

Appendix C

Rocky Flats Site Soil Disturbance Evaluation Procedure

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Soil Disturbance Evaluation Process

Purpose: The purpose of this Soil Disturbance Evaluation Process is to identify hazards and regulatory requirements so that appropriate work control steps, including regulatory agency and/or engineering approvals, are implemented to address and mitigate the hazard and/or meet regulatory requirements. The soil disturbance evaluation process is a part of the *Rocky Flats Site Operations Guide* (RFSOG) work planning process (Section 12.1), including consideration of the *Health and Safety Manual*, LMS/POL/S04321 standard for penetration permits. This procedure provides guidance on what constitutes a soil disturbance and the items to consider when the work planning process requires that an evaluation be conducted.

Background: Soil disturbance is prohibited by the *Rocky Flats Legacy Management Agreement* (RFLMA) institutional controls (ICs) (RFLMA Attachment 2, Table 4), unless conducted in accordance with the Rocky Flats Erosion Control Plan (ECP) requirements; disturbance deeper than 3 feet, or that will not return the surface to the preexisting grade or higher, must be approved by the Colorado Department of Public Health and Environment (CDPHE), in accordance with RFLMA Attachment 2, Section 4.0.

The soil disturbance evaluation provides the information needed to implement the ECP and to obtain CDPHE approval, when required.

Soil disturbance is also of concern because of the actual or potential presence of subsurface residual contamination or buried utilities or infrastructure or unstable soil conditions that may cause health and safety hazards or may render the location potentially unsuitable for the planned activity.

The soil disturbance evaluation also provides the information needed to complete the penetration permit and facilitate appropriate health and safety and engineering review and approval, if required, of the planned activity.

Protection of the threatened Preble's meadow jumping mouse (PMJM) and its designated habitat at Rocky Flats (RFSOG Figure 6) may also affect project plans. The ECP also contains a description of the general measures and best management practices to protect the PMJM.

Soil Disturbance Activities: Soil disturbance means activities that, by design, will penetrate the existing surface by digging, ripping, tilling, constructing, drilling, or driving rods, stakes, or similar sturdy items (i.e., stronger than a pin flag) to a depth deeper than 6 inches.

Soil disturbance also means construction or similar project activities in an area of 1 acre or more even if soil penetration deeper than 6 inches is not anticipated, which may result in loss of vegetation or loosening soils that could lead to soil erosion. The acreage is the total area involved for any one project activity, even if the areas are not contiguous. For example, stockpiling of soils, crushed rock and similar construction materials, driving or staging construction equipment and vehicles in vegetated and riparian areas, cleaning sediment deposits from roadside drainage channels, removing erosion control blankets and the like, which cumulatively involves more than 1 acre is a soil disturbance that must be evaluated.

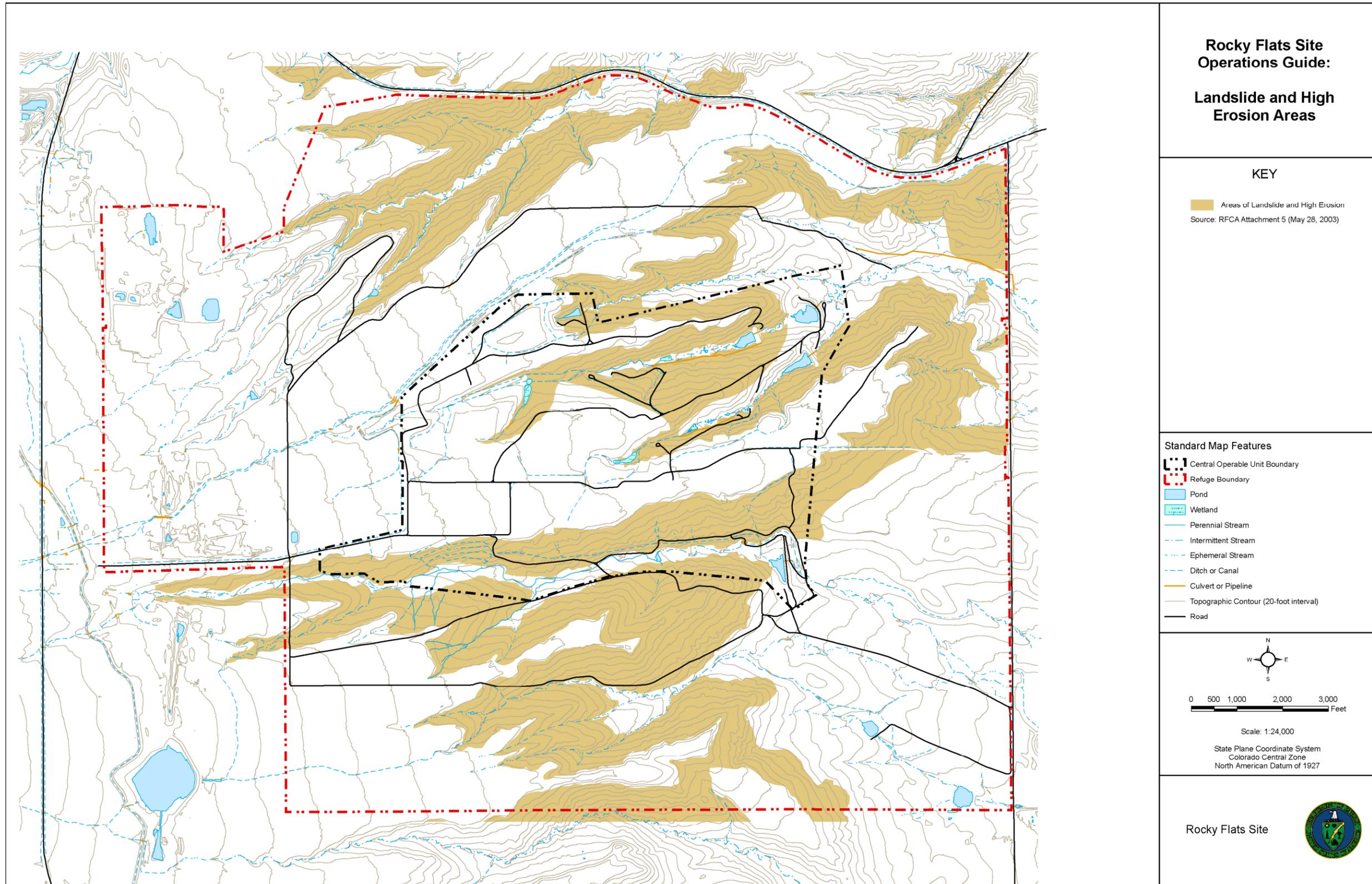
Soil disturbance is also an activity that may impact the stability of the soils, even if soil penetration deeper than 6 inches is not anticipated, because the geotechnical characteristics of the location may not be suitable for the activity.

Potential Hazards that May Need Controls: Soil disturbance could encounter subsurface infrastructure present in the soil disturbance area, which may create a hazard if contacted, severed, or penetrated. Soil disturbance may also have remedy performance implications because of the possibility that soil or groundwater contaminants could be mobilized and/or because activities may be affected by the restrictions imposed by physical or ICs. Protection of the threatened PMJM and its designated habitat at Rocky Flats (RFSOG Figure 6) may also affect project plans.

Soil disturbance could also be in areas where former subsurface infrastructure was removed, the topography was altered, and/or in areas that have been identified as being historically unstable due to landslides or high erosion or that contain groundwater seeps. Figures C-1 and C-2 show areas onsite where landslides and seeps have occurred, respectively. In these instances, the geotechnical conditions of the underlying soils may not be suitable for the planned activity.

Soil disturbance activities could impair the functioning of physical controls, groundwater treatment systems, and/or environmental monitoring facilities. The RFLMA ICs are intended to mitigate the possibility of exposure from access to or mobilization of contaminants that may remain in or under the soil, and preserve various aspects of the remedy to ensure it remains protective of human health and the environment. For reference, the rationale for each IC is included at the end of this appendix.

Soil disturbance may involve use of tools or equipment that could pose worker or environmental hazards (including possible impacts to the PMJM or PMJM habitat) that must be evaluated, such as fugitive dust emissions or destruction of vegetation or habitat. These hazards may also include the potential for people or equipment to contact hazards that are below the soil surface, such as buried utilities, remaining infrastructure, or unstable subsurface soil conditions.



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Figure C-1. Landslide and High Erosion Areas

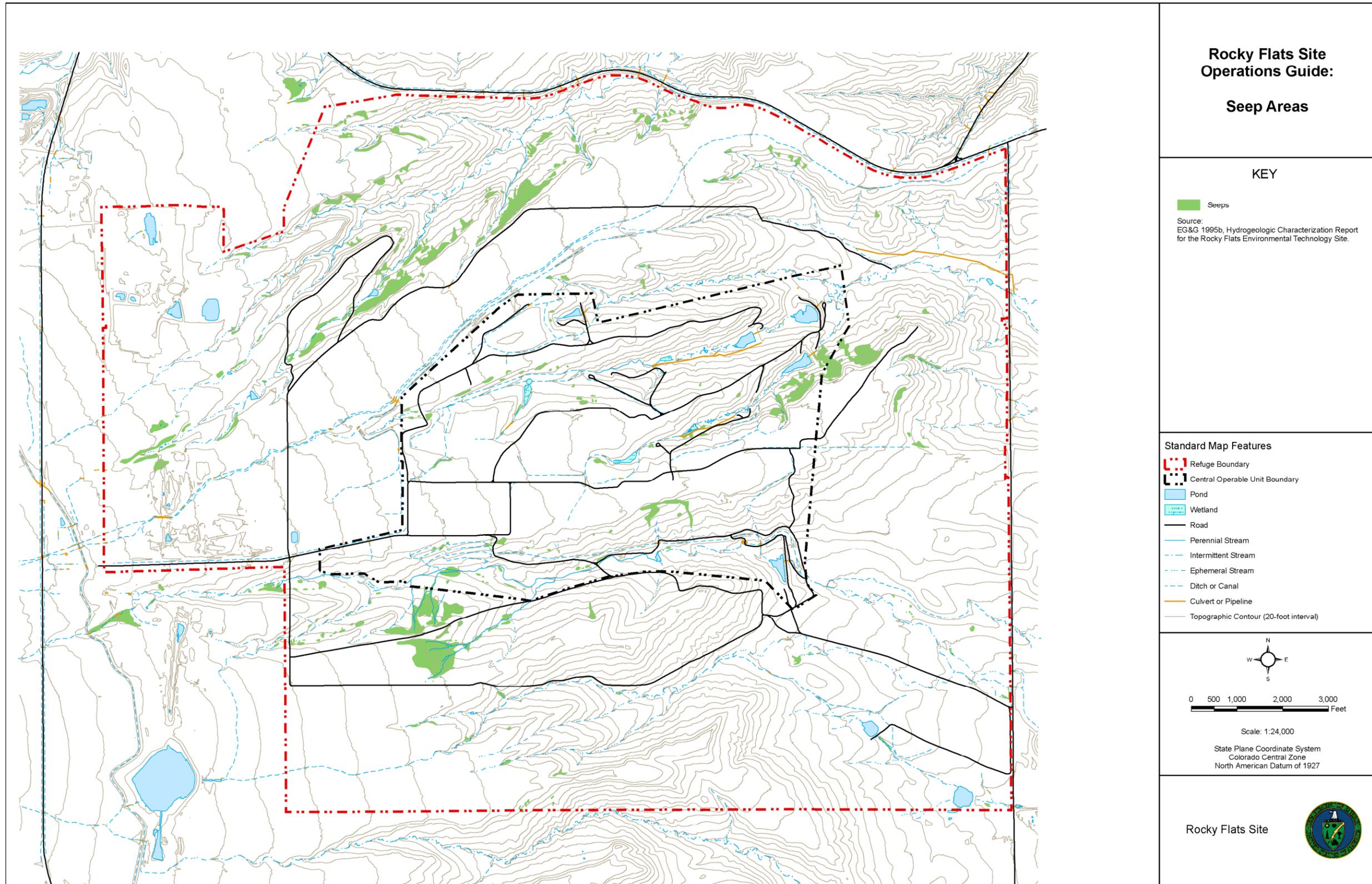


Figure C-2. Seep Areas

Evaluation Process and Documentation: Subject matter experts shall be consulted during the evaluation as necessary. Engineering consultation, geotechnical services, and engineering approval may also be required for evaluations involving potential soil stability issues.

The evaluation is based on a graded approach that considers the area, depth, and location of the disturbance. Soil disturbances that are related to construction of remedy-supporting components (e.g., groundwater treatment system components, landfill cover repairs, and so on) or are located in areas that may be reasonably concluded to be prone to landslides or soil creep or to have been significantly regraded as a part of Rocky Flats operations (pre- or post-closure) must be evaluated by Engineering representatives during the project planning effort. Soil disturbance that involves activities prohibited by RFLMA ICs must be evaluated to determine the implementation of the ECP, including general measures and best management practices to protect the PMJM and whether specific regulatory approval is required. The rationale for each IC will be considered in applying the graded approach.

The hazards review will consider the following:

- Residual contamination
 - Rocky Flats Cleanup Agreement closeout reports and proximity to former Individual Hazardous Substance Sites
 - Maps, figures, and tables in RFLMA decision documents, characterization reports, and site databases containing environmental media sampling locations and analytical results
 - Post-closure environmental data, which may include results of RFLMA monitoring, if applicable
- Active gas pipeline
 - Map with prohibitions
- Inactive and removed utilities, buildings, and infrastructure
 - Sector Closeout Reports (RFSOG Appendix D)
 - GIS maps, complete with relevant details (e.g., sizes of buried utilities, depths of buried utilities and infrastructure—both former/abandoned and current)
- Active utilities
- Results of line locate
- Maps of historically unstable areas and areas with historical groundwater seeps (note that these maps are not necessarily indicative of post-closure conditions, but they may serve to indicate further inquiry into current conditions is needed)
- Results of previous soil disturbance evaluations and activities conducted in the area

Evaluation Documentation: The determination that soil disturbance is expected as part of an activity, must be noted in the RFSOG checklist (RFSOG Appendix D), and a brief discussion of the evaluation (generally 1 to 2 pages) will be documented for Rocky Flats Site manager review as part of the work approval process (RFSOG Section 5.0). The discussion can also just reference design drawings, maps, sketches, RFLMA Contact Records, penetration permit, and so forth, rather than developing a new document, to provide information.

The evaluation documentation, at a minimum, will address the following topics:

Work: Provide the name of the activity as shown on the Project/Activity Evaluation checklist (form LMS 1005).

Reason for and location of soil disturbance: State briefly why the scope requires soil disturbance, and the area of the Site being disturbed.

Depth of penetration/cut/excavation: Describe location and amount of soil to be disturbed (proposed size and depth of excavated area). Identify documentation of final grade if activity will not return to preexisting grade or higher (for example, engineering drawing for construction.)

Material being placed in ground: If material will be left in the ground, provide brief description.

IC review: Note that a review of ICs has been done and provide conclusion.

Hazard review: Discuss the types of work hazards expected. Typically, this will mention:

- Remains of infrastructure that might be encountered, and whether it may be contaminated requiring monitoring or controls;
- Whether the location is in area where subsurface infrastructure was removed, and if so, how likely this is to pose issues of soil instability;
- Whether the location is in area of historical instability or groundwater seeps; and
- Types and results of utility line locates that have been completed in the project area and any plans for performing line locates.

PMJM areas—If disturbance is to be conducted within PMJM habitat (including the buffer area), discuss U.S. Fish and Wildlife Service notification requirements per the Programmatic Biological Assessment (Part II, Section 3.2) or whether consultation is needed.

Wetlands areas—If disturbance is within or may impact wetland areas, discuss whether permit requirements must be met.

Evaluation completed by: Document individuals contributing to the soil disturbance evaluation. Include Site SMEs, Engineering representatives, other Site/LMS staff, and subcontractors, and note the specific areas of expertise contributed by each.

Additional subject matter expert review and approval (if needed): Indicate whether other items may need to be considered, such as soil stability, whether existing line locates are sufficient, or particular hazard review items.

Documentation of completion of line locates, engineering review, and engineering approval, if necessary must be completed prior to the work being authorized.

Site Manager Review: _____

An example of a completed soil disturbance evaluation is included on the following page.

Example Rocky Flats Soil Disturbance Evaluation

Rocky Flats Soil Disturbance Evaluation (See RFSOG Appendix F for Criteria)

Work: Complete upgrades to PLF Road

Reason for disturbance/penetration: Reconfigure curve west of FC1 to allow heavy equipment and trailers to negotiate turn. Add road base to upgrade road conditions.

Depth of penetration/cut/excavation: The maximum penetration depths will be greater than 3 ft. bgs at the turn area being reconfigured. Road will be scarified to approx. 6 inches prior to adding road base/aggregate rock. See engineering drawings.

Material being placed in ground: Cut and fill material, scarify and add road base and aggregate rock, and rock crossing per engineering drawings.

IC Review: IC-2 and IC-3 applies; Contact Record CR 2011-06 approved.

Hazard Review: No former infrastructure other than the Walnut Creek culvert crossing. Utility locate will be performed as specified in construction documents.

Personnel will be alert for remnants of former infrastructure and pause work if unanticipated conditions or materials are intercepted.

Remains of infrastructure – See above.

Line locate - Yes

PMJM areas - Yes. USFWS notification complete 10/4/11.

Wetlands areas – Adjacent, but not in construction footprint

Evaluation completed by: Rick DiSalvo, Jody Nelson, Jeremiah McLaughlin, Wendy Nakao and Kurt Franzen

Additional SME Review (if needed): None.

Site Manager Review: _____

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