (mg/kg)	MRL (mg/kg)	(mg/kg)
Acenaphthene	16	nd*(31.4)	0.083	nd*(0.165)	0.083	nd*(0.165)	0.035	nd*(0.0699)	-
Acenaphthylene	48	31.4	0.083	nd*(0.165)	0.083	nd*(0.165)	0.035	nd*(0.0699)	-
Anthracene	127	31.4	0.083	nd*(0.165)	0.083	nd*(0.165)	0.035	nd*(0.0699)	-
Benzo(a)anthracene	612	31.4	0.246	0.165	0.783	0.165	0.119	0.0699	-
Benzo(a)pyrene	607	31.4	0.233	0.165	0.763	0.165	0.173	0.0699	-
Benzo(b)fluoranthene	1330	31.4	0.571	0.165	1.62	0.165	0.232	0.0699	-
Benzo(g,h,i)perylene	515	31.4	0.243	0.165	0.683	0.165	0.194	0.0699	-
Benzo(k)fluoranthene	432	31.4	0.204	0.165	0.495	0.165	0.150	0.0699	-
Chrysene	1420	31.4	0.661	0.165	1.92	0.165	0.184	0.0699	-
Dibenzo(a,h)anthracene	143	31.4	0.083	nd*(0.165)	0.083	nd*(0.165)	0.035	nd*(0.0699)	-
Fluoranthene	2040	314	0.868	0.165	2.78	0.165	0.176	0.0699	-
Fluorene	68	31.4	0.083	nd*(0.165)	0.083	nd*(0.165)	0.035	nd*(0.0699)	-
Indeno(1,2,3-cd)pyrene	392	31.4	0.189	0.165	0.517	0.165	0.162	0.0699	-
Naphthalene	16	nd*(31.4)	0.083	nd*(0.165)	0.083	nd*(0.165)	0.035	nd*(0.0699)	-
Phenanthrene	1130	31.4	0.335	0.165	1.4	0.165	0.035	nd*(0.0699)	-
Pyrene	1590	314	0.736	0.165	2.27	0.165	0.170	0.0699	-
PAH Totals	10,485	Lab RL7 [2]	4.8	Lab RL7 [2]	13.7	Lab RL7 [2]	1.8	Lab RL7 [2]	-

PEF Calculations	PEF [3]	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Benzo(a)anthracene	0.10	0.02	0.08	0.01	-
Benzo(a)pyrene	1.00	0.23	0.76	0.17	-
Benzo(b)fluoranthene	0.10	0.06	0.16	0.02	-
Benzo(k)fluoranthene	0.10	0.02	0.05	0.02	-
Chrysene	0.01	0.01	0.02	0.00	-
Dibenzo(a,h)anthracene	0.10	0.01	0.01	0.00	-
Indeno(1,2,3-cd)pyrene	0.10	0.02	0.05	0.02	-
PEF Totals [3]	-	0.37	1.13	0.2	2

mg/kg - milligrams per kilogram

MRL - Method Reporting Limit

nd* - Sample result for analyte was non-detectable. The reported number is one-half the MRL (mg/kg). Due to the range of sample dilution requirements, the detection limit may vary between sample analyses.

[1] "C" denotes Composite sample of sludge; "U" denotes Underlying soil sample; "LE" denotes Lateral Extent sample.

[1a] BC-5 is grid point midway between grid lines B and C on the 5 line. Range of depths specifies total depth of composite, single depth specifies depth from which discrete sample collected.

[2] RL7 - Sample required dilution due to high concentrations of target analyte.

[3] PEF - Potency Equivalency Factors (WAC 173-340-900); potency equivalency factors (PEFs) for carcinogenic PAHs adopted by the California Environmental Protection Agency. Method C Industrial Cleanup Standard is the sum of the cPAHs after the PEF has been applied.

TABLE 1a. 2008 Goldendale NPDES Ponds Soil Sampling - PAH Dry Wt Analyses

Pond B Sludge and Underlying Soils

Sample ID / Date Collected	**Pond B - C** [1] **B10. 0-6 ft.** [1a] 05/07/08 (mg/kg)	MRL (mg/kg)	**Pond B - U** [1] **B9. 8 ft.** [1a] 05/07/08 (mg/kg)	MRL	**Pond B - U** [1] **C11. 6 ft.** [1a] 05/07/08 (mg/kg)	MRL (mg/kg)	**Pond B - U** [1] **C11. 8 ft.** [1a] 05/07/08 (mg/kg)	MRL (mg/kg)	**Cleanup Standard** (mg/kg)
Acenaphthene	13.2	nd*(26.4)	0.0084	nd*(0.0167)	0.00825	nd*(0.0165)	0.0089	nd*(0.0178)	-
Acenaphthylene	13.2	nd*(26.4)	0.0084	nd*(0.0167)	0.00825	nd*(0.0165)	0.0089	nd*(0.0178)	-
Anthracene	84.3	26.4	0.0084	nd*(0.0167)	0.00825	nd*(0.0165)	0.0089	nd*(0.0178)	-
Benzo(a)anthracene	553	264	0.0379	0.0167	0.0534	0.0165	0.0398	0.0178	-
Benzo(a)pyrene	372	26.4	0.0327	0.0167	0.0392	0.0165	0.0309	0.0178	-
Benzo(b)fluoranthene	772	26.4	0.0687	0.0167	0.0995	0.0165	0.0909	0.0178	-
Benzo(g,h,i)perylene	263	26.4	0.0281	0.0167	0.0357	0.0165	0.0308	0.0178	-
Benzo(k)fluoranthene	305	26.4	0.0278	0.0167	0.0364	0.0165	0.0261	0.0178	-
Chrysene	1230	264	0.103	0.0167	0.1520	0.0165	0.1220	0.0178	-
Dibenzo(a,h)anthracene	84.6	26.4	0.0084	nd*(0.0167)	0.00825	nd*(0.0165)	0.0089	nd*(0.0178)	-
Fluoranthene	3340	264	0.103	0.0167	0.2040	0.0165	0.1200	0.0178	-
Fluorene	44.4	26.4	0.0084	nd*(0.0167)	0.00825	nd*(0.0165)	0.0089	nd*(0.0178)	-
Indeno(1,2,3-cd)pyrene	204	26.4	0.0214	0.0167	0.0286	0.0165	0.0245	0.0178	-
Naphthalene	13.2	nd*(26.4)	0.0084	nd*(0.0167)	0.00825	nd*(0.0165)	0.0089	nd*(0.0178)	-
Phenanthrene	623	26.4	0.0789	0.0167	0.0235	0.0165	0.0089	nd*(0.0178)	-
Pyrene	2230	264	0.12	0.0167	0.1680	0.0165	0.1040	0.0178	-
PAH Totals	10,145	Lab RL7 [2]	0.672		0.890		0.651		-
PEF Calculations	PEF [3]		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)
Benzo(a)anthracene	0.10		0.00		0.01		0.00		-
Benzo(a)pyrene	1.00		0.03		0.04		0.03		-
Benzo(b)fluoranthene	0.10		0.01		0.01		0.01		-
Benzo(k)fluoranthene	0.10		0.00		0.00		0.00		-
Chrysene	0.01		0.00		0.00		0.00		-
Dibenzo(a,h)anthracene	0.10		0.00		0.00		0.00		-
Indeno(1,2,3-cd)pyrene	0.10		0.00		0.00		0.00		-
PEF Totals [3]	-		0.05		0.06		0.05		2

mg/kg - milligrams per kilogram
MRL - Method Reporting Limit
nd* - Sample result for analyte was non-detectable. The reported number is one-half the MRL (mg/kg). Due to the range of sample dilution requirements, the detection limit may vary between sample analyses.

[1] "C" denotes Composite sample of sludge; "U" denotes Underlying soil sample; "LE" denotes Lateral Extent sample.

[1a] B10 is grid point. Range of depths specifies total depth of composite, single depth specifies depth from which discrete sample collected.

[2] RL7 - Sample required dilution due to high concentrations of target analyte.

[3] PEF - Potency Equivalency Factors (WAC 173-340-900); potency equivalency factors (PEFs) for carcinogenic PAHs adopted by the California Environmental Protection Agency. Method C Industrial Cleanup Standard is the sum of the cPAHs after the PEF has been applied.

TABLE 1a. 2008 Goldendale NPDES Ponds Soil Sampling - PAH Dry Wt Analyses

Pond B Lateral Extent Samples

Sample ID / Date Collected	Pond B - LE [1] A11 + 15 ft. 0-6 in. [1a] 06/10/08 (mg/kg)	MRL (mg/kg)	Pond B - LE [1] F12 + 17.5 ft. 0-6 in. [1a] 06/10/08 (mg/kg)	MRL (mg/kg)	Pond B - LE [1] F7 + 22.5 ft. 0-6 in. [1a] 06/10/08 (mg/kg)	MRL (mg/kg)	Cleanup Standard (mg/kg)
Acenaphthene	0.725	nd*(1.450)	0.351	nd*(0.701)	0.710	nd*(1.420)	-
Acenaphthylene	0.725	nd*(1.450)	0.351	nd*(0.701)	0.710	nd*(1.420)	-
Anthracene	0.725	nd*(1.450)	0.351	nd*(0.701)	0.710	nd*(1.420)	-
Benzo(a)anthracene	4.94	1.45	1.85	0.701	6.05	13.4	-
Benzo(a)pyrene	6.45	1.45	2.23	0.701	7.97	13.4	-
Benzo(b)fluoranthene	6.91	1.45	2.27	0.701	9.15	13.4	-
Benzo(g,h,i)perylene	4.75	1.45	1.50	0.701	6.26	13.4	-
Benzo(k)fluoranthene	5.57	1.45	1.89	0.701	6.59	13.4	-
Chrysene	5.90	1.45	1.96	0.701	7.33	13.4	-
Dibenzo(a,h)anthracene	0.725	nd*(1.450)	0.351	nd*(0.701)	1.78	13.4	-
Fluoranthene	7.15	1.45	2.76	0.701	8.50	13.4	-
Fluorene	0.725	nd*(1.450)	0.351	nd*(0.701)	0.710	nd*(1.420)	-
Indeno(1,2,3-cd)pyrene	4.37	1.45	1.45	0.701	5.74	13.4	-
Naphthalene	0.725	nd*(1.450)	0.351	nd*(0.701)	0.710	nd*(1.420)	-
Phenanthrene	3.12	1.45	1.41	0.701	3.22	13.4	-
Pyrene	6.94	1.45	2.68	0.701	8.56	13.4	-
PAH Totals	60.5	Lab RL7 [2]	22.1	Lab RL7 [2]	74.7	Lab RL7 [2]	-

PEF Calculations	PEF [3]	(mg/kg)	(mg/kg)	(mg/kg)
Benzo(a)anthracene	0.49	0.19	0.61	-
Benzo(a)pyrene	6.45	2.23	7.97	-
Benzo(b)fluoranthene	0.69	0.23	0.92	-
Benzo(k)fluoranthene	0.56	0.19	0.66	-
Chrysene	0.06	0.02	0.07	-
Dibenzo(a,h)anthracene	0.07	0.04	0.18	-
Indeno(1,2,3-cd)pyrene	0.44	0.15	0.57	-
PEF Totals [3]	8.76	3.03	11.0	2

mg/kg - milligrams per kilogram

MRL - Method Reporting Limit

nd* - Sample result for analyte was non-detectable. The reported number is one-half the MRL (mg/kg). Due to the range of sample dilution requirements, the detection limit may vary between sample analyses.

[1] "C" denotes Composite sample of sludge; "U" denotes Underlying soil sample; "LE" denotes Lateral Extent sample.

[1a] A11 is grid point; plus 15 ft is distance beyond that point on A line. Range of depths specifies total depth of composite, single depth specifies depth from which discrete sample collected.

[2] RL7 - Sample required dilution due to high concentrations of target analyte.

[3] PEF - Potency Equivalency Factors (WAC 173-340-900); potency equivalency factors (PEFs) for carcinogenic PAHs adopted by the California Environmental Protection Agency. Method C Industrial Cleanup Standard is the sum of the cPAHs after the PEF has been applied.

TABLE 1a. 2008 Goldendale NPDES Ponds Soil Sampling - PAH Dry Wt Analyses

Pond C Delta and Underlying Soils

Sample ID	**Pond C-DL - C** [1]		**Pond C-DL - U** [1]		**Pond C-DL - U** [1]		**Cleanup Standard**
	E4-5. 0-11 ft [1a]		**E4-5. 11.5 ft** [1a]		**E4-5. 12.5 ft** [1a]		
Date Collected	05/07/08	MRL	05/07/08	MRL	05/07/08	MRL	
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Acenaphthene	12.5	nd*(25)	0.0775	nd*(0.155)	0.00775	nd*(0.0155)	-
Acenaphthylene	12.5	nd*(25)	0.0775	nd*(0.155)	0.00775	nd*(0.0155)	-
Anthracene	116	0.0155	0.592	0.155	0.00775	nd*(0.0155)	-
Benzo(a)anthracene	477	25	1.37	0.155	0.0533	0.0155	-
Benzo(a)pyrene	382	25	0.801	0.155	0.0449	0.0155	-
Benzo(b)fluoranthene	566	25	1.19	0.155	0.0642	0.0155	-
Benzo(g,h,i)perylene	269	25	0.547	0.155	0.0346	0.0155	-
Benzo(k)fluoranthene	270	25	0.634	0.155	0.0309	0.0155	-
Chrysene	814	25	2.19	0.155	0.0851	0.0155	-
Dibenzo(a,h)anthracene	79.9	25	0.156	0.155	0.00775	nd*(0.0155)	-
Fluoranthene	2160	**250**	6.91	0.155	0.305	0.0155	-
Fluorene	12.5	nd*(25)	0.0775	nd*(0.155)	0.00775	nd*(0.0155)	-
Indeno(1,2,3-cd)pyrene	227	25	0.469	0.155	0.0296	0.0155	-
Naphthalene	12.5	nd*(25)	0.0775	nd*(0.155)	0.00775	nd*(0.0155)	-
Phenanthrene	310	25	1.11	0.155	0.0328	0.0155	-
Pyrene	1470	**250**	4.99	0.155	0.205	0.0155	-
PAH Totals	7,191	Lab RL7 [2]	21.27	Lab RL7 [2]	0.9		-

PEF Calculations	PEF [3]	(mg/kg)	(mg/kg)	(mg/kg)
Benzo(a)anthracene	0.10	0.14	0.01	-
Benzo(a)pyrene	1.00	0.80	0.04	-
Benzo(b)fluoranthene	0.10	0.12	0.01	-
Benzo(k)fluoranthene	0.10	0.06	0.00	-
Chrysene	0.01	0.02	0.00	-
Dibenzo(a,h)anthracene	0.10	0.02	0.00	-
Indeno(1,2,3-cd)pyrene	0.10	0.05	0.00	-
PEF Totals [3]	-	1.20	0.06	2

mg/kg - milligrams per kilogram

MRL - Method Reporting Limit

nd* - Sample result for analyte was non-detectable. The reported number is one-half the MRL (mg/kg). Due to the range of sample dilution requirements, the detection limit may vary between sample analyses.

[1] "DL" denotes Delta area upper end of Pond C. "C" denotes Composite sample of sludge; "U" denotes Underlying soil sample; "LE" denotes Lateral Extent sample.

[1a] E4-5 is grid point midway between grid lines 4 and 5 on the E line. Range of depths specifies total depth of composite, single depth specifies depth from which discrete sample collected.

[2] RL7 - Sample required dilution due to high concentrations of target analyte.

[3] PEF - Potency Equivalency Factors (WAC 173-340-900); potency equivalency factors (PEFs) for carcinogenic PAHs adopted by the California Environmental Protection Agency.
Method C Industrial Cleanup Standard is the sum of the cPAHs after the PEF has been applied.

TABLE 1a. 2008 Goldendale NPDES Ponds Soil Sampling - PAH Dry Wt Analyses

	Pond C Sludge and Lateral Extent Soils				Pond D Sludge		
Sample ID	**Pond C - C** [1] **L3. 0-3 ft.** [1a]		**Pond C - LE** [1] **H2 + 8.5 ft. 0-6 in.** [1a]		**Pond D - C** [1] **O5. 0-2 ft.** [1a]		**Cleanup Standard**
Date Collected	05/08/08	MRL	06/10/08	MRL	05/08/08	MRL	
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Acenaphthene	14.6	nd*(29.2)	0.0690	nd*(0.138)	10.2	nd*(20.3)	-
Acenaphthylene	14.6	nd*(29.2)	0.0690	nd*(0.138)	10.2	nd*(20.3)	-
Anthracene	111	29.2	0.0690	nd*(0.138)	10.2	nd*(20.3)	-
Benzo(a)anthracene	838	292	0.459	0.138	71	20.3	-
Benzo(a)pyrene	524	29.2	0.613	0.138	135	20.3	-
Benzo(b)fluoranthene	913	29.2	0.712	0.138	262	20.3	-
Benzo(g,h,i)perylene	333	29.2	0.477	0.138	161	20.3	-
Benzo(k)fluoranthene	431	29.2	0.514	0.138	84.6	20.3	-
Chrysene	1540	292	0.554	0.138	210	20.3	-
Dibenzo(a,h)anthracene	115	29.2	0.0690	nd*(0.138)	45.6	20.3	-
Fluoranthene	3990	292	0.658	0.138	91	20.3	-
Fluorene	14.6	nd*(29.2)	0.0690	nd*(0.138)	10.2	nd*(20.3)	-
Indeno(1,2,3-cd)pyrene	273	29.2	0.435	0.138	128.0	20.3	-
Naphthalene	14.6	nd*(29.2)	0.0690	nd*(0.138)	10.2	nd*(20.3)	-
Phenanthrene	312	29.2	0.278	0.138	10.2	nd*(20.3)	-
Pyrene	2320	292	0.677	0.138	57.9	20.3	-
PAH Totals	11,758	Lab RL7 [2]	5.8	Lab RL7 [2]	1,307	Lab RL7 [2]	-

PEF Calculations	PEF [3]	(mg/kg)		(mg/kg)
Benzo(a)anthracene	0.10	0.05		-
Benzo(a)pyrene	1.00	0.61		-
Benzo(b)fluoranthene	0.10	0.07		-
Benzo(k)fluoranthene	0.10	0.05		-
Chrysene	0.01	0.01		-
Dibenzo(a,h)anthracene	0.10	0.01		-
Indeno(1,2,3-cd)pyrene	0.10	0.04		-
PEF Totals [2]	-	0.84	-	2

mg/kg - milligrams per kilogram

MRL - Method Reporting Limit

nd* - Sample result for analyte was non-detectable. The reported number is one-half the MRL (mg/kg). Due to the range of sample dilution requirements, the detection limit may vary between sample analyses.

[1] "C" denotes Composite sample of sludge; "U" denotes Underlying soil sample; "LE" denotes Lateral Extent sample.

[1a] L3 is grid point. Range of depths specifies total depth of composite, single depth specifies depth from which discrete sample collected.

[2] RL7 - Sample required dilution due to high concentrations of target analyte.

[3] PEF - Potency Equivalency Factors (WAC 173-340-900); potency equivalency factors (PEFs) for carcinogenic PAHs adopted by the California Environmental Protection Agency. Method C Industrial Cleanup Standard is the sum of the cPAHs after the PEF has been applied.

TABLE 2. 2008 Goldendale NPDES Ponds Water Sampling and Dewatering Information

Pond C Delta Piezometer Water Sample — **Pumping Rates Up To:** '

Sample ID / Date Collected	Pond C-Delta E4-5. Piezo [1a] 05/07/08 (mg/L)	MRL	NPDES Permit Effluent Limits Monthly Avg (lbs/day)	Daily Max (lbs/day)	Monthly Avg 130,000 gal per day lbs/day	Daily Max 260,000 gal per day lbs/day
Aluminum	4.07	0.500	18	40	4.4	8.8
Antimony	0.005	nd (0.01)	5.6	12.6	0.01	0.01
Arsenic (total)	0.005	nd (0.01)	NA	NA	0.01	0.01
Nickel	0.112	0.020	2.4	3.6	0.12	0.24
Fluoride	22.2	5.00	160	350	24	48
TSS	65.7	2.86	103	411	71	143
Benzo(a)pyrene	0.0448	0.0125	0.05	0.1	0.05	0.10
	Limiting Factor this sample:		Monthly Avg - TSS			
			Daily Max - TSS			

Pond C Surface Water Sample — **Pumping Rates Up To:** [1]

Sample ID / Date Collected	Pond C L3, SW [1a] 05/07/08 (mg/L)	MRL	NPDES Permit Effluent Limits Monthly Avg (lbs/day)	Daily Max (lbs/day)	Monthly Avg 550,000 gal per day lbs/day	Daily Max 2,200,000 gal per day lbs/day
Aluminum	1.1	0.050	18	40	5.0	20.2
Antimony	0.0005	nd (0.001)	5.6	12.6	0.0	0.0
Arsenic (total)	0.00238	0.001	NA	NA	0.0	0.0
Nickel	0.0131	0.002	2.4	3.6	0.1	0.2
Fluoride	5.04	0.500	160	350	23	92
TSS	22.0	2.00	103	411	101	403
Benzo(a)pyrene	0.00284	0.000485	0.05	0.1	0.01	0.05
	Limiting Factor this sample:		Monthly Avg - TSS			
			Daily Max - TSS			

Pond D Surface Water Sample — **Pumping Rates Up To:** [1]

Sample ID / Date Collected	D O5, SW [1a] 06/10/08 (mg/L)	MRL	NPDES Permit Effluent Limits Monthly Avg (lbs/day)	Daily Max (lbs/day)	Monthly Avg 1,900,000 gal per day lbs/day	Daily Max 4,200,000 gal per day lbs/day
Aluminum	0.135	0.005	18	40	2.1	4.7
Antimony	0.001	nd (0.001)	5.6	12.6	0.0	0.0
Arsenic (total)	0.00230	0.001	NA	NA	0.0	0.1
Nickel	0.0197	0.001	2.4	3.6	0.3	0.7
Fluoride	9.98	0.500	160	350	158	349
TSS	4.0	2.00	103	411	63	140
Benzo(a)pyrene	0.000173	0.000133	0.05	0.1	0.00	0.01
	Limiting Factor this sample:		Monthly Avg - Fluoride			
			Daily Max - Fluoride			

mg/L - milligrams per leter
MRL - Method Reporting Limit
nd* - Sample result for analyte was non-detectable. The reported number is one-half the MRL (mg/kg).
[1] Pumping rates are maximum rates of water that can be discharged per day with water analysis shown.
[1a] L# is grid point, E4-5 is grid point midway between grid lines 4 and 5 on the E line. Piezo is water sample from piezometer installed in the sludge, SW is a Surface Water sample.
[2] RL7 - Sample required dilution due to high concentrations of target analyte.

Example of estimated (approximate) dewatering pump rate:		
	200	gallons per minute
	12	hours pumping
	144,000	gallons pumped per day

TABLE 2. 2008 Goldendale NPDES Ponds Water Sampling and Dewatering Information

Pond C Delta Piezometer Water Sample — **Pumping Rates Up To: '**

Sample ID / Date Collected	**Pond C-Delta E4-5. Piezo** [1a] 05/07/08 (mg/L)	MRL	**NPDES Permit Effluent Limits** Monthly Avg (lbs/day)	Daily Max (lbs/day)	Monthly Avg **130,000** gal per day **lbs/day**	Daily Max **260,000** gal per day **lbs/day**
Aluminum	4.07	0.500	18	40	4.4	8.8
Antimony	0.005	nd (0.01)	5.6	12.6	0.01	0.01
Arsenic (total)	0.005	nd (0.01)	NA	NA	0.01	0.01
Nickel	0.112	0.020	2.4	3.6	0.12	0.24
Fluoride	22.2	5.00	160	350	24	48
TSS	65.7	2.86	103	411	71	143
Benzo(a)pyrene	0.0448	0.0125	0.05	0.1	0.05	0.10
	Limiting Factor this sample:			Monthly Avg - BaP Daily Max - BaP		

Pond C Surface Water Sample — **Pumping Rates Up To:** [1]

Sample ID / Date Collected	**Pond C L3, SW** [1a] 05/07/08 (mg/L)	MRL	**NPDES Permit Effluent Limits** Monthly Avg (lbs/day)	Daily Max (lbs/day)	Monthly Avg **550,000** gal per day **lbs/day**	Daily Max **2,200,000** gal per day **lbs/day**
Aluminum	1.1	0.050	18	40	5.0	20.2
Antimony	0.0005	nd (0.001)	5.6	12.6	0.0	0.0
Arsenic (total)	0.00238	0.001	NA	NA	0.0	0.0
Nickel	0.0131	0.002	2.4	3.6	0.1	0.2
Fluoride	5.04	0.500	160	350	23	92
TSS	22.0	2.00	103	411	101	403
Benzo(a)pyrene	0.00284	0.000485	0.05	0.1	0.01	0.05
	Limiting Factor this sample:			Monthly Avg - TSS Daily Max - TSS		

Pond D Surface Water Sample — **Pumping Rates Up To:** [1]

Sample ID / Date Collected	**D O5, SW** [1a] 06/10/08 (mg/L)	MRL	**NPDES Permit Effluent Limits** Monthly Avg (lbs/day)	Daily Max (lbs/day)	Monthly Avg **1,900,000** gal per day **lbs/day**	Daily Max **4,200,000** gal per day **lbs/day**
Aluminum	0.135	0.005	18	40	2.1	4.7
Antimony	0.001	nd (0.001)	5.6	12.6	0.0	0.0
Arsenic (total)	0.00230	0.001	NA	NA	0.0	0.1
Nickel	0.0197	0.001	2.4	3.6	0.3	0.7
Fluoride	9.98	0.500	160	350	158	349
TSS	4.0	2.00	103	411	63	140
Benzo(a)pyrene	0.000173	0.000133	0.05	0.1	0.00	0.01
	Limiting Factor this sample:			Monthly Avg - Fluoride Daily Max - Fluoride		

mg/L - milligrams per leter
MRL - Method Reporting Limit
nd* - Sample result for analyte was non-detectable. The reported number is one-half the MRL (mg/kg).
[1] Pumping rates are maximum rates of water that can be discharged per day with water analysis shown.
[1a] L# is grid point, E4-5 is grid point midway between grid lines 4 and 5 on the E line. Piezo is water sample from piezometer installed in the sludge, SW is a Surface Water sample.
[2] RL7 - Sample required dilution due to high concentrations of target analyte.

Example of estimated (approximate) dewatering pump rate:	200	gallons per minute
	12	hours pumping
	144,000	gallons pumped per day

Rev 7/21/08 (had TSS both)

Table 3. NPDES Pond Removal Areas, Volumes and PAH Summary
NPDES Ponds - Comparison of July 2007 and May 2008 Data
Lockheed Martin Corporation, Goldendale, Washington

Volume Estimates		**2007**						**2008**						**Sample Analytical: Composite Sample Results**	
Area	Area (ft^2)	Sludge Volume [3] (cy)	Volume + 6 inches [4] (cy)	Add [5] 10% (cy)	Volume per Pond (cy)	Total Tonnage [6] (ton)	Tonnage per Pond (ton)	Sludge Volume [3] (cy)	Volume + 6 inches [4] (cy)	Add [5] 10% (cy)	**Volume per Pond (cy)**	Total Tonnage [6] (ton)	**Tonnage per Pond (ton)**	**2007** PAHs (mg/kg)	**2008** PAHs (mg/kg)
Pond A	30,614	5,673	6,149	6,764	7,085	9,469	9,918	4,139	4,428	4,871	**5,192**	6,820	**7,269**	1,264	4,434
A North [1]	4,484	-	83	91		128			83	91		128		-	-
A-B W&S [1]	11,255	-	208	229		321			208	229		321		-	-
Pond B	62,921	7,353	8,194	9,013	9,095	12,619	12,732	9,555	10,653	11,719	**11,800**	16,406	**16,520**	5,499	5,129
B-East [1]	3,983	-	74	81		114			74	81		114		-	-
Ditch	3,020	224	280	560	560	784	784	453	509	560	**560**	784	**784**	1,329	-
C-Delta [2]	15,185	-	-	-	-	-	-			-	**-**	-	**-**	6,578	3,830
Pond C	78,732	14,576	16,301	17,931	18,245	25,104	25,543	15,266	16,896	18,586	**18,900**	26,020	**26,459**	7,987	5,372
C North [1]	9,811	-	182	200		280			182	200		280		-	-
C South [1]	5,592	-	104	114		159			104	114		159		-	-
Pond D	78,374	5,725	7,218	7,940	8,095	11,116	11,333	5,835	6,798	7,477	**7,633**	10,468	**10,686**	3,745	852
D North [1]	5,068	-	94	103		145			94	103		145		-	-
D South [1]	2,555	-	47	52		73			47	52		73		-	-
Area	311,594	ft^2				2007 Estimates						**2008 Estimates**			
	7.2	acres				43,079 cy						**44,084 cy**			
						60,311 tons						**61,717 tons**			

Note: During 2008, additional sampling and an independent calculation of pond volumes were conducted to confirm or revise estimates of sludge volumes. 2007 investigation values were confirmed for the selected remedial closure alternative.

Note: Sample collection during 2007 was a multiple point composite collected from the median depth of sludge. 2008 sample collection was a single point, full profile composite.

Note: The 2008 Pond D sample was collected from an area inundated in water and may not be representative of actual PAH concentrations.

[1] See Figures 2 and 3. A thin layer of sludge extends out from the pond perimeters in a several locations. Because of the rocky soil, excavation is estimated at 0.5 feet for all extended perimeter areas.

[2] The delta area of Pond C was separated out for purposed of the site characterization. Excavation volumes are combined with Pond C proper.

[3] Base volume of sludge (field and survey data).

[4] Excavation volume of ponds when adding 6 inches to depth of sludge (minimum cut of excavator for underlying gravel and rock).

[5] Anticipated additional volume due to irregularities in sludge depths and terrain.

[6] Density tests of the sludge reveal a conversion factor of 1.2 tons per cy for the in place material (NPDES Ponds Investigation Report and Alternatives Analysis, Jan-08); however, a factor of 1.4 tons per cubic yard has been applied.

LOCKHEED MARTIN CORPORATION

Post Removal Sampling and Analysis Plan July 2008

LMC Goldendale, Washington
NPDES Ponds
Cleanup Work Plan

Prepared for

Lockheed Martin Corporation

Post Removal
Sampling and Analysis Plan
July 2008

LMC Goldendale, Washington
NPDES Ponds
Cleanup Work Plan

P R E P A R E D F O R
Lockheed Martin Corporation

1. INTRODUCTION

A Cleanup Action Plan (Work Plan) has been developed in accordance with Lockheed Martin Corporation (LMC) Scope of Work and Technical and Functional Requirements for Preparation of RI/FS and Cleanup Action Plan for NPDES Ponds. This sampling and analysis plan includes a description of the proposed post removal sampling and analysis to verify cleanup criteria have been met for removal of contaminated sludge and underlying soil in the vicinity of the Goldendale Aluminum Reduction facility at Goldendale, Washington in accordance with the Work Plan referenced above.

The Work Plan describes cleanup measures proposed at the National Pollutant Disposal and Elimination System (NPDES) ponds in the vicinity of the Goldendale Aluminum Reduction facility. LMC, as a former owner of the site, has elected to remediate the site through the development of an Agreed Order under Washington's Model Toxics Cleanup Regulatory Program (MTCA). The Agreed Order is an administrative order issued by the Department of Ecology (Ecology) that describes the site activities to take place which have included a remedial investigation, evaluation of cleanup alternatives and development of a cleanup work plan.

This Sampling and Analysis Plan (SAP) establishes the guidelines for collecting representative post removal confirmatory soil samples at LMC's Goldendale Aluminum Reduction facility at Goldendale, Washington (Figure 1). The sampling plan has been developed in accordance with Washington State regulatory guidance including the Model Toxics Control Act Chapter 70.105D Revised Code of Washington (RCW) (Amended 2005) and Cleanup Regulation Chapter 173-340 Washington Administrative Code (WAC) (Amended February 12, 2001).

For the purpose of this sampling plan, it is assumed that the presence of Polynuclear Aromatic Hydrocarbons (PAHs) in soils below the Method A industrial cleanup level of 2 mg/kg constitute "clean" soil. This cleanup level represents the sum of the carcinogenic PAHs (cPAHs) which have been calculated using the Potency Equivalency Factors (PEF).

2. POST REMOVAL SAMPLING

Post-removal sampling (often called confirmatory samples) in the excavation areas will be conducted once an area is designated "clean" (based on field observations, removal depth, analytical results, or other information). Post-removal samples will be collected from within the excavation footprints to confirm that remaining soils affected with constituents above the cleanup standards have been removed to residential standards. Post-removal samples will be analyzed for PAHs. Removal criteria as outlined in the Work Plan will be utilized to determine removal depths.

Sampling, laboratory analysis, data quality review, statistical data evaluation and reporting procedures and protocols are fully described in the SAP prepared for the Work Plan and will be followed for post-removal activities. Four discrete (or grab) samples will be collected from each of the pond areas and two samples will be collected from the connecting ditch.

Data from the post-removal soil samples will be evaluated to confirm that contaminated sludge has been adequately excavated to achieve the removal criteria described the Work Plan. Documentation of the post-removal characterization effort will be prepared by the entity responsible for sampling and analysis. The documentation will identify the location at which samples were collected, any deviations from SAP procedures, an assessment of data quality and adequacy for intended uses, statistical data evaluation, and recommendations for areas of additional excavation needed to achieve cleanup standards. The document will be submitted to the Project Engineer who will seek approval of the documentation and any additional excavation from LMC and Ecology. Additional, focused excavation will be performed to remove any additional soil that requires cleanup as directed by the Project Engineer after receiving approval from both LMC and Ecology. Additional, focused excavation requirements may therefore differ from those recommended in the post-removal documentation.

Once the staging area(s) is no longer needed and all staged materials have been removed, the staging area(s) will be decontaminated, if necessary, by removing the top two to four inches of soil. This soil will be hauled to the solid waste disposal facility. Four grab samples in each staging area will be collected after the contaminated sludge and soil is removed to ensure that no cross-contamination occurred as described for the excavation area.

3. SAMPLING PROCEDURES

The following sections outline standard operating procedures (SOP) to be followed in conducting sampling for quantitative analysis. These sampling procedures are compliant with Ecology guidance documents to determine the lateral and vertical limits of impacts in excess of industrial standards (Washington State Department of Ecology Toxics Cleanup Program, 1995, *Guidance on Sampling and Data Analysis Methods*. Publication No. 94-49.) This plan includes the sampling procedures for collection of soil/surface deposit materials after remediation procedures are complete.

Grab samples will be collected from the shallow subsurface (0 to 4 inches) by hand methods. Grab sample locations will be determined primarily by field observations:

- One sample will be collected from the center point of the removal area. The center of each remediated pond can typically be determined visually as the lowest point of sediment deposition.
- The three remaining grab samples for each pond area will be collected from a star pattern radiating out from the center point. The “star” points will be collected from a point midway between the center point and the excavation area perimeter. Because of the irregular pond shapes, these samples will be collected from different distances from the center point.

Table 1 summarizes the proposed sampling program. All samples collected will be analyzed for PAHs. The following sections describe specific sampling procedures to be used in the collection process.

Table 1
Proposed Sampling Program
Goldendale NPDES Ponds Work Plan SAP

Sample Locations	Number of Samples	Parameters
Post Removal Samples:		
NPDES Ponds A-D	4 each pond (16 total)	PAH
NPDES Ditch	2	PAH
Sludge and Soil Staging Area(s)	4 each area	PAH

3.1 Spatial Distribution of Sample Locations

As described previously in Section 2, four samples will be obtained from each of the 4 ponds with the exception of the ditch, of which 2 samples will be obtained. In addition, 4 grab samples will be collected from the temporary sludge and soil staging area. If more than one temporary sludge and soil staging area has been utilized, four grab samples will be collected from each area.

3.2 Field Sampling Procedures

The following procedures will be used to collect the soil samples. Plastic tools and bags are included in the following procedures; however, they may add phthalate esters to sample media resulting in false detections in PAH analysis.

- Excavate a hole to three inches greater than the desired sample depth using a trowel, hand shovel, or auger (post removal samples will be collected from the zero to four inch interval);
  Using a disposable plastic trowel or stainless steel spoon, scrape the side of the hole until undisturbed sample material is exposed.
  Scrape sample material from the (vertical) profile interval of the side of the hole to collect sample material using a disposable or stainless steel sampling utensil. Fill appropriate sample container directly with the scoop. If multiple sample containers are required, scoop sample material into a stainless steel bowl or a clean, unused ziplock bag and then fill separate sample containers from the bowl or bag.
  Sample containers will be supplied by the analytical laboratory. Table 2 describes the sample containers, the preservation method and the holding times for each sample type.
  After filling, properly seal the sample container;
  Label the sample container; and
  Replace excavated soil into the hole and place survey stake.

If stainless steel sampling and mixing equipment is used, decontaminate it with Alconox or a similar product, triple rinse with de-ionized water prior to each use. In this case, one equipment rinsate sample will be collected, as described in Section 6.2. For disposable equipment (including plastic scoops and plastic baggies), new equipment will be used for each sample and no rinsate sample will be collected.

Table 2
Sample Container, Volume, Preservative and Holding Times
Goldendale NPDES Ponds Work Plan SAP

Parameter	Container	Required Volume	Preservation	Maximum Holding Time
Polynuclear Aromatic Hydrocarbons (PAHs)	8 oz. Jar	250 grams	Store cool at 4°C	14 days

3.3 Field Activities Documentation

Field activities will be documented using a field logbook and chain-of-custody (COC) forms. A waterproof project field logbook will be used to record general sample event data not included on the field forms. Each page in the logbook will be sequentially numbered pages and waterproof ink will be used to record information.

Necessary documentation to record includes, but is not limited to:

Project name (and number if applicable);
Names and affiliations of sampling personnel;
Date(s) of sampling and site location/address;
Weather condition during sampling;
Chronological series of significant events or unusual site conditions, if any;
Date and time of sample collection (do not note time on COC form for duplicate samples);
Location of sampling;
Description of sampling device and sample collection method;
Description of decontamination procedures;
Documentation of field QC samples;
Sample matrix;
Sample container types and preservatives; and
Requested analyses.

Significant deviations from sampling protocol will be formally noted in the field log, along with participating personnel and unusual circumstances pertinent to the sampling effort.

3.4 Sampling Tools

Soil samples will be collected using clean disposable or decontaminated stainless steel hand tools. These tools may include one or more of the following:

- Spoon, trowel, or cup;
- Hand shovel or auger;
- Stainless steel bowl or plastic bags.

Only new or decontaminated tools will contact sampled material. Reusable sampling tools will be decontaminated prior to use following the decontamination procedures described in the SAP and rinsate samples collected. Disposable gloves will be used during the collection of all samples.

3.5 Sample Containers, Preservation Techniques, and Holding Times

Sample containers, preservation techniques, and holding times are shown on Table 2 and will be consistent with United States Environmental Protection Agency (USEPA), protocols. All analytical procedures will be consistent with Federal Guidance Solid Waste (Test Methods for Evaluating Solid Waste, SW-846) guidelines.

3.6 Container Labels

To prevent misidentification of samples, each sample container will be labeled and written with indelible ink. The following information will be recorded on the sample container:

- Project name or number;
- Sample identification number;
- Date and time of collection;
- Requested analyses;
- Initials of sampling personnel; and
- Preservative.

3.7 Sample Packaging and Shipping

All samples will be packaged carefully to avoid breakage or cross-contamination, and will be shipped to the laboratory in coolers containing packaged ice and sealed. The signed COC will be hand delivered to the laboratory or will be placed within a plastic bag inside the sealed cooler if the samples are shipped or delivered by courier. The samples will be transported from the site to the analytical laboratory following appropriate chain-of-custody procedures, as described in Section 4.

3.8 Surveying

Post-removal sample locations will be staked and surveyed immediately after collection of the samples for easy identification in the event additional excavation is needed.

4. CHAIN-OF-CUSTODY

Standard sample custody procedures for environmental investigations will be followed to provide a documented, legally defensible record that can be used to track samples from initial collection to final reporting.

Chain-of-custody (COC) will be maintained for all samples collected. To establish the documentation necessary to trace sample possession from the time of collection, a COC form will be filled out and accompany every set of samples. The record will include the following:

- List of sample numbers;
- Signature of collector;
- Date and time of collection;
- Sample types;
- Number of containers;
- Parameters requested for analysis for each sample;
- Signature of person(s) involved in the chain of possession; and
- Inclusive dates of possession.

A sample is considered to be under custody if:

- It is in actual possession of the responsible person;
- It is in view, following physical possession; or
- It is locked or sealed to prevent tampering and is in a secure area.

Sample custody will be documented on a COC form. All information on the COC form and the labels will be checked against other documentation prior to sample shipment. Sample custody will be traceable by documenting sampling information in the project field book, sample labels, and/or the COC form. All changes to the COC form will be initialed and dated.

Prior to transfer of custody, the COC form will be signed by the sampler, including the date and time. All COC forms received by the laboratory will be signed and dated by a laboratory representative upon receipt of the samples.

The custodian at the laboratory will note the condition and integrity of the samples received. The custodian will also maintain a sample tracking record that will follow each sample through all stages of laboratory processing. Sample tracking records will include dates of sample preparation, extraction, and analysis. These records will be used to verify holding time compliance.

5. ANALYTICAL METHODS

The soil samples will be analyzed in a State of Washington-approved laboratory for the constituents of concern according to USEPA Methods. All analytical procedures will be consistent with SW-846 guidelines. All verification samples will be analyzed for PAHs as outlined in Table 3. Waste profiling analytical methods will be negotiated with the selected disposal facility to meet their requirements.

6. DATA QUALITY

6.1 Quality Assurance Objectives

The purpose of the data quality assessment is to assure that data generated are accurate and consistent with project objectives. The quality of the data will be assessed based on precision, accuracy, representativeness and completeness. Percent precision is the degree to which a measurement is reproducible and will be assessed by a comparison of split sample results. Percent accuracy is a determination of how close the measurement is to the true value and will be assessed via spike recovery in sample matrices. This will be performed by the laboratory as part of their Quality Assurance/Quality Control (QA/QC) procedures.

Completeness is a measure of the amount of valid data obtained, compared to the amount that was expected under normal conditions.

Analytical reporting requirements outlined in this SAP will be followed, including the performance of matrix spikes and laboratory duplicates (or equivalent) at a frequency of 1 per 20 samples. All soil samples will be analyzed by a qualified analytical laboratory in accordance with USEPA analytical methods (non-contract laboratory program [CLP]).

Data quality assurance objectives (DQOs) for laboratory precision, accuracy, and completeness of the analytical data are presented in Table 3.

Table 3
Quality Assurance Objectives
Goldendale NPDES Ponds Work Plan SAP

Parameter	Units	Method	Reporting Limit	Precision	Accuracy	Completeness
Polynuclear Aromatic Hydrocarbons (PAHs)	mg/kg	EPA 8270M-SIM (EPA 8270m)	0.0134	50%	60%	60%

These are target objectives and may not be met due to interferences and/or dilution.
Laboratory-established control limits for precision and accuracy may also be used.
mg/kg milligrams per kilogram

6.2 Field Quality Assurance/Quality Control Samples

A field duplicate is defined as a sample that is collected and divided into two parts for analysis of the same parameters. Results from field duplicates are useful in determining potential sampling variability. Greater than expected differences between duplicates may occur due to variability within the sample matrix (soil). For this reason, it is proposed that no field duplicates will be collected during the post removal soil sampling.

If reusable equipment is used to collect samples, one equipment rinsate sample will be collected. Data from the equipment rinsate blank will be evaluated to determine whether the equipment was adequately decontaminated to prevent cross-contamination among the primary samples. The equipment rinsate sample will be collected by pouring de-ionized water over the recently decontaminated equipment and collection of the water in a laboratory-supplied sample container. The equipment blank will be submitted to the laboratory along with the primary samples and analyzed for PAHs.

6.3 Laboratory QA/QC Samples

TestAmerica Laboratory, in Beaverton, Oregon will provide analytical laboratory services for this project. TestAmerica is USEPA Certified and follows QA/QC procedures consistent with USEPA standards. Laboratory QA/QC samples will include method blanks, matrix spikes, duplicates and matrix duplicates, and calibration and calibration check samples.

6.4 Data Validation and Reporting

This section describes data evaluation and validation procedures for the NPDES ponds post removal soil sampling program. The purpose of data validation is to produce data of known quality and to document the quality in an organized, systematic, and legally defensible manner. Data validation will include evaluation of the field data package as well as the laboratory analytical package. A data validation checklist (Appendix A) will be submitted upon completion of the review of analytical data.

6.4.1 Validation of Field Data Package

The field data package will include all of the field records and measurements developed by the sampling personnel, as previously described in this SAP. The field data package validation procedure will consist of:

- Review of field data for completeness and discussions (clarifications) with field personnel, if necessary.
- Verification that rinsate and field duplicate samples were collected and analyzed at required frequencies.
- Determination that field analytical equipment was calibrated.
- Review of COC forms for completeness and signature of sampler and the laboratory representative and discussions (clarifications) with field personnel, if necessary.

6.4.2 Validation of Laboratory Analytical Package

Data quality will be determined using the DQOs summarized in Table 3, the USEPA guidelines, and professional judgment. Data may be qualified as:

- Estimated (J or UJ qualifier)
- Not detected at the reporting limit (U qualifier)
- Rejected (R qualifier)

All data will be considered complete and useable, with the exception of rejected data (R qualified).

The data validation results will be summarized in a validation checklist (Appendix A) for each laboratory report provided. Each checklist will detail the QC evaluation including: parameters reviewed, comparison to acceptable control limits, actions taken when control limits are not met, validation qualifiers assigned, and the reason(s) for data qualification.

The laboratory is responsible for conducting quality control procedures appropriate to the analytical method and quality assurance to meet the requirements and objectives discussed in Section 6.1. Additional quality assurance information, including laboratory quality assurance manuals and updates, can be provided to Ecology upon request.

6.5 Corrective Action

If QC results indicate conditions or data that do not meet QC requirements, corrective action will be initiated. The nature of the action will depend on the circumstances unique to each situation and may include:

- Reanalyzing the samples, if holding time criteria permit;
- Resampling and analyzing;
- Evaluating and amending sampling and analytical procedures;
- Accepting data, acknowledging level of uncertainty; and
- Conducting a laboratory audit.

7. REPORTING

A report presenting the sampling and analysis results will be provided by the sampling personnel to construction and construction oversight personnel as soon they are available from the laboratory. The report will contain:

- Hard copy analytical laboratory reports including laboratory QA/QC results and copies of completed COC documents will be provided.
- Map(s) showing the locations at which samples were collected and that identify any sampling locations where one or more constituents exceed the cleanup criteria.
- Descriptions of any necessary deviations from the sampling and analysis procedures described in this SAP.
- Data validation checklists and a summary description indicating what sample results are/are not of sufficient quality to support post-removal sampling objectives.
- A statistical evaluation of the data in accordance with Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites (USEPA, 2002, OSWER 9285.6-10). One-half the laboratory reported detection limit for a constituent will be used for constituents reported as not detected by the laboratory unless a valid statistical rationale is provided that supports an alternative approach. Consideration will be given to distribution of the data and handling of any data outliers such that the statistical method selected is appropriate for the data distribution.
- Recommendations for closure without additional excavation or areas needing additional excavation to achieve cleanup objectives will be provided. Recommendations will consider the geospatial distribution of the data, the objective to achieve a closure wherein the one-sided 95 percent upper confidence limit of the mean concentration (or its equivalent depending on data distribution) across the site is equal to or below the cleanup criteria for all constituents measured, and the desire to minimize technical complexity and cost of additional excavation if possible. If additional excavation is recommended, procedures for conducting additional confirmation sampling, analysis and reporting will be provided.

Drafter: M. HOEFER Project Manager: K. SMITH Task Manager: M. RISHER Technical Review: M. RISHER / C. COLE	ARCADIS Arcadis U.S., Inc. 1610 B Street, Suite 100 Helena, MT 59601 Tel: 406-449-7001 Fax: 406-449-3063 www.arcadis-us.com	SITE LOCATION MAP GOLDENDALE, WASHINGTON	Project Number: MH000978.0001 Drawing Date: 4/21/2008 Figure: 1

Acad Version : R17.0s (LMS Tech) Current Plotstyle : ByColor
User Name : MHoefer Path\Name : G:\Common\Matt H\Goldendale\Goldendale Site Map.dwg

DATA VALIDATION CHECKLIST

Sample Identification(s):

ARCADIS
1610 B Street
Helena, Montana
59601
Tel 406 449 7001
Fax 406 449 3063

Sample Date(s):

Sample Team:

Sample Matrix:

Analyzing

Analyses:

Environmental

Project:

Project Number:

QA Reporting Level:

Laboratory Report

FIELD DATA PACKAGE DOCUMENTATION

	Reported		Performance Acceptable		Not
Field Sampling Logs: *	No	Yes	No	Yes	Required
1. Sampling dates noted					
2. Sampling team indicated					
3. Sampling identification traceable to location collected					
4. Sample location					
5. Sample depth for soils					
6. Collection technique (bailer, pump, etc.)					
7. Field sample preparation techniques					
8. Sample type (grab, composite)					
9. Sample container type					
10. Preservation methods					
11. Chain-of-custody form completed					
12. Required analytical methods requested					
13. Field (water and soil) sample logs completed properly and signed					
14. Number and type of field QC samples collected (blanks, replicates, splits, etc.)					
15. Field equipment calibration					
16. Field equipment decontamination					
17. Sample shipping					
18. Laboratory task order					

*Field sampling logs = water and/or soil/sediment sampling logs

QC - quality control

Comments:

ANALYTICAL DATA PACKAGE DOCUMENTATION
GENERAL INFORMATION

	Reported		Performance Acceptable		Not
	No	Yes	No	Yes	Required
1. Sample results					
2. Parameters analyzed					
3. Method of analysis					
4. Reporting limits of analysis					
5. Master tracking list					
6. Sample collection date					
7. Laboratory sample received date					
8. Sample preparation/extraction date					
9. Sample analysis date					
10. Copy of chain-of-custody form signed by lab sample custodian					
11. Narrative summary of QA or sample problems provided					

QA - quality assurance

Comments:

INORGANIC ANALYSES
TOTAL AND DISSOLVED METALS METHODS

	Reported		Performance Acceptable		Not
	No	Yes	No	Yes	Required
1. Holding times					
2. Reporting limits					
3. Calibration curve standards					
4. Initial calibration verification %R					
5. Continuing calibration verification %R					
6. Blanks					
A. Preparation and calibration blanks					
B. Equipment rinsate blanks					
C. Field blanks					
7. Interference check sample %R (ICP only)					
8. Serial dilution check %D (ICP only)					
9. Laboratory control sample (LCS) %R					
10. Matrix spike (MS) %R					
11. MS duplicate %R and MS/MSD RPD					
12. Laboratory duplicate RPD					
13. Post-digestion analytical spike (FAA only)					
14. Field duplicate comparison					
15. Total and dissolved metals comparison					

%R - percent recovery %D - percent difference RPD - relative percent difference
MSD - matrix spike duplicate NA - not applicable or not analyzed
FAA - furnace atomic absorption ICP - inductively coupled plasma atomic emission spectroscopy

Comments:
Performance was acceptable, with the following exceptions and notes.

INORGANIC ANALYSES
WET CHEMISTRY METHODS

	Reported		Performance Acceptable		Not
	No	Yes	No	Yes	Required
1. Holding times					
2. Reporting limits					
3. Calibration curve standards					
4. Initial calibration verification %R					
5. Continuing calibration verification %R					
6. Blanks					
A. Preparation and calibration blanks					
B. Equipment rinsate blanks					
C. Field blanks					
7. Laboratory control sample (LCS) %R					
8. Matrix spike (MS) %R					
9. MS duplicate (MSD) %R					
10. Laboratory duplicate RPD					
11. Field duplicate comparison					

%R percent recovery
LCS - laboratory control sample
RPD - relative percent difference
NA - not applicable or not analyzed
MSD - matrix spike duplicate

Comments:
Performance was acceptable, with the following exceptions and notes.

ORGANIC ANALYSES

	Reported		Performance Acceptable		Not
	No	Yes	No	Yes	Required
GAS CHROMATOGRAPHY (GC) OR HIGH PERFORMANCE LIQUID CHROMATOGRAPHY (HPLC)					
1. Holding times					
A. Extraction holding time					
B. Analysis holding time					
2. Reporting limits					
3. Blanks					
A. Instrument blank					
B. Extraction blanks					
C. Equipment rinsate blanks					
D. Field Blanks					
E. Trip blanks					
4. Initial calibration verification %R					
5. Continuing calibration verification %R					
6. Matrix spike (MS) %R					
7. Matrix spike duplicate (MSD) %R					
8. MS/MSD precision (RPD)					
9. Laboratory duplicate (optional)					
10. Reagent water spike (BS)					
11. Reagent water spike duplicate (BSD)					
12. BS/BSD precision (RPD)					
13. Surrogate spike recoveries					
14. Sample chromatograms					
15. Field duplicate comparison					

VOCs - volatile organic compounds
%R - percent recovery
RPD - relative percent difference
MS - matrix spike
MSD - matrix spike duplicate
NA - not analyzed or not applicable
BS - blank spike
BSD - blank spike duplicate

Comments:
Performance was acceptable, with the following exceptions and notes.

ORGANIC ANALYSES
VOLATILE ORGANIC COMPOUNDS

	Reported		Performance Acceptable		Not
	No	Yes	No	Yes	Required
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
1. Holding times					
2. Reporting limits					
3. Blanks					
A. Water blanks (VOCs)					
B. Equipment rinsate blanks					
C. Field Blanks					
D. Trip blanks					
4. Instrument tune and performance check					
5. Initial calibration RRFs and %RSDs					
6. Continuing calibration RRFs and %Ds					
7. Matrix spike (MS) %R					
8. Matrix spike duplicate (MSD) %R					
9. MS/MSD precision (RPD)					
10. Laboratory duplicate precision (optional)					
11. Reagent water spike (BS)					
12. Reagent water spike duplicate (BSD)					
13. BS/BSD precision (RPD)					
14. Laboratory control sample (LCS)					
15. Surrogate spike recoveries					
16. Internal standard retention times and areas					
17. Compound identification and quantitation					
A. Reconstructed ion chromatograms					
B. Quantitation reports					
18. TIC search (optional)					
19. Field duplicate comparison					

VOCs - volatile organic compounds
RRF - relative response factor
% RSD - percent relative standard deviation
TIC - tentatively identified compound
%D - percent drift
%R - percent recovery
RPD - relative percent difference
BS - blank spike
BSD - blank spike duplicate

Comments:
Performance was acceptable, with the following exceptions and notes.

ORGANIC ANALYSES
SEMIVOLATILE ORGANIC COMPOUNDS

	Reported		Performance Acceptable		Not
	No	Yes	No	Yes	Required
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
1. Holding times					
A. Extraction holding time					
B. Analysis holding time					
2. Reporting limits					
3. Blanks					
A. Water blanks					
B. Extraction blanks					
C. Equipment rinsate blanks					
D. Field Blanks					
4. Instrument tune and performance check					
5. Initial calibration RRFs and %RSDs					
6. Continuing calibration RRFs and %Ds					
7. Matrix spike (MS) %R					
8. Matrix spike duplicate (MSD) %R					
9. Laboratory duplicate precision (optional)					
10. MS/MSD precision (RPD)					
11. Laboratory control sample (LCS)					
12. LCS duplicate (LCSD)					
13. LCS/LCSD precision (RPD)					
14. Surrogate spike recoveries					
15. Internal standard retention times and areas					
16. Compound identification and quantitation					
A. Reconstructed ion chromatograms					
B. Quantitation reports					
17. TIC search (optional)					
18. Field duplicate comparison					

SVOCs - semivolatile organic compounds
RRF - relative response factor
% RSD - percent relative standard deviation
TIC - tentatively identified compound
%D - percent drift
%R - percent recovery
RPD - relative percent difference
BS - blank spike
BSD - blank spike duplicate

Comments:
Performance was acceptable, with the following exceptions and notes.

ORGANIC ANALYSES
PESTICIDES AND POLYCHLORINATED BIPHENYL COMPOUNDS

	Reported		Performance Acceptance		Not
	No	Yes	No	Yes	Required
GAS CHROMATOGRAPHY/ELECTRON CAPTURE DETECTOR (GC/ECD)					
1. Holding times					
A. Extraction holding time					
B. Analysis holding time					
2. Reporting limits					
3. Blanks					
A. Extraction blanks					
B. Instrument blanks					
C. Equipment rinsate blanks					
D. Field Blanks					
4. GC/ECD instrument performance check					
5. 4,4'-DDT/Endrin breakdown					
6. Initial calibration %RSD					
A. Retention time window calculation					
B. Peak resolution					
6. Continuing calibration verification %D					
7. Matrix spike (MS) %R					
8. Matrix spike duplicate (MSD) %R					
9. MS/MSD precision (RPD)					
10. Laboratory duplicate precision (optional)					
11. Reagent water spike (BS)					
12. Reagent water spike duplicate (BSD)					
13. BS/BSD precision (RPD)					
14. Surrogate spike recoveries					
15. Pesticide cleanup checks					
16. Compound identification and quantitation					
A. Reconstructed ion chromatograms					
B. Quantitation reports					
17. Second column confirmation					
18. Field duplicate comparison					

% RSD - percent relative standard deviation %R - percent recovery BS - blank spike
%D - percent difference RPD - relative percent difference BSD - blank spike duplicate

Comments:
Performance was acceptable, with the following exceptions and notes.

ORGANIC ANALYSES
DIOXINS AND FURANS

	Reported		Performance Acceptable		Not
	No	Yes	No	Yes	Required
HIGH RESOLUTION CAPILLARY COLUMN GAS CHROMATOGRAPHY/LOW RESOLUTION MASS SPECTORMETRY (HRGC/LRMS)					
1. Holding times					
A. Extraction holding time					
B. Analysis holding time					
2. Reporting limits					
3. Blanks					
A. Extraction blanks					
B. Equipment rinsate blanks					
C. Field Blanks					
4. Column performance check					
5. Chromatographic peak separation					
6. Initial calibration %RSD					
A. Retention time windows and RFs					
B. Gas chromatography resolution					
C. Relative ion abundance (ratio)					
D. Instrument sensitivity (S/N)					
7. Continuing calibration verification %D					
8. Matrix spike (MS) %R					
9. Matrix spike duplicate (MSD) %R					
10. MS/MSD precision (RPD)					
11. Laboratory duplicate precision (RPD)					
12. Reagent water spike (BS)					
13. Reagent water spike duplicate (BSD)					
14. BS/BSD precision (RPD)					
15. Surrogate spike recoveries					
16. Compound identification and quantitation					
A. Sample chromatograms					
B. Quantitation reports					
17. Field duplicate comparison					

% RSD - percent relative standard deviation %R - percent recovery BS - blank spike
%D - percent difference RPD - relative percent difference BSD - blank spike duplicate

Comments:
Performance was acceptable, with the following exceptions and notes.

DATA VALIDATION CHECKLIST
SUMMARY AND DATA QUALIFIER CODES

ARCADIS
1610 B Street
Helena, Montana
59601
Tel 406 449 7001
Fax 406 449 3063

Project Name

Project Number

Sample Identification(s)

Sample Date(s)

Sample Team

Sample Matrix

Analyzing Laboratory

Analyses

QA Reporting Level

Laboratory Report No.

Environmental

Project:

Project Number:

Sample ID	Analyte(s)	Result	Qualifier	Reason(s)

Explanation/Notes:

VALIDATION PERFORMED BY SIGNATURE: ______________________

DATE: ______________________

PEER REVIEW SIGNATURE: ______________________

DATE: ______________________

ARCADIS
Infrastructure, environment, facilities

Imagine the result

Lockheed Martin Corporation

Stormwater Pollution Prevention Plan

Cleanup Action Plan – NPDES Ponds

Goldendale, Washington

July 2008

ARCADIS

Stormwater Pollution Prevention Plan

Goldendale, Washington

Prepared for:

Lockheed Martin Corporation

Prepared by:
ARCADIS
1610 B Street
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Our Ref.:

MH000978.0001

Date:

July 15, 2008

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Figures

Appendices

1. Introduction

Contaminated sludge and soil will be removed from the four NPDES Ponds located at the Goldendale Aluminum Reduction Facility site (site) located along State Highway 14 in Goldendale, Washington. These activities will be performed in accordance with the Cleanup Action Plan (CAP) developed for the site. This Stormwater Pollution Prevention Plan (SWPP) has been developed based on the Ecology SWPPP Template downloaded from the Ecology website on July 11, 2008 and the Stormwater Management Manual for Eastern Washington. Based on the CAP scope of work, to be reviewed and approved by Ecology prior to implementation, it has been determined that a Stormwater Discharge Permit is not required to implement this work. This SWPP presents the Best Management Practices (BMPs) that will be employed and plans for preventing uncontrolled stormwater discharges from Ponds A, B, C, and D and the stockpile and dewatering areas in the scope of the CAP. All other stormwater for the site will be managed under the site's stormwater discharge NPDES permit, and are not discussed in the SWPP.

Best Management Practices (BMPs) will be implemented to mitigate the potential for erosion, contaminant mobilization, or noncompliant stormwater discharges during the activities described in the CAP. These BMPs will no longer be required upon completion of the CAP when site conditions are returned to typical operating conditions.

1.1 Site Description

The site is located on the basalt bluffs on the north side of the Columbia River Gorge, approximately 6 miles southeast of the town of Goldendale, Washington (Figure 1). The site is generally unpaved and lightly vegetated with grasses and low brush. Site features relevant to this scope of work include four wastewater and stormwater management ponds which historically handled site wastewater and stormwater under an NPDES permit. All four ponds were constructed by installing earthen dikes which damn the natural surface water drainage that extended from the plant to the Columbia River. Ponds A and B were installed to remove suspended sediments from plant wastewater in 1971. In 1972 and 1973, Ponds C and D were installed downstream from Ponds A and B. A stormwater overflow outlet from Pond D to the Columbia River is present at the southeast corner of Pond D, however discharges from this overflow outlet have not historically occurred as all stormwater collected in Ponds C and D is managed through evaporation.

Plant decommissioning has eliminated the need for Ponds A and B as process water/waste water is no longer generated. The need for stormwater management, currently handled by Ponds C and D will be eliminated as a stormwater bypass line is being constructed to collect stormwater at the site and directly discharge to the Columbia River in compliance with NPDES discharge permit requirements.

2. The 12 BMP Elements

Construction activities at the site will be performed under the CAP, and therefore do not require approval of a Stormwater Discharge Permit. Furthermore, through implementation of the BMPs discussed below, stormwater will be collected and managed such that is it not discharged from the site.

2.1 Element #1 – Mark Clearing Limits

To protect adjacent properties and to reduce the area of soil exposed to construction, the limits of construction will be clearly marked before land-disturbing activities begin. Trees that are to be preserved, as well as all sensitive areas and their buffers, shall be clearly delineated, both in the field and on the plans. In general, natural vegetation and native topsoil shall be retained in an undisturbed state to the maximum extent possible. The BMPs relevant to marking the clearing limits that will be applied for this project include:

- Delineation of Sludge Removal Areas and Temporary Stockpile and Dewatering Areas (as shown on Figures 2 and 3).

2.2 Element #2 – Establish Construction Access

Construction access or activities occurring on unpaved areas shall be minimized, yet where necessary, access points shall be stabilized to minimize the tracking of sediment onto public roads, and wheel washing, street sweeping, and street cleaning shall be employed to prevent sediment from entering state waters. All wash wastewater shall be controlled on site. The specific BMPs related to establishing construction access that will be used on this project include:

- Use of dedicated equipment for working within sludge removal areas and stockpile/dewatering areas.

- All vehicles to be used for off-site hauling will stay on maintained dirt, gravel, or paved roads.

2.3 Element #3 – Control Flow Rates

In order to protect the properties and waterways downstream of the project site, stormwater discharges from the site will be controlled. The specific BMPs for flow control that shall be used on this project include:

- Performing work during driest time of year (September and October)
- Maintaining existing stormwater capture system – earthen dams and stormwater collection ponds.
- Capturing stormwater accumulated in stockpile/dewatering areas in dewatering sumps and pumping captured stormwater and dewatering water into holding tanks for disposal as specified in the CAP.

2.4 Element #4 – Install Sediment Controls

All stormwater runoff from disturbed areas shall pass through an appropriate sediment removal BMP before leaving the construction site or prior to being discharged to an infiltration facility. The specific BMPs to be used for controlling sediment on this project include:

- Capture of all accumulated stormwater within stormwater handling ponds (Ponds A, B, C or D) or in dewatering sumps (stockpile/dewatering area) and allowing resultant captured stormwater to evaporate or pump into storage tanks for disposal.

2.5 Element #5 – Stabilize Soils

Exposed and unworked soils shall be stabilized with the application of effective BMPs to prevent erosion throughout the life of the project. The specific BMPs for soil stabilization that shall be used on this project include:

- Soils within the NPDES ponds will be contained within the dewatered pond area and do not need stabilization.

- Stockpiled soils will be tarped and covered in the event of a predicted major storm event, or if the stockpile will be left unworked overnight.

2.6 Element #6 – Protect Slopes

Cut and fill slopes will not be constructed as part of the CAP.

2.7 Element #7 – Protect Drain Inlets

All storm drain inlets and culverts made operable during construction shall be protected to prevent unfiltered or untreated water from entering the drainage conveyance system. However, the first priority is to keep all access roads clean of sediment and keep street wash water separate from entering storm drains until treatment can be provided. Storm Drain Inlet Protection (BMP C220) will be implemented for all drainage inlets and culverts that could potentially be impacted by sediment-laden runoff on and near the project site. The following inlet protection measures will be applied on this project

- The existing drainage from Pond D is the only drain inlet that can be affected during implementation of the corrective actions. This inlet will be sealed or otherwise protected during this work.

2.8 Element #8 – Stabilize Channels and Outlets

Where site runoff is to be conveyed in channels, or discharged to a stream or some other natural drainage point, efforts will be taken to prevent downstream erosion. The specific BMPs for channel and outlet stabilization that shall be used on this project include:

- Site runoff is being captured by BMPs described above and will not be allowed to drain. No additional BMPs are needed to stabilize channels or outlets.

2.9 Element #9 – Control Pollutants

All pollutants, including waste materials and demolition debris, that occur onsite shall be handled and disposed of in a manner that does not cause contamination of stormwater. Good housekeeping and preventative measures will be taken to ensure that the site will be kept clean, well organized, and free of debris. If required, BMPs to be implemented to control specific sources of pollutants are discussed below.

- The facility is not transportation-related and therefore subject to the criteria for determining if a Spill Prevention, Control, and Countermeasure (SPCC) Plan is required under the Federal regulations of the Clean Water Act (CWA). The SPCC plan will be prepared by the contractor performing the CAP activities.

2.10 Element #10 – Control Dewatering

Dewatering of stockpiled sludges will be managed by the Contractor in the fully bermed, HDPE-lined, Temporary Stockpile and Dewatering Area. Water will be collected in dewatering sumps and pumped into storage containers at the adjacent Water Management Area. Berm enclosures, HDPE liner, sumps, pumps, and water storage and containment facilities will be inspected routinely during CAP activities to confirm that accumulated water is properly managed.

2.11 Element #11 – Maintain BMPs

All temporary and permanent erosion and sediment control BMPs shall be maintained and repaired as needed to assure continued performance of their intended function. Maintenance and repair shall be conducted in accordance with each particular BMP's specifications. Visual monitoring of the BMPs will be conducted at least once every calendar week and within 24 hours of any rainfall event that causes a discharge from the site. If the site becomes inactive, and is temporarily stabilized, the inspection frequency will be reduced to once every month.

All temporary erosion and sediment control BMPs shall be removed within 30 days after the final site stabilization is achieved or after the temporary BMPs are no longer needed. Trapped sediment shall be removed or stabilized on site. Disturbed soil resulting from removal of BMPs or vegetation shall be permanently stabilized.

2.12 Element #12 – Manage the Project

Erosion and sediment control BMPs for this project have been designed based on the following principles:

– Design the project to fit the existing topography, soils, and drainage patterns.

– Emphasize erosion control rather than sediment control.

– Minimize the extent and duration of the area exposed.

– Keep runoff velocities low.

– Retain sediment on site.

– Thoroughly monitor site and maintain all ESC measures.

– Schedule major earthwork during the dry season.

In addition, project management will incorporate the key components listed below:

As this project site is located east of the Cascade Mountain Crest, the project will be managed according to the following key project components:

Phasing of Construction

– The construction project is being phased to the extent practicable in order to prevent, to the maximum extent practicable, the transport of sediment from the development site during construction. Revegetation of exposed areas and maintenance of that vegetation shall be an integral part of the clearing activities during each phase.

– Clearing and grading activities will be conducted only as pursuant to a site development plan approved by the local jurisdiction that establishes permitted areas of clearing, grading, cutting, and filling. These permitted clearing and grading areas and any other areas required to preserve critical or sensitive areas, buffers, native growth protection easements, or tree retention areas as required by the local jurisdiction, are delineated on the site plans and shall be delineated at the construction site.

Seasonal Work Limitations

– The local permitting authority may impose a seasonal limitation on site disturbance. This decision may be based upon local weather conditions and/or other information provided including site conditions, the extent and nature of the construction activity, and the proposed erosion and sediment control measures.

– The following activities are exempt from the seasonal clearing and grading limitations:

Routine maintenance and necessary repair of erosion and sediment control BMPs;

Routine maintenance of public facilities or existing utility structures that do not expose the soil or result in the removal of the vegetative cover to soil; and

Activities where there is 100 percent infiltration of surface water runoff within the site in approved and installed erosion and sediment control facilities.

Coordination with Utilities and Other Contractors

– Care has been taken to coordinate with utilities, other construction projects, and the local jurisdiction in preparing this SWPPP and scheduling the construction work.

Inspection and Monitoring

– All BMPs shall be inspected, maintained, and repaired as needed to assure continued performance of their intended function.

– A Certified Erosion and Sediment Control Lead shall be on-site or on-call at all times.

– Sampling and analysis of the stormwater discharges from the construction site may be necessary to ensure compliance with standards. It is recognized that the local permitting authority may establish monitoring and reporting requirements when necessary.

– Whenever inspection and/or monitoring reveals that the BMPs identified in the this SWPPP are inadequate, due to the actual discharge of or potential to discharge a significant amount of any pollutant, the SWPPP shall be modified, as appropriate, in a timely manner.

Maintenance of the Construction SWPPP

– This SWPPP shall be retained on-site or within reasonable access to the site. The SWPPP shall be modified whenever there is a significant change in the design, construction, operation, or maintenance of any BMP.

2.13 Site Specific BMPs

Site specific BMPs are shown on Figures 2 and 3.

3. Pollution Prevention Team

3.1 Roles and Responsibilities

The pollution prevention team consists of personnel responsible for implementation of the SWPPP, including the following:

– Certified Erosion and Sediment Control Lead (CESCL) – primary contractor contact, responsible for site inspections (BMPs, visual monitoring, sampling, etc.); to be called upon in case of failure of any ESC measures.

– Resident Engineer – For projects with engineered structures only (sediment ponds/traps, sand filters, etc.): site representative for the owner that is the project's supervising engineer responsible for inspections and issuing instructions and drawings to the contractor's site supervisor or representative

– Emergency Ecology Contact – individual to be contacted at Ecology in case of emergency.

– Emergency Owner Contact – individual that is the site owner or representative of the site owner to be contacted in the case of an emergency.

– Non-Emergency Ecology Contact – individual that is the site owner or representative of the site owner than can be contacted if required.

– Monitoring Personnel – personnel responsible for conducting water quality monitoring; for most sites this person is also the Certified Erosion and Sediment Control Lead.

3.2 Team Members

Names and contact information for those identified as members of the pollution prevention team are provided in the following table.

Title	Name(s)	Phone Number
Certified Erosion and Sediment Control Lead (CESCL)	TBD	TBD
Resident Engineer	NA	NA
Emergency Ecology Contact	Mark Layman	509-454-7829
Emergency Owner Contact	TBD	TBD
Non-Emergency Ecology Contact	Mark Layman	509-454-7829
Monitoring Personnel	TBD	TBD

4. Maintenance and Monitoring of BMPs

Monitoring includes visual inspection, monitoring for water quality parameters of concern and documentation of the inspection and monitoring findings in a site log book. A site log book will be maintained for all on-site construction activities and will include:

– A record of the implementation of the SWPPP and other permit requirements;

– Site inspections; and,

– Stormwater quality monitoring.

For convenience, the inspection form and water quality monitoring forms included in this SWPPP include the required information for the site log book. This SWPPP may function as the site log book if desired, or the forms may be separated and included in a separate site log book. However, if separated, the site log book but must be maintained on-site or within reasonable access to the site and be made available upon request to Ecology or the local jurisdiction.

4.1 Site Inspection

All BMPs will be inspected, maintained, and repaired as needed to assure continued performance of their intended function. The inspector will be a Certified Erosion and Sediment Control Lead (CESCL) per BMP C160. The name and contact information for the CESCL is provided in Section 5 of this SWPPP.

Site inspection will occur in all areas disturbed by construction activities and at all stormwater discharge points. Stormwater will be examined for the presence of suspended sediment, turbidity, discoloration, and oily sheen. The site inspector will evaluate and document the effectiveness of the installed BMPs and determine if it is necessary to repair or replace any of the BMPs to improve the quality of stormwater discharges. All maintenance and repairs will be documented in the site log book or forms provided in this document. All new BMPs or design changes will be documented in the SWPPP as soon as possible.

4.1.1 Site Inspection Frequency

Site inspections will be conducted at least once a week and within 24 hours following any rainfall event which causes a discharge of stormwater from the site. For sites with temporary stabilization measures, the site inspection frequency can be reduced to once every month.

4.1.2 Site Inspection Documentation

The site inspector will record each site inspection using the site log inspection forms provided in Appendix A, or in the field notebook. The site inspection log forms or field notebook may be separated from this SWPPP document, but will be maintained on-site or within reasonable access to the site and be made available upon request to Ecology or the local jurisdiction.

4.2 Compliance Criteria

Stormwater in areas affected by CAP activities will not be discharged. Instead this stormwater will be collected and managed in conjunction with other dewatering water generated as part of the CAP activities.

4.3 Monitoring and Inspection Schedule

BMPs will be visually inspected weekly during CAP activities and within 24 hours following any rain storm. These visual inspections are intended to confirm that all BMPs are intact and will function as intended in the case of a storm event. If any BMPs appear to be inadequate or damaged the will be immediately repaired or upgraded. These inspections, repairs, and upgrades will be documented in the field notebook.

4.4 Recordkeeping

4.4.1 Site Log Book

A site log book will be maintained for all on-site construction activities and will include:

- A record of the implementation of the SWPPP and other permit requirements;
- Site inspections; and,
- Stormwater quality monitoring

4.4.2 Records Retention

Records of all monitoring information (site log book, inspection reports/checklists, etc.), this Stormwater Pollution Prevention Plan, and any other documentation of compliance with permit requirements will be retained during the life of the construction project and for a minimum of three years following the termination of permit coverage.

4.4.3 Access to Plans and Records

The SWPPP and Site Log Book will be retained on site or within reasonable access to the site and will be made immediately available upon request to Ecology or the local jurisdiction. A copy of this SWPPP will be provided to Ecology within 14 days of receipt of a written request for the SWPPP from Ecology. Any other information requested by Ecology will be submitted within a reasonable time. A copy of the SWPPP or access to the SWPPP will be provided to the public when requested in.

4.4.4 Updating the SWPPP

This SWPPP will be modified if the SWPPP is ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the site or there has been a change in design, construction, operation, or maintenance at the site that has a significant effect on the discharge, or potential for discharge, of pollutants to the waters of the State. The SWPPP will be modified within seven days of determination based on inspection(s) that additional or modified BMPs are necessary to correct problems identified, and an updated timeline for BMP implementation will be prepared.

4.5 Reporting

Discharge Monitoring Reports, or other Stormwater Discharge Permit required reports will not be required for this work because no stormwater will be discharged, as discussed above. In the event of an unintended stormwater release, Ecology will be immediately notified.

5. Removal of BMPs

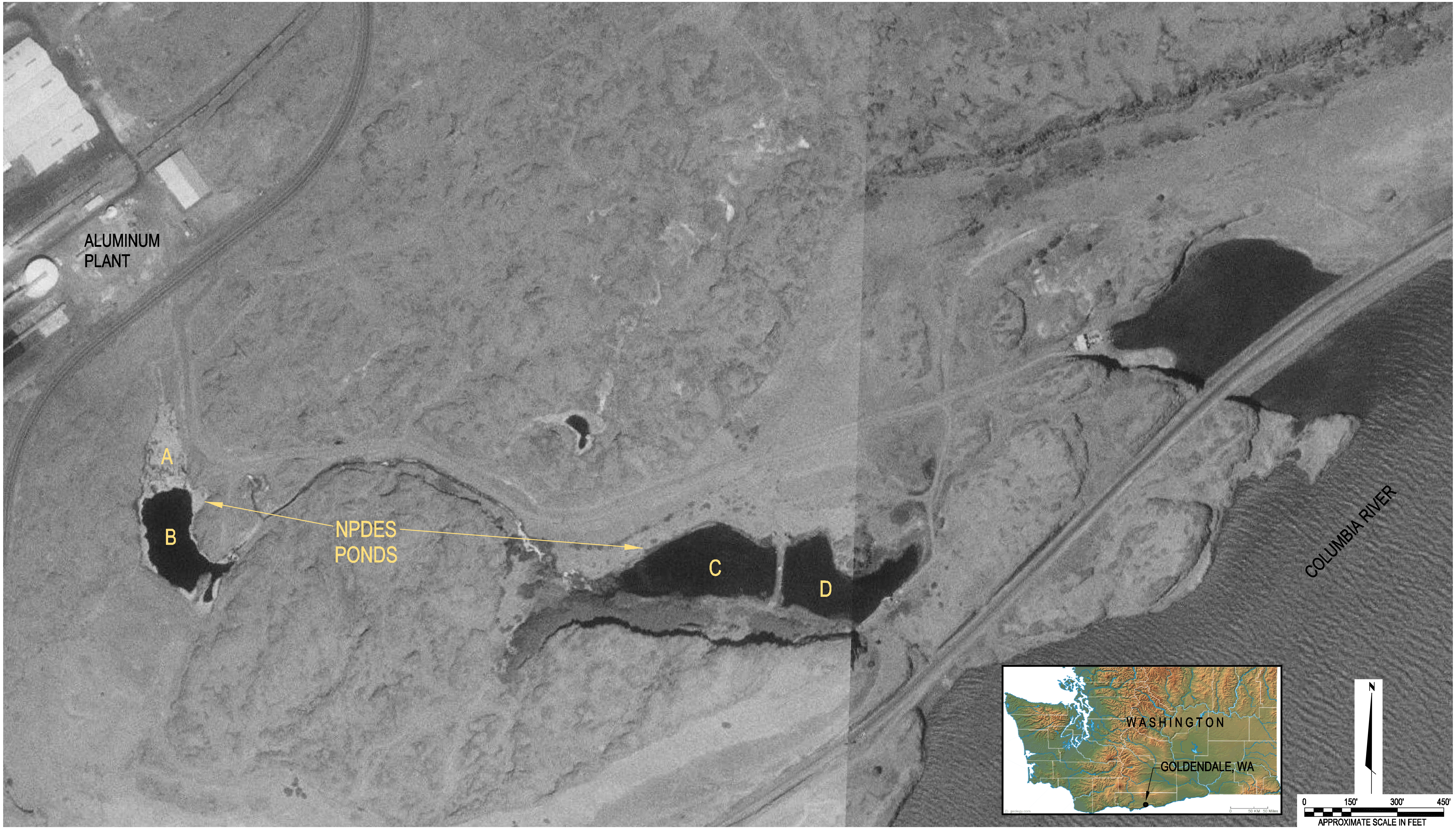
The BMPs discussed above are intended to address stormwater management during activities performed as described in the CAP (Arcadis, 2008). Once CAP activities are complete and the affected areas (NPDES Ponds and Temporary Stockpile and Dewatering Area) are sufficiently reclaimed and revegetated to stabilize the soils, the BMPs will no longer be needed and will be eliminated at that time.

ARCADIS

Appendix A

Site Inspection Form

Acad Version : R17.0s (LMS Tech)
User Name : mhoefer
Current Plotsyle : ByColor
Path\Name : G:\Common\Matt H\Goldendale\Goldendale Site-Map-2.dwg



SITE LOCATION MAP

GOLDENDALE, WASHINGTON

Drafter: M. HOEFER
Project Manager: K. SMITH
Task Manager: M. RISHER
Technical Review: M. RISHER / C. COLE

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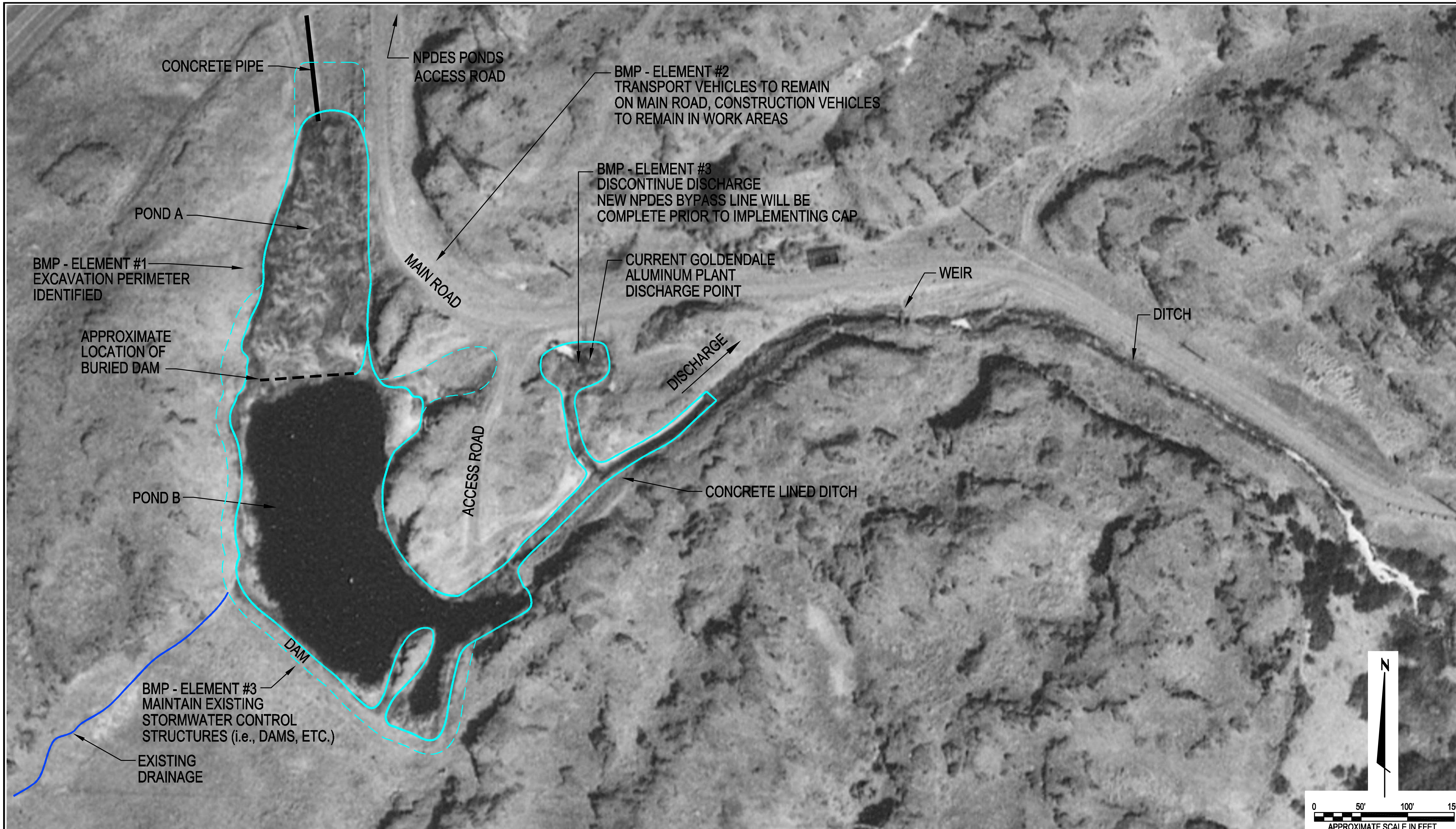
Project Number: MH000978.0001
Drawing Date: 6/30/2008
Figure: 1



Acad Version : R17.0s (LMS Tech) User Name : MHoefer

Current Plotstyle : ByColor Path\Name : G:\Common\Watt H\Goldendale\MT000978\COLOC-0265.dwg

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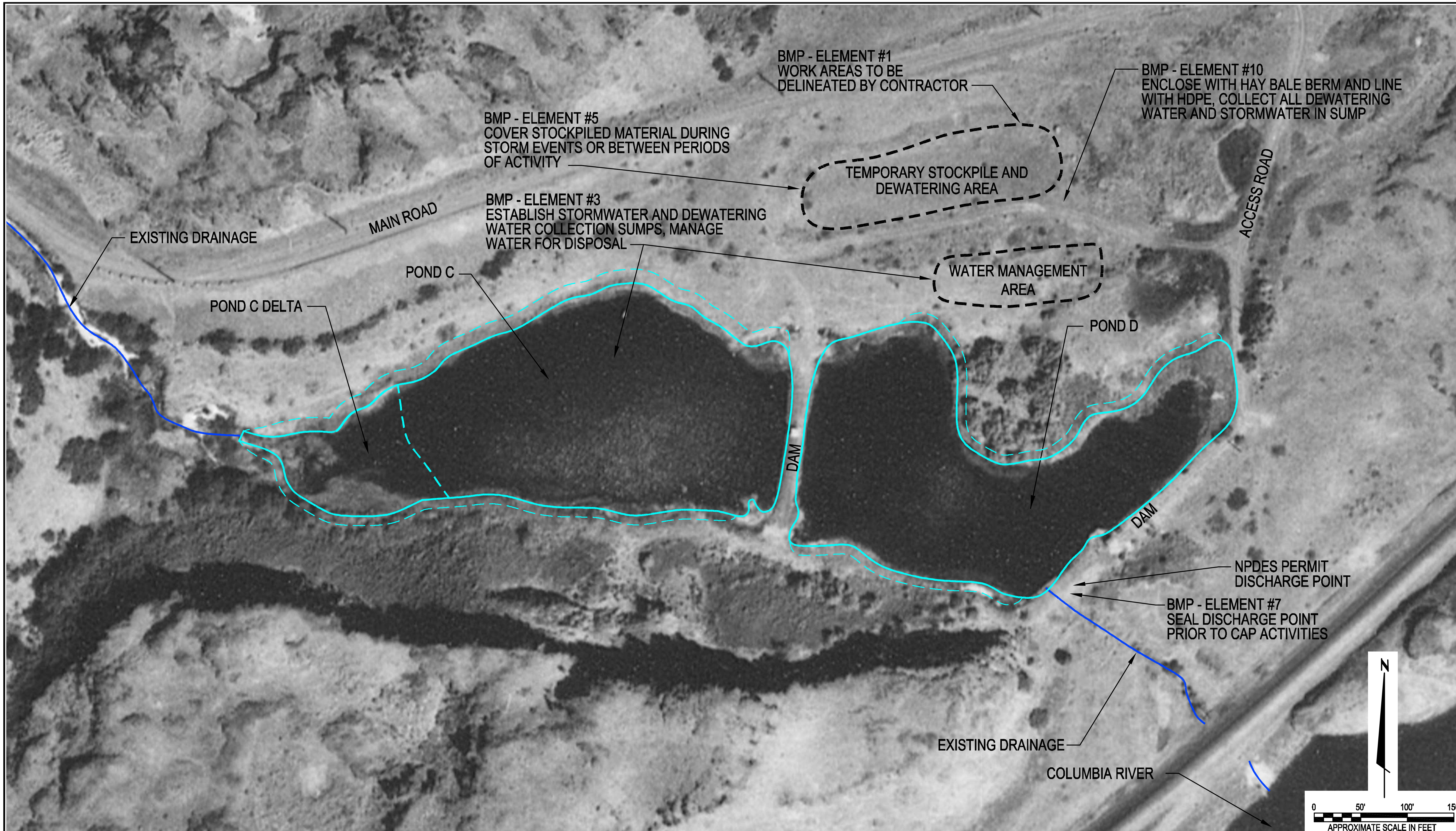
LEGEND:

- POND SLUDGE PERIMETER (solid line)
- EXTENDED PERIMETER (THIN LAYER OF SLUDGE OUTSIDE POND PERIMETER) (dashed line)

NPDES PONDS A AND B - BMPs

GOLDENDALE, WASHINGTON

Project Number	MH000978.0001
Drawing Date	07/16/2008
Figure	2



Acad Version : R17.0s (LMS Tech) User Name : MHoefer
Current Plotstyle : ByColor Path\Name : G:\Common\Matt H\Goldendale\MT000978\C0LOC-0266.dwg

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LEGEND:
POND SLUDGE PERIMETER
EXTENDED PERIMETER (THIN LAYER OF SLUDGE OUTSIDE POND PERIMETER)

NPDES PONDS C AND D - BMPs

GOLDENDALE, WASHINGTON

Project Number: MH000978.0001
Drawing Date: 07/16/2008
Figure: 3

Appendix A – Site Inspection Forms (and Site Log)

The results of each inspection shall be summarized in an inspection report or checklist that is entered into or attached to the site log book. It is suggested that the inspection report or checklist be included in this appendix to keep monitoring and inspection information in one document, but this is optional. However, it is mandatory that this SWPPP and the site inspection forms be kept onsite at all times during construction, and that inspections be performed and documented as outlined below.

At a minimum, each inspection report or checklist shall include:

a. Inspection date/times

b. Weather information: general conditions during inspection, approximate amount of precipitation since the last inspection, and approximate amount of precipitation within the last 24 hours.

c. A summary or list of all BMPs that have been implemented, including observations of all erosion/sediment control structures or practices.

d. The following shall be noted:

   i. locations of BMPs inspected,

   ii. locations of BMPs that need maintenance,

   iii. the reason maintenance is needed,

   iv. locations of BMPs that failed to operate as designed or intended, and

   v. locations where additional or different BMPs are needed, and the reason(s) why

e. A description of stormwater discharged from the site. The presence of suspended sediment, turbid water, discoloration, and/or oil sheen shall be noted, as applicable.

f. A description of any water quality monitoring performed during inspection, and the results of that monitoring.

g. General comments and notes, including a brief description of any BMP r repairs, maintenance or installations made as a result of the inspection.

h. A statement that, in the judgment of the person conducting the site inspection, the site is either in compliance or out of compliance with the terms and conditions of the SWPPP and the NPDES permit. If the site inspection indicates that the site is out of compliance, the inspection report shall include a summary of the remedial actions required to bring the site back into compliance, as well as a schedule of implementation.

i. Name, title, and signature of person conducting the site inspection; and the following statement: "I certify under penalty of law that this report is true, accurate, and complete, to the best of my knowledge and belief".

When the site inspection indicates that the site is not in compliance with any terms and conditions of the NPDES permit, the Permittee shall take immediate action(s) to: stop, contain, and clean up the unauthorized discharges, or otherwise stop the noncompliance; correct the problem(s); implement appropriate Best Management Practices (BMPs), and/or conduct maintenance of existing BMPs; and achieve compliance with all applicable standards and permit conditions. In addition, if the noncompliance causes a threat to human health or the environment, the Permittee shall comply with the Noncompliance Notification requirements in Special Condition S5.F of the permit.

Site Inspection Form

General Information			
Project Name:			
Inspector Name:		**Title:** **CESCL # :**	
Date:		**Time:**	
Inspection Type:	• After a rain event • Weekly • Turbidity/transparency benchmark exceedance • Other		
Weather			
Precipitation	Since last inspection	In last 24 hours	
Description of General Site Conditions:			

Inspection of BMPs

Element 1: Mark Clearing Limits

BMP:

Location	Inspected Y	Inspected N	Functioning Y	Functioning N	Functioning NIP	Problem/Corrective Action

BMP:

Location	Inspected Y	Inspected N	Functioning Y	Functioning N	Functioning NIP	Problem/Corrective Action

Element 2: Establish Construction Access

BMP:

Location	Inspected Y	Inspected N	Functioning Y	Functioning N	Functioning NIP	Problem/Corrective Action

BMP:

Location	Inspected Y	Inspected N	Functioning Y	Functioning N	Functioning NIP	Problem/Corrective Action

Element 3: Control Flow Rates

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

Element 4: Install Sediment Controls

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

Element 5: Stabilize Soils

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

Element 6: Protect Slopes

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

Element 7: Protect Drain Inlets

BMP:

Location	Inspected Y	Inspected N	Functioning Y	Functioning N	Functioning NIP	Problem/Corrective Action

BMP:

Location	Inspected Y	Inspected N	Functioning Y	Functioning N	Functioning NIP	Problem/Corrective Action

BMP:

Location	Inspected Y	Inspected N	Functioning Y	Functioning N	Functioning NIP	Problem/Corrective Action

Element 8: Stabilize Channels and Outlets

BMP:

Location	Inspected Y	Inspected N	Functioning Y	Functioning N	Functioning NIP	Problem/Corrective Action

BMP:

Location	Inspected Y	Inspected N	Functioning Y	Functioning N	Functioning NIP	Problem/Corrective Action

BMP:

Location	Inspected Y	Inspected N	Functioning Y	Functioning N	Functioning NIP	Problem/Corrective Action

BMP:

Location	Inspected Y	Inspected N	Functioning Y	Functioning N	Functioning NIP	Problem/Corrective Action

Element 9: Control Pollutants

BMP:

Location	Inspected Y	Inspected N	Functioning Y	Functioning N	Functioning NIP	Problem/Corrective Action

BMP:

Location	Inspected Y	Inspected N	Functioning Y	Functioning N	Functioning NIP	Problem/Corrective Action

Element 10: Control Dewatering

BMP:

Location	Inspected Y	Inspected N	Functioning Y	Functioning N	Functioning NIP	Problem/Corrective Action

BMP:

Location	Inspected Y	Inspected N	Functioning Y	Functioning N	Functioning NIP	Problem/Corrective Action

BMP:

Location	Inspected Y	Inspected N	Functioning Y	Functioning N	Functioning NIP	Problem/Corrective Action

Stormwater Discharges From the Site

	Observed? Y	Observed? N	Problem/Corrective Action
Location			
Turbidity			
Discoloration			
Sheen			
Location			
Turbidity			
Discoloration			
Sheen			

Water Quality Monitoring		
Was any water quality monitoring conducted?	• Yes	• No
If water quality monitoring was conducted, record results here:		
If water quality monitoring indicated turbidity 250 NTU or greater; or transparency 6 cm or less, was Ecology notified by phone within 24 hrs?	• Yes	• No
If Ecology was notified, indicate the date, time, contact name and phone number below:		
Date:		
Time:		
Contact Name:		
Phone #:		
General Comments and Notes		
Include BMP repairs, maintenance, or installations made as a result of the inspection.		
Were Photos Taken?	• Yes	• No
If photos taken, describe photos below:		