ROCKY MOUNTAIN ARSENAL

ANNUAL COVERS REPORT FOR INTEGRATED COVER SYSTEM 2022

Revision 0

November 17, 2022

U.S. Department of the Army

Shell Oil Company

Prepared by:

Navarro Research and Engineering, Inc.

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ACRONYMS

ACR	Annual Covers Report
AMA	Army Maintained Areas
CPSM	Cover Perimeter Survey Monuments
FY21	Fiscal Year 2021
FY22	Fiscal Year 2022
FY23	Fiscal Year 2023
ICS	Integrated Cover System
LTCP	Long-Term Care Plan
NRAP	Non-Routine Action Plan
NWS	National Weather Service
O&M	Operations and Maintenance
OCN	O&M Change Notice
RCRA	Resource Conservation and Recovery Act
SDT	Shell Disposal Trenches
SOP	Standard Operating Procedure

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EXECUTIVE SUMMARY

This 2022 Annual Covers Report (ACR) for the Integrated Cover System (ICS) at the Rocky Mountain Arsenal Federal Facility Site was prepared in accordance with the *RCRA-Equivalent, 2-, and 3-Foot Covers Long-Term Care Plan,* Revision 3 (LTCP) (Navarro 2021a). The purpose of this ICS ACR is to document cover inspection results and maintenance activities performed on the ICS during the reporting period, and to describe plans to improve or sustain cover conditions. This ICS ACR documents maintenance-related activities performed on the ICS Army Maintained Area (AMA) during Fiscal Year 2022 (FY22), that is, between October 1, 2021 and September 30, 2022.

The rain gauge located west of the Lime Basins Resource Conservation and Recovery Act (RCRA)-Equivalent Cover, near the Lime Basins Metering Building collects precipitation data for the RMA. The precipitation measured at the Lime Basins gauge during FY22 was 11.13 inches. Precipitation data collected by the Lime Basins gauge are provided in Appendix A.

The ICS was in good condition throughout FY22. Cover deficiencies observed during the reporting period include areas of cover surface drainage interruption, noxious or undesirable weeds, tumbleweed accumulation, and areas of poor grass species diversity. All cover soil thickness loss measurements were below the non-routine action trigger level and the compliance standard.

Percolation at all ICS lysimeters was well below the non-routine action trigger level and the compliance standard for the entire year.

The 2022 Vegetation Performance Assessment was conducted in accordance with Standard Operating Procedure (SOP) 002 of the LTCP, Revision 3. Separate assessments were performed on the ICS RCRA-equivalent covers and on the ICS 2-foot and 3-foot soil covers. In all, data from 15 vegetation transects were collected. The dates on which the assessments were conducted were inside the range specified in the LTCP SOP 002. Total live vegetation values were well above the compliance standard of 25 percent for all areas. The two-year average of total ground cover was also comfortably above the compliance standard of 50 percent for all cover areas, and the three-year running average of total ground cover was also well above the compliance standard of 67 percent.

Areas of the ICS that experienced poor vigor and growth by native perennial grasses were overseeded in April of 2022 in accordance with Non-Routine Action Plan (NRAP)-2021-005. These substandard areas were mowed, drill seeded, required weed control by herbicide application, and additional mowing during this reporting period.

Cost incurred performing Interim Operations and Maintenance (O&M) of the ICS AMA during FY22, including inspections, repairs, and maintenance, was $159,479. A complete budget for Fiscal Year 2023 (FY23) has not been approved as of the issuance of this report. However, the FY23 budget is estimated to be approximately $152,00, but does not include the estimated cost of non-routine maintenance activities.

Recommendations for FY23 include:

- The site should be examined for weeds throughout FY23. Occurrences of Canada thistle, whitetop, and other noxious weeds should be spot sprayed.
- The site should continue to be examined for areas that could interrupt cover drainage, burrowing animal holes, excessive buildup of tumbleweeds, vegetation health, and localized settlement.
- A prescribed burn of the ICS in the fall or spring would be beneficial to the health of established native perennial grasses and would remove litter left behind after the robust growth of annual weeds.
- Close observation of the overseeded area that is documented in NRAP-2021-005 for established grass species and necessary maintenance to decrease weedy species.
- Selective mowing of ICS would be beneficial to the health of established native perennial grasses and would assist in the control of weedy species.
- The Shell Disposal Trenches RCRA-Equivalent Cover should continue to be monitored closely due to the intrusive repairs that were performed during 2020.
- Replace the eight-foot tall portion of the ICS perimeter fence in accordance with O&M Change Notice (OCN)-LTCP-2022-001.

These recommendations are planned for FY23 and will be discussed in the 2023 ICS ACR.

1.0 INTRODUCTION

This 2022 Annual Covers Report (ACR) for the Integrated Cover System (ICS) at the Rocky Mountain Arsenal Federal Facility Site was prepared in accordance with the *RCRA-Equivalent, 2-, and 3-Foot Covers Long-Term Care Plan,* Revision 3 (LTCP) (Navarro 2021a). The purpose of this ICS ACR is to document cover inspection results and maintenance activities performed on the ICS during the reporting period, and to describe plans to improve or sustain cover conditions. This ICS ACR documents maintenance-related activities performed on the ICS Army Maintained Area (AMA) during Fiscal Year 2022 (FY22), that is, between October 1, 2021 and September 30, 2022. The ICS is currently in the Interim Operations and Maintenance (O&M) Period defined in Section 1.0 of the LTCP. This report addresses the thirteenth year of Interim O&M for the ICS since construction was completed in early 2010.

2.0 METHODOLOGY

The Resource Conservation and Recovery Act (RCRA)-equivalent, 2-foot, and 3-foot covers and associated non-cover areas within the outside shoulder of the perimeter access road, collectively referred to as the ICS AMA, were inspected, monitored, repaired, and maintained in accordance with the LTCP, Revision 3. The results of inspections and monitoring of vegetation, percolation, and cover soil thickness were used to verify cover performance and to trigger cover maintenance and repair work.

2.1 Type I and Type II Cover Inspections

The procedure for inspecting soil cover conditions and infrastructure features is detailed in LTCP Standard Operating Procedure (SOP) 001, *Cover Conditions Inspections*. This SOP includes procedures for Type I and Type II cover inspections, as well as a procedure for collecting cover soil thickness data, which were used to evaluate the actual cover soil thickness against the cover soil thickness compliance standard. Where feasible, multiple inspections were conducted concurrently for efficiency and to minimize traffic on the cover. Copies of the cover inspection forms are provided in Appendix C.

2.2 Vegetation Performance Assessment

LTCP SOP 002, *Cover Vegetation Performance Assessment*, provides the procedure to collect and document vegetation conditions for assessment and future management. This SOP includes a procedure for conducting the annual quantitative vegetation survey. Data collected in accordance with LTCP SOP 002 were used to evaluate the vegetation against the vegetation performance standard. The results of the evaluation are presented in Section 6.1.1 of this report. Refer to Appendix B for photos and other information collected during the 2022 Vegetation Performance Assessment.

2.3 Percolation Monitoring

The procedure for collecting percolation data and operating the lysimeters is provided in LTCP SOP 003, *Percolation Monitoring System Data Collection and Operation*. Data collected in accordance with LTCP SOP 003 were used to evaluate the measured percolation against the percolation compliance standard. Monthly percolation measurements are provided in Table 7.0-1.

2.4 Maintenance and Repair Activities

Routine maintenance and repair activities are listed in Table 3.2-1 of the LTCP, while conditions requiring non-routine actions are listed in Table 3.2-2 of the LTCP. There were three non-routine actions approved for the ICS AMA in FY22, which are described in Section 8.2 of this report. Routine maintenance and repair activities performed in FY22 are discussed in Section 4.0 of this report.

3.0 PRECIPITATION AND WEATHER CONDITIONS

The rain gauge located west of the Lime Basins RCRA-Equivalent Cover, near the Lime Basins Metering Building collects precipitation data for the RMA. The precipitation measured at the Lime Basins gauge during FY22 was 11.13 inches. Precipitation data collected by the Lime Basins gauge are provided in Appendix A.

3.1 National Weather Service Summary

Figures 3.1-1 and 3.1-2 illustrate the Rocky Mountain Region's monthly temperature and precipitation values for FY22 as published by the National Oceanic and Atmospheric Administration, National Weather Service (NWS) Forecast Office for Denver/Boulder, Colorado. Climate data reported by the NWS were collected at the Primary Local Climatological Data Site, located at the Denver International Airport. In general, FY22 had near average temperatures and was drier than normal in the Rocky Mountain Region.

3.2 Significant Storm Events at RMA

RMA experienced two significant storm events during FY22. A significant storm event is defined as a rainstorm event in which greater than 1.0 inch of precipitation falls within 24 hours. On June 1, 2022 and July 26, 2022, the RMA received 1.47 inches of rain and 1.07 inches of rain, respectively in a 24-hour period.

4.0 SOIL COVER ASSESSMENT, MAINTENANCE AND REPAIR ACTIONS

During FY22, the condition of the ICS AMA was inspected during the Type I and Type II inspections in accordance with the LTCP. Type I inspections were conducted on October 5, 2021, January 12, 2022, and July 13, 2022. The spring Type II inspection was conducted on April 26, 2022.

There were two significant storm events that occurred in FY22 on June 1, 2022 and July 26, 2022. Post-storm drive around inspections were performed on June 1, 2022 and July 27, 2022 and these inspections were documented in the project logbook. Cover post-storm inspections were performed on June 8, 2022 and August 3, 2022 and documented on Form SOP 001-1 which are included in Appendix C. Small holes were identified in the outlet of Channel 13 during the June 8 post-storm inspection. No additional issues were identified during the post-storm inspections.

The soil covers were inspected for the following:

- Surface Conditions
- Vegetative Cover
- Engineering and Access Controls

- Percolation Monitoring
- Surface Drainage Controls
- Erosion/Settlement Monuments
- Other deleterious conditions

The ICS cover was in good condition throughout FY22. Observations made during the reporting period are described below and cover inspection documentation is provided in Appendix C of this report. The repair actions associated with these observations are shown on Figure 4.0-1 and are also described below.

4.1 Cover Surface Drainage Interruption

Holes greater than three inches in diameter were observed and marked with Global Positioning System coordinates during the spring 2022 Type II inspection. These holes were not repaired during this reporting period and will be further discussed in the 2023 ICS ACR.

4.2 Impeded Drainage in the Channel

Some of the drainage channels on ICS were observed to have accumulated tumbleweeds. The tumbleweeds were removed by high winds and no maintenance actions were required.

Small holes were observed in the grass lined outlet end of Channel 13 during the June post-storm inspection. These holes were not repaired during FY22 and will therefore be included in the 2023 ICS ACR.

4.3 Noxious or Undesirable Weeds

Canada and Musk thistles along with other noxious weeds were identified on areas of the ICS. Weed control efforts were performed during July and August of 2022 using the herbicides Escort XP®, Transline®, Milestone®, Telar®, and surfactant.

In June 2022, an area of whitetop (*Lepidium draba*) was sprayed on ICS using the herbicides Escort XP®, 2,4-D, and surfactant.

Herbicide was applied as a ground clear in October of 2021. Ground clear herbicide was applied along the shoulders of the ICS roadways, the cattle guards, the well pads on the Lime Basins access road, around the Lime Basins Metering Building, and at gate entrances. The herbicide used was Plainview® mixed with surfactant.

The acreage that was overseeded per Non-Routine Action Plan (NRAP)-2021-005 was sprayed in July of 2022 to target Russian thistle and kochia. The herbicides used were 2,4-D and Vista XRT® mixed with surfactant.

4.4 Lysimeters

Lysimeters 004, 005, 007, and 012 had the standing water inside of the manholes pumped out in May of 2022.

4.5 Shell Disposal Trenches RCRA-Equivalent Cover Piezometers

O&M Change Notice (OCN)-LTCP-2020-001 (Navarro 2020) documents the frequency of inspection of the Shell Disposal Trenches (SDT) RCRA-Equivalent Cover piezometers and this OCN was approved in October of 2020. Routine water level monitoring of the four piezometers began in the fall of 2020 and continued for eight consecutive quarters. The piezometers were measured in November of 2021, February of 2022, May of 2022, and August of 2022 for this reporting period. All quarterly measurements for the four piezometers were dry. The August 2022 measurement was the eighth and final quarter of measurements per OCN-LTCP-2020-001.

4.6 Perimeter Fence and Road

Due to high winds and tumbleweed collection, two wooden fence posts along the west side of the 3-Foot Soil Cover need to be replaced. These posts were not replaced during this reporting period. In the southeast section of eight-foot-tall perimeter fence, a section of fabric ripped apart and the fence fabric needed to be reattached to the wooden posts. In July of 2022, the eight-foot-tall section of fence fabric was reattached to the wooden fence posts and the fabric was mended back together.

OCN-LTCP-2022-001 (Navarro 2022d) was approved in July of 2022 and changes the eight-foot height perimeter fence to 5 feet-7 inches and replaces the wooden fence posts with galvanized steel posts. The fence was not replaced during this reporting period and will be addressed in the 2023 ICS ACR.

Tumbleweeds were frequently removed from the interior and exterior of the ICS perimeter fence throughout the reporting period. Tumbleweeds also needed to be removed from the perimeter road for accessibility.

An additional cattle guard was installed on the southeast perimeter road in August of 2022.

A bison breached the northwest perimeter fence along D Street in August of 2022. One t-post was damaged and needs replaced. No other damage was observed along the fence or cover areas. The t-post was not replaced during FY22 and will be addressed in Fiscal Year 2023 (FY23).

4.7 Bare Areas or Areas of Poor Growth

NRAP-2021-005 (Navarro 2021b), was prepared to document the sparse grass areas in the southwest corner of the ICS and the maintenance to address the deficiency. In April of 2022, the areas requiring improvement were mowed short to remove any litter and standing dead vegetation. After mowing was complete, the acreage was drill seeded at a rate of ten pounds Pure Live Seed per acre. The seed mix was a warm season perennial grass mix consisting of buffalograss (*Buchloe dactyloides)*, side oats grama *(Bouteloua curtipendula)*, blue grama *(Chondrosum gracile)*, alkali sacaton *(Sporobolus airoides),* and rice hulls. Seedlings were sparse during FY22 and the area was overcome with weedy species during the growing season. Herbicide application and additional mowing were performed to reduce the weedy population. This area will continue to be monitored for grass establishment, and additional maintenance will be performed as necessary to promote species diversity.

4.8 Mowing

Sensitive features were mowed around on ICS in preparation for prescribed burns. No prescribed burns were performed on the cover during this reporting period.

Many areas of ICS were mowed throughout the growing season to control tall weedy vegetation and to mitigate potential tumbleweed formation following the growing season. Figure 4.0-1 shows all areas that were mowed.

4.9 Lime Basins Precipitation Gauge

In October of 2021, routine maintenance was performed on the Lime Basins precipitation gauge. The tipping bucket, thermostat, heater, fuse, voltage, and overall condition were checked. Precipitation measurements collected from the time frame of this inspection have been disregarded and not included in the annual precipitation total. No issues were identified with the precipitation gauge.

4.10 Carsonite Markers

In May of 2022, Carsonite markers were added next to the SDT RCRA-Equivalent Cover piezometers. During the fall 2021 inspection, erosion monument 64 was noted to need a replacement marker and this was replaced in May of 2022. Also in May of 2022, a replacement marker was added next to Lysimeter 005 and well 01662 identified during the spring 2022 Type II inspection.

5.0 COVER SOIL THICKNESS LOSS

The ICS RCRA-equivalent covers and 3-Foot Soil Cover includes a network of 92 erosion/settlement monuments embedded within the cover soil. The monuments are generally positioned on a 500-foot grid, except for the SDT RCRA-Equivalent Cover area, where monuments are positioned at locations selected by the regulatory agencies during the design process. Cover soil thickness loss was measured at each of the monuments during the inspections in October of 2021 and April of 2022 in accordance with SOP 001, *Cover Conditions Inspections*. The measurements for each monument are provided on Table 5.0-1. All cover soil thickness loss measurements were below the compliance standard of 0.5 foot.

6.0 VEGETATION PERFORMANCE ASSESSMENT

The 2022 Vegetation Performance Assessment was conducted in accordance with SOP 002 of the LTCP, Revision 3. Vegetation data were collected and evaluated independently for each of the two cover groups; the ICS RCRA-equivalent covers group, and the 2-foot and 3-foot covers group

Results of the 2022 Vegetation Performance Assessment are summarized on Table 6.0-1. Appendix B includes additional tables that provide cover and frequency by species, expanded vegetation performance assessments providing two and three year running average comparisons, sample adequacy checks, and raw transect data. Separate assessments were performed on the following areas:

- ICS RCRA-Equivalent Covers Group
  (10 transects sampled between August 18 and 24, 2022)

- ICS 2-Foot and 3-Foot Covers Group
  (5 transects sampled on August 16, 2022)

In all, data from 15 vegetation transects were collected in August of 2022 for the ICS. Figures 1 and 2 in Appendix B illustrate the transects that were sampled on the entirety of ICS. The dates on which the assessments were conducted were inside the range specified in LTCP SOP 002. Prior to performing the assessments, transect locations and compass bearings were randomly selected using Geographical Information System software. Maps showing the pre-selected sample locations and bearings are included in Appendix B of this report. Photos, provided in Appendix B, were taken along the compass bearing at the start of each 50-meter transect. A total of 100 observations were made along each transect. All plant species that were present within one meter on either side of the 50-meter transect but had not been observed using the point-intercept sampling method were tallied and used to calculate species density (species per 100 square meters). Appendix B includes cover and frequency summary tables as well as vegetation performance assessment tables for each of the sample areas. These tables meet the reporting requirements set forth by the *Revegetation of the Basin A Soil Cover*, developed during the Basin A dispute resolution process in 1999.

Warm season species were prolific and robust at the time the vegetation assessment was conducted. However, in some areas where cool season plants used to be predominant, primarily monocultural areas of western wheatgrass *(Pascopyrum smithii*), plants were somewhat diminished in stature. There did not appear to be excessive stress due to low soil moisture or biological stressors on the grassland community at the time of the assessment. Insects and other wildlife, such as small rodents, grassland birds and deer were observed at all areas. A list of all species observed on the ICS is included in Table 6.0-2. The change in species diversity to warm season grasses, may be an indication of both continued development of plant community complexity, as well as improved performance by individual established plants.

6.1 ICS RCRA-Equivalent Covers Vegetation

During the 2021 and 2022 growing seasons, the ICS RCRA-equivalent covers exhibited dramatic changes in species composition. Based on 10 transects sampled, cool season grasses, primarily western wheatgrass *(Pascopyrum smithii*), provided an average cover of only 11.4 percent which is significantly lower than the 31 percent cover in 2020 and even higher values in other years. In contrast, cover by seeded warm season species increased when compared to what has been documented in previous years. Warm season grass species provided an average cover of 28.9 percent with blue grama (*Chondrosum gracile*) providing almost 12 percent cover. Weedy species continued to contribute significantly, which was also seen in 2021, with an average cover of about 29.5 percent breaking the trend of very low cover by weedy species on the ICS in general. Average cover by litter was about 21.4 percent.

6.1.1 Comparison to the Performance Standard

The total absolute mean live vegetation was estimated to be 70.4 percent. However, since the cover by weedy species exceeded 10 percent, only 47.94 percent of the total can count towards achieving the performance standard of 25 percent. Total ground cover remained very high at 91.8 percent, and corresponding bare ground was 8.2 percent. The two-year running average for total absolute cover was 94.35 percent, well above the standard. The three-year running average for total absolute ground cover was 94.7 percent, also well above the standard.

6.1.2 Comparison to the Non-Routine Action Trigger Level

The results of the quantitative vegetation assessment performed on the ICS RCRA-equivalent covers determined that 41.90 percent of the total live vegetation (relative cover) was comprised of undesirable annual or biennial species. Therefore, the allowable cover was reduced from the total live vegetation cover to better account for live cover provided by desirable vegetation. The allowable total absolute live vegetation cover for this site is 47.94 percent, which is still well above the non-routine trigger level established in the LTCP.

6.2 ICS 2-Foot and 3-Foot Soil Covers Vegetation

During the 2020 season, cover by a variety of weedy species composed only a small part of the total vegetation cover. However, the vegetation community composition changed during the 2021 and 2022 growing seasons. Based on data from five samples, relative cover by weedy species increased from less than three percent in 2020 to more than 29 percent in 2022. Average total absolute live cover was about 72 percent. However, since the relative cover by weedy species averaged over 29 percent, the allowable total absolute live vegetation cover was reduced to 57.8 percent. Average total absolute ground cover remained high at 96.4 percent, with litter contributing about 24 percent cover. Cool season grasses, primarily western wheatgrass, provided an average cover of approximately 23 percent, which was significantly reduced from the 2020 average. Average cover by warm season grasses was about 26 percent, significantly higher than in past years.

Allowable total absolute live vegetation was estimated to be 57.8 percent, well above the non-routine action trigger level of 25 percent. The estimate for total absolute ground cover was 96.4 percent, and corresponding bare ground was relatively low at 3.6 percent. The two-year running average for total absolute ground cover was 96.45 percent, well above the standard. The three-year running average for total absolute ground cover was 96.92 percent, also well above the standard.

6.3 Sample Adequacy

Sample adequacy calculations were performed for the ICS RCRA-equivalent covers group and the ICS 2-foot and 3-foot covers group. The intent of the sample adequacy calculation is to determine whether sufficient samples have been gathered to be able to detect a 10 percent reduction in the mean with 90 percent confidence. Sample adequacy was calculated using the formula provided in SOP 002:

$$N_{\min} = t_{\alpha}^{2} s^{2} / (d\bar{x})^{2}$$

To ensure that the sample size is adequate, N_{min} must be less than, or equal to, the number of transects sampled in the respective area. If N_{min} is greater than the number of transects sampled, additional vegetation transects need to be sampled until N_{min} becomes less than, or equal to, the number of transects sampled, or all transect blocks within the respective area have been sampled, whichever comes first. Sample adequacy was calculated for total live vegetation only.

The results of the sample adequacy calculations are provided in Table 6.3-1. Sample adequacy calculations indicated that variability was low for the ICS RCRA-equivalent cover and the ICS 2-foot and 3-foot cover areas and that an acceptable number of samples were collected.

6.4 Poor Vigor and Species Diversity

In May of 2021, the Army observed little or no growth of established perennial grasses over several acres of the ICS. The affected areas were primarily located on the west side of the South Plants 3-Foot Soil Cover but extended east and north into the South Plants and Lime Basins RCRA-equivalent covers.

The Army's Vegetation Expert immediately began investigating the cause of the sparsely covered areas to develop the best course of action to correct the condition. The Vegetation Expert also consulted with David Buckner, Ph.D. of ESCO Associates regarding the condition of the plant community, potential causes of the condition, and suggestions for improvement.

The vegetation community in the areas that appeared sparse have historically been dominated by western wheatgrass (*Pascopyron smithii*), a cool season grass species. The severe drought conditions that the region experienced over the past few years put significant moisture stress on the vegetation community. Cool season grasses tend to be more susceptible to moisture stress than warm season grasses because of their physiological and structural differences. The limited growth of the drought-stressed western wheatgrass, and lack of species diversity in the vegetation community on some ICS areas, resulted in large "dead zones" where little or no growth was observed through the first part of the 2021 growing season. The sudden decline of western wheatgrass was not isolated to the engineered covers. The phenomenon was observed in other parts of the Rocky Mountain Arsenal National Wildlife Refuge and across the Front Range region early in the 2021 growing season.

The substandard condition of the vegetation was also confirmed quantitatively during the annual vegetation assessment performed in September of 2021. NRAP-2021-005 was created to document the substandard condition of the vegetation and was approved in October of 2021 to improve the ICS vegetation in this area. In April of 2022, this acreage was mowed short, and then drill seeded using a warm season perennial grass mix consisting of buffalograss (*Buchloe dactyloides)*, side oats grama *(Bouteloua curtipendula)*, blue grama *(Chondrosum gracile)*, and alkali sacaton *(Sporobolus airoides)*. Seedlings were sparse during FY22 and the area was overcome with weedy species during the growing season. In July of 2022, this area was sprayed with herbicide to control annual broad-leaf weeds, and in September of 2022 the area was mowed again to reduce the weedy species and open the canopy for grass establishment. The area will continue to be monitored for grass establishment and species diversity during the 2023 growing season and additional maintenance will be performed as necessary to promote grass establishment.

7.0 PERCOLATION MONITORING

The RCRA-equivalent covers use a network of lysimeters to monitor deep percolation. The ICS covers have 15 lysimeters. Percolation is reported in millimeters, which is calculated by dividing the measured percolation volume by the area of the lysimeter pan, or 1,500 square feet (139.35 square meters).

According to the LTCP, Revision 3, most of the ICS lysimeters are inspected four times per year. The SDT RCRA-Equivalent Cover lysimeters (Lysimeters 001, 002, and 003) will be inspected monthly for five years following the corrective action performed in December of 2020.

The percolation measurements are presented in Table 7.0-1. Table 7.0-2 presents rolling nine-month percolation totals for comparison to the non-routine action trigger level of 1.0 mm in nine months, and Table 7.0-3 presents twelve-month rolling totals for comparison to the compliance standard of 1.3 mm in 12 months. The compliance standard for percolation is the quantity of percolation that, if exceeded, would subject the Army to potential enforcement actions by the regulatory agencies. Enforcement of the compliance standard began on April 21, 2015. As shown in Tables 7.0-2 and 7.0-3 all ICS lysimeters were well below the non-routine action trigger level and the compliance standard for the entire reporting period.

Quarterly submission of percolation monitoring results for all cover lysimeters were issued to the regulatory agencies and included six months of data. Each quarterly submittal included monthly measurements, 9-month cumulative totals, and 12-month cumulative totals. Percolation data for FY22 were transmitted in January (Navarro 2022a), March (Navarro 2022b), June (Navarro 2022c), and September (Navarro 2022e).

8.0 ROUTINE AND NON-ROUTINE ACTIONS

8.1 Routine Actions

Routine maintenance and repairs were performed on ICS and were intended to ensure that the covers continue to function as designed. Routine maintenance and repair actions were identified during inspections and are discussed in Section 4.0 of this report. Figure 4.0-1 illustrates the locations of routine maintenance and repair activities performed on ICS during FY22. Appendix D includes Contractor Daily Quality Control Reports that describe the work performed.

8.2 Non-Routine Actions

The implementation of non-routine actions is described in the LTCP. The LTCP provides criteria for non-routine actions, and a mechanism for consultation between the parties and documentation of the consultative outcome. Each time a non-routine action was identified a NRAP was prepared to document the substandard condition, the actions that will be carried out to remedy the condition, consultation between the parties, and concurrence on the proposed action. Three NRAPs affecting the ICS were prepared during FY22.

NRAP-2021-003: NRAP-2021-003 documents the prescribed burn planned for the ICS during FY22. Due to weather restraints and limited resources, the ICS was not burned during FY22.

NRAP-2021-005: The NRAP documents the lack of vegetation diversity during Fiscal Year 2021 (FY21) and vegetation improvements that were conducted on ICS during FY22. This NRAP is referenced in Sections 4.7 and 6.4 of this report and is shown in the NRAP Log provided in Appendix E of this report.

NRAP-2022-002: NRAP-2022-002 documents the prescribed burn planned for the ICS during FY23. This NRAP is shown in the NRAP Log provided in Appendix E of this report.

9.0 RECOMMENDATIONS AND CORRECTIVE MEASURES

Inspections and assessments performed during FY22 produced the following recommendations for FY23:

- The site should be examined for weeds throughout FY23. Occurrences of Canada thistle, whitetop, and other noxious weeds should be spot sprayed.
- The site should continue to be examined for areas that could interrupt cover drainage, burrowing animal holes, excessive buildup of tumbleweeds, vegetation health, and localized settlement.
- A prescribed burn of the ICS in the fall or spring would be beneficial to the health of established native perennial grasses and would remove litter left behind after the robust growth of annual weeds.
- Close observation of the overseeded area that is documented in NRAP-2021-005 for established grass species and necessary maintenance to decrease weedy species.
- Selective mowing of ICS would be beneficial to the health of established native perennial grasses and would assist in the control of weedy species.
- The SDT RCRA-Equivalent Cover should continue to be monitored closely due to the intrusive repairs that were performed during 2020.

- Replace the eight-foot tall portion of the ICS perimeter fence in accordance with OCN-LTCP-2022-001.

No corrective measures are currently planned for FY23.

10.0 FY22 COSTS AND FY23 BUDGETS

Cost incurred performing Interim O&M of the ICS AMA during FY22, including inspections, repairs, and maintenance, was $159,479. A complete budget for FY23 has not been approved as of the issuance of this report. However, the FY23 budget is estimated to be approximately $152,000, but does not include the estimated cost of non-routine maintenance activities.

11.0 REFERENCES

Navarro (Navarro Research and Engineering, Inc.)

2022a (Jan 5) *Rocky Mountain Arsenal Integrated Cover System and Basin F Cover Lysimeter Monitoring Data, July 2021 through December 2021.*

2022b (Mar 22) *Rocky Mountain Arsenal Integrated Cover System and Basin F Cover Lysimeter Monitoring Data, October 2021 through March 2022.*

2022c (Jun 27) *Rocky Mountain Arsenal Integrated Cover System and Basin F Cover Lysimeter Monitoring Data, January 2022 through June 2022*.

2022d (Jul 19) *OCN-LTCP-2022-001: ICS Fence Design.*

2022e (Sep 21) *Rocky Mountain Arsenal Integrated Cover System and Basin F Cover Lysimeter Monitoring Data, April 2022 through September 2022*.

2021a (Aug 12) *RCRA-Equivalent, 2-, and 3-Foot Covers Long-Term Care Plan*. Revision 3.

2021b (Oct 12) *NRAP-2021-005: ICS Vegetation Improvement.*

2020 (Oct 10) *OCN-LTCP-2020-001: SDT Piezometers.*

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TABLES

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Table 5.0-1: Soil Cover Thickness Loss

ICS Monument No.	Measurement (in.) October 5, 2021	Measurement (in.) April 26, 2022	Change (in.)
ER01	0.75	0.25	-0.50
ER02	1.00	1.00	0.00
ER03	0.50	0.00	-0.50
ER04	2.25	2.25	0.00
ER05	1.50	1.00	-0.50
ER06	2.00	1.50	-0.50
ER07	0.75	0.00	-0.75
ER08	2.00	2.00	0.00
ER09	1.25	1.00	-0.25
ER10	1.00	1.00	0.00
ER11	1.00	1.00	0.00
ER12	1.00	0.75	-0.25
ER13	1.50	1.25	-0.25
ER14	1.25	1.00	-0.25
ER15	0.00	0.00	0.00
ER16	1.75	1.75	0.00
ER17	0.25	0.00	-0.25
ER18	0.00	0.00	0.00
ER19	0.00	0.00	0.00
ER20	0.75	1.00	0.25
ER21	0.50	0.50	0.00
ER22	1.50	1.50	0.00
ER23	1.00	0.50	-0.50
ER24	0.00	0.00	0.00
ER25	1.50	0.25	-1.25
ER26	0.25	0.50	0.25
ER27	1.50	1.25	-0.25
ER28	1.50	1.00	-0.50
ER29	2.50	1.50	-1.00
ER30	2.50	2.50	0.00
ER31	2.75	2.50	-0.25
ER32	0.75	0.00	-0.75
ER33	1.50	1.25	-0.25
ER34	1.75	1.50	-0.25
ER35	1.75	1.50	-0.25
ER36	1.75	1.50	-0.25
ER37	2.50	2.50	0.00

Table 5.0-1: Soil Cover Thickness Loss

ICS Monument No.	Measurement (in.) October 5, 2021	Measurement (in.) April 26, 2022	Change (in.)
ER38	2.75	2.50	-0.25
ER39	0.00	0.25	0.25
ER40	0.50	0.75	0.25
ER41	2.75	1.75	-1.00
ER42	1.50	1.00	-0.50
ER43	2.00	1.75	-0.25
ER44	2.50	2.00	-0.50
ER45	1.50	1.50	0.00
ER46	2.75	2.25	-0.50
ER47	2.25	1.75	-0.50
ER48	1.50	1.00	-0.50
ER49	1.00	1.00	0.00
ER50	0.50	0.25	-0.25
ER51	0.00	0.00	0.00
ER52	0.00	0.25	0.25
ER53	1.00	1.25	0.25
ER54	0.00	0.00	0.00
ER55	1.00	0.75	-0.25
ER56	1.00	1.00	0.00
ER57	0.50	0.00	-0.50
ER58	1.00	1.25	0.25
ER59	0.50	0.50	0.00
ER60	1.50	1.50	0.00
ER61	0.00	0.50	0.50
ER62	0.50	0.00	-0.50
ER63	2.00	1.75	-0.25
ER64	1.50	1.50	0.00
ER65	1.75	1.50	-0.25
ER66	1.75	1.50	-0.25
ER67	0.00	0.25	0.25
ER68	1.00	1.00	0.00
ER69	1.25	1.00	-0.25
ER70	0.00	0.00	0.00
ER71	1.00	0.75	-0.25
ER72	2.00	1.50	-0.50
ER73	2.00	0.00	-2.00
ER74	0.00	0.00	0.00

Table 5.0-1: Soil Cover Thickness Loss

ICS Monument No.	Measurement (in.) October 5, 2021	Measurement (in.) April 26, 2022	Change (in.)
ER75	0.50	0.00	-0.50
ER76	1.75	1.50	-0.25
ER77	1.00	0.50	-0.50
ER78	1.50	1.00	-0.50
ER79	0.50	0.25	-0.25
ER80	1.00	0.00	-1.00
ER81	1.75	1.50	-0.25
ER82	1.25	0.75	-0.50
ER83	0.25	0.00	-0.25
ER84	1.75	1.50	-0.25
ER85	1.00	0.00	-1.00
ER86	0.00	0.00	0.00
ER87	0.00	0.00	0.00
ER88	1.50	1.00	-0.50
ER89	1.75	1.00	-0.75
ER90	1.00	1.00	0.00
ER91	1.50	1.00	-0.50
ER92	1.00	0.00	-1.00

Table 6.0-1: 2022 Vegetation Performance Assessment Summary

Performance Criterion and Evaluation	2-Foot and 3-Foot Covers (Note 1)	ICS RCRA-Equivalent Cover
Total Absolute Ground Cover	96.40%	91.80%
Allowable Total Absolute Live Vegetation Cover	57.80%	47.94%
Vegetation Performance Standard for Total Live Vegetation	≥ 25%	≥ 25%
Is Vegetation Performance Standard met? (Enforcement started in fall 2015.)	Yes	Yes
Two Year Running Average for Total Absolute Ground Cover	96.45%	94.35%
Vegetation Performance Standard for Two Year Running Average	≥ 50%	≥ 50%
Is Vegetation Performance Standard met? (Enforcement started in fall 2016.)	Yes	Yes
Three Year Running Average for Total Absolute Ground Cover	96.92%	94.70%
Vegetation Performance Standard for Three Year Running Average	≥ 67%	≥ 67%
Is Vegetation Performance Standard met? (Enforceable starting in fall 2017.)	Yes	Yes
Relative Weed Cover	29.72%	41.90%
Relative Allowable Weed Cover	N/A (Note 3)	≤ 10%
Calculate Total Live Vegetation without the weed fraction? (Note 2)	N/A (Note 3)	Yes

Note 1: For 2-Foot and 3-Foot soil covers, vegetation performance criteria function as Non-Routine Action Trigger Levels, not compliance standards.

Note 2: The relative weed cover is less than 10 percent, therefore, subtracting all but 10 percent of the total live vegetation cover fraction that is comprised of weeds does not affect the Total Live Vegetation calculation. The Total Live Vegetation values are within the Non-Routine Action Trigger Levels.

Note 3: The relative weed fraction does not affect vegetation compliance or non-routine actions on the 2-Foot and 3-Foot soil covers.

Table 6.0-2 Plant Species Observed on the ICS Army Maintained Area

Common Name	Scientific Name
Agave family	Agavaceae
Yucca/Soapweed	*Yucca glauca*
Amaranth family	Amaranthaceae
Redroot pigweed *	*Amaranthus retroflexus*
Milkweed family	Asclepiadaceae
Showy milkweed	*Asclepias speciosa*
Sunflower family	Asteraceae
Yarrow	*Achillea lanulosa*
Western ragweed	*Ambrosia psilostachya*
White sagebrush/Louisiana sagewort	*Artemisia ludoviciana*
Musk thistle* (B)	*Carduus nutans*
Canada thistle * (B)	*Cirsium arvense*
Horseweed	*Conyza canadensis*
Praire sunflower	*Helianthus petiolaris*
Hairy false goldenaster	*Heterotheca villosa*
Prickly lettuce *	*Lactuca serriola*
Rush skeletonweed/Rush skeletonplant	*Lygodesmia juncea*
Lacy tansyaster	*Machaeranthera pinnatifida*
Scotch thistle * (B)	*Onopordum acanthium*
Broom groundsel	*Senecio spartioides*
Common dandelion *	*Taraxacum officinale*
Yellow salsify *	*Tragopogon dubius*
Golden crownbeard/Cowpen daisy	*Verbesina encelioides*
Mustard family	Brassicaceae
Pinnate tansy mustard/Western tansymustard	*Descurainia pinnata*
Tall tumble-mustard *	*Sisymbrium altissimum*
Goosefoot family	Chenopodiaceae
Lambsquarters/White goosefoot*	*Chenopodium album*
Narrowleaf goosefoot	*Chenopodium leptophyllum*
Burningbush/Kochia *	*Kochia scoparia*
Slender Russian-thistle *	*Salsola collina*
Russian-thistle *	*Salsola tragus*
Morning glory family	Convolvulaceae
Field bindweed * (C)	*Convolvulus arvensis*
Pea family	Fabaceae
Alfalfa *	*Medicago sativa*
White sweetclover *	*Melilotus albus*
Yellow sweetclover *	*Melilotus officinalis*

Table 6.0-2 Plant Species Observed on the ICS Army Maintained Area

Common Name	Scientific Name
Poppy family	Papaveraceae
Crested prickly poppy	*Argemone polyanthemos*
Grass family	Poaceae
Crested wheatgrass *	*Agropyron cristatum*
Big bluestem	*Andropogon gerardii*
Sand bluestem	*Andropogon hallii*
Purple threeawn	*Aristida purpurea var. purpurea*
Sideoats grama	*Bouteloua curtipendula*
Blue grama	*Bouteloua gracilis*
Smooth brome *	*Bromus inermis*
Japanese brome/Field brome *	*Bromus japonicus*
Cheatgrass/Downy brome *(C)	*Bromus tectorum*
Buffalograss	*Buchloe dactyloides*
Prairie sandreed	*Calamovilfa longifolia*
Squirreltail	*Elymus elymoides*
Needle and thread	*Hesperostipa comata*
Foxtail barley	*Hordeum jubatum*
Little barley	*Hordeum pusillum*
Witchgrass	*Panicum capillare*
Switchgrass	*Panicum virgatum*
Western wheatgrass	*Pascopyrum smithii*
Little bluestem	*Schizachyrium scoparium*
Alkalai sacaton	*Sporobolus airoides*
Sand dropseed	*Sporobolus cryptandrus*
Buckwheat family	Polygonaceae
Curly dock *	*Rumex crispus*
Narrowleaf dock *	*Rumex stenophyllus*
Willow Dock/Mexican dock	*Rumex salicifolius* var. *mexicanus*
Figwort family	Scrophulariaceae
Great Mullein	*Verbascum thapsus*

* Non-native species (A) (B) (C) = Colorado noxious weed listing

Table 6.3-1: Sample Adequacy Results

Cover Area	Sample Size (n)	Minimum Sample Size total live cover (N_{min})
ICS RCRA-Equivalent Covers	10	2.99
ICS 2-Ft and 3-Ft Soil Covers	5	4.81

Note: Based on absolute total live vegetation cover

Table 7.0-1: Monthly Percolation Measurements

Lysimeter No.	Monthly Percolation Measurement (Liters)											
	Oct-21[1]	Nov-21	Dec-21[1]	Jan-22[1]	Feb-22[1]	Mar-22[1]	Apr-22[1]	May-22	Jun-22[1]	Jul-22	Aug-22[1]	Sep-22
Lysimeter 001	0	0	0	0	0	0	0	0	0	0	0	0
Lysimeter 002	0	Trace	0	0	0	0	0	0	0	0	0	0
Lysimeter 003	0	0	Trace	0	0	Trace	0	0	0	0	0	0
Lysimeter 004		0.5						Trace		0		1
Lysimeter 005		7						Trace		0		3
Lysimeter 006		0						0		0		0
Lysimeter 007		0						Trace		0		1
Lysimeter 008		1.5						Trace		Trace		1
Lysimeter 009		0						Trace		0		0
Lysimeter 010		Trace						Trace		0		0
Lysimeter 011		Trace						0		0		Trace
Lysimeter 012		0						0		0		0
Lysimeter 013		3						Trace		0		6
Lysimeter 014		0						Trace		0		0
Lysimeter 015		1						Trace		0		Trace

Note 1: Lysimeters 004 through 015 are inspected in May, July, September, and November.

Table 7.0-2: Rolling Nine-Month Percolation Totals

Lysimeter No.	Rolling Nine-Month Percolation Total (mm)											
	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22
Lysimeter 001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lysimeter 002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lysimeter 003	0.04	0.04	0.04	0.04	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Lysimeter 004	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.01
Lysimeter 005	0.01	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.00	0.02
Lysimeter 006	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lysimeter 007	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Lysimeter 008	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.01	0.00	0.01
Lysimeter 009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lysimeter 010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lysimeter 011	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lysimeter 012	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lysimeter 013	0.04	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.02	0.02	0.00	0.04
Lysimeter 014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lysimeter 015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 7.0-3: Rolling Twelve-Month Percolation Totals

Lysimeter No.	Rolling Twelve-Month Percolation Total (mm)											
	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22
Lysimeter 001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lysimeter 002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lysimeter 003	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.02	0.01	0.00	0.00	0.00
Lysimeter 004	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01
Lysimeter 005	0.01	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.07
Lysimeter 006	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lysimeter 007	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Lysimeter 008	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.02
Lysimeter 009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lysimeter 010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lysimeter 011	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lysimeter 012	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lysimeter 013	0.04	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Lysimeter 014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lysimeter 015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

FIGURES

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Figure 3.1-1: Average Monthly Temperature for FY22

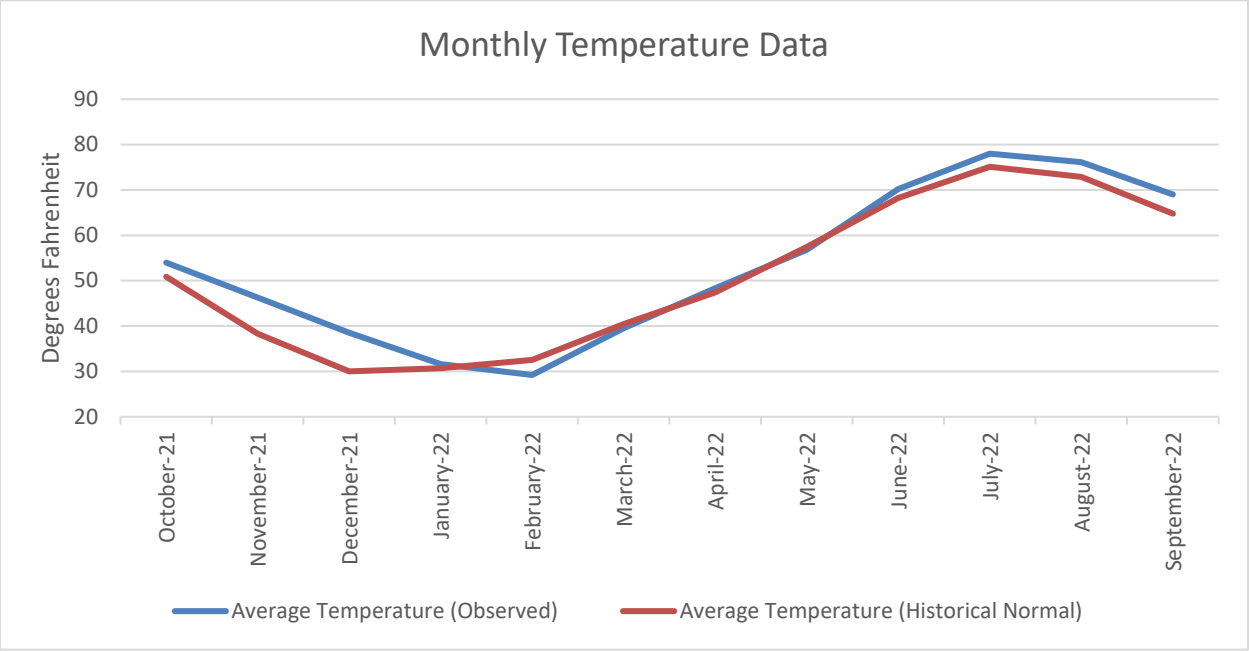
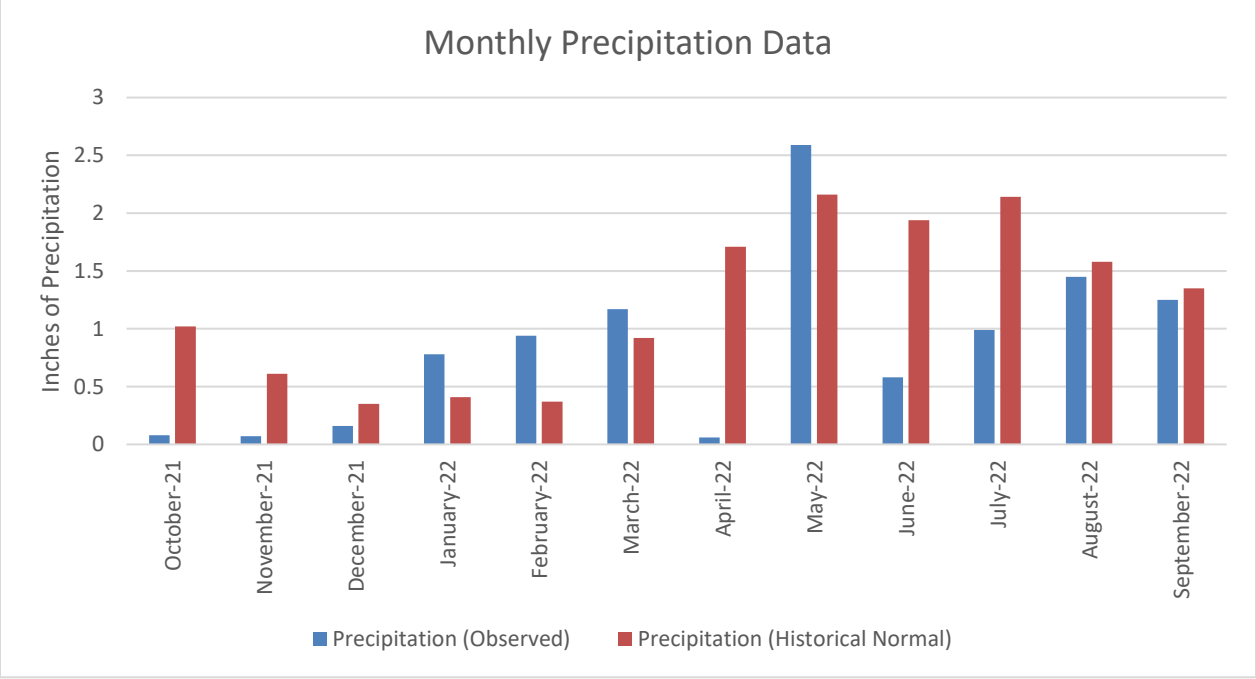
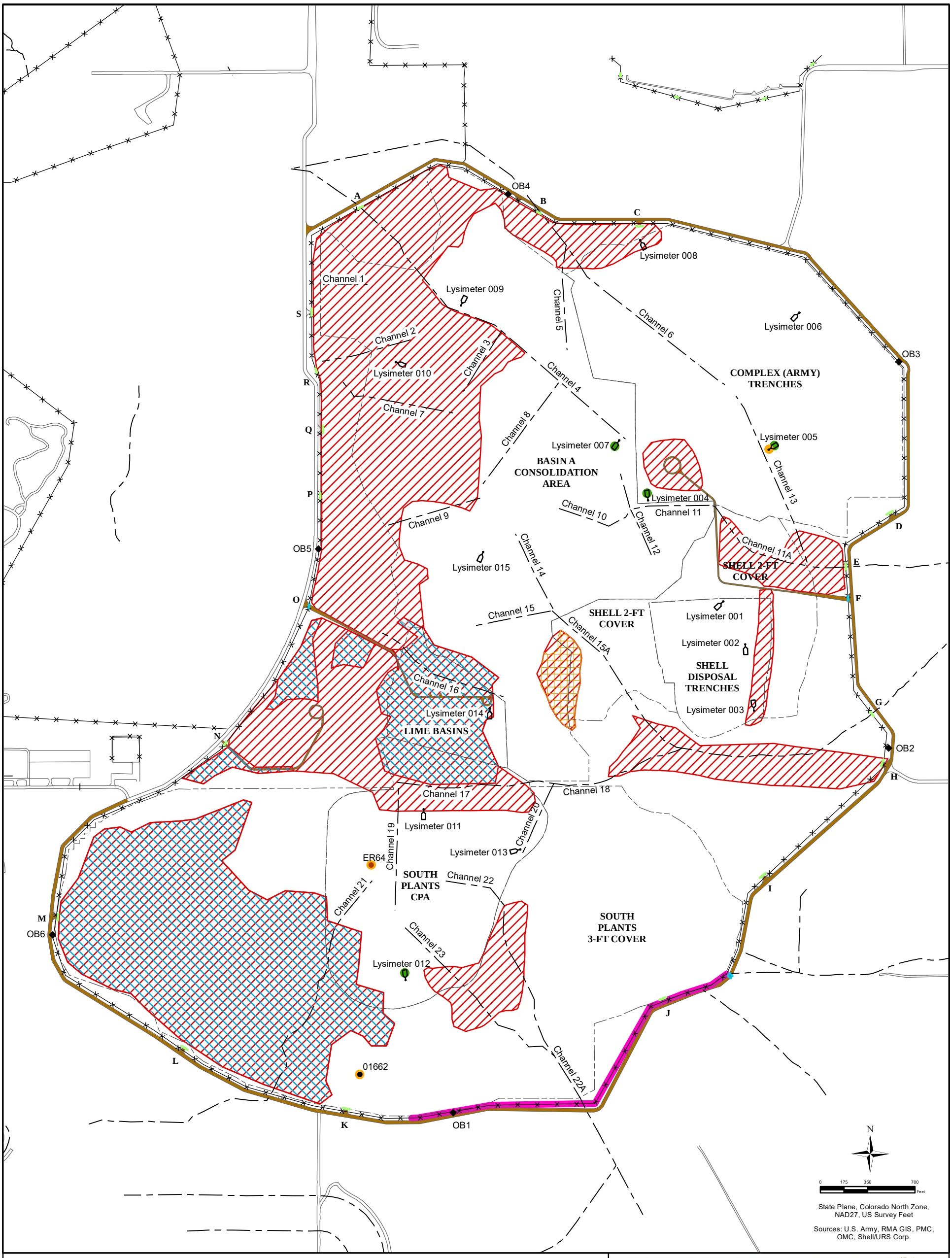


Figure 3.1-2: Average Monthly Precipitation for FY22





Legend

- Cover Boundary
- Perimeter Access Road
- Fence
- Cattle Guard
- Gate
- Lysimeter
- Channel Flow Line
- Obelisk
- Erosion Monument
- Well
- Lysimeter Maintenance
- Carsonite Marker Maintenance
- Repaired Perimeter Fence
- Mowed Areas
- Overseeded, Mowed and Herbicide Areas
- Whitetop Herbicide Application Area
- Ground Clear Herbicide Application Area
- G — Labeled Gates and Cattle Guards

Note 1. The outside shoulder of the Perimeter Access Road defines the Army Maintained Area Boundary (AMA).
Note 2. The ICS Perimeter Road was maintained by a motorgrader as needed.
Note 3. Tumbleweeds were removed from the Perimeter Fence and Road.

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Figure 4.0-1

2022 Integrated Cover System
Routine and Non-Routine
Maintenance Activities

ICS_RoutineMaintenanceActivities_Nov2022.mxd
11/16/2022

APPENDICES

A Precipitation Data (October 1, 2021 through September 30, 2022)

B 2022 Vegetation Performance Assessment Documentation

C Cover Inspection Documentation (October 1, 2021 through September 30, 2022)

D Maintenance and Repair Documentation (October 1, 2021 through September 30, 2022)

E NRAP Log

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APPENDIX A

Precipitation Data

(October 1, 2021 through September 30, 2022)

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Appendix A - Precipitation Data (October 1, 2021 through September 30, 2022)

Note 1: The reporting period for this table is October 1, 2021 through September 30, 2022.

Note 2: This table provides precipitation data for all dates when precipitation was recorded. For dates not shown, there was no recorded precipitation.

Note 3: The yellow highlighted boxes indicate that there was more than one inch of precipitation in a 24-hour period.

Date	Lime Basins Daily Precipitation (in.)
October 12, 2021	0.01
October 26, 2021	0.01
November 2, 2021	0.01
December 10, 2021	0.07
December 15, 2021	0.02
December 24, 2021	0.01
December 31, 2021	0.13
January 1, 2022	0.09
January 5, 2022	0.08
January 6, 2022	0.16
January 21, 2022	0.02
January 25, 2022	0.21
January 27, 2022	0.12
February 1, 2022	0.05
February 2, 2022	0.11
February 11, 2022	0.33
February 12, 2022	0.01
February 16, 2022	0.22
February 17, 2022	0.04
February 22, 2022	0.02
February 23, 2022	0.06
February 24, 2022	0.11
March 5, 2022	0.12
March 6, 2022	0.12
March 9, 2022	0.02
March 10, 2022	0.02
March 16, 2022	0.35
March 17, 2022	0.41
March 29, 2022	0.13
April 10, 2022	0.05
April 17, 2022	0.04
May 1, 2022	0.04
May 2, 2022	0.45
May 3, 2022	0.15
May 4, 2022	0.10
May 5, 2022	0.11
May 20, 2022	0.70
May 21, 2022	0.20
May 29, 2022	0.21

Appendix A - Precipitation Data (October 1, 2021 through September 30, 2022)

Date	Lime Basins Daily Precipitation (in.)
May 31, 2022	0.93
June 1, 2022	0.54
June 29, 2022	0.10
June 30, 2022	0.01
July 1, 2022	0.01
July 7, 2022	0.17
July 19, 2022	0.04
July 20, 2022	0.02
July 23, 2022	0.12
July 24, 2022	0.12
July 26, 2022	1.07
July 27, 2022	0.07
July 28, 2022	0.10
August 6, 2022	0.88
August 7, 2022	0.46
August 15, 2022	0.13
August 16, 2022	0.42
August 22, 2022	0.04
August 28, 2022	0.02
September 2, 2022	0.05
September 9, 2022	0.02
September 10, 2022	0.22
September 21, 2022	0.14
September 22, 2022	0.04
September 30, 2022	0.30
Lime Basins Total:	**11.13**

APPENDIX B

2022 Vegetation Performance Assessment Documentation

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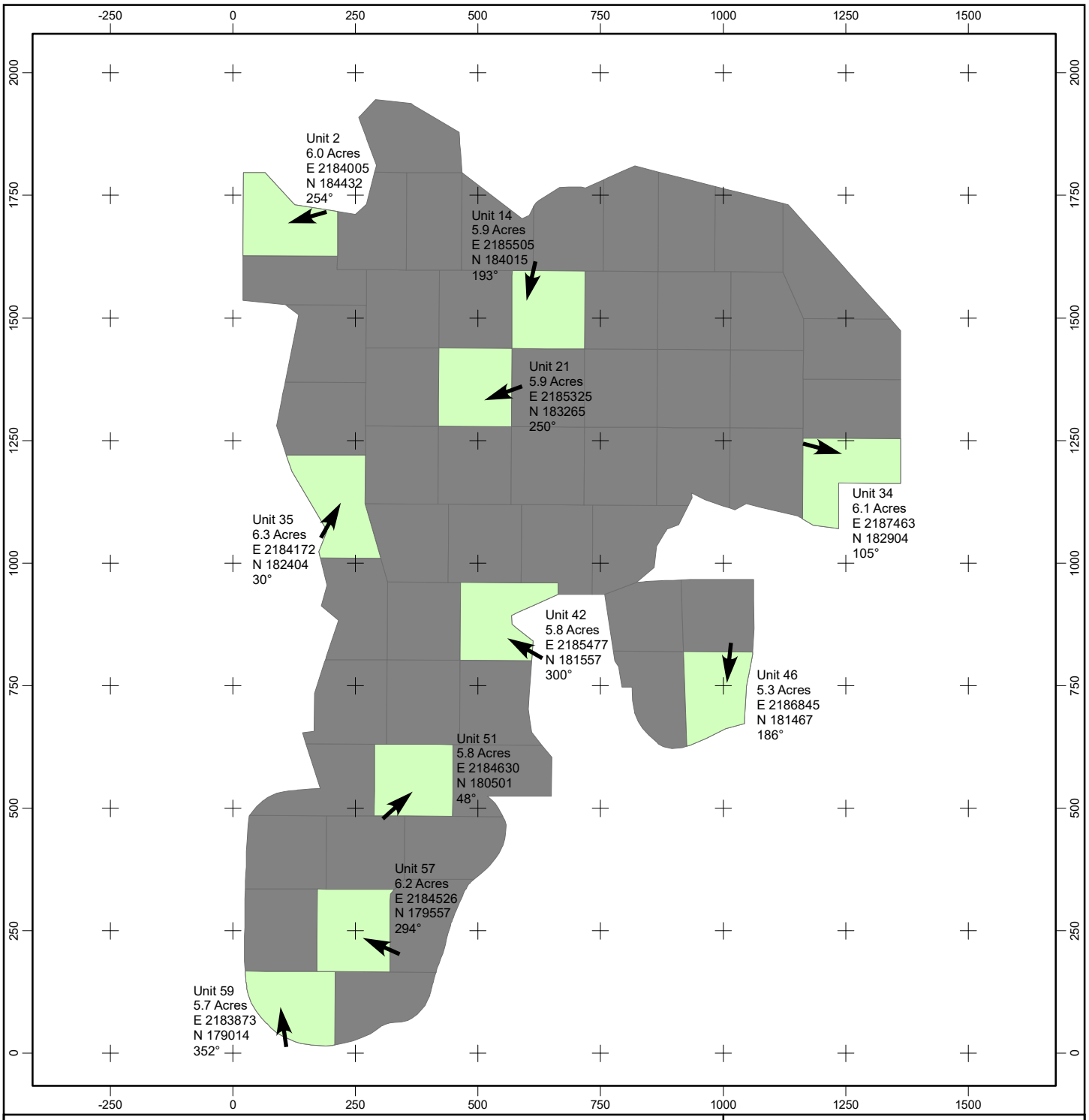

Legend

- Sampled Unit
- Non-Sampled Unit

N

250 meter grid shown for reference
Coordinates are listed in
Colorado State Plane
North Zone (NAD 1927)

0 50 100 200 300 400

Meters

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Appendix D, Figure 1

ICS RCRA-Equivalent Cover (340.95 Acres) 2022 Random Transect Survey Locations

M:\projects\OMC\Vegetation\mxds\ICS_RCRA_2022.mxd
11/15/2022

ICS RCRA
Unit 2


ICS RCRA
Unit 14

ICS RCRA
Unit 21


ICS RCRA
Unit 34

ICS RCRA
Unit 35

ICS RCRA
Unit 42


ICS RCRA
Unit 46

ICS RCRA
Unit 51

ICS RCRA

Unit 54


ICS RCRA
Unit 59

Table 6.1.1

Cover and Frequency summary for the ICS RCRA-Equivalent at Rocky Mountain Arsenal. Based on data from 10 sampling locations. 2022 data. +/- values equal the standard deviation. Incidental Species present within 1 meter on either side of the data transect, but not quantitatively encountered.

2022

Species	Mean Cover (%)	Relative Cover (%)	Range of Cover Values (%)	Percent Frequency (%)	Relative Frequency(%)	[2]Rank
COOL SEASON PERENNIAL GRASSES						
Hesperostipa comata	1.2	1.7	0 - 4	40.0	4.94	10.0
Pascopyrum smithii	10.2	14.49	0 - 32	90.0	11.11	4.0
Sub-Total	11.4	16.19				
WARM SEASON PERENNIAL GRASSES						
Bouteloua curtipendula	8.4	11.93	0 - 37	90.0	11.11	5.0
Buchloe dactyloides	5.2	7.39	0 - 16	80.0	9.88	6.0
Chondrosum gracile	11.9	16.9	0 - 31	90.0	11.11	3.0
Panicum virgatum	0.2	.28	0 - 2	10.0	1.23	13.0
Sporobolus airoides	1.8	2.56	0 - 10	50.0	6.17	8.0
Sporobolus cryptandrus	1.4	1.99	0 - 5	50.0	6.17	9.0
Sub-Total	28.9	41.05				

INTRODUCED PERENNIAL GRASSES						
Psathyrostachys juncea	0.2	.28	0 - 2	10.0	1.23	13.0
Sub-Total	.2	.28				
ANNUAL GRASSES						
[1] Bromus tectorum	0.5	.71	0 - 4	20.0	2.47	11.0
Sub-Total	.5	.71				
ANNUAL AND BIENNIAL FORBS						
Amaranthus arenicola	0.3	.43	0 - 2	20.0	2.47	12.0
[1] Bassia sieversiana	12.5	17.76	0 - 37	90.0	11.11	2.0
[1] Salsola collina	14.4	20.45	0 - 25	90.0	11.11	1.0
[1] Sisymbrium altissimum	2.1	2.98	0 - 5	70.0	8.64	7.0
Ximenesia encelioides	0.1	.14	0 - 1	10.0	1.23	14.0
Sub-Total	29.4	41.76				
SUM OF SPECIES COVER	70.4	99.99				

[3]Total Absolute Mean Vegetation Cover	70.40	+/-3.84
[3]Total Absolute Mean Litter Cover	21.40	+/-3.86
[3]Total Absolute Mean Bare Soil	8.20	+/-1.42
[3]Total Absolute Mean Weedy Cover	29.50	+/-8.20
Total Absolute Ground Cover	91.80	+/-1.42
Relative Weed Cover	41.90	

Incidental Species
i.e < 0.01 Mean Cover

Amaranthus arenicola
Bassia sieversiana
Buchloe dactyloides
Chenopodium leptophyllum
Chondrosum gracile

Relative Allowable Weed Cover	10.0	
Relative Non-Allowable Cover by Weeds	31.90	
Non-Allowable Absolute Weedy Cover	22.46	
Allowable Total Absolute Live Vegetation Cover	47.94	
Mean Number of Species/Sample	8.1	
Mean Species Density/100sq. meters	9.00	+/-0.73

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[1] Weedy Species

[2] Based on total cover

[3] Based on 1st hit data

Helianthus annuus
Hesperostipa comata
Psathyrostachys juncea
Salsola collina
Schizachyrium scoparium
Sisymbrium altissimum
Sporobolus airoides
Sporobolus cryptandrus

Table 6.1.2	Vegetation Performance Assessment ICS RCRA-Equivalent Reporting Years 2020, 2021, 2022	2022

Reporting Year: 2020

Species	Mean Cover (%)	Relative Cover (%)	Range of Cover Values (%)	Percent Frequency (%)	Relative Frequency(%)	[2]Rank
COOL SEASON PERENNIAL GRASSES						
Pascopyrum smithii	31.47	65.43	13 - 49	100.00	23.62	1
Sub-Total	31.47	65.43				
WARM SEASON PERENNIAL GRASSES						
Bouteloua curtipendula	2.90	6.03	0 - 16	56.67	13.39	4
Buchloe dactyloides	4.77	9.92	0 - 16	90.00	21.26	3
Chondrosum gracile	6.97	14.49	0 - 24	86.67	20.47	2
Sporobolus airoides	0.87	1.81	0 - 14	23.33	5.51	5
Sub-Total	15.51	32.25				
ANNUAL GRASSES						
[1] Bromus tectorum	0.17	.35	0 - 4	6.67	1.58	9
Panicum capillare	0.03	.06	0 - 1	3.33	.79	10
Sub-Total	0.20	0.41				

ANNUAL AND BIENNIAL FORBS						
Amaranthus arenicola	0.30	.62	0 - 8	6.67	1.58	7
[1] Bassia sieversiana	0.33	.69	0 - 2	26.67	6.30	6
[1] Lactuca serriola	0.03	.06	0 - 1	3.33	.79	10
[1] Salsola collina	0.27	.56	0 - 2	20.00	4.72	8
Sub-Total	0.93	1.93				
SUM OF SPECIES COVER	48.11	100.0				

CRITERIA ASSESSMENT

Total Absolute Cover	95.40
Allowable Total Absolute Live Vegetation Cover 2020	48.10

Reporting Year: 2021

Species	Mean Cover (%)	Relative Cover (%)	Range of Cover Values (%)	Percent Frequency (%)	Relative Frequency(%)	[2]Rank
COOL SEASON PERENNIAL GRASSES						
Hesperostipa comata	0.30	.49	0 - 2	20.00	2.44	10
Pascopyrum smithii	11.50	18.95	3 - 21	100.00	12.20	2
Sub-Total	11.80	19.44				

WARM SEASON PERENNIAL GRASSES						
Bouteloua curtipendula	5.80	9.56	0 - 20	80.00	9.76	5
Buchloe dactyloides	3.40	5.60	0 - 11	60.00	7.32	6
Chondrosum gracile	10.60	17.46	3 - 25	100.00	12.20	3
Schizachyrium scoparium	0.10	.16	0 - 1	10.00	1.22	12
Sporobolus airoides	2.50	4.12	0 - 24	20.00	2.44	7
Sporobolus cryptandrus	0.70	1.15	0 - 3	40.00	4.88	9
Sub-Total	23.10	38.05				
ANNUAL GRASSES						
Panicum capillare	1.80	2.97	0 - 5	50.00	6.10	8
Sub-Total	1.80	2.97				
ANNUAL AND BIENNIAL FORBS						
[1] Bassia sieversiana	7.10	11.70	2 - 21	100.00	12.20	4
Chenopodium album	0.10	.16	0 - 1	10.00	1.22	12
Helianthus annuus	0.10	.16	0 - 1	10.00	1.22	12
[1] Lactuca serriola	0.20	.33	0 - 1	20.00	2.44	11
[1] Melilotus officinale	0.10	.16	0 - 1	10.00	1.22	12
[1] Salsola collina	14.30	23.56	2 - 30	100.00	12.20	1
[1] Sisymbrium altissimum	1.80	2.97	0 - 11	60.00	7.32	8
Solanum triflorum	0.20	.33	0 - 1	20.00	2.44	11
Ximenesia encelioides	0.10	.16	0 - 1	10.00	1.22	12
Sub-Total	24.00	39.53				

SUM OF SPECIES COVER	60.70	100.0

CRITERIA ASSESSMENT

Total Absolute Cover	96.90
Allowable Total Absolute Live Vegetation Cover 2021	43.27

Reporting Year: 2022

Species	Mean Cover (%)	Relative Cover (%)	Range of Cover Values (%)	Percent Frequency (%)	Relative Frequency(%)	[2]Rank
COOL SEASON PERENNIAL GRASSES						
Hesperostipa comata	1.20	1.70	0 - 4	40.00	4.94	10
Pascopyrum smithii	10.20	14.49	0 - 32	90.00	11.11	4
Sub-Total	11.40	16.19				
WARM SEASON PERENNIAL GRASSES						
Bouteloua curtipendula	8.40	11.93	0 - 37	90.00	11.11	5
Buchloe dactyloides	5.20	7.39	0 - 16	80.00	9.88	6
Chondrosum gracile	11.90	16.90	0 - 31	90.00	11.11	3
Panicum virgatum	0.20	.28	0 - 2	10.00	1.23	13
Sporobolus airoides	1.80	2.56	0 - 10	50.00	6.17	8
Sporobolus cryptandrus	1.40	1.99	0 - 5	50.00	6.17	9

Sub-Total	28.90	41.05				
INTRODUCED PERENNIAL GRASSES						
Psathyrostachys juncea	0.20	.28	0 - 2	10.00	1.23	13
Sub-Total	0.20	0.28				
ANNUAL GRASSES						
[1] Bromus tectorum	0.50	.71	0 - 4	20.00	2.47	11
Sub-Total	0.50	0.71				
ANNUAL AND BIENNIAL FORBS						
Amaranthus arenicola	0.30	.43	0 - 2	20.00	2.47	12
[1] Bassia sieversiana	12.50	17.76	0 - 37	90.00	11.11	2
[1] Salsola collina	14.40	20.45	0 - 25	90.00	11.11	1
[1] Sisymbrium altissimum	2.10	2.98	0 - 5	70.00	8.64	7
Ximenesia encelioides	0.10	.14	0 - 1	10.00	1.23	14
Sub-Total	29.40	41.76				
SUM OF SPECIES COVER	70.40	100.0				

CRITERIA ASSESSMENT

Total Absolute Cover	91.80
Allowable Total Absolute Live Vegetation Cover 2022	47.94

Two year running average for Total Absolute Cover	94.35
Three year running average for Total Absolute Cover	94.7

[1] Weedy Species

[2] Based on total cover

[3] Based on 1st hit data

Table 6.1.3

Sample Adequacy Check

2022

ICS RCRA-Equivalent

Year : 2022

Transect	Hits
02 :	69
14 :	72
21 :	73
34 :	76
35 :	78
42 :	69
46 :	82
51 :	54
57 :	74
59 :	57

Sample Adequacy = 2.99

(Mean value: 70.4, Sample Variance: 8.81, One Tailed Value: 1.383)

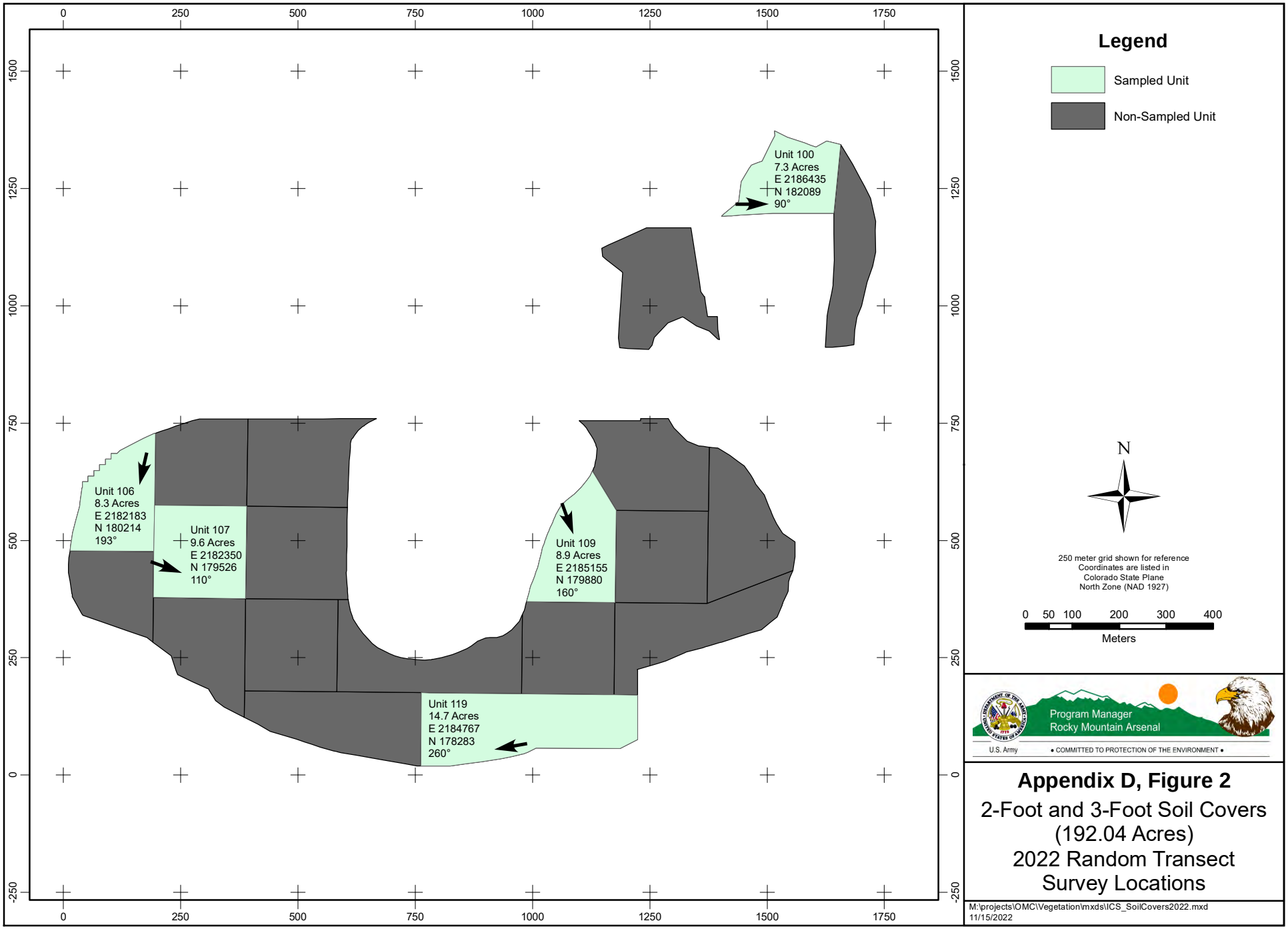
Table 6.1.4 - ICS RCRA-Equivalent Cover
Raw Data Report

Sampled by: Andrew Martinez
Sample Date(s): 8/24/2022

1 - Only plant species that were hit or observed along the transect are recorded in this table.
Blank boxes indicate the species was not present on the transect.
2 - Species with cover values of 0.1 were species observed within the 100 meter zone associated with each transect,
but not recorded in the quantitative data collection for each transect.
3 - # of species/100sq meter zone

	Transects									
SPECIES/Other	**02**	**14**	**21**	**34**	**35**	**42**	**46**	**51**	**57**	**59**
BARE SOIL	5.0	9.0	7.0	8.0	3.0	8.0	10.0	6.0	12.0	14.0
LITTER	26.0	19.0	20.0	16.0	19.0	23.0	8.0	40.0	14.0	29.0
AMARANTHUS ARENICOLA			0.1		2.0	1.0				
BASSIA SIEVERSIANA	6.0	19.0	12.0	5.0	32.0	37.0	0.1	8.0	4.0	2.0
BOUTELOUA CURTIPENDULA	12.0	4.0	3.0	6.0		5.0	37.0	2.0	7.0	8.0
BROMUS TECTORUM						4.0		1.0		
BUCHLOE DACTYLOIDES	5.0	7.0	3.0	8.0		4.0	16.0	0.1	7.0	2.0
CHENOPODIUM LEPTOPHYLLUM			0.1							
CHONDROSUM GRACILE	3.0	27.0	13.0	31.0	0.1	2.0	11.0	2.0	17.0	13.0
HELIANTHUS ANNUUS		0.1				0.1				
HESPEROSTIPA COMATA	0.1	2.0	4.0				0.1		3.0	3.0
PANICUM VIRGATUM								2.0		
PASCOPYRUM SMITHII	32.0	3.0	6.0	18.0	13.0		4.0	17.0	7.0	2.0
PSATHYROSTACHYS JUNCEA					2.0					0.1
SALSOLA COLLINA	9.0	7.0	24.0	5.0	24.0	11.0	0.1	19.0	20.0	25.0
SCHIZACHYRIUM SCOPARIUM		0.1								
SISYMBRIUM ALTISSIMUM	1.0	0.1	5.0		5.0	2.0		3.0	3.0	2.0
SPOROBOLUS AIROIDES		2.0	0.1	2.0		3.0	10.0		1.0	
SPOROBOLUS CRYPTANDRUS	1.0		3.0	1.0	0.1	0.1	4.0		5.0	
XIMENESIA ENCELIOIDES		1.0								
Total Hits plus Incidental Species:	**100.1**	**100.3**	**100.3**	**100.0**	**100.2**	**100.2**	**100.3**	**100.1**	**100.0**	**100.1**
Species Density:	**9**	**12**	**12**	**8**	**8**	**11**	**9**	**9**	**10**	**9**

[3] Sample Mean: 9.7, Variance: 1.49



Appendix D, Figure 2

2-Foot and 3-Foot Soil Covers
(192.04 Acres)
2022 Random Transect
Survey Locations

M:\projects\OMC\Vegetation\mxds\ICS_SoilCovers2022.mxd
11/15/2022


2-ft/3-ft
Unit 100


2-ft/3-ft
Unit 106


2-ft/3-ft
Unit 107


2-ft/3-ft
Unit 109

2-ft/3-ft

Unit 119

Table 6.2.1

Cover and Frequency summary for the 2 Foot and 3 Foot at Rocky Mountain Arsenal. Based on data from 5 sampling locations. 2022 data. +/- values equal the standard deviation. Incidental Species present within 1 meter on either side of the data transect, but not quantitatively encountered.

2022

Species	Mean Cover (%)	Relative Cover (%)	Range of Cover Values (%)	Percent Frequency (%)	Relative Frequency(%)	[2]Rank
COOL SEASON PERENNIAL GRASSES						
Hesperostipa comata	1.2	1.67	0 - 5	40.0	5.56	9.0
Pascopyrum smithii	22.0	30.56	14 - 30	100.0	13.89	1.0
Sub-Total	23.2	32.23				
WARM SEASON PERENNIAL GRASSES						
Bouteloua curtipendula	2.0	2.78	0 - 7	40.0	5.56	7.0
Buchloe dactyloides	1.8	2.5	0 - 5	80.0	11.11	8.0
Chondrosum gracile	7.0	9.72	2 - 17	100.0	13.89	4.0
Panicum virgatum	0.2	.28	0 - 1	20.0	2.78	10.0
Sporobolus airoides	2.8	3.89	0 - 7	60.0	8.33	6.0
Sporobolus cryptandrus	12.4	17.22	1 - 25	100.0	13.89	3.0
Sub-Total	26.2	36.39				

ANNUAL AND BIENNIAL FORBS						
Amaranthus arenicola	1.2	1.67	0 - 6	20.0	2.78	9.0
[1] Bassia sieversiana	4.2	5.83	0 - 11	60.0	8.33	5.0
[1] Salsola collina	17.2	23.89	5 - 32	100.0	13.89	2.0
Sub-Total	22.6	31.39				
SUM OF SPECIES COVER	72.0	100.01				

[3]Total Absolute Mean Vegetation Cover	72.00	+/- 7.04
[3]Total Absolute Mean Litter Cover	24.40	+/- 6.21
[3]Total Absolute Mean Bare Soil	3.60	+/- 1.04
[3]Total Absolute Mean Weedy Cover	21.40	+/- 6.95
Total Absolute Ground Cover	96.40	+/- 1.04
Relative Weed Cover	29.72	
Relative Allowable Weed Cover	10.0	
Relative Non-Allowable Cover by Weeds	19.72	
Non-Allowable Absolute Weedy Cover	14.20	
Allowable Total Absolute Live Vegetation Cover	57.80	
Mean Number of Species/Sample	7.2	
Mean Species Density/100sq. meters	9.00	+/- 0.84

Incidental Species
i.e < 0.01 Mean Cover

Amaranthus arenicola
Bassia sieversiana
Chrysothamnus nauseosus
Convolvulus arvensis
Helianthus annuus
Rumex crispus
Sisymbrium altissimum
Solanum rostratum
Yucca glauca

[1] Weedy Species

[2] Based on total cover

[3] Based on 1st hit data

Table 6.2.2	Vegetation Performance Assessment 2 Foot and 3 Foot Reporting Years 2020, 2021, 2022	2022

Reporting Year: 2020

Species	Mean Cover (%)	Relative Cover (%)	Range of Cover Values (%)	Percent Frequency (%)	Relative Frequency(%)	[2]Rank
COOL SEASON PERENNIAL GRASSES						
Hesperostipa comata	0.13	.28	0 - 1	13.33	2.53	10
Pascopyrum smithii	38.80	82.79	26 - 48	100.00	18.99	1
Sub-Total	38.93	83.07				
WARM SEASON PERENNIAL GRASSES						
Bouteloua curtipendula	1.20	2.56	0 - 6	60.00	11.39	3
Buchloe dactyloides	1.80	3.84	0 - 15	33.33	6.33	2
Chondrosum gracile	1.13	2.41	0 - 4	60.00	11.39	4
Sporobolus airoides	0.47	1.00	0 - 3	26.67	5.06	6
Sporobolus cryptandrus	0.53	1.13	0 - 2	33.33	6.33	5
Sub-Total	5.13	10.94				
ANNUAL GRASSES						
[1] Bromus tectorum	0.53	1.13	0 - 3	26.67	5.06	5
Eragrostis cilianensis	0.07	.15	0 - 1	6.67	1.27	11

Panicum capillare	0.53	1.13	0 - 3	40.00	7.60	5
Sub-Total	1.13	2.41				
ANNUAL AND BIENNIAL FORBS						
Amaranthus albus	0.40	.85	0 - 2	26.67	5.06	7
Amaranthus arenicola	0.13	.28	0 - 1	13.33	2.53	10
[1] Bassia sieversiana	0.27	.58	0 - 2	20.00	3.80	8
Chenopodium album	0.20	.43	0 - 2	13.33	2.53	9
Helianthus annuus	0.13	.28	0 - 1	13.33	2.53	10
[1] Salsola collina	0.47	1.00	0 - 2	33.33	6.33	6
[1] Sisymbrium altissimum	0.07	.15	0 - 1	6.67	1.27	11
Sub-Total	1.67	3.57				
SUM OF SPECIES COVER	46.86	100.0				

CRITERIA ASSESSMENT

Total Absolute Cover	97.87
Allowable Total Absolute Live Vegetation Cover 2020	46.87

Reporting Year: 2021

Species	Mean Cover (%)	Relative Cover (%)	Range of Cover	Percent Frequency	Relative Frequency(%)	[2]Rank

			Values (%)	(%)		
COOL SEASON PERENNIAL GRASSES						
Hesperostipa comata	0.60	1.28	0 - 6	25.00	3.50	10
Pascopyrum smithii	15.85	33.69	0 - 59	90.00	12.59	1
Sub-Total	16.45	34.97				
WARM SEASON PERENNIAL GRASSES						
Bouteloua curtipendula	1.60	3.40	0 - 7	60.00	8.39	8
Buchloe dactyloides	2.40	5.10	0 - 13	60.00	8.39	6
Chondrosum gracile	4.25	9.03	0 - 16	85.00	11.89	5
Panicum virgatum	0.45	.96	0 - 6	20.00	2.80	12
Schizachyrium scoparium	0.20	.43	0 - 2	15.00	2.10	13
Sporobolus airoides	1.55	3.29	0 - 20	30.00	4.20	9
Sporobolus cryptandrus	5.55	11.80	0 - 38	80.00	11.19	3
Sub-Total	16.00	34.01				
ANNUAL GRASSES						
Eragrostis cilianensis	0.10	.21	0 - 2	5.00	.70	14
Panicum capillare	2.15	4.57	0 - 9	40.00	5.59	7
Sub-Total	2.25	4.78				
PERENNIAL FORBS						
Argemone polyanthemos	0.05	.11	0 - 1	5.00	.70	15
[1] Convolvulus arvensis	0.05	.11	0 - 1	5.00	.70	15
Sub-Total	0.10	0.22				

ANNUAL AND BIENNIAL FORBS						
Amaranthus albus	0.05	.11	0 - 1	5.00	.70	15
[1] Bassia sieversiana	6.30	13.39	0 - 42	70.00	9.79	2
[1] Lactuca serriola	0.05	.11	0 - 1	5.00	.70	15
[1] Salsola collina	4.95	10.52	0 - 28	70.00	9.79	4
[1] Sisymbrium altissimum	0.10	.21	0 - 1	10.00	1.40	14
Solanum rostratum	0.50	1.06	0 - 9	10.00	1.40	11
Solanum triflorum	0.20	.43	0 - 2	15.00	2.10	13
Ximenesia encelioides	0.05	.11	0 - 1	5.00	.70	15
Sub-Total	12.20	25.94				
SHRUBS						
Yucca glauca	0.05	.11	0 - 1	5.00	.70	15
Sub-Total	0.05	0.11				
SUM OF SPECIES COVER	47.05	100.0				

CRITERIA ASSESSMENT

Total Absolute Cover	96.50
Allowable Total Absolute Live Vegetation Cover 2021	40.31

Reporting Year: 2022

Species	Mean Cover (%)	Relative Cover (%)	Range of Cover Values (%)	Percent Frequency (%)	Relative Frequency(%)	[2]Rank
COOL SEASON PERENNIAL GRASSES						
Hesperostipa comata	1.20	1.67	0 - 5	40.00	5.56	9
Pascopyrum smithii	22.00	30.56	14 - 30	100.00	13.89	1
Sub-Total	23.20	32.23				
WARM SEASON PERENNIAL GRASSES						
Bouteloua curtipendula	2.00	2.78	0 - 7	40.00	5.56	7
Buchloe dactyloides	1.80	2.50	0 - 5	80.00	11.11	8
Chondrosum gracile	7.00	9.72	2 - 17	100.00	13.89	4
Panicum virgatum	0.20	.28	0 - 1	20.00	2.78	10
Sporobolus airoides	2.80	3.89	0 - 7	60.00	8.33	6
Sporobolus cryptandrus	12.40	17.22	1 - 25	100.00	13.89	3
Sub-Total	26.20	36.39				
ANNUAL AND BIENNIAL FORBS						
Amaranthus arenicola	1.20	1.67	0 - 6	20.00	2.78	9
[1] Bassia sieversiana	4.20	5.83	0 - 11	60.00	8.33	5
[1] Salsola collina	17.20	23.89	5 - 32	100.00	13.89	2
Sub-Total	22.60	31.39				
SUM OF SPECIES COVER	72.00	100.0				

CRITERIA ASSESSMENT

Total Absolute Cover	96.40
Allowable Total Absolute Live Vegetation Cover 2022	57.80
Two year running average for Total Absolute Cover	96.45
Three year running average for Total Absolute Cover	96.92

[1] Weedy Species

[2] Based on total cover

[3] Based on 1st hit data

Table 6.2.3

Sample Adequacy Check

2022

2 Foot and 3 Foot

Year : 2022

Transect	Hits
100 :	73
106 :	67
107 :	59
109 :	74
119 :	87

Sample Adequacy = 4.81

(Mean value: 72, Sample Variance: 10.3, One Tailed Value: 1.533)

Table 6.2.4 - 2 Foot and 3 Foot Cover
Raw Data Report

Sampled by: Andrew Martinez
Sample Date(s): 8/24/2022

1 - Only plant species that were hit or observed along the transect are recorded in this table.
Blank boxes indicate the species was not present on the transect.
2 - Species with cover values of 0.1 were species observed within the 100 meter zone associated with each transect, but not recorded in the quantitative data collection for each transect.
3 - # of species/100sq meter zone

	Transects				
SPECIES/Other	**100**	**106**	**107**	**109**	**119**
BARE SOIL	3.0	3.0	6.0	4.0	2.0
LITTER	24.0	30.0	35.0	22.0	11.0
AMARANTHUS ARENICOLA				0.1	6.0
BASSIA SIEVERSIANA	9.0	0.1		11.0	1.0
BOUTELOUA CURTIPENDULA				7.0	3.0
BUCHLOE DACTYLOIDES		1.0	2.0	1.0	5.0
CHONDROSUM GRACILE	6.0	2.0	2.0	8.0	17.0
CHRYSOTHAMNUS NAUSEOSUS				0.1	
CONVOLVULUS ARVENSIS			0.1		
HELIANTHUS ANNUUS		0.1		0.1	
HESPEROSTIPA COMATA	1.0			5.0	
PANICUM VIRGATUM	1.0				
PASCOPYRUM SMITHII	14.0	30.0	18.0	21.0	27.0
RUMEX CRISPUS	0.1				
SALSOLA COLLINA	10.0	29.0	32.0	10.0	5.0
SISYMBRIUM ALTISSIMUM	0.1		0.1		
SOLANUM ROSTRATUM					0.1
SPOROBOLUS AIROIDES	7.0	4.0	3.0		
SPOROBOLUS CRYPTANDRUS	25.0	1.0	2.0	11.0	23.0
YUCCA GLAUCA			0.1		
Total Hits plus Incidental Species:	**100.2**	**100.2**	**100.3**	**100.3**	**100.1**
Species Density:	**10**	**8**	**9**	**11**	**9**

[3] Sample Mean: 9.4, Variance: 1.14

APPENDIX C

Cover Inspection Documentation

(October 1, 2021 through September 30, 2022)

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Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspector Name(s): M. Jones, C. Mackey | **Inspection Date(s):** 10-5-21

Conditions:
Previous 24-Hour Precipitation: Ø | Weather Conditions: sunny, calm winds, 70's | Acceptable/Unacceptable for Inspection ***(circle one)***

INSPECTION ITEM	CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			OBSERVATION Indicate recommended action, if required.	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
1.0 Percolation Collection Manhole (PCM) Condition								
1.1 Damage to the PCM or internal components		✓				✓	none	
1.2 Accumulation of a quantity of water greater than that caused by natural condensation in the manhole		✓				✓	none	

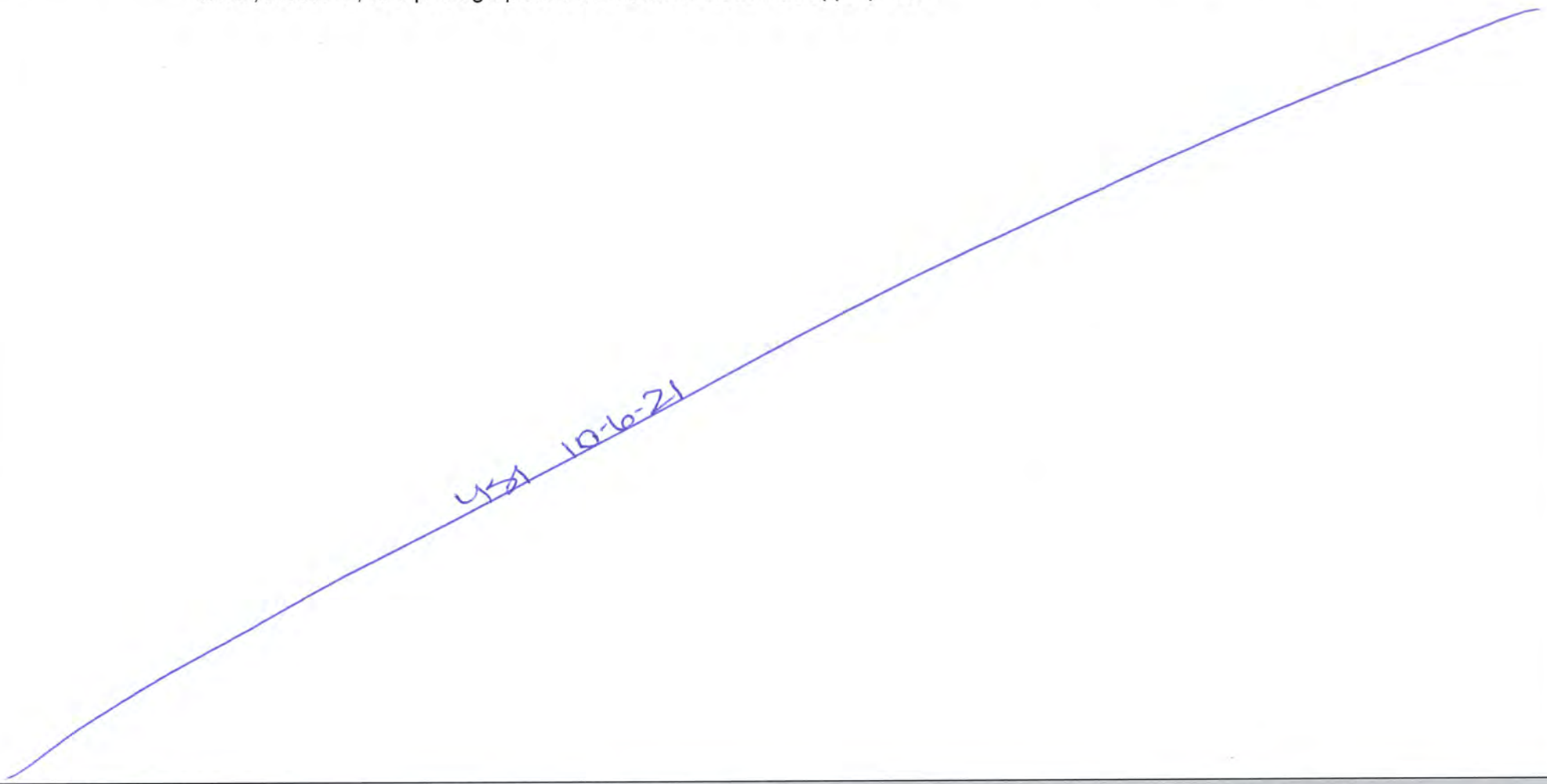
1.3 If the water level observed in the PCM impacts the ability to measure percolation, remove water accumulated in the PCM, and record the quantity here. Quantity removed from the PCM (liters): Ø

2.0 Percolation Collection

Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)
001 (SDT)	Ø	006 (CAT)	N/A	011 (SP)	N/A
002 (SDT)	Ø	007 (Basin A)	N/A	012 (SP)	N/A
003 (SDT)	Ø	008 (CAT)	N/A	013 (SP)	N/A
004 (CAT)	N/A	009 (Basin A)	N/A	014 (LB)	N/A
005 (CAT)	N/A	010 (Basin A)	N/A	015 (Basin A)	N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations, and photographs. Provide attachments as appropriate.



Inspector		
Name: Kim Hoffman	**Signature:** Kim Hoffman	**Date:** 10-6-21
Covers Manager Review of Inspection Documentation		
Name: Michael W. Jones	**Signature:** Michael W. Jones	**Date:** 10/8/21
Covers Manager Confirmation of Completed Actions		
Name: N/A	**Signature:** N/A	**Date:** N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspector Name(s): M. Jones, C. Mackey, K. Hoffman, V. Stewart

Inspection Date(s): 11-3-21

Conditions:
Previous 24-Hour Precipitation: Ø Weather Conditions: calm winds, sunny, 60's Acceptable/Unacceptable for Inspection ***(circle one)***

INSPECTION ITEM	CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			OBSERVATION Indicate recommended action, if required.	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
1.0 Percolation Collection Manhole (PCM) Condition								
1.1 Damage to the PCM or internal components		✓				✓	none	
1.2 Accumulation of a quantity of water greater than that caused by natural condensation in the manhole		✓				✓	none	

1.3 If the water level observed in the PCM impacts the ability to measure percolation, remove water accumulated in the PCM, and record the quantity here. Quantity removed from the PCM (liters): Ø

2.0 Percolation Collection

Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)
001 (SDT)	Ø	006 (CAT)	Ø	011 (SP)	trace
002 (SDT)	trace	007 (Basin A)	Ø	012 (SP)	Ø
003 (SDT)	Ø	008 (CAT)	1.5	013 (SP)	3
004 (CAT)	0.5	009 (Basin A)	Ø	014 (LB)	Ø
005 (CAT)	7	010 (Basin A)	trace	015 (Basin A)	0.5

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations, and photographs. Provide attachments as appropriate.

Lysimeters 004, 007, 011, 013, and 015 would benefit to have the standing water pumped from inside the manhole.

Inspector		
Name: Kim Hoffman	**Signature:** Kim Hoffman	**Date:** 11-4-21
Covers Manager Review of Inspection Documentation		
Name: Michael W. Jones	**Signature:** Michael W. Jones	**Date:** 12/6/21
Covers Manager Confirmation of Completed Actions		
Name: N/A	**Signature:** N/A	**Date:** N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspector Name(s): M. Jones, V. Stewart, E. Jacobs | **Inspection Date(s):** 12-1-21

Conditions:
Previous 24-Hour Precipitation: Ø | Weather Conditions: Sunny, calm winds, 50's | Acceptable/Unacceptable for Inspection ***(circle one)***

INSPECTION ITEM	CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			OBSERVATION Indicate recommended action, if required.	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
1.0 Percolation Collection Manhole (PCM) Condition								
1.1 Damage to the PCM or internal components		✓				✓	none	
1.2 Accumulation of a quantity of water greater than that caused by natural condensation in the manhole		✓				✓	none	

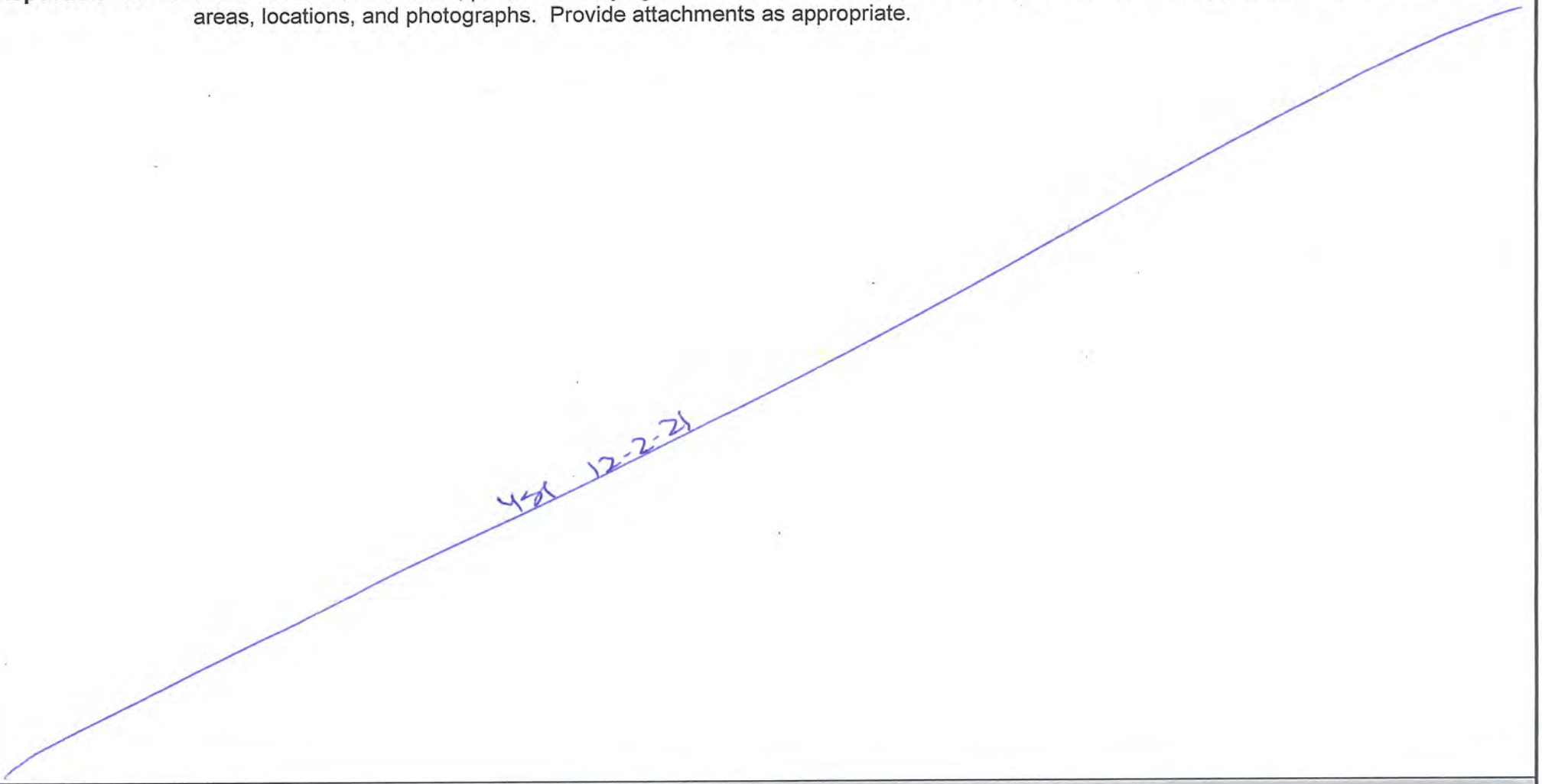
1.3 If the water level observed in the PCM impacts the ability to measure percolation, remove water accumulated in the PCM, and record the quantity here. Quantity removed from the PCM (liters): Ø

2.0 Percolation Collection

Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)
001 (SDT)	Ø	006 (CAT)	N/A	011 (SP)	N/A
002 (SDT)	Ø	007 (Basin A)	N/A	012 (SP)	N/A
003 (SDT)	trace	008 (CAT)	N/A	013 (SP)	N/A
004 (CAT)	N/A	009 (Basin A)	N/A	014 (LB)	N/A
005 (CAT)	N/A	010 (Basin A)	N/A	015 (Basin A)	N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations, and photographs. Provide attachments as appropriate.



Inspector		
Name: Kim Hoffman	Signature: Kim Hoffman	Date: 12-2-21
Covers Manager Review of Inspection Documentation		
Name: Michael W. Jones	Signature: Michael W. Jones	Date: 12/6/21
Covers Manager Confirmation of Completed Actions		
Name: N/A	Signature: N/A	Date: N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspector Name(s): M. Jones, K. Hoffman, V. Stewart **Inspection Date(s):** 1-12-2022

Conditions:
Previous 24-Hour Precipitation: Ø Weather Conditions: sunny, calm winds, 30's Acceptable/Unacceptable for Inspection ***(circle one)***

INSPECTION ITEM	CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			OBSERVATION Indicate recommended action, if required.	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
1.0 Percolation Collection Manhole (PCM) Condition								
1.1 Damage to the PCM or internal components		✓				✓	none	
1.2 Accumulation of a quantity of water greater than that caused by natural condensation in the manhole		✓				✓	none	

1.3 If the water level observed in the PCM impacts the ability to measure percolation, remove water accumulated in the PCM, and record the quantity here. Quantity removed from the PCM (liters): Ø

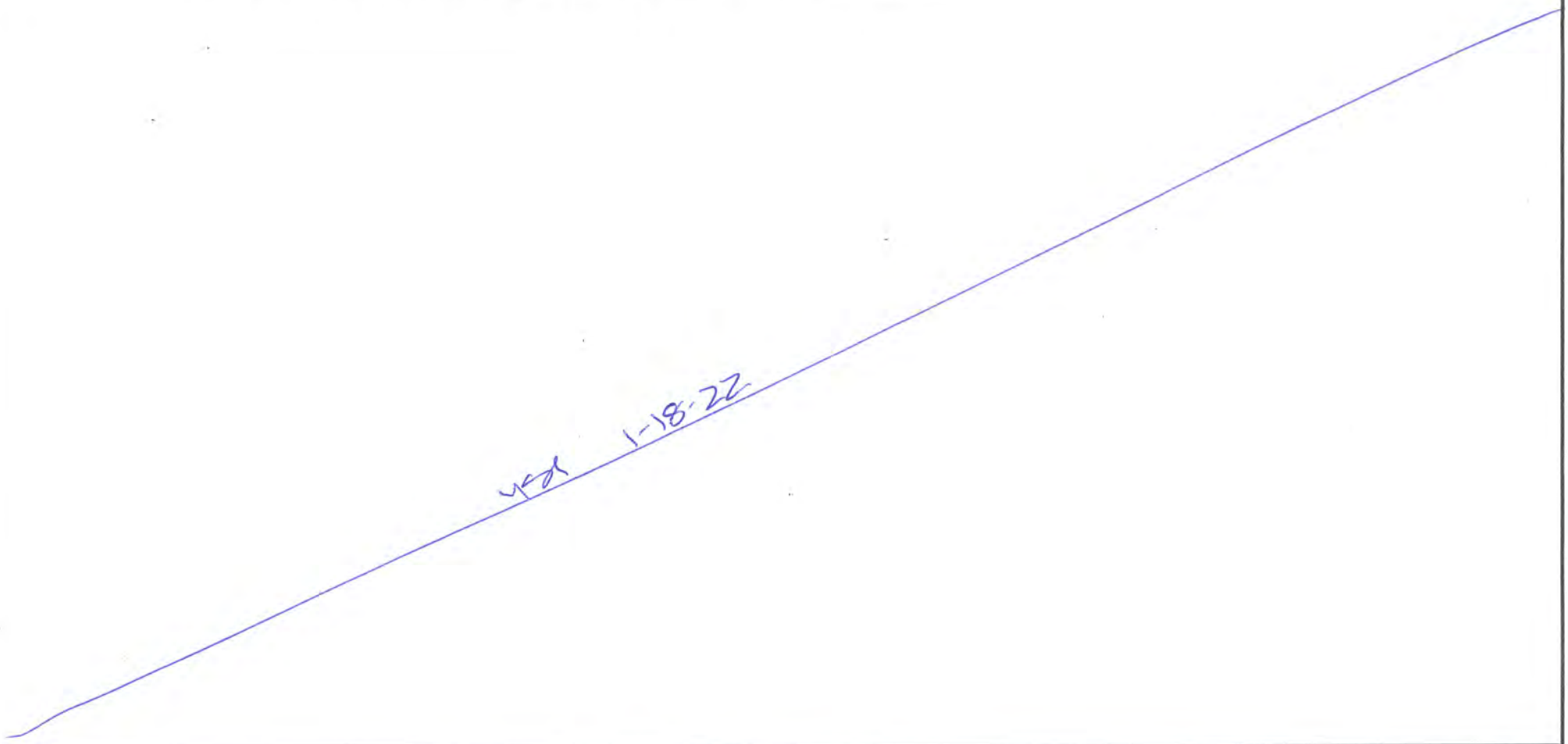
2.0 Percolation Collection

Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)
001 (SDT)	Ø	006 (CAT)	N/A	011 (SP)	N/A
002 (SDT)	Ø	007 (Basin A)	N/A	012 (SP)	N/A
003 (SDT)	Ø	008 (CAT)	N/A	013 (SP)	N/A
004 (CAT)	N/A	009 (Basin A)	N/A	014 (LB)	N/A
005 (CAT)	N/A	010 (Basin A)	N/A	015 (Basin A)	N/A

8.5

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations, and photographs. Provide attachments as appropriate.



Inspector		
Name: Kim Hoffman	**Signature:** Kim Hoffman	**Date:** 1-18-22
Covers Manager Review of Inspection Documentation		
Name: Michael W. Jones	**Signature:** Michael W. Jones	**Date:** 1/27/22
Covers Manager Confirmation of Completed Actions		
Name: N/A	**Signature:** N/A	**Date:** N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspector Name(s): M. Jones, K. Hoffman **Inspection Date(s):** 2-9-22

Conditions:
Previous 24-Hour Precipitation: Ø Weather Conditions: mostly sunny, calm winds, 30's Acceptable/Unacceptable for Inspection ***(circle one)***

INSPECTION ITEM	CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			OBSERVATION Indicate recommended action, if required.	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
1.0 Percolation Collection Manhole (PCM) Condition								
1.1 Damage to the PCM or internal components		✓				✓	none	
1.2 Accumulation of a quantity of water greater than that caused by natural condensation in the manhole		✓				✓	none	
1.3 If the water level observed in the PCM impacts the ability to measure percolation, remove water accumulated in the PCM, and record the quantity here. Quantity removed from the PCM (liters): Ø								

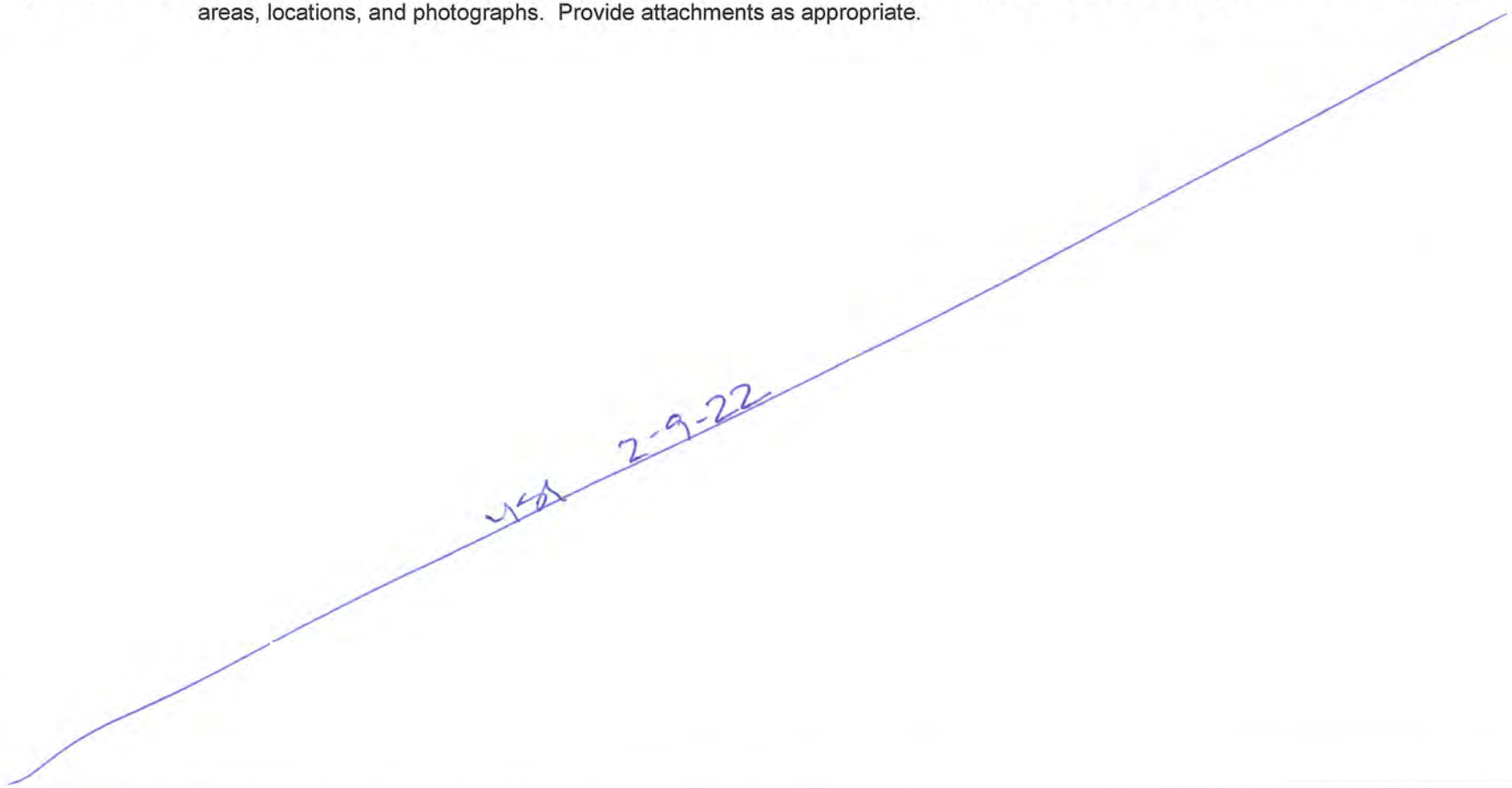
2.0 Percolation Collection

Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)
001 (SDT)	Ø	006 (CAT)	N/A	011 (SP)	N/A
002 (SDT)	Ø	007 (Basin A)	N/A	012 (SP)	N/A
003 (SDT)	Ø	008 (CAT)	N/A	013 (SP)	N/A
004 (CAT)	N/A	009 (Basin A)	N/A	014 (LB)	N/A
005 (CAT)	N/A	010 (Basin A)	N/A	015 (Basin A)	N/A

8-5

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations, and photographs. Provide attachments as appropriate.



Inspector		
Name: Kim Hoffman	**Signature:** Kim Hoffman	**Date:** 2-9-22
Covers Manager Review of Inspection Documentation		
Name: Michael W. Jones	**Signature:** Michael W. Jones	**Date:** 2/15/22
Covers Manager Confirmation of Completed Actions		
Name: N/A	**Signature:** N/A	**Date:** N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspector Name(s): M. Jones, V. Stewart | **Inspection Date(s):** 3-15-22

Conditions:
Previous 24-Hour Precipitation: Ø | Weather Conditions: sunny, calm winds, 50's | Acceptable/Unacceptable for Inspection ***(circle one)***

INSPECTION ITEM	CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			OBSERVATION Indicate recommended action, if required.	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
1.0 Percolation Collection Manhole (PCM) Condition								
1.1 Damage to the PCM or internal components		✓				✓	none	
1.2 Accumulation of a quantity of water greater than that caused by natural condensation in the manhole		✓				✓	none	

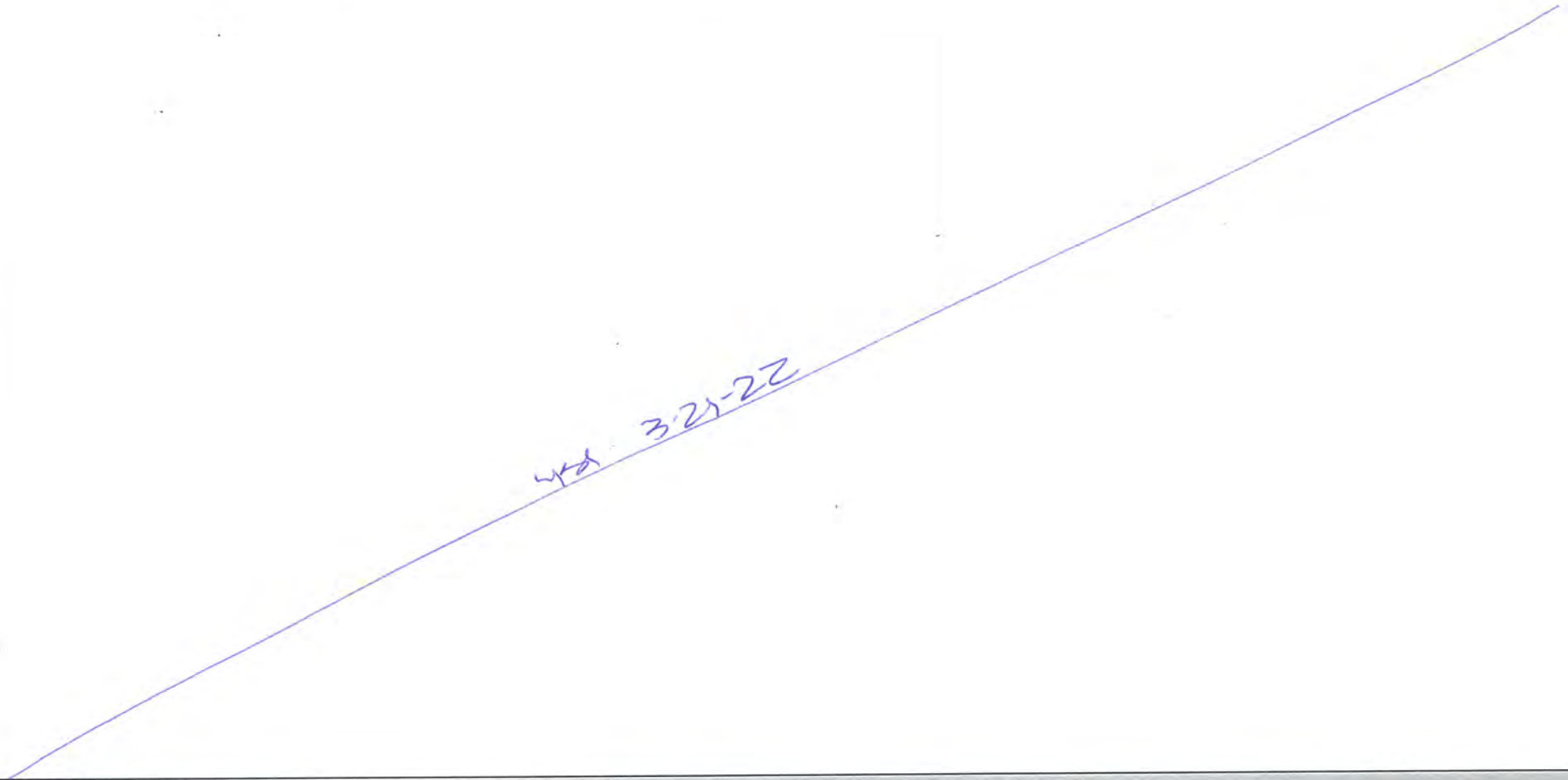
1.3 If the water level observed in the PCM impacts the ability to measure percolation, remove water accumulated in the PCM, and record the quantity here. Quantity removed from the PCM (liters): Ø

2.0 Percolation Collection

Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)
001 (SDT)	Ø	006 (CAT)	N/A	011 (SP)	N/A
002 (SDT)	Ø	007 (Basin A)	N/A	012 (SP)	N/A
003 (SDT)	trace	008 (CAT)	N/A	013 (SP)	N/A
004 (CAT)	N/A	009 (Basin A)	N/A	014 (LB)	N/A
005 (CAT)	N/A	010 (Basin A)	N/A	015 (Basin A)	N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations, and photographs. Provide attachments as appropriate.



Inspector		
Name: Kris Hoffman	**Signature:** Kris Hoffman	**Date:** 3-24-22
Covers Manager Review of Inspection Documentation		
Name: Michael W. Jones	**Signature:**	**Date:** 3/24/22
Covers Manager Confirmation of Completed Actions		
Name: N/A	**Signature:** N/A	**Date:** N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspector Name(s): M. Jones, K. Hoffman **Inspection Date(s):** 4-6-22

Conditions:
Previous 24-Hour Precipitation: Ø Weather Conditions: windy, cold, sunny 35° Acceptable/Unacceptable for Inspection ***(circle one)***

INSPECTION ITEM	CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			OBSERVATION Indicate recommended action, if required.	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
1.0 Percolation Collection Manhole (PCM) Condition								
1.1 Damage to the PCM or internal components		✓				✓	none	
1.2 Accumulation of a quantity of water greater than that caused by natural condensation in the manhole		✓				✓	none	
1.3 If the water level observed in the PCM impacts the ability to measure percolation, remove water accumulated in the PCM, and record the quantity here. Quantity removed from the PCM (liters): Ø								

2.0 Percolation Collection

Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)
001 (SDT)	Ø	006 (CAT)	N/A	011 (SP)	N/A
002 (SDT)	Ø	007 (Basin A)	N/A	012 (SP)	N/A
003 (SDT)	Ø	008 (CAT)	N/A	013 (SP)	N/A
004 (CAT)	N/A	009 (Basin A)	N/A	014 (LB)	N/A
005 (CAT)	N/A	010 (Basin A)	N/A	015 (Basin A)	N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations, and photographs. Provide attachments as appropriate.

Inspector		
Name: Kim Hoffman	**Signature:** Kim Hoffman	**Date:** 4-6-22
Covers Manager Review of Inspection Documentation		
Name: Michael W. Jones	**Signature:** Michael W. Jones	**Date:** 4/6/22
Covers Manager Confirmation of Completed Actions		
Name: N/A	**Signature:** N/A	**Date:** N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspector Name(s): M. Jones, K. Hoffman | **Inspection Date(s):** 5-12-22

Conditions:
Previous 24-Hour Precipitation: Ø | Weather Conditions: breezy, sunny, 60's | Acceptable/Unacceptable for Inspection ***(circle one)***

INSPECTION ITEM	CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			OBSERVATION Indicate recommended action, if required.	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
1.0 Percolation Collection Manhole (PCM) Condition								
1.1 Damage to the PCM or internal components		✓				✓	none	
1.2 Accumulation of a quantity of water greater than that caused by natural condensation in the manhole		✓				✓	none	

1.3 If the water level observed in the PCM impacts the ability to measure percolation, remove water accumulated in the PCM, and record the quantity here. Quantity removed from the PCM (liters): Ø

2.0 Percolation Collection

Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)
001 (SDT)	Ø	006 (CAT)	Ø	011 (SP)	Ø
002 (SDT)	Ø	007 (Basin A)	trace	012 (SP)	Ø
003 (SDT)	Ø	008 (CAT)	trace	013 (SP)	trace
004 (CAT)	trace	009 (Basin A)	trace	014 (LB)	trace
005 (CAT)	trace	010 (Basin A)	trace	015 (Basin A)	trace

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations, and photographs. Provide attachments as appropriate.

KH 5-12-22

Inspector		
Name: Kim Hoffman	**Signature:** Kim Hoffman	**Date:** 5-12-22
Covers Manager Review of Inspection Documentation		
Name: Michael W. Jones	**Signature:** Michael W. Jones	**Date:** 5/19/22
Covers Manager Confirmation of Completed Actions		
Name: N/A	**Signature:** N/A	**Date:** N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspector Name(s): M. Jones, K. Hoffman, V. Stewart **Inspection Date(s):** 6-8-22

Conditions:
Previous 24-Hour Precipitation: Ø Weather Conditions: calm, sunny, 60's Acceptable/Unacceptable for Inspection ***(circle one)***

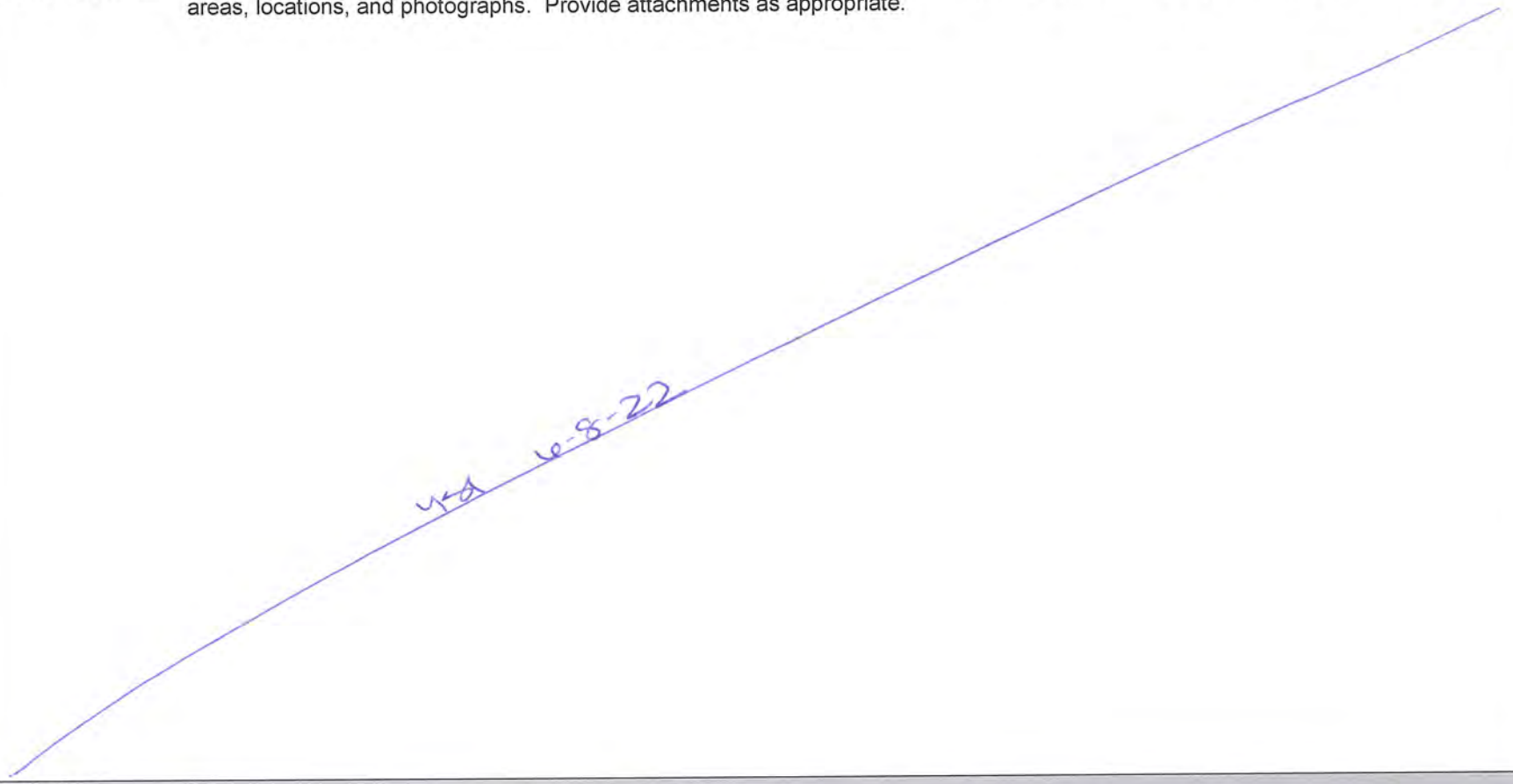
INSPECTION ITEM	CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			OBSERVATION Indicate recommended action, if required.	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
1.0 Percolation Collection Manhole (PCM) Condition								
1.1 Damage to the PCM or internal components		✓				✓	none	
1.2 Accumulation of a quantity of water greater than that caused by natural condensation in the manhole		✓				✓	none	
1.3 If the water level observed in the PCM impacts the ability to measure percolation, remove water accumulated in the PCM, and record the quantity here. Quantity removed from the PCM (liters): Ø								

2.0 Percolation Collection

Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)
001 (SDT)	Ø	006 (CAT)	N/A	011 (SP)	N/A
002 (SDT)	Ø	007 (Basin A)	N/A	012 (SP)	N/A
003 (SDT)	Ø	008 (CAT)	N/A	013 (SP)	N/A
004 (CAT)	N/A	009 (Basin A)	N/A	014 (LB)	N/A
005 (CAT)	N/A	010 (Basin A)	N/A	015 (Basin A)	N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations, and photographs. Provide attachments as appropriate.



Inspector		
Name: Kim Hoffman	**Signature:** Kim Hoffman	**Date:** 6-8-22
Covers Manager Review of Inspection Documentation		
Name: Michael W. Jones	**Signature:** Michael W. Jones	**Date:** 6/29/22
Covers Manager Confirmation of Completed Actions		
Name:	**Signature:**	**Date:**

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspector Name(s): M. Jones, K. Hoffmann, V. Stewart **Inspection Date(s):** 7-13-22

Conditions:
Previous 24-Hour Precipitation: Ø Weather Conditions: sunny, calm winds, 80's Acceptable/Unacceptable for Inspection ***(circle one)***

INSPECTION ITEM	CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			OBSERVATION Indicate recommended action, if required.	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
1.0 Percolation Collection Manhole (PCM) Condition								
1.1 Damage to the PCM or internal components		✓				✓	none	
1.2 Accumulation of a quantity of water greater than that caused by natural condensation in the manhole		✓				✓	none	
1.3 If the water level observed in the PCM impacts the ability to measure percolation, remove water accumulated in the PCM, and record the quantity here. Quantity removed from the PCM (liters): Ø								

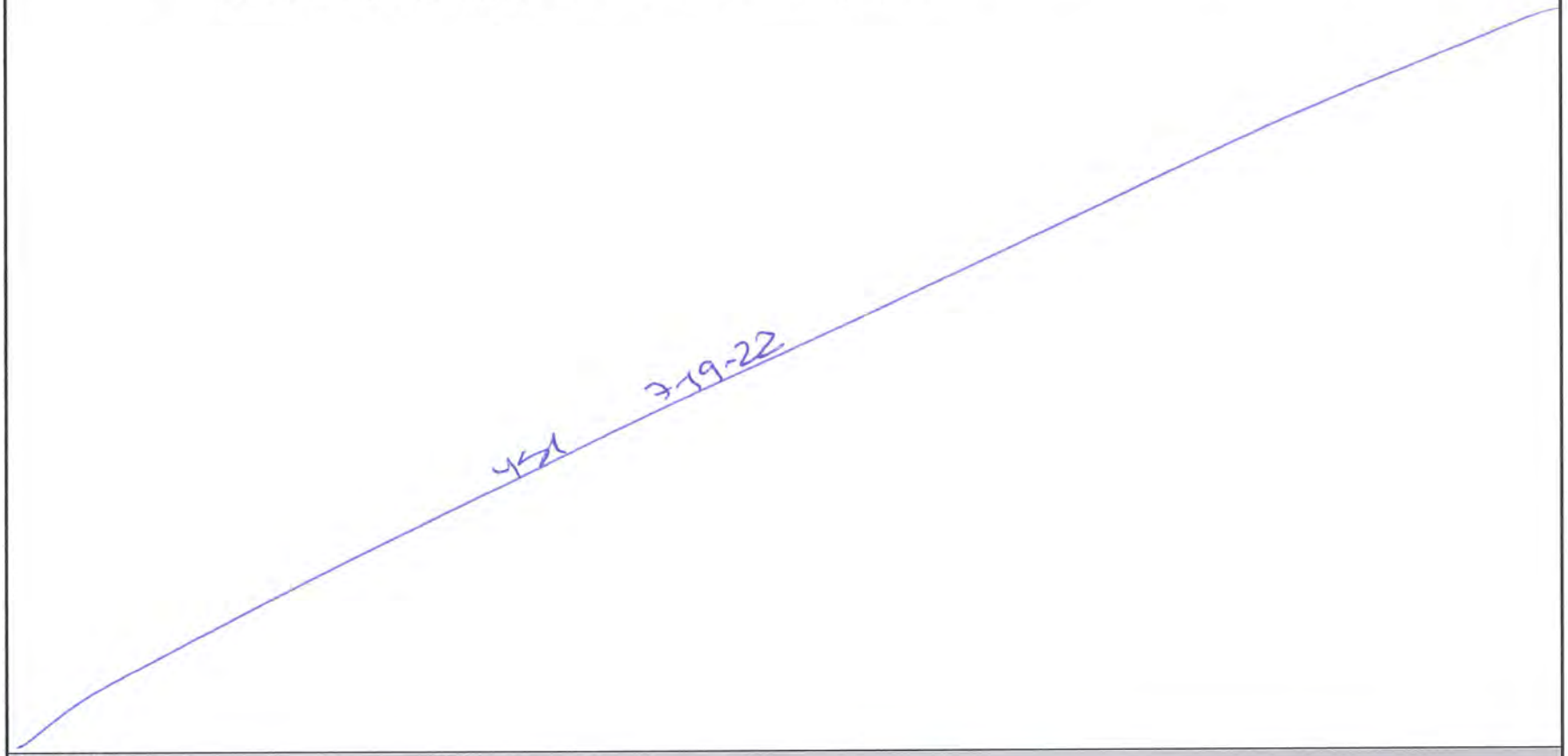
2.0 Percolation Collection

Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)
001 (SDT)	Ø	006 (CAT)	Ø	011 (SP)	Ø
002 (SDT)	Ø	007 (Basin A)	Ø	012 (SP)	Ø
003 (SDT)	Ø	008 (CAT)	trace	013 (SP)	Ø
004 (CAT)	Ø	009 (Basin A)	Ø	014 (LB)	Ø
005 (CAT)	Ø	010 (Basin A)	Ø	015 (Basin A)	Ø

Form SOP 003-1

ICS Percolation Monitoring System Data Collection and Operation Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations, and photographs. Provide attachments as appropriate.



Inspector		
Name: Kris Hoffman	**Signature:** Kris Hoffman	**Date:** 7-19-22
Covers Manager Review of Inspection Documentation		
Name: Michael W. Jones	**Signature:** Michael W. Jones	**Date:** 7/21/22
Covers Manager Confirmation of Completed Actions		
Name: N/A	**Signature:** N/A	**Date:** N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspector Name(s): M. Jones, V. Stewart **Inspection Date(s):** 8-3-22

Conditions:
Previous 24-Hour Precipitation: Ø Weather Conditions: sunny, calm winds, 80's Acceptable/Unacceptable for Inspection ***(circle one)***

INSPECTION ITEM	CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			OBSERVATION Indicate recommended action, if required.	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
1.0 Percolation Collection Manhole (PCM) Condition								
1.1 Damage to the PCM or internal components		✓				✓	none	
1.2 Accumulation of a quantity of water greater than that caused by natural condensation in the manhole		✓				✓	none	
1.3 If the water level observed in the PCM impacts the ability to measure percolation, remove water accumulated in the PCM, and record the quantity here. Quantity removed from the PCM (liters): Ø								

2.0 Percolation Collection

Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)
001 (SDT)	Ø	006 (CAT)	N/A	011 (SP)	N/A
002 (SDT)	Ø	007 (Basin A)	N/A	012 (SP)	N/A
003 (SDT)	Ø	008 (CAT)	N/A	013 (SP)	N/A
004 (CAT)	N/A	009 (Basin A)	N/A	014 (LB)	N/A
005 (CAT)	N/A	010 (Basin A)	N/A	015 (Basin A)	N/A

8-5

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations, and photographs. Provide attachments as appropriate.

KH 8-4-22

Inspector		
Name: Kim Hoffman	**Signature:** Kim Hoffman	**Date:** 8-4-22
Covers Manager Review of Inspection Documentation		
Name: Michael W. Jones	**Signature:**	**Date:** 10/3/22
Covers Manager Confirmation of Completed Actions		
Name: N/A	**Signature:** N/A	**Date:** N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspector Name(s): M. Jones, K. Hoffman, N. Stewart **Inspection Date(s):** 9-14-22

Conditions:
Previous 24-Hour Precipitation: Ø Weather Conditions: mostly sunny, calm winds, 70's Acceptable/Unacceptable for Inspection ***(circle one)***

INSPECTION ITEM	CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			OBSERVATION Indicate recommended action, if required.	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
1.0 Percolation Collection Manhole (PCM) Condition								
1.1 Damage to the PCM or internal components		✓				✓	none	
1.2 Accumulation of a quantity of water greater than that caused by natural condensation in the manhole		✓				✓	none	

1.3 If the water level observed in the PCM impacts the ability to measure percolation, remove water accumulated in the PCM, and record the quantity here. Quantity removed from the PCM (liters): Ø

2.0 Percolation Collection

Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)
001 (SDT)	Ø	006 (CAT)	Ø	011 (SP)	trace
002 (SDT)	Ø	007 (Basin A)	i	012 (SP)	Ø
003 (SDT)	Ø	008 (CAT)	1	013 (SP)	6
004 (CAT)	1	009 (Basin A)	Ø	014 (LB)	Ø
005 (CAT)	3	010 (Basin A)	Ø	015 (Basin A)	trace

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations, and photographs. Provide attachments as appropriate.

Lysimeters 008, 009, and 010 would benefit to have the standing water pumped from inside the manhole.

Inspector		
Name: Kim Hoffman	**Signature:** Kim Hoffman	**Date:** 9-14-22
Covers Manager Review of Inspection Documentation		
Name: Michael W. Jones	**Signature:** Michael W. Jones	**Date:** 10/3/22
Covers Manager Confirmation of Completed Actions		
Name: N/A	**Signature:** N/A	**Date:** N/A

Form SOP 001-1
ICS Inspection Form

Inspector Names: M. Jones, K. Hoffmann, C. Mackey | **Date(s):** 10-5-21 **Time of Inspection:** 12:30

Type I inspection ☑ **Type II inspection** ☐ **Post-Storm inspection** ☐

Drive-around Post-Storm Inspection:

Drive-around inspection date (taken from Logbook): N/A

*Note: Post-storm event inspection items are indicated with a * next to the Inspection Item number.*

Date(s) of Significant Storm Event: N/A

Total Precipitation (in): N/A

Inspection Conditions:

Previous 24-hour precipitation: Ø Weather Conditions: sunny, calm winds, 80's Acceptable/Unacceptable for Inspection ***(circle one)***

Attachments: ☐ Photographs ☐ Figures ☐ Other

INSPECTION ITEM		CONDITION PRESENT			REPEAT OR CHRONIC CONDITION			INSPECTION NOTE	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
		Y	N	N/A	Y	N	N/A		
1.0	**Surface Conditions**								
1.1*	Erosion rills, gullies, or sheet erosion		✓				✓	none	
1.2*	Conditions that could interrupt cover surface drainage (ponding areas, ruts, hole greater than 3" in diameter)		✓				✓	none	
1.3	Excessive animal trails		✓				✓	none	
1.4	Widespread burrowing animal holes		✓				✓	none	
1.5*	Extensive linear cracks		✓				✓	none	

Form SOP 001-1
ICS Inspection Form

	INSPECTION ITEM	CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			INSPECTION NOTE	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
		Y	N	N/A	Y	N	N/A		
1.0	**Surface Conditions (Continued)**								
1.6	Vandalism, or intrusive damage such as unplanned excavation, drilling, grading, damage to engineering or access controls		✓				✓	none	
2.0	**Vegetative Cover**								
2.1	Bare area or areas of poor growth greater than 100 square feet	✓				✓		Note 1.	Overseeded in April 2022. MJ 8/2/22
2.2	Areas of vegetation stress greater than 100 square feet (over grazing, discoloration, pedestalling)		✓				✓	none	
2.3	Deep rooted, noxious or undesirable weedy species		✓				✓	none	
2.4	Excessive litter accumulation		✓				✓	none	
3.0	**Engineering and Access Controls**								
3.1	The perimeter fence is damaged		✓				✓	none	
3.2	Debris has collected along the perimeter fence		✓				✓	none	
3.3	Obelisks are damaged, not visible, or not legible		✓				✓	none	
3.4	Warning signs are not legible from 25 feet		✓				✓	none	
3.5*	Damage to the Perimeter Access Road such as potholes, washouts, washboard, or burrowing		✓				✓	none	

Form SOP 001-1
ICS Inspection Form

4.0 Surface Drainage Controls: *Were the following conditions observed during the inspection of the stormwater drainage controls? (circle all that apply)*

INSPECTION ITEM		CHANNEL NUMBER																								
		1	2	3	4	5	6	7	8	9	10	11	11A	12	13	14	15	15A	16	17	18	19	20	21	22	23
4.1*	Impeded drainage or ponding in the channel (siltation/debris present)	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
4.2*	Inadequate protective vegetation	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
4.3*	Erosion rills or gullies in the grass-lined channel	Y N	Y N	Y N			Y N	Y N	Y N	Y N	Y N			Y N		Y N	Y N		Y N		Y N	Y N	Y N	Y N		Y N
4.4*	Cracked or degraded concrete				Y N	Y N	Y N					Y N	Y N	Y N	Y N		Y N	Y N	Y N	Y N	Y N				Y N	
4.5*	Expansion joint damage (missing caulk)				Y N	Y N	Y N					Y N	Y N	Y N	Y N		Y N	Y N	Y N	Y N	Y N				Y N	
4.6*	Inhibited drainage from the soil to the concrete-lined channel				Y N	Y N	Y N					Y N	Y N	Y N	Y N		Y N	Y N	Y N	Y N	Y N				Y N	
4.7*	Subsidence or undercutting of the concrete-lined channel				Y N	Y N	Y N					Y N	Y N	Y N	Y N		Y N	Y N	Y N	Y N	Y N				Y N	

Form SOP 001-1
ICS Inspection Form

5.0 Erosion/Settlement Monuments: *Inspect monuments for damage and legibility, and record the soil thickness loss, if any. Perform during spring Type II and fall Type I inspections.*

INSPECTION ITEM	ER01	ER02	ER03	ER04	ER05	ER06	ER07	ER08	ER09	ER10	ER11	ER12	ER13	ER14	ER15	ER16	ER17	ER18	ER19
5.1 Was the monument free of damage and legible?	(Y) N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	(Y) N
5.2 Measured Soil Thickness Loss (inches)	0.75	1.0	0.5	2.25	1.5	2.0	0.75	2	1.25	1	1	1	1.5	1.25	Ø	1.75	0.25	Ø	Ø

INSPECTION ITEM	ER20	ER21	ER22	ER23	ER24	ER25	ER26	ER27	ER28	ER29	ER30	ER31	ER32	ER33	ER34	ER35	ER36	ER37	ER38
5.1 Was the monument free of damage and legible?	(Y) N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	(Y) N
5.2 Measured Soil Thickness Loss (inches)	0.75	0.5	1.5	1	Ø	1.5	0.25	1.5	1.5	2.5	2.5	2.75	0.75	1.5	1.75	1.75	1.75	2.5	2.75

INSPECTION ITEM	ER39	ER40	ER41	ER42	ER43	ER44	ER45	ER46	ER47	ER48	ER49	ER50	ER51	ER52	ER53	ER54	ER55	ER56	ER57
5.1 Was the monument free of damage and legible?	(Y) N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	(Y) N
5.2 Measured Soil Thickness Loss (inches)	Ø	0.5	2.75	1.5	2	2.5	1.5	2.75	2.25	1.5	1	0.5	Ø	Ø	1	Ø	1	1	0.5

INSPECTION ITEM	ER58	ER59	ER60	ER61	ER62	ER63	ER64	ER65	ER66	ER67	ER68	ER69	ER70	ER71	ER72	ER73	ER74	ER75	ER76
5.1 Was the monument free of damage and legible?	(Y) N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	(Y) N
5.2 Measured Soil Thickness Loss (inches)	1	0.5	1.5	Ø	0.5	2	1.5	1.75	1.75	Ø	1	1.25	Ø	1	2	2	Ø	0.5	1.75

INSPECTION ITEM	ER77	ER78	ER79	ER80	ER81	ER82	ER83	ER84	ER85	ER86	ER87	ER88	ER89	ER90	ER91	ER92
5.1 Was the monument free of damage and legible?	(Y) N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	(Y) N
5.2 Measured Soil Thickness Loss (inches)	1	1.5	0.5	1	1.75	1.25	0.25	1.75	1	Ø	Ø	1.5	1.75	1	1.5	1

Form SOP 001-1
ICS Inspection Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations with GPS coordinates, and photographs as needed. Provide attachments as appropriate.

ER 64 needs a replacement corrosmite marker. Addressed in May 2022. MJ 8/2/22

Note 1: the west side of the south plants 3-foot cover has an area in need of over seeding. This is also documented in NRAP-2021-005.

Inspector	
Name: Kim Hoffman	**Signature and Date:** Kim Hoffman 10-7-21
Covers Manager Review of Inspection Documentation	
Name: Michael W. Jones	**Signature and Date:** 10/8/21
Covers Manager Confirmation of Completed Actions	
Name: Michael W. Jones	**Signature and Date:** 8/2/22

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Form SOP 001-1
ICS Inspection Form

Names: M. Jones, K. Hoffman, V. Stewart	Date(s): 1-12-22 Time of Inspection: 0800

pection ☑ Type II inspection ☐ Post-Storm inspection ☐

nd Post-Storm Inspection: nd inspection date (taken from Logbook): N/A *-storm event inspection items are indicated with a * next to the Inspection Item*	Date(s) of Significant Storm Event: N/A	Total Precipitation (in): N/A

n Conditions:
24-hour precipitation: Ø Weather Conditions: sunny, calm winds, 30's Acceptable/Unacceptable for Inspection ***(circle one)***

nts: ☐ Photographs ☒ Figures ☐ Other

INSPECTION ITEM	CONDITION PRESENT			REPEAT OR CHRONIC CONDITION			INSPECTION NOTE	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
rface Conditions								
sion rills, gullies, or sheet sion		✓				✓	none	
nditions that could interrupt ver surface drainage (ponding eas, ruts, hole greater than 3" in ameter)		✓				✓	none	
cessive animal trails		✓				✓	none	
despread burrowing animal les		✓				✓	none	
tensive linear cracks		✓				✓	none	

8.12

Form SOP 001-1
ICS Inspection Form

	INSPECTION ITEM	CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			INSPECTION NOTE	CONFIRMATION ACTION IS COM (Initial and Da
		Y	N	N/A	Y	N	N/A		
1.0	**Surface Conditions (Continued)**								
1.6	Vandalism, or intrusive damage such as unplanned excavation, drilling, grading, damage to engineering or access controls		✓				✓	none	
2.0	**Vegetative Cover**								
2.1	Bare area or areas of poor growth greater than 100 square feet	✓				✓		Note 1.	Overseeded in 2022. MJ 8/2/
2.2	Areas of vegetation stress greater than 100 square feet (over grazing, discoloration, pedestalling)		✓				✓	none	
2.3	Deep rooted, noxious or undesirable weedy species		✓				✓	none	
2.4	Excessive litter accumulation		✓				✓	none	
3.0	**Engineering and Access Controls**								
3.1	The perimeter fence is damaged	✓				✓		Note 2.	
3.2	Debris has collected along the perimeter fence	✓				✓		Note 3.	Addressed in Oc MJ 10/20/22
3.3	Obelisks are damaged, not visible, or not legible		✓				✓	none	
3.4	Warning signs are not legible from 25 feet		✓				✓	none	
3.5*	Damage to the Perimeter Access Road such as potholes, washouts, washboard, or burrowing		✓				✓	none	

Form SOP 001-1
ICS Inspection Form

4.0 Surface Drainage Controls: *Were the following conditions observed during the inspection of the stormwater drainage controls? (circle all that apply)*

INSPECTION ITEM	CHANNEL NUMBER																							
	1	2	3	4	5	6	7	8	9	10	11	11A	12	13	14	15	15A	16	17	18	19	20	21	22	23
4.1* Impeded drainage or ponding in the channel (siltation/debris present)	Y (N)	Y (N)	Y (N)	(Y) N	(Y) N	(Y) N	Y (N)	Y (N)	Y (N)	Y (N)	(Y) N	(Y) N	(Y) N	(Y) N	Y (N)	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	Y (N)	Y (N)	Y (N)	(Y) N	Y (N)
4.2* Inadequate protective vegetation	Y (N)	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y (N)
4.3* Erosion rills or gullies in the grass-lined channel	Y (N)	Y (N)	Y (N)			Y (N)	Y (N)	Y (N)	Y (N)	Y (N)			Y (N)		Y (N)	Y (N)		Y (N)		Y (N)	Y (N)	Y (N)	Y (N)		Y (N)
4.4* Cracked or degraded concrete				Y (N)	Y N	Y (N)					Y (N)	Y N	Y N	Y (N)		Y (N)	Y N	Y N	Y N	Y (N)				Y (N)	
4.5* Expansion joint damage (missing caulk)				Y (N)	Y N	Y (N)					Y (N)	Y N	Y N	Y (N)		Y (N)	Y N	Y N	Y N	Y (N)				Y (N)	
4.6* Inhibited drainage from the soil to the concrete-lined channel				Y (N)	Y N	Y (N)					Y (N)	Y N	Y N	Y (N)		Y (N)	Y N	Y N	Y N	Y (N)				Y (N)	
4.7* Subsidence or undercutting of the concrete-lined channel				Y (N)	Y N	Y (N)					Y (N)	Y N	Y N	Y (N)		Y (N)	Y N	Y N	Y N	Y (N)				Y (N)	

4.1: tumble weeds have collected in channels.

Form SOP 001-1
ICS Inspection Form

5.0 Erosion/Settlement Monuments: *Inspect monuments for damage and legibility, and record the soil thickness loss, if any. Perform during spring Type II and fall Type I inspections.*

INSPECTION ITEM	ER01	ER02	ER03	ER04	ER05	ER06	ER07	ER08	ER09	ER10	ER11	ER12	ER13	ER14	ER15	ER16	ER17	ER18	ER19
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																			

INSPECTION ITEM	ER20	ER21	ER22	ER23	ER24	ER25	ER26	ER27	ER28	ER29	ER30	ER31	ER32	ER33	ER34	ER35	ER36	ER37	ER38
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																			

INSPECTION ITEM	ER39	ER40	ER41	ER42	ER43	ER44	ER45	ER46	ER47	ER48	ER49	ER50	ER51	ER52	ER53	ER54	ER55	ER56	ER57
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																			

INSPECTION ITEM	ER58	ER59	ER60	ER61	ER62	ER63	ER64	ER65	ER66	ER67	ER68	ER69	ER70	ER71	ER72	ER73	ER74	ER75	ER76
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																			

INSPECTION ITEM	ER77	ER78	ER79	ER80	ER81	ER82	ER83	ER84	ER85	ER86	ER87	ER88	ER89	ER90	ER91	ER92
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																

Form SOP 001-1
ICS Inspection Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations with GPS coordinates, and photographs as needed. Provide attachments as appropriate.

- Snow covered many areas, thus it was hard to identify surface conditions.
- ER 64 needs a replacement carsonite marker. Replaced in May 2022. MJ 10/20/22

Note 1: The west side of the South Plants 3-Foot cover has an area in need of reseeding. This is also documented in NRRP-2021-005.

Note 2: Due to high winds and tumble weed collection, 2 wooden fence posts need replaced and a section of fence fabric needs to be attached. Please see attached figure for ~ location information.

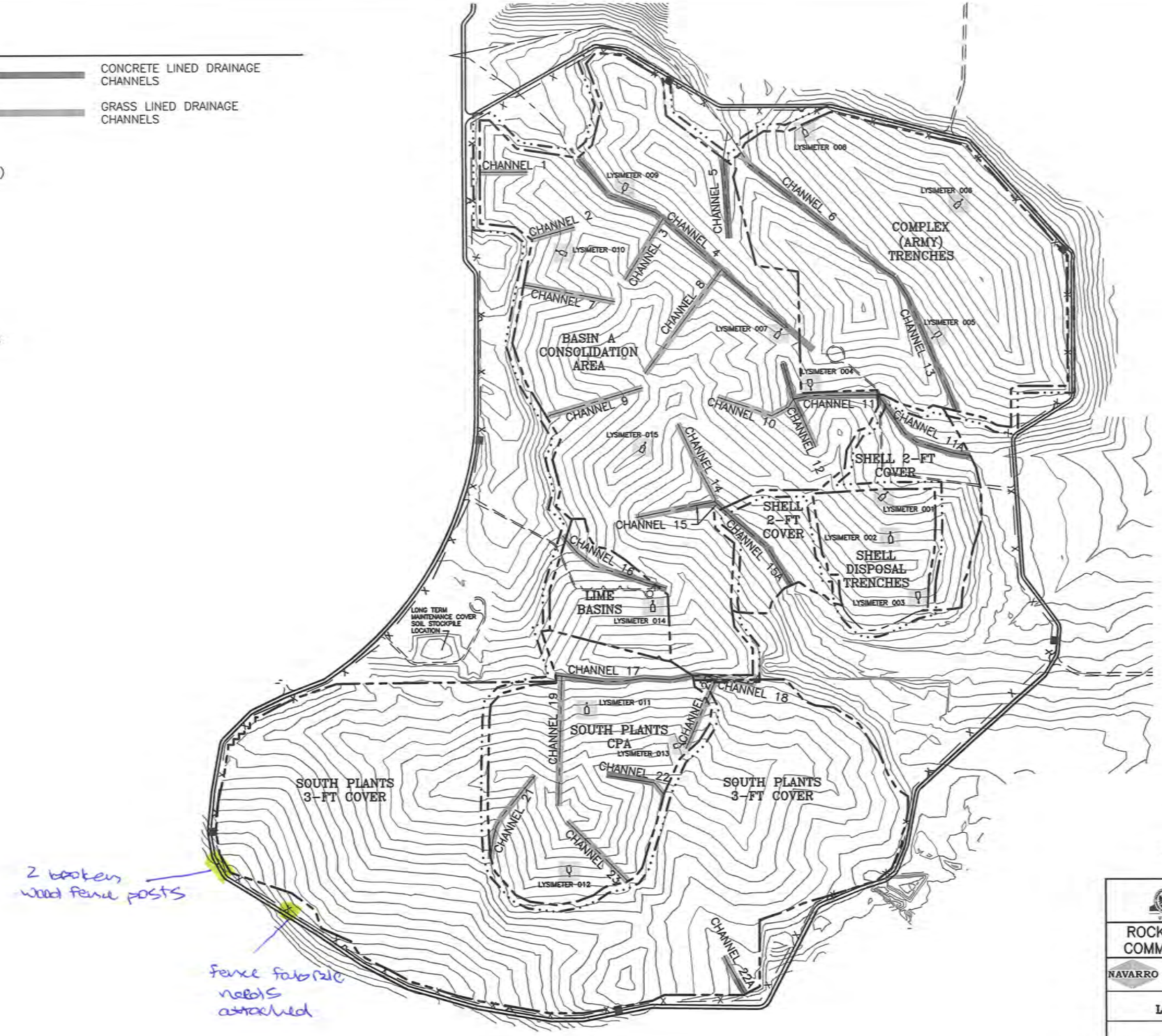
Note 3: Tumble weeds have accumulated along fence line.

Inspector	
Name: Kim Hoffman	**Signature and Date:** Kim Hoffman 1-13-22
Covers Manager Review of Inspection Documentation	
Name: Michael W. Jones	**Signature and Date:** 1/27/22
Covers Manager Confirmation of Completed Actions	
Name:	**Signature and Date:**

LEGEND

- COVER BOUNDARY
- BIOTA BARRIER MATERIAL BOUNDARY
- WELL ACCESS ROAD
- AS–BUILT CONTOURS (RECORD CONDITIONS)
- PERIMETER FENCE
- ARMY MAINTAINED AREA BOUNDARY (SEE NOTE)
- LYSIMETER
- OBELISK (OUTSIDE FENCE)
- CONCRETE LINED DRAINAGE CHANNELS
- GRASS LINED DRAINAGE CHANNELS

NOTE: THE OUTSIDE SHOULDER OF THE ACCESS ROAD DEFINES THE ARMY MAINTAINED AREA BOUNDARY.



Program Manager
Rocky Mountain Arsenal

ROCKY MOUNTAIN ARSENAL
COMMERCE CITY, COLORADO

NAVARRO
Research and Engineering, Inc.

PROJECT NAME
LONG–TERM CARE PLAN

TITLE
ICS SURFACE WATER DRAINAGE CHANNEL PLAN

CAD FILE:	DATE	FIGURE NUMBER
FIG SOP 001–2.dwg	03.23.21	SOP 001–2

S:\G PROJECTS\ICS LONG TERM CARE PLAN 2021 UPDATE\

Form SOP 001-1
ICS Inspection Form

Inspector Names: M. Jones, K. Hoffman, V. Stewart | **Date(s):** 7-13-22 | **Time of Inspection:** 0800

Type I inspection ☑ **Type II inspection** ☐ **Post-Storm inspection** ☐

Drive-around Post-Storm Inspection:

Drive-around inspection date (taken from Logbook): N/A

*Note: Post-storm event inspection items are indicated with a * next to the Inspection Item number.*

Date(s) of Significant Storm Event: N/A

Total Precipitation (in): N/A

Inspection Conditions:

Previous 24-hour precipitation: Ø | Weather Conditions: sunny, calm winds, 80's | Acceptable/Unacceptable for Inspection ***(circle one)***

Attachments: ☐ Photographs ☑ Figures ☐ Other

INSPECTION ITEM		CONDITION PRESENT			REPEAT OR CHRONIC CONDITION			INSPECTION NOTE	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
		Y	N	N/A	Y	N	N/A		
1.0	**Surface Conditions**								
1.1*	Erosion rills, gullies, or sheet erosion		✓				✓	none	
1.2*	Conditions that could interrupt cover surface drainage (ponding areas, ruts, hole greater than 3" in diameter)	✓				✓		Note 1.	
1.3	Excessive animal trails		✓				✓	none	
1.4	Widespread burrowing animal holes		✓				✓	none	
1.5*	Extensive linear cracks		✓				✓	none	

8-12

Form SOP 001-1
ICS Inspection Form

	INSPECTION ITEM	CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			INSPECTION NOTE	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
		Y	N	N/A	Y	N	N/A		
1.0	**Surface Conditions (Continued)**								
1.6	Vandalism, or intrusive damage such as unplanned excavation, drilling, grading, damage to engineering or access controls		✓				✓	none	
2.0	**Vegetative Cover**								
2.1	Bare area or areas of poor growth greater than 100 square feet		✓				✓	none	
2.2	Areas of vegetation stress greater than 100 square feet (over grazing, discoloration, pedestalling)		✓				✓	none	
2.3	Deep rooted, noxious or undesirable weedy species	✓				✓		Note 2.	Weed control is on-going. MJ 8/2/22
2.4	Excessive litter accumulation		✓				✓	none	
3.0	**Engineering and Access Controls**								
3.1	The perimeter fence is damaged	✓				✓		Note 3.	
3.2	Debris has collected along the perimeter fence	✓				✓		tumble weed accumulations along fence line	Addressed in Oct 2022. MJ 10/20/22
3.3	Obelisks are damaged, not visible, or not legible		✓				✓	none	
3.4	Warning signs are not legible from 25 feet		✓				✓	none	
3.5*	Damage to the Perimeter Access Road such as potholes, washouts, washboard, or burrowing		✓				✓	none	

Form SOP 001-1
ICS Inspection Form

4.0 Surface Drainage Controls: *Were the following conditions observed during the inspection of the stormwater drainage controls? (circle all that apply)*

INSPECTION ITEM	CHANNEL NUMBER																								
	1	2	3	4	5	6	7	8	9	10	11	11A	12	13	14	15	15A	16	17	18	19	20	21	22	23
4.1* Impeded drainage or ponding in the channel (siltation/debris present)	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
4.2* Inadequate protective vegetation	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
4.3* Erosion rills or gullies in the grass-lined channel	Y N	Y N	Y N			Y N	Y N	Y N	Y N	Y N			Y N		Y N	Y N		Y N		Y N	Y N	Y N	Y N		Y N
4.4* Cracked or degraded concrete				Y N	Y N	Y N					Y N	Y N	Y N	Y N		Y N	Y N	Y N	Y N	Y N				Y N	
4.5* Expansion joint damage (missing caulk)				Y N	Y N	Y N					Y N	Y N	Y N	Y N		Y N	Y N	Y N	Y N	Y N				Y N	
4.6* Inhibited drainage from the soil to the concrete-lined channel				Y N	Y N	Y N					Y N	Y N	Y N	Y N		Y N	Y N	Y N	Y N	Y N				Y N	
4.7* Subsidence or undercutting of the concrete-lined channel				Y N	Y N	Y N					Y N	Y N	Y N	Y N		Y N	Y N	Y N	Y N	Y N				Y N	

4.1: A couple of small holes were observed near the outlet of ch. 13. See figure for location information.

Form SOP 001-1
ICS Inspection Form

5.0 Erosion/Settlement Monuments: *Inspect monuments for damage and legibility, and record the soil thickness loss, if any. Perform during spring Type II and fall Type I inspections.*

INSPECTION ITEM	ER01	ER02	ER03	ER04	ER05	ER06	ER07	ER08	ER09	ER10	ER11	ER12	ER13	ER14	ER15	ER16	ER17	ER18	ER19
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																			
INSPECTION ITEM	**ER20**	**ER21**	**ER22**	**ER23**	**ER24**	**ER25**	**ER26**	**ER27**	**ER28**	**ER29**	**ER30**	**ER31**	**ER32**	**ER33**	**ER34**	**ER35**	**ER36**	**ER37**	**ER38**
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																			
INSPECTION ITEM	**ER39**	**ER40**	**ER41**	**ER42**	**ER43**	**ER44**	**ER45**	**ER46**	**ER47**	**ER48**	**ER49**	**ER50**	**ER51**	**ER52**	**ER53**	**ER54**	**ER55**	**ER56**	**ER57**
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																			
INSPECTION ITEM	**ER58**	**ER59**	**ER60**	**ER61**	**ER62**	**ER63**	**ER64**	**ER65**	**ER66**	**ER67**	**ER68**	**ER69**	**ER70**	**ER71**	**ER72**	**ER73**	**ER74**	**ER75**	**ER76**
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																			
INSPECTION ITEM	**ER77**	**ER78**	**ER79**	**ER80**	**ER81**	**ER82**	**ER83**	**ER84**	**ER85**	**ER86**	**ER87**	**ER88**	**ER89**	**ER90**	**ER91**	**ER92**			
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N			
5.2 Measured Soil Thickness Loss (inches)																			

Form SOP 001-1
ICS Inspection Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations with GPS coordinates, and photographs as needed. Provide attachments as appropriate.

Note 1: (6) areas of holes were observed during the Spring 2022 Type II inspections. See attached figure for location information.

Note 2: Many areas of Russian thistle and kochia observed. Also cheatgrass was observed during Spring 2022 Type II.

Note 3: There are (2) broken wooden fence posts, fence fabric needs attached to wooden posts, and a tear of fence fabric along the 8-ft south perimeter fence.

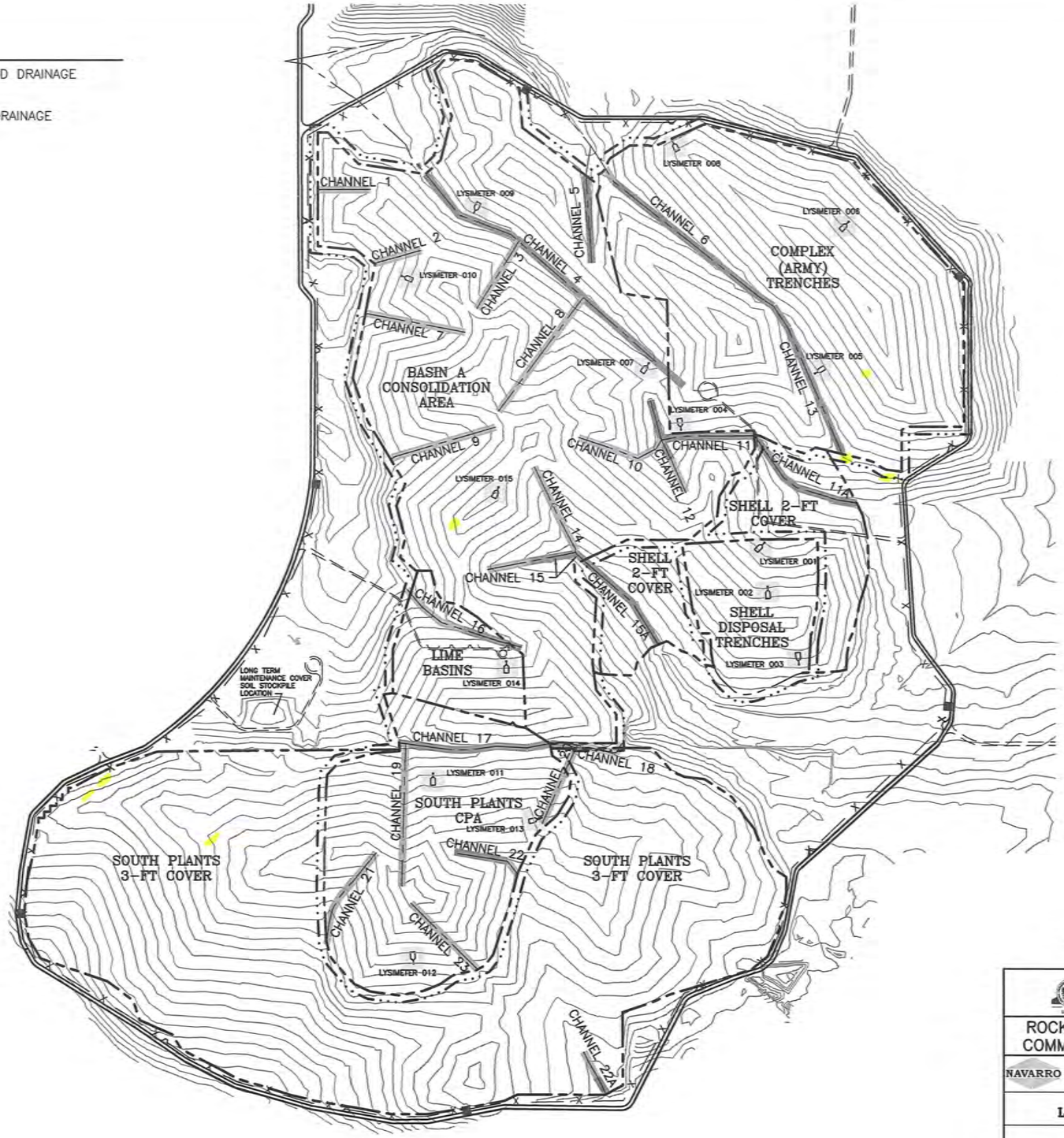
Inspector	
Name: Kim Hoffman	**Signature and Date:** Kim Hoffman 7-19-22
Covers Manager Review of Inspection Documentation	
Name: Michael W. Jones	**Signature and Date:** 7/21/22
Covers Manager Confirmation of Completed Actions	
Name:	**Signature and Date:**

LEGEND

- COVER BOUNDARY
- BIOTA BARRIER MATERIAL BOUNDARY
- WELL ACCESS ROAD
- AS–BUILT CONTOURS (RECORD CONDITIONS)
- PERIMETER FENCE
- ARMY MAINTAINED AREA BOUNDARY (SEE NOTE)
- LYSIMETER
- OBELISK (OUTSIDE FENCE)
- CONCRETE LINED DRAINAGE CHANNELS
- GRASS LINED DRAINAGE CHANNELS

NOTE: THE OUTSIDE SHOULDER OF THE ACCESS ROAD DEFINES THE ARMY MAINTAINED AREA BOUNDARY.

holes



0 400 800
Scale In Feet

Program Manager
Rocky Mountain Arsenal

ROCKY MOUNTAIN ARSENAL
COMMERCE CITY, COLORADO

NAVARRO
Research and Engineering, Inc.

PROJECT NAME
LONG–TERM CARE PLAN

TITLE
ICS SURFACE WATER DRAINAGE CHANNEL PLAN

CAD FILE:	DATE	FIGURE NUMBER
FIG SOP 001–2.dwg	03.23.21	SOP 001–2

S:\G PROJECTS\ICS LONG TERM CARE PLAN 2021 UPDATE\

Form SOP 001-1
ICS Inspection Form

Inspector Names: M. Jones, K. Hoffman, C. Mackey | **Date(s):** 4-26-22 | **Time of Inspection:** 0800 - 1200

Type I inspection ☐ **Type II inspection** ☑ **Post-Storm inspection** ☐

Drive-around Post-Storm Inspection:

Drive-around inspection date (taken from Logbook): N/A

*Note: Post-storm event inspection items are indicated with a * next to the Inspection Item number.*

Date(s) of Significant Storm Event: N/A

Total Precipitation (in): N/A

Inspection Conditions:

Previous 24-hour precipitation: Ø | Weather Conditions: sunny, calm winds, 70's | Acceptable/Unacceptable for Inspection ***(circle one)***

Attachments: ☐ Photographs ☑ Figures ☑ Other: 2022 Coordinate list

INSPECTION ITEM	CONDITION PRESENT			REPEAT OR CHRONIC CONDITION			INSPECTION NOTE	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
1.0 Surface Conditions								
1.1* Erosion rills, gullies, or sheet erosion		✓				✓	none	
1.2* Conditions that could interrupt cover surface drainage (ponding areas, ruts, hole greater than 3" in diameter)	✓				✓		Note 1.	
1.3 Excessive animal trails		✓				✓	none	
1.4 Widespread burrowing animal holes		✓				✓	none	
1.5* Extensive linear cracks		✓				✓	none	

Form SOP 001-1
ICS Inspection Form

	INSPECTION ITEM	CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			INSPECTION NOTE	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
		Y	N	N/A	Y	N	N/A		
1.0	**Surface Conditions (Continued)**								
1.6	Vandalism, or intrusive damage such as unplanned excavation, drilling, grading, damage to engineering or access controls		✓				✓	none	
2.0	**Vegetative Cover**								
2.1	Bare area or areas of poor growth greater than 100 square feet		✓				✓	none	
2.2	Areas of vegetation stress greater than 100 square feet (over grazing, discoloration, pedestalling)		✓				✓	none	
2.3	Deep rooted, noxious or undesirable weedy species	✓				✓		Note 2.	Weed control is on-going. MJ 10/20/22
2.4	Excessive litter accumulation		✓				✓	none	
3.0	**Engineering and Access Controls**								
3.1	The perimeter fence is damaged	✓				✓		Note 3.	
3.2	Debris has collected along the perimeter fence	✓				✓		Note 4.	Addressed in Oct 2022. MJ 10/20/22
3.3	Obelisks are damaged, not visible, or not legible		✓				✓	none	
3.4	Warning signs are not legible from 25 feet		✓				✓	none	
3.5*	Damage to the Perimeter Access Road such as potholes, washouts, washboard, or burrowing		✓				✓	none	

Form SOP 001-1
ICS Inspection Form

4.0 Surface Drainage Controls: *Were the following conditions observed during the inspection of the stormwater drainage controls? (circle all that apply)*

INSPECTION ITEM	CHANNEL NUMBER																								
	1	2	3	4	5	6	7	8	9	10	11	11A	12	13	14	15	15A	16	17	18	19	20	21	22	23
4.1* Impeded drainage or ponding in the channel (siltation/debris present)	Y (N)	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y (N)
4.2* Inadequate protective vegetation	Y (N)	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y (N)
4.3* Erosion rills or gullies in the grass-lined channel	Y (N)	Y (N)	Y (N)			Y (N)	Y N	Y N	Y N	Y (N)			Y (N)		Y (N)	Y (N)		Y (N)		Y (N)	Y N	Y N	Y (N)		Y (N)
4.4* Cracked or degraded concrete				Y (N)	Y N	Y (N)					Y (N)	Y N	Y N	Y (N)		Y (N)	Y N	Y N	Y N	Y (N)				Y (N)	
4.5* Expansion joint damage (missing caulk)				Y (N)	Y N	Y (N)					Y (N)	Y N	Y N	Y (N)		Y (N)	Y N	Y N	Y N	Y (N)				Y (N)	
4.6* Inhibited drainage from the soil to the concrete-lined channel				Y (N)	Y N	Y (N)					Y (N)	Y N	Y N	Y (N)		Y (N)	Y N	Y N	Y N	Y (N)				Y (N)	
4.7* Subsidence or undercutting of the concrete-lined channel				Y (N)	Y N	Y (N)					Y (N)	Y N	Y N	Y (N)		Y (N)	Y N	Y N	Y N	Y (N)				Y (N)	

Form SOP 001-1
ICS Inspection Form

5.0 Erosion/Settlement Monuments: *Inspect monuments for damage and legibility, and record the soil thickness loss, if any. Perform during spring Type II and fall Type I inspections.*

INSPECTION ITEM	ER01	ER02	ER03	ER04	ER05	ER06	ER07	ER08	ER09	ER10	ER11	ER12	ER13	ER14	ER15	ER16	ER17	ER18	ER19
5.1 Was the monument free of damage and legible?	(Y)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	(Y)
	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
5.2 Measured Soil Thickness Loss (inches)	0.25	1	Ø	2.25	1	1.5	Ø	2	1	1	1	0.75	1.25	1	Ø	1.75	Ø	Ø	Ø

INSPECTION ITEM	ER20	ER21	ER22	ER23	ER24	ER25	ER26	ER27	ER28	ER29	ER30	ER31	ER32	ER33	ER34	ER35	ER36	ER37	ER38
5.1 Was the monument free of damage and legible?	(Y)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	(Y)
	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
5.2 Measured Soil Thickness Loss (inches)	1	0.5	1.5	0.5	Ø	0.25	0.5	1.25	1	1.5	2.5	2.5	Ø	1.25	1.5	1.5	1.5	2.5	2.5

INSPECTION ITEM	ER39	ER40	ER41	ER42	ER43	ER44	ER45	ER46	ER47	ER48	ER49	ER50	ER51	ER52	ER53	ER54	ER55	ER56	ER57
5.1 Was the monument free of damage and legible?	(Y)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	(Y)
	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
5.2 Measured Soil Thickness Loss (inches)	0.25	0.75	1.75	1	1.75	2	1.5	2.25	1.75	1	1	0.25	Ø	0.25	1.25	Ø	0.75	1	Ø

INSPECTION ITEM	ER58	ER59	ER60	ER61	ER62	ER63	ER64	ER65	ER66	ER67	ER68	ER69	ER70	ER71	ER72	ER73	ER74	ER75	ER76
5.1 Was the monument free of damage and legible?	(Y)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	(Y)
	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
5.2 Measured Soil Thickness Loss (inches)	1.25	0.5	1.5	0.5	Ø	1.75	1.5	1.5	1.5	0.25	1	1	Ø	0.75	1.5	Ø	Ø	Ø	1.5

INSPECTION ITEM	ER77	ER78	ER79	ER80	ER81	ER82	ER83	ER84	ER85	ER86	ER87	ER88	ER89	ER90	ER91	ER92
5.1 Was the monument free of damage and legible?	(Y)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	(Y)
	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
5.2 Measured Soil Thickness Loss (inches)	0.5	1	0.25	Ø	1.5	0.75	Ø	1.5	Ø	Ø	Ø	1	1	1	1	Ø

Form SOP 001-1
ICS Inspection Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations with GPS coordinates, and photographs as needed. Provide attachments as appropriate.

Carsonite markers:
ERL4 needs a new carsonite marker. Lysimeter 005 needs a new marker.
Well 01462 (waypoint 010 west transects) needs a replacement marker.
Replaced in May 2022.
MJ 10/20/22

Note 1: (4) holes were observed on the west transects and (2) holes were observed on the east transects. See attached figures for location information.

Note 2: (6) areas of cheatgrass were observed on the west transects. See attached figure for locations.

Note 3: The 8-ft fence along the south perimeter of ICS has numerous areas of fence fabric not attached to wooden posts, 2 broken wooden posts, and 1 tear of fabric.

Note 4: Tumble weed accumulation along fenceline around perimeter of ICS.

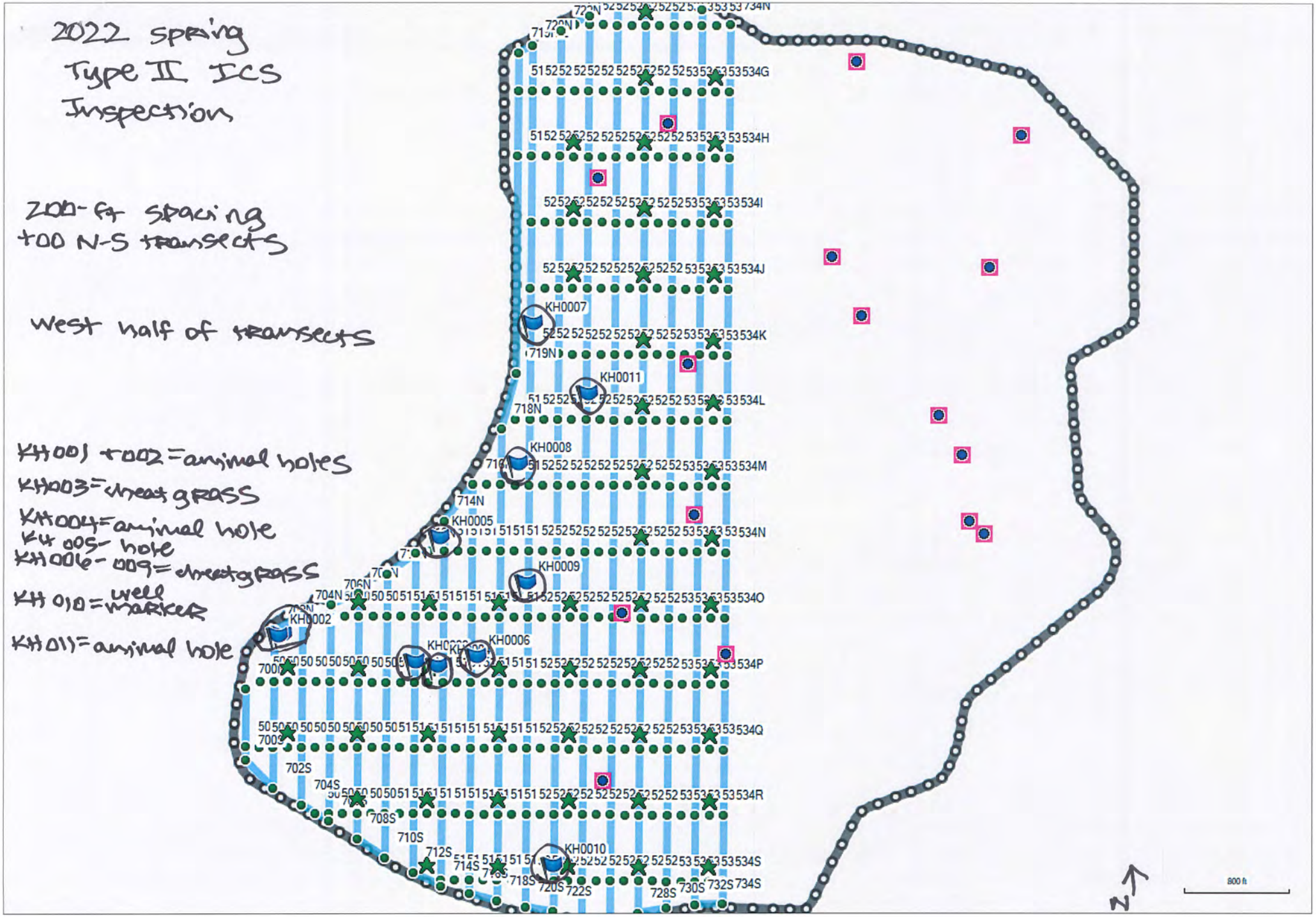
Inspector	
Name: Kim Hoffman	**Signature and Date:** Kim Hoffman 4-28-22
Covers Manager Review of Inspection Documentation	
Name: Michael W. Jones	**Signature and Date:** 5/10/22
Covers Manager Confirmation of Completed Actions	
Name:	**Signature and Date:**

2022 spring
Type II ICS
Inspection

200-ft spacing
100 N-S transects

West half of transects

KH001 + 002 = animal holes
KH003 = dreat grass
KH004 = animal hole
KH 005 - hole
KH006 - 009 = dreat grass
KH 010 = well marker
KH 011 = animal hole



2022 spring Type II
ICS Inspection

200-Ft spacing
too N-S transects

East half of transects

2022 Spring Type II Coordinate List

ICS West Transects

Waypoint	Coordinates		Description
KH0001	N39 49.575	W104 51.164	animal hole
KH0002	N39 49.574	W104 51.169	animal hole
KH0003	N39 49.542	W104 50.961	cheatgrass
KH0004	N39 49.537	W104 50.927	animal hole
KH0005	N39 49.697	W104 50.924	cheatgrass
KH0006	N39 49.548	W104 50.868	cheatgrass
KH0007	N39 49.965	W104 50.783	cheatgrass
KH0008	N39 49.789	W104 50.806	cheatgrass
KH0009	N39 49.640	W104 50.792	cheatgrass
KH0010	N39 49.286	W104 50.753	well 01662 needs marker
KH0011	N39 49.877	W104 50.699	animal hole

ICS East Transects

Waypoint	Coordinates		Description
Hole 0001	N39 50.044	W104 50.010	hole
Hole 0002	N39 49.933	W104 50.014	hole

post-storm

Form SOP 001-1
ICS Inspection Form

Inspector Names: M. Jones, K. Hoffmans, V. Stewart	**Date(s):** 6-8-22 **Time of Inspection:** 0800

Type I inspection ☐ **Type II inspection** ☐ **Post-Storm inspection** ☑

Drive-around Post-Storm Inspection:	**Date(s) of Significant Storm Event:**	**Total Precipitation (in):**
Drive-around inspection date (taken from Logbook): 6-1-22 *Note: Post-storm event inspection items are indicated with a * next to the Inspection Item number.*	6-1-22	1.47"

Inspection Conditions:

Previous 24-hour precipitation: 0 Weather Conditions: sunny, calm, 50's-60's Acceptable/Unacceptable for Inspection ***(circle one)***

Attachments: ☐ Photographs ☑ Figures ☐ Other

INSPECTION ITEM	CONDITION PRESENT			REPEAT OR CHRONIC CONDITION			INSPECTION NOTE	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
1.0 Surface Conditions								
1.1* Erosion rills, gullies, or sheet erosion		✓				✓	none	
1.2* Conditions that could interrupt cover surface drainage (ponding areas, ruts, hole greater than 3" in diameter)	✓				✓		Note 1.	
1.3 Excessive animal trails			✓			✓	N/A	
1.4 Widespread burrowing animal holes			✓			✓	N/A	
1.5* Extensive linear cracks		✓				✓	none	

5-12

Form SOP 001-1
ICS Inspection Form

INSPECTION ITEM		CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			INSPECTION NOTE	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
		Y	N	N/A	Y	N	N/A		
1.0	**Surface Conditions (Continued)**								
1.6	Vandalism, or intrusive damage such as unplanned excavation, drilling, grading, damage to engineering or access controls			✓			✓	N/A	
2.0	**Vegetative Cover**								
2.1	Bare area or areas of poor growth greater than 100 square feet			✓			✓	N/A	
2.2	Areas of vegetation stress greater than 100 square feet (over grazing, discoloration, pedestalling)			✓			✓	N/A	
2.3	Deep rooted, noxious or undesirable weedy species			✓			✓	N/A	
2.4	Excessive litter accumulation			✓			✓	N/A	
3.0	**Engineering and Access Controls**								
3.1	The perimeter fence is damaged			✓			✓	N/A	
3.2	Debris has collected along the perimeter fence			✓			✓	N/A	
3.3	Obelisks are damaged, not visible, or not legible			✓			✓	N/A	
3.4	Warning signs are not legible from 25 feet			✓			✓	N/A	
3.5*	Damage to the Perimeter Access Road such as potholes, washouts, washboard, or burrowing		✓				✓	none	

Form SOP 001-1
ICS Inspection Form

4.0 Surface Drainage Controls: *Were the following conditions observed during the inspection of the stormwater drainage controls? (circle all that apply)*

INSPECTION ITEM		CHANNEL NUMBER																								
		1	2	3	4	5	6	7	8	9	10	11	11A	12	13	14	15	15A	16	17	18	19	20	21	22	23
4.1*	Impeded drainage or ponding in the channel (siltation/debris present)	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
4.2*	Inadequate protective vegetation	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
4.3*	Erosion rills or gullies in the grass-lined channel	Y / N	Y / N	Y / N			Y / N	Y / N	Y / N	Y / N	Y / N			Y / N		Y / N	Y / N		Y / N		Y / N	Y / N	Y / N	Y / N		Y / N
4.4*	Cracked or degraded concrete				Y / N	Y / N	Y / N					Y / N	Y / N	Y / N	Y / N		Y / N	Y / N	Y / N	Y / N	Y / N				Y / N	
4.5*	Expansion joint damage (missing caulk)				Y / N	Y / N	Y / N					Y / N	Y / N	Y / N	Y / N		Y / N	Y / N	Y / N	Y / N	Y / N				Y / N	
4.6*	Inhibited drainage from the soil to the concrete-lined channel				Y / N	Y / N	Y / N					Y / N	Y / N	Y / N	Y / N		Y / N	Y / N	Y / N	Y / N	Y / N				Y / N	
4.7*	Subsidence or undercutting of the concrete-lined channel				Y / N	Y / N	Y / N					Y / N	Y / N	Y / N	Y / N		Y / N	Y / N	Y / N	Y / N	Y / N				Y / N	

4.1: A couple of small holes were observed near the outlet of ch. 13 see attached figure for location information.

Form SOP 001-1
ICS Inspection Form

5.0 Erosion/Settlement Monuments: *Inspect monuments for damage and legibility, and record the soil thickness loss, if any. Perform during spring Type II and fall Type I inspections.*

INSPECTION ITEM	ER01	ER02	ER03	ER04	ER05	ER06	ER07	ER08	ER09	ER10	ER11	ER12	ER13	ER14	ER15	ER16	ER17	ER18	ER19
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																			

INSPECTION ITEM	ER20	ER21	ER22	ER23	ER24	ER25	ER26	ER27	ER28	ER29	ER30	ER31	ER32	ER33	ER34	ER35	ER36	ER37	ER38
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																			

INSPECTION ITEM	ER39	ER40	ER41	ER42	ER43	ER44	ER45	ER46	ER47	ER48	ER49	ER50	ER51	ER52	ER53	ER54	ER55	ER56	ER57
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																			

INSPECTION ITEM	ER58	ER59	ER60	ER61	ER62	ER63	ER64	ER65	ER66	ER67	ER68	ER69	ER70	ER71	ER72	ER73	ER74	ER75	ER76
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																			

INSPECTION ITEM	ER77	ER78	ER79	ER80	ER81	ER82	ER83	ER84	ER85	ER86	ER87	ER88	ER89	ER90	ER91	ER92
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																

Form SOP 001-1
ICS Inspection Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations with GPS coordinates, and photographs as needed. Provide attachments as appropriate.

Note 1: (6) holes were observed on the Spring 2022 Type II transects. See attached figure for ≈ location information.

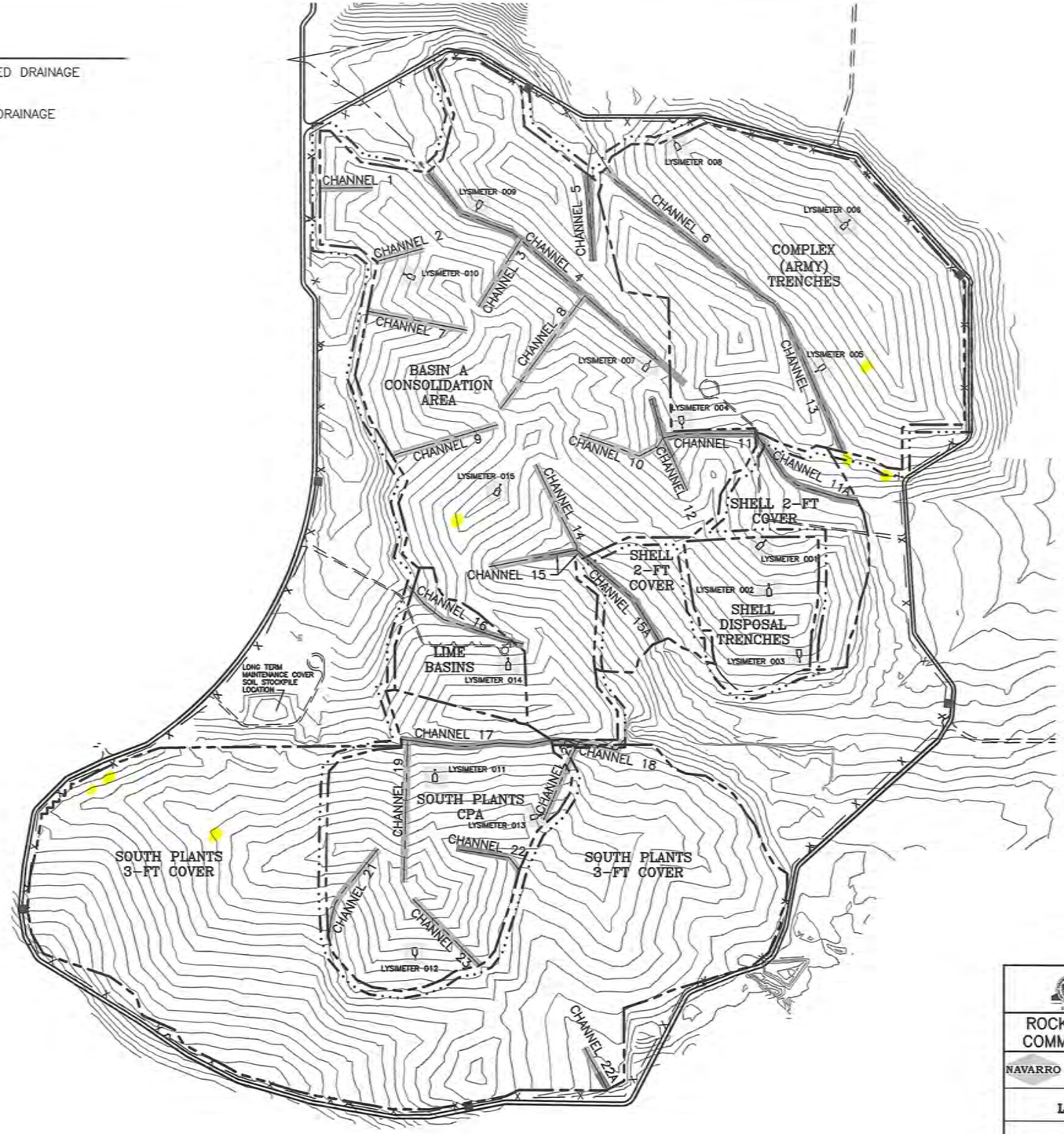
Inspector	
Name: Kim Hoffman	**Signature and Date:** Kim Hoffman 6-8-22
Covers Manager Review of Inspection Documentation	
Name: Michael W. Jones	**Signature and Date:** 6/29/22
Covers Manager Confirmation of Completed Actions	
Name:	**Signature and Date:**

LEGEND

- COVER BOUNDARY
- BIOTA BARRIER MATERIAL BOUNDARY
- WELL ACCESS ROAD
- AS–BUILT CONTOURS (RECORD CONDITIONS)
- PERIMETER FENCE
- ARMY MAINTAINED AREA BOUNDARY (SEE NOTE)
- LYSIMETER
- OBELISK (OUTSIDE FENCE)
- CONCRETE LINED DRAINAGE CHANNELS
- GRASS LINED DRAINAGE CHANNELS

NOTE: THE OUTSIDE SHOULDER OF THE ACCESS ROAD DEFINES THE ARMY MAINTAINED AREA BOUNDARY.

holes



Program Manager
Rocky Mountain Arsenal

ROCKY MOUNTAIN ARSENAL
COMMERCE CITY, COLORADO

NAVARRO
Research and Engineering, Inc.

PROJECT NAME
LONG–TERM CARE PLAN

TITLE
ICS SURFACE WATER DRAINAGE CHANNEL PLAN

CAD FILE:	DATE	FIGURE NUMBER
FIG SOP 001–2.dwg	03.23.21	SOP 001–2

S:\G PROJECTS\ICS LONG TERM CARE PLAN 2021 UPDATE\

POST-STORM

Form SOP 001-1
ICS Inspection Form

Inspector Names: K. Hoffman **Date(s):** 8-3-22 **Time of Inspection:** 0830

Type I inspection ☐ **Type II inspection** ☐ **Post-Storm inspection** ☑

Drive-around Post-Storm Inspection:
Drive-around inspection date (taken from Logbook): 7-27-22
*Note: Post-storm event inspection items are indicated with a * next to the Inspection Item number.*

Date(s) of Significant Storm Event: 7-26-22

Total Precipitation (in): 1.07"

Inspection Conditions:
Previous 24-hour precipitation: 0 Weather Conditions: sunny, calm winds, 80's Acceptable/Unacceptable for Inspection ***(circle one)***

Attachments: ☐ Photographs ☐ Figures ☐ Other

INSPECTION ITEM	CONDITION PRESENT			REPEAT OR CHRONIC CONDITION			INSPECTION NOTE	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
1.0 Surface Conditions								
1.1* Erosion rills, gullies, or sheet erosion		✓				✓	none	
1.2* Conditions that could interrupt cover surface drainage (ponding areas, ruts, hole greater than 3" in diameter)	✓				✓		Note 1.	
1.3 Excessive animal trails			✓			✓	N/A	
1.4 Widespread burrowing animal holes			✓			✓	N/A	
1.5* Extensive linear cracks		✓				✓	none	

8-12

Form SOP 001-1
ICS Inspection Form

INSPECTION ITEM		CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			INSPECTION NOTE	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
		Y	N	N/A	Y	N	N/A		
1.0	**Surface Conditions (Continued)**								
1.6	Vandalism, or intrusive damage such as unplanned excavation, drilling, grading, damage to engineering or access controls			✓			✓	N/A	
2.0	**Vegetative Cover**								
2.1	Bare area or areas of poor growth greater than 100 square feet			✓			✓	N/A	
2.2	Areas of vegetation stress greater than 100 square feet (over grazing, discoloration, pedestalling)			✓			✓	N/A	
2.3	Deep rooted, noxious or undesirable weedy species			✓			✓	N/A	
2.4	Excessive litter accumulation			✓			✓	N/A	
3.0	**Engineering and Access Controls**								
3.1	The perimeter fence is damaged			✓			✓	N/A	
3.2	Debris has collected along the perimeter fence			✓			✓	N/A	
3.3	Obelisks are damaged, not visible, or not legible			✓			✓	N/A	
3.4	Warning signs are not legible from 25 feet			✓			✓	N/A	
3.5*	Damage to the Perimeter Access Road such as potholes, washouts, washboard, or burrowing		✓				✓	none	

Form SOP 001-1
ICS Inspection Form

4.0 Surface Drainage Controls: *Were the following conditions observed during the inspection of the stormwater drainage controls? (circle all that apply)*

	INSPECTION ITEM	CHANNEL NUMBER																								
		1	2	3	4	5	6	7	8	9	10	11	11A	12	13	14	15	15A	16	17	18	19	20	21	22	23
4.1*	Impeded drainage or ponding in the channel (siltation/debris present)	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
4.2*	Inadequate protective vegetation	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
4.3*	Erosion rills or gullies in the grass-lined channel	Y N	Y N	Y N			Y N	Y N	Y N	Y N	Y N			Y N		Y N	Y N		Y N		Y N	Y N	Y N	Y N		Y N
4.4*	Cracked or degraded concrete				Y N	Y N	Y N					Y N	Y N	Y N	Y N		Y N	Y N	Y N	Y N	Y N				Y N	
4.5*	Expansion joint damage (missing caulk)				Y N	Y N	Y N					Y N	Y N	Y N	Y N		Y N	Y N	Y N	Y N	Y N				Y N	
4.6*	Inhibited drainage from the soil to the concrete-lined channel				Y N	Y N	Y N					Y N	Y N	Y N	Y N		Y N	Y N	Y N	Y N	Y N				Y N	
4.7*	Subsidence or undercutting of the concrete-lined channel				Y N	Y N	Y N					Y N	Y N	Y N	Y N		Y N	Y N	Y N	Y N	Y N				Y N	

4.1: A couple of small holes were observed near the outlet of ch. 13. See figure for location information.

Form SOP 001-1
ICS Inspection Form

5.0 Erosion/Settlement Monuments: *Inspect monuments for damage and legibility, and record the soil thickness loss, if any. Perform during spring Type II and fall Type I inspections.*

INSPECTION ITEM	ER01	ER02	ER03	ER04	ER05	ER06	ER07	ER08	ER09	ER10	ER11	ER12	ER13	ER14	ER15	ER16	ER17	ER18	ER19
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																			

INSPECTION ITEM	ER20	ER21	ER22	ER23	ER24	ER25	ER26	ER27	ER28	ER29	ER30	ER31	ER32	ER33	ER34	ER35	ER36	ER37	ER38
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																			

INSPECTION ITEM	ER39	ER40	ER41	ER42	ER43	ER44	ER45	ER46	ER47	ER48	ER49	ER50	ER51	ER52	ER53	ER54	ER55	ER56	ER57
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)			-45																

INSPECTION ITEM	ER58	ER59	ER60	ER61	ER62	ER63	ER64	ER65	ER66	ER67	ER68	ER69	ER70	ER71	ER72	ER73	ER74	ER75	ER76
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																			

INSPECTION ITEM	ER77	ER78	ER79	ER80	ER81	ER82	ER83	ER84	ER85	ER86	ER87	ER88	ER89	ER90	ER91	ER92
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																

Form SOP 001-1
ICS Inspection Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations with GPS coordinates, and photographs as needed. Provide attachments as appropriate.

Note 1: several areas of holes were observed during the Spring 2022 Type II inspection. See attached figure for location information.

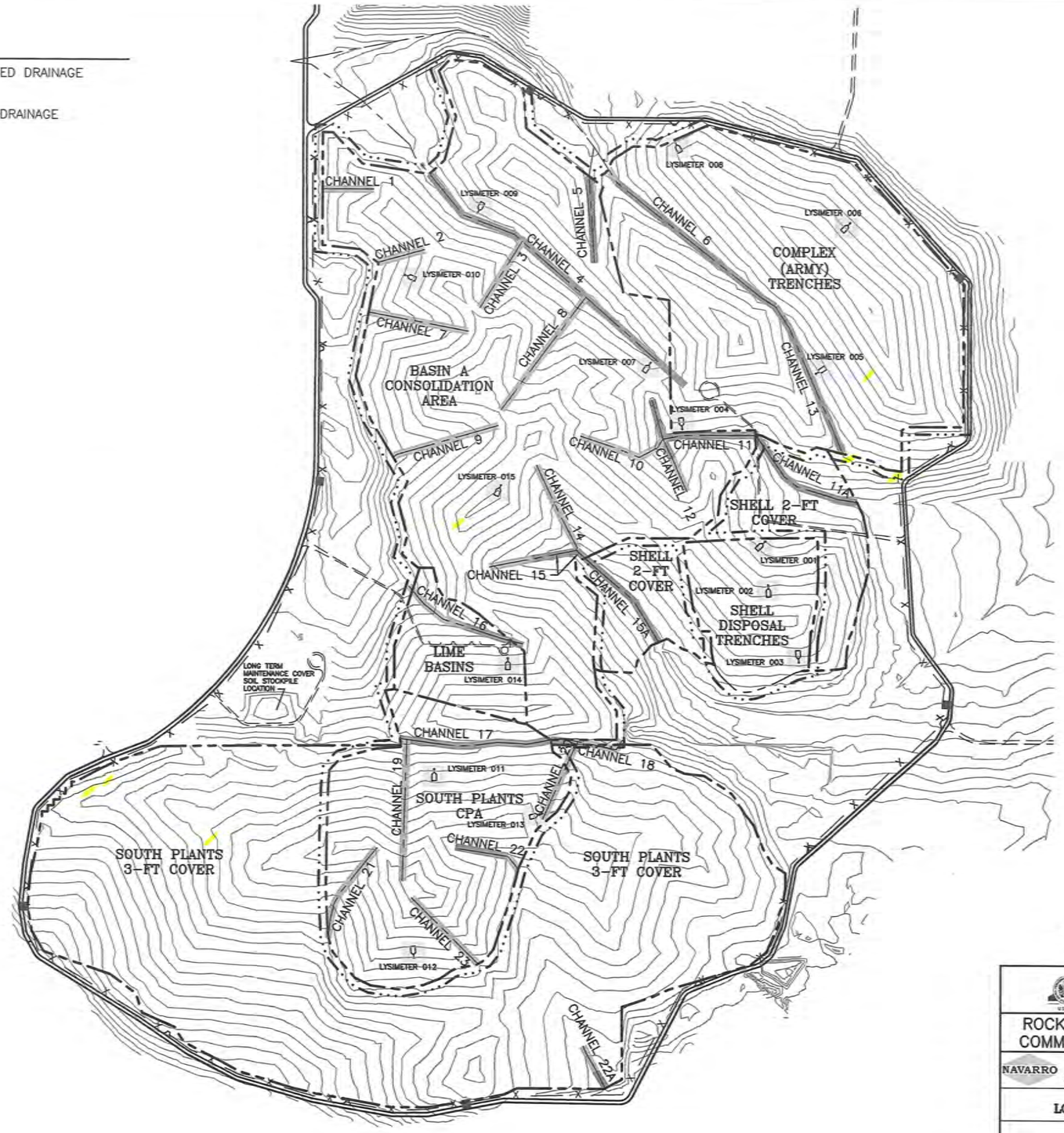
Inspector	
Name: Kim Hoffman	**Signature and Date:** [signature] 8-4-22
Covers Manager Review of Inspection Documentation	
Name: Michael W. Jones	**Signature and Date:** [signature] 10/3/22
Covers Manager Confirmation of Completed Actions	
Name:	**Signature and Date:**

LEGEND

- COVER BOUNDARY
- BIOTA BARRIER MATERIAL BOUNDARY
- WELL ACCESS ROAD
- AS–BUILT CONTOURS (RECORD CONDITIONS)
- PERIMETER FENCE
- ARMY MAINTAINED AREA BOUNDARY (SEE NOTE)
- LYSIMETER
- OBELISK (OUTSIDE FENCE)
- CONCRETE LINED DRAINAGE CHANNELS
- GRASS LINED DRAINAGE CHANNELS

NOTE: THE OUTSIDE SHOULDER OF THE ACCESS ROAD DEFINES THE ARMY MAINTAINED AREA BOUNDARY.

holes



Program Manager
Rocky Mountain Arsenal

ROCKY MOUNTAIN ARSENAL
COMMERCE CITY, COLORADO

NAVARRO
Research and Engineering, Inc.

PROJECT NAME
LONG–TERM CARE PLAN

TITLE
ICS SURFACE WATER DRAINAGE CHANNEL PLAN

CAD FILE:	DATE	FIGURE NUMBER
FIG SOP 001–2.dwg	03.23.21	SOP 001–2

S:\G PROJECTS\ICS LONG TERM CARE PLAN 2021 UPDATE\

APPENDIX D

Maintenance and Repair Documentation

(October 1, 2021 through September 30, 2022)

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CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 10-13-21
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
OMC personnel mowed around the CAT control panel, Lysimeters 001-003, the Lime Basins metering building, and the Lime Basins precipitation gauge. This activity was to protect these sensitive features for the controlled burn that may potentially be conducted by the USFWS.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Site Inspector/CDM Smith
Signature: Kim Hoffman	Date: 12-16-21
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature:	Date: 12/17/21

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 10-25-21
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
OMC personnel maintenance the LB precipitation gauge on ICS. The tipping bucket, thermostat, heater, fuse, voltage, and overall condition was checked. Precipitation measurements collected between noon and one can be disregarded. No issues were identified with the precipitation gauge.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Site Inspector/CDM Smith
Signature: Kim Hoffman	Date: 12-16-21
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature:	Date: 12/17/21

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: Weed Wranglers	Project: ICS O&M
Task: maintenance/repair	Date: 10-28-21
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
Weed Wranglers sprayed the herbicide Plainview SC® as a ground clear herbicide treatment on ICS. Roadways, around gates and wells, and other working surfaces were sprayed.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Site Inspector/CDM Smith
Signature: Kim Hoffman	Date: 12-16-21
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature:	Date: 12/17/21

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 11-17-21
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
OMC measured the four SDT piezometers. All four piezometers were dry. This is the fifth consecutive quarter out of eight to collect measurements.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Site Inspector/CDM Smith
Signature: Kim Hoffman	Date: 12-16-21
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature:	Date: 12/17/21

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: USFWS	Project: ICS O&M
Task: maintenance/repair	Date: 11-18-21
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
USFWS used the tumble weed fence cleaner to clear tumble weeds from the exterior ICS perimeter fence. USFWS cleared the west and north fence line.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Site Inspector/CDM Smith
Signature: Kim Hoffman	Date: 12-16-21
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature:	Date: 12/17/21

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 11-30-21
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
OMC personnel used the tumble weed fence cleaner to remove the tumble weeds from the east and south interior and exterior fence line.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Site Inspector/CDM Smith
Signature: Kim Hoffman	Date: 12-16-21
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature:	Date: 12/17/21

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: USFWS	Project: ICS O&M
Task: maintenance/repair	Date: 12-16-21
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
USFWS used a tractor and batwing mower to remove tumble weeds that have collected along the east and south ICS perimeter road and fence. High winds have made the tumble weeds collect in large volumes and buried most of the east perimeter road.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Site Inspector/CDM Smith
Signature: Kim Hoffman	Date: 7-20-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature:	Date: 7/29/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 2/9/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
OMC personnel measured the four SDT RCRA-Equivalent Cover piezometers. All piezometers remained dry. This was the sixth consecutive quarter for measurements in accordance with OCN-LTCP-2020-001.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: [signature]	Date: 7-20-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature: [signature]	Date: 7/21/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 3/3/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
OMC used the USFWS tractor and OMC's fence cleaner to remove tumble weeds from the ICS perimeter fence.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: Kim Hoffman	Date: 7-20-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature:	Date: 7/29/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: USFWS	Project: ICS O&M
Task: maintenance/repair	Date: 3/29/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
USFWS mowed the tumble weeds from the south perimeter road of ICS. This road was inaccessible due to accumulation after high winds.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: Kim Hoffman	Date: 7-20-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature:	Date: 7/29/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: H2	Project: ICS O&M
Task: maintenance/repair	Date: 4/18/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
H2 mobilized onsite to begin mowing the ICS overseeding areas that are documented in NRAP-2021-005 ICS Vegetation Improvement. The mowing operations were not completed today.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: Kim Hoffman	Date: 7-20-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature:	Date: 7/29/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: H2	Project: ICS O&M
Task: maintenance/repair	Date: 4/19/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
H2 continued to mow the ICS overseeding areas that are documented in NRAP-2021-005 ICS Vegetation Improvement. All mowing was completed today. H2 began overseeding the ICS area using approximately 10 lb/acre of a seed and rice hull mix. H2 is using a drill seeder. The seed mix is buffalo grass, side oats grama, blue grama, and alkali sacaton.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
Seed tags	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: Kim Hoffman	Date: 7-20-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature:	Date: 7/29/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: H2	Project: ICS O&M
Task: maintenance/repair	Date: 4/20/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
H2 continued to overseed the ICS area using approximately 10 lb/acre of a seed and rice hull mix. H2 is using a drill seeder. The seed mix is buffalo grass, side oats grama, blue grama, and alkali sacaton.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
Seed tags	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: Kim Hoffman	Date: 7-20-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature:	Date: 7/29/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: H2	Project: ICS O&M
Task: maintenance/repair	Date: 4/21/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
H2 continued to overseed the ICS area using approximately 10 lb/acre of a seed and rice hull mix. H2 is using a drill seeder. The seed mix is buffalo grass, side oats grama, blue grama, and alkali sacaton. H2 finished the overseeding today. H2 began mowing tumble weeds along the ICS perimeter fence.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
Seed tags	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: Kim Hoffman	Date: 7-20-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature:	Date: 7/21/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: H2	Project: ICS O&M
Task: maintenance/repair	Date: 4/22/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
H2 continued to mow the tumble weeds along the ICS perimeter fence. The mowing was completed today and H2 demobilized all of their equipment.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: Kim Hoffman	Date: 7-20-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature: Michael Jones	Date: 7/29/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 5/11/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
OMC personnel measured the four SDT RCRA-Equivalent piezometers and they were dry. This was the seventh consecutive quarter for measurements. One green with yellow reflective Carsonite marker was installed next to each piezometer. One yellow with red reflective Carsonite marker was replaced at ER64 due to damage of the existing marker.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: Kim Hoffman	Date: 7-20-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature: Michael S. Jones	Date: 7/29/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 5/18/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
OMC personnel pumped the standing water from the following lysimeters: 012=118 liters 004=91 liters 007=57 liters 005=53 liters	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: Kim Hoffman	Date: 7-20-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature: Michael W. Jones	Date: 7/29/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 5/25/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
OMC personnel replaced the damaged Carsonite markers for Lysimeter 005 and a well that was identified in the 2022 spring Type II inspection.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: Kim Hoffman	Date: 7-20-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature: Michael W. Jones	Date: 7/29/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 6/1/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
OMC personnel performed a drive around inspection due to the RMA receiving 1.47" of rain in a 24-hour period. The rain stopped on 6/1/22 during the am and the inspection was performed in the afternoon. No new observations were noted.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: Kim Hoffman	Date: 7-20-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature: Michael V. Jones	Date: 7/21/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: Weed Wranglers	Project: ICS O&M
Task: maintenance/repair	Date: 6/7/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
Weed Wranglers sprayed a 0.5 acre patch of whitetop using the herbicides 2,4-D and Escort. This activity was completed today.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: Kim Hoffman	Date: 7-20-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature: Michael V. Jones	Date: 7/29/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 7/11/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
OMC personnel repaired the areas of the 8-foot fence along the south perimeter of ICS. This fence was damaged due to high winds and tumble weed accumulation. Areas were repaired by stapling the fence fabric onto wooden posts and mending the fabric where it was torn apart.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: Kim Hoffman	Date: 7-20-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature: Michael V. Jones	Date: 7/29/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: Weed Wranglers	Project: ICS O&M
Task: maintenance/repair	Date: 7/12/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
Weed Wranglers began spraying the 94 acres of ICS that was overseeded in the spring of 2022. These areas were sprayed for Russian thistle and kochia. Weed Wranglers used 2-4,D, Vista XRT and non-ionic surfactant. This task was not completed today.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: Kim Hoffman	Date: 7-20-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature:	Date: 7/29/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: Weed Wranglers	Project: ICS O&M
Task: maintenance/repair	Date: 7/13/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
Weed Wranglers continued to spray the 94 acres of ICS that was overseeded in the spring of 2022. These areas were sprayed for Russian thistle and kochia. Weed Wranglers used 2-4,D, Vista XRT and non-ionic surfactant. This task was completed today.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: Kim Hoffman	Date: 7-20-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature:	Date: 7/29/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: Weed Wranglers	Project: ICS O&M
Task: maintenance/repair	Date: 7/20/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
Weed Wranglers was onsite to spot spray noxious weeds. The herbicides used were Escort XP and Transline. Weed Wranglers used an ATV and drove around the cover identifying and spraying weeds detailed in the Prohibited Plants and Weed Watch List from the LTCP.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: Kri Hoffman	Date: 9-29-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature:	Date: 10/10/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: Weed Wranglers	Project: ICS O&M
Task: maintenance/repair	Date: 7/21/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
Weed Wranglers continued to spot spray noxious weeds. The herbicides used were Escort XP and Transline. Weed Wranglers used an ATV and drove around the cover identifying and spraying weeds detailed in the Prohibited Plants and Weed Watch List from the LTCP. The entire ICS was completed today.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: Kim Hoffman	Date: 9-29-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature:	Date: 10/10/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: H2	Project: ICS O&M
Task: maintenance/repair	Date: 7/26/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
H2 mowed weedy areas on ICS. Approximately 57 acres were requested to be mowed. One area was not completed today which totaled 7.4 acres.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: Kim Hoffman	Date: 9-29-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature: Michael W. Jones	Date: 10/10/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 7/27/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
The RMA received 1.07" of rain in a 24-hour period. A drive around post-storm inspection was performed. No new observations were noted.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: Kim Hoffman	Date: 9-29-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature:	Date: 10/10/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: H2	Project: ICS O&M
Task: maintenance/repair	Date: 8/3/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
H2 mowed the remaining 7.40 acres on ICS. H2 demobilized from the site. OMC measured the SDT piezometers. All four of the piezometers were dry. This is the final (eighth) quarter for measurements per OCN-LTCP-2020-001.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: Kim Hoffman	Date: 9-29-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature:	Date: 10/10/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 8/9/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
OMC installed a second cattleguard on the southeast ICS perimeter road to help manage bison. A bison breached the perimeter fence on the north end of ICS along D Street. One T-post was damaged and needs repaired.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: Kim Hoffman	Date: 9-29-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature: Michael W. Jones	Date: 10/10/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: Weed Wranglers	Project: ICS O&M
Task: maintenance/repair	Date: 8/10/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
Weed Wranglers was onsite to spot spray noxious weeds for a follow up inspection. The herbicides used were Escort XP and Transline. Weed Wranglers used an ATV and drove around the cover identifying and spraying weeds detailed in the Prohibited Plants and Weed Watch List from the LTCP. OMC inspected the ICS for potential bison damage due to the perimeter fence breach on 8/9/22. No damage was observed on the cover. One T-post needs replaced on the perimeter fence.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: Kim Hoffman	Date: 9-29-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature:	Date: 10/10/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: H2	Project: ICS O&M
Task: maintenance/repair	Date: 9/21/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
H2 began mowing the 174 acres on ICS that were weedy. H2 mowed the vegetation to approximately 10 inches. This work was not completed today. H2 mowed 33.9 acres. YSI 10-12-22	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: Kim Hoffman	Date: 9-29-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature: Michael W. Jones	Date: 10/10/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: H2	Project: ICS O&M
Task: maintenance/repair	Date: 9/22/22
Weather AM: wet	Weather PM: wet
Activities Inspected and Observed:	
H2 was not mowing today due to wet field conditions. RMA received 0.14" of rain overnight and OMC determined field conditions were too wet for mowing activities.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: Kim Hoffman	Date: 9-29-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature:	Date: 10/10/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: H2	Project: ICS O&M
Task: maintenance/repair	Date: 9/23/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
H2 continued mowing the 174 acres on ICS that were weedy. H2 mowed the vegetation to approximately 10 inches. This work was not completed today. H2 mowed 54.5 acres. KH 10-12-22	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: Kim Hoffman	Date: 9-29-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature:	Date: 10/10/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: H2	Project: ICS O&M
Task: maintenance/repair	Date: 9/26/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
H2 continued mowing the 174 acres on ICS that were weedy. H2 mowed the vegetation to approximately 10 inches. This work was not completed today. H2 mowed 40 acrees. KH 10-12-22	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: Kim Hoffman	Date: 9-29-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature:	Date: 10/10/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: H2	Project: ICS O&M
Task: maintenance/repair	Date: 9/27/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
H2 continued mowing the 174 acres on ICS that were weedy. H2 mowed the vegetation to approximately 10 inches. This work was not completed today. H2 mowed 55 acres. KH 10-12-22	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: Kim Hoffman	Date: 9-29-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature: Michael Jones	Date: 10/10/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: H2	Project: ICS O&M
Task: maintenance/repair	Date: 9/28/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
H2 continued mowing the 174 acres on ICS that were weedy. H2 mowed the vegetation to approximately 10 inches. This work was completed today and H2 demobilized. H2 mowed 13 acres. KH 10-12-22 OMC mowed around sensitive features on ICS in preparation for a fall prescribed burn.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: Kim Hoffman	Date: 9-29-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature:	Date: 10/10/22

APPENDIX E

NRAP Log

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NON-ROUTINE ACTION PLAN LOG

Projects: Long-Term Maintenance of the HWL, ELF, ICS, and Basin F RCRA-Equivalent Cover

WBS: 4.01.01, 4.01.02, 4.01.03, and 4.01.04

Number	Description of Condition and Non-Routine Action	Cover/Cap Affected	Consultation Date(s)	Concurrence Dates					Status
				Covers Manager	Army PM	EPA	CDPHE	TCHD	
2008-001	Hand seeding of small areas on the SDT RCRA-Equivalent Cover. Amendment will not be applied, the sites will not be irrigated, and minor changes to the seed mix are required based on availability.	SDT RCRA-Equivalent	Unknown	09/20/11 (Issued for concur-ance 05/27/08)	09/20/11 (Issued for concur-ance 05/27/08)	Comments resolved 06/2008	05/29/08	05/29/08	Concurrence or resolution with all parties.
2009-001	Temperature probe #4 failed and requires replacement. The probe is located near Lysimeter 002 and is approximately 30” bgs. Hand tools will be used to dig a hole adjacent to the temperature probe nest and a new probe will be installed at the appropriate depth. The hole will be filled with spoils from the excavation.	SDT RCRA-Equivalent	06/25/09 07/02/09 07/07/09	07/14/09	07/16/09	07/22/09	07/23/09	07/16/09	All parties concur.
2009-002	The rain gauge at Lysimeter 002 will be replaced with another unit mounted to a stand, separate from the control panel. A hole approximately 24” deep will be dug with hand tools. The stand will be placed in the hole and spoils will be used to backfill around it. A shallow trench (6” deep) will be dug from the new stand to the control panel for the instrument wire.	SDT RCRA-Equivalent	06/29/09	07/30/09	07/30/09	07/30/09	07/30/09	07/30/09	All parties concur.
2009-003	The soil thickness loss at EM-HWL03 exceeds the Non-Routine Action Level. The settlement around this monument is localized and additional soil will be placed in the depression to match the	HWL	09/10/09 09/17/09	09/28/09	09/28/09	10/01/09	10/01/09	10/01/09	All parties concur.

NON-ROUTINE ACTION PLAN LOG

Projects: Long-Term Maintenance of the HWL, ELF, ICS, and Basin F RCRA-Equivalent Cover

WBS: 4.01.01, 4.01.02, 4.01.03, and 4.01.04

Number	Description of Condition and Non-Routine Action	Cover/Cap Affected	Consultation Date(s)	Concurrence Dates					Status
				Covers Manager	Army PM	EPA	CDPHE	TCHD	
	surrounding grade.								
2009-004	The RMA biomonitoring program requires the installation of starling and kestrel nest boxes within the ICS AMA. Two arrays of starling nest boxes (10 boxes each) will be installed; one on the SDT 2-ft Cover and one on the South Plants 3-ft cover. One kestrel box will be installed near the former intersection of 7th Avenue and D Street, in a non-cover area. Installation of these nest boxes will require intrusive activities.	SDT 2-ft Cover South Plants 3-ft Cover Non-cover area	12/17/09 01/06/10 01/07/10	01/12/10	01/12/10	01/22/10	02/04/10	02/04/10	All parties concur.
2010-001	Extraction wells in the South Tank Farm Benzene Plume area will be closed and piping will be capped. These activities will be intrusive in the 3-ft Cover.	South Plants 3-ft Cover	N/A	NRAP-2010-001 was terminated after the Water Team agreed not to close extraction wells at this time.					Terminated
2010-002	Some components of the Lime Basins dewatering wells discharge piping have deteriorated and require replacement. Excavations must be made through the RCRA-Equivalent Cover and into the subgrade soil to access the components. Excavations will be made at six well locations. The excavations will be repaired to the requirements of the ICS Project Design with materials removed during excavation, or new materials if those removed do not meet the requirements of the	Lime Basins	05/20/10 06/29/10	07/14/10	07/14/10	07/15/10	07/15/10	07/15/10	All parties concur.

Number	Description of Condition and Non-Routine Action	Cover/Cap Affected	Consultation Date(s)	Concurrence Dates					Status
				Covers Manager	Army PM	EPA	CDPHE	TCHD	
	design.								
2010-003	Significant storm events have created deep erosion gullies around box culvert wing walls and in other locations of concentrated flow into perimeter channels at the HWL and ELF. The soil around these features generally has not withstood concentrated stormwater flow and it is unlikely that vegetation establishment will be robust enough to prevent further erosion. Additional erosion protection, exceeding that required by the original design, is required to maintain the integrity of the perimeter channel slopes where concentrated flow enters them.	HWL/ELF	08/19/10	Unknown	Unknown	08/24/10 (email)	Unknown	Unknown	Failure to locate original document.
2010-004	The Lime Basins Groundwater Treatment Relocation Project requires the transmission of groundwater from the Lime Basins meter building to the Basin A Neck treatment facility via the existing pipeline that was formerly used to carry treated water from the CERCLA Plant to the Basin A Neck recharge trenches. Use of this existing transmission pipeline for the stated purpose requires the installation of a section of piping connecting the existing piping from the Lime Basins meter building to the CERCLA Plant to	ICS Non-Cover	08/02/10 08/11/10	08/11/10	08/11/10	08/25/10	09/23/10	08/23/10	All parties concur.

Number	Description of Condition and Non-Routine Action	Cover/Cap Affected	Consultation Date(s)	Concurrence Dates					Status
				Covers Manager	Army PM	EPA	CDPHE	TCHD	
	the existing piping connecting the CERCLA Plant to the Basin A Neck treatment facility.								
2010-005	The PMC is replacing survey monuments at section corners and mid-section points throughout RMA that were destroyed during remediation activities. Two such monuments will be installed within the ICS Army Maintained Area (AMA) along former 7th Avenue.	ICS Non-Cover	09/09/10	09/10/10	09/13/10	09/23/10	09/15/10	09/13/10	All parties concur.
2010-006	The RVO requires extension of the fiber optic network to provide data/phone service to the Lime Basins Meter Building. An existing (buried) fiber optic line that formerly serviced the B-312 Fire Station is located near a phone pedestal just southeast of the CERCLA Wastewater Treatment Facility (white circle on attached drawing). This fiber optic line will be located and a new line will be connected to extend to the Lime Basins Meter Building.	ICS Non-Cover	09/09/10	09/09/10	09/09/10	09/09/10 (e-mail)	09/09/10 (e-mail)	09/09/10 (e-mail)	All parties concur.
2010-007	Closure of the Landfill Wastewater Treatment System (LWTS) requires the abandonment of several underground utilities, including the treated water discharge piping. Abandonment of the treated water discharge piping will involve the abandonment of two manholes containing air relief valves, which	HWL Non-Cover	10/04/10	10/04/10	05/02/11	10/05/10 (e-mail)	None	10/05/10 (e-mail)	No record of CDPHE concurrence. All other parties concur.

Number	Description of Condition and Non-Routine Action	Cover/Cap Affected	Consultation Date(s)	Concurrence Dates					Status
				Covers Manager	Army PM	EPA	CDPHE	TCHD	
	are within the HWL fence, north of the landfill. Abandonment of the manholes will involve intrusive work inside the Army Maintained Area.								
2010-008	On Thursday, September 30, 2010, URS discovered a potential leak at the Complex Trenches groundwater extraction wellhead (Well #36305). Initial investigation suggests that there may be damage to the groundwater conveyance piping at, or near, the well's pitless adaptor. Further investigation and repair will involve intrusive work (excavation and backfill) inside the Army Maintained Area.	CAT	10/04/10	10/04/10	10/04/10	10/14/10	10/14/10	10/06/10	All parties concur.
2010-009	A telephone pedestal was damaged by a mower during recent weed control work. The pedestal is located on D Street, south of Drainage Crossing 2, between the perimeter road and the fence. Repair will require excavation around the box and cables, which are located within the Army Maintained Area.	ICS Non-Cover	10/18/10	10/18/10	10/18/10	10/27/10	11/10/10	11/10/10	All parties concur.
2010-010	Over-seeding is required on the ELF and in some parts of the HWL and surrounding areas in order to better establish desirable grasses, especially cool season grasses. The area exceeds 11,000 sft and requires	HWL and ELF	11/08/10	11/10/10	11/10/10	11/10/10	11/10/10	11/10/10	All parties concur.

NON-ROUTINE ACTION PLAN LOG

Projects: Long-Term Maintenance of the HWL, ELF, ICS, and Basin F RCRA-Equivalent Cover **WBS:** 4.01.01, 4.01.02, 4.01.03, and 4.01.04

Number	Description of Condition and Non-Routine Action	Cover/Cap Affected	Consultation Date(s)	Concurrence Dates					Status
				Covers Manager	Army PM	EPA	CDPHE	TCHD	
	consultation.								
2010-011	Over-seeding is required on parts of the ICS and Basin F Army Maintained Areas in order to better establish desirable grasses. The area exceeds 11,000 sft and requires consultation.	Basin F, ICS, and Non-Cover	11/09/10	11/10/10	11/10/10	11/10/10	11/10/10	11/10/10	All parties concur.
2010-012	The LLDPE boot cannot be replaced around well DW-9 because a new pitless adaptor was installed. Bentonite will be placed around the liner penetrations as an alternative.	Lime Basins	11/18/10 11/22/10	11/23/10	05/02/11	11/23/10 (e-mail)	11/23/10 (e-mail)	11/23/10 (e-mail)	All parties concur.
2011-001	An ICS perimeter fence gate stop post at the Channel 6 gate was installed incorrectly. The post will be moved to the correct location.	ICS Non-Cover	01/19/11	01/23/11	01/31/11	02/02/11	02/02/11	02/02/11	All parties concur.
2011-002A	Installation of Carsonite marker posts to improve visibility of features that could be obscured by tall vegetation. Installation of the marker posts will require intrusive activities in the covers and in non-cover areas.	Basin F, ICS, and Non-Cover	02/23/11	03/14/11	03/16/11	03/17/11	04/22/11	03/17/11	All parties concur.
2011-002B	Installation of Carsonite marker posts to improve visibility of features that could be obscured by tall vegetation. Installation of the marker posts will require intrusive activities in the caps and in surrounding support areas.	HWL and ELF	02/23/11	03/14/11	03/16/11	03/17/11	04/22/11	03/17/11	All parties concur.
2011-003	Installation of a new rain gauge near the Lime Basins Metering	ICS Non-	03/15/11	03/17/11	03/17/11	03/17/11	04/22/11	03/17/11	All parties

Number	Description of Condition and Non-Routine Action	Cover/Cap Affected	Consultation Date(s)	Concurrence Dates					Status
				Covers Manager	Army PM	EPA	CDPHE	TCHD	
	Building. The installation will require intrusive activities in a non-cover area west of the Lime Basins cover.	Cover							concur.
2011-004	Re-establish positive drainage downstream of the Channel 4 outlet structure northwest of the Basin A cover. Approximately 400 feet of flowline in the non-cover area will be excavated to promote positive drainage.	ICS Non-Cover	03/24/11	05/04/11	05/04/11	03/28/11 (e-mail)	03/29/11 (e-mail)	03/28/11 (e-mail)	All parties concur.
2011-005	Revegetation of the ELF perimeter channels including amendment, seedbed prep, seeding, and installation of erosion control blankets and erosion control wattles over the seeded areas.	ELF Non-Cover	06/10/11	06/21/11	06/21/11	07/05/11	08/11/11	07/12/11	All parties concur.
2011-006	Documentation of ELF sump sample results at LB LDS2. Monthly sampling was performed per the ELF Post-Closure Groundwater Monitoring Plan. Results of the three-month sampling period and an investigation summary regarding potential causes for the detections are included.	ELF	07/21/11	04/02/12	04/03/12	04/25/12	04/19/12	04/19/12	All parties concur.
2011-007	Rebuild the riprap outlet structure at Channel 4 to improve drainage from the concrete lined channel.	ICS	08/23/11	08/23/11	08/24/11	09/01/11	09/08/11	09/0811	All parties concur.
2011-008	Removal of barbed wire from the HWL and ELF perimeter fence, and removal of gate on the west	HWL and ELF Non-Cover	08/24/11	08/25/11	08/24/11	09/01/11	09/01/11	09/01/11	All parties concur.

NON-ROUTINE ACTION PLAN LOG

Projects: Long-Term Maintenance of the HWL, ELF, ICS, and Basin F RCRA-Equivalent Cover

WBS: 4.01.01, 4.01.02, 4.01.03, and 4.01.04

Number	Description of Condition and Non-Routine Action	Cover/Cap Affected	Consultation Date(s)	Concurrence Dates					Status
				Covers Manager	Army PM	EPA	CDPHE	TCHD	
	fence and replacement with chainlink fence fabric.								
2011-009	Removal of a soil feature measuring approximately 50-ft long, 4-ft wide, and 2-ft tall that was left in place along the eastern portion of the former CERCLA Wastewater Treatment Plant site.	ICS Non-Cover	09/16/11	09/20/11	09/20/11	09/22/11	09/22/11	09/22/11	All parties concur.
2011-010	Installation of warning signs adjacent to two cattle guards, one each, on the ICS and Basin F perimeter fences.	ICS and Basin F Non-Cover	09/21/11	09/22/11	09/26/11	09/29/11	09/29/11	09/29/11	All parties concur.
2011-011	Covering exposed portions of the HWL and ELF gravel drainage layer geotextile with stone.	HWL and ELF	10/26/11	NRAP-2011-011 was rescinded by James L. Green via email on November 17, 2011.					Rescinded
2011-012	Erosion/settlement monument EM-ELF08 had a measured soil thickness loss of 5.0 inches on September 29, 2011. The non-routine action trigger level for these monuments is 0.4 foot, which is 4.8 inches. Investigation showed the soil around the monument had settled or washed away. Replacement soil will be imported to fill the depression.	ELF	10/10/11	11/21/11	11/21/11	12/15/11	01/11/12	11/22/11	All parties concur.
2011-013	Overseeding of 12.4 acres around the ELF perimeter, and hand seeding of Sand Dropseed on 37.4 acres of the ELF cap.	ELF	11/17/11	11/21/11	11/21/11	12/15/11	01/11/12	11/22/11	All parties concur.
2011-014	Areas of the ICS and Basin F require seeding where soil repairs had been made earlier in the year,	Basin F and ICS	11/21/11	11/21/11	11/21/11	12/15/11	01/11/12	11/22/11	All parties concur.

NON-ROUTINE ACTION PLAN LOG

Projects: Long-Term Maintenance of the HWL, ELF, ICS, and Basin F RCRA-Equivalent Cover

WBS: 4.01.01, 4.01.02, 4.01.03, and 4.01.04

Number	Description of Condition and Non-Routine Action	Cover/Cap Affected	Consultation Date(s)	Concurrence Dates					Status
				Covers Manager	Army PM	EPA	CDPHE	TCHD	
	and over-seeding where vegetation is less well established than surrounding areas.								
2012-001	Documentation of HWL sump sample results at LDS2, LDS3, and LDS4 from April 2011 through October 2011.	HWL	06/17/11 08/31/11 09/23/11 10/06/11 10/13/11 11/15/11	09/26/12	09/26/12	10/29/12	10/10/12	10/10/12	All parties concur.
2012-002	Documentation of ELF sump sample results at WPLDS1, WPLDS2, and LBLDS2 from July 2011 through October 2011.	ELF	08/31/11 09/23/11 10/06/11 10/13/11 11/15/11	09/26/12	09/26/12	10/29/12	10/10/12	10/10/12	All parties concur.
2012-003	The fence surrounding the HWL and ELF demarcates the AMA boundary, which needs to be expanded in six locations to improve access to monitoring wells and to provide enough space to construct an interior access road between the perimeter fence and perimeter drainage channels.	HWL and ELF	02/06/12	02/10/12	02/13/12	02/14/12	02/14/12	02/14/12	All parties concur.
2012-004	The existing HWL and ELF access road network needs to be expanded to improve access to groundwater monitoring wells and other features that require routine inspection and maintenance.	HWL and ELF	06/29/12	07/09/12	07/11/12	07/25/12	08/01/12	07/11/12	All parties concur.

NON-ROUTINE ACTION PLAN LOG

Projects: Long-Term Maintenance of the HWL, ELF, ICS, and Basin F RCRA-Equivalent Cover

WBS: 4.01.01, 4.01.02, 4.01.03, and 4.01.04

Number	Description of Condition and Non-Routine Action	Cover/Cap Affected	Consultation Date(s)	Concurrence Dates					Status
				Covers Manager	Army PM	EPA	CDPHE	TCHD	
2012-005	Plans for a prescribed burn over 127 acres of the ICS. The burn will be performed in the northeast area of ICS over the CAT and Shell covers.	ICS	12/19/11 03/01/12	03/06/12	03/06/12	03/08/12	03/14/12	03/08/12	All parties concur.
2012-006	The fence surrounding the HWL will be relocated to provide enough space to construct an interior access road between the eastern perimeter fence and perimeter drainage channel. Access to the four LCS/LDS manholes will to be improved for the safety of personnel working on the manholes.	HWL	04/16/12	05/23/12	05/29/12	05/31/12	05/31/12	05/31/12	All parties concur.
2012-007	The area around both ELF LRCH Buildings will be graded to drain and wingwalls will be constructed to divert surface water away from the buildings.	ELF	05/02/12 12/27/12	03/18/14	03/18/14	04/09/14	04/09/14	04/09/14	All parties concur.
2012-008	Frequent traffic to the top of the HWL and ELF by inspection and maintenance equipment has damaged the cap vegetation. Designated and surfaced paths to the upper portion of the landfills will be constructed to improve access to the terrace channels and upper portion of the caps, minimizing additional vegetation disturbance.	HWL and ELF	12/27/12	N/A	N/A	N/A	N/A	N/A	Suspended.
2013-001	Plans for a prescribed burn over	ICS and	01/29/13	02/13/13	02/13/13	02/13/13	02/13/13	02/13/13	All parties

NON-ROUTINE ACTION PLAN LOG

Projects: Long-Term Maintenance of the HWL, ELF, ICS, and Basin F RCRA-Equivalent Cover **WBS:** 4.01.01, 4.01.02, 4.01.03, and 4.01.04

Number	Description of Condition and Non-Routine Action	Cover/Cap Affected	Consultation Date(s)	Concurrence Dates					Status
				Covers Manager	Army PM	EPA	CDPHE	TCHD	
	ICS and Basin F. The burns will include the entirety of both AMAs (approximately 670 acres for ICS and 112 acres for Basin F).	Basin F							concur.
2013-002	Notification of first-time detection of MEK in HWL LDS4 during the January 2012 sampling event.	HWL	01/22/13 01/29/13	02/13/13	01/29/13	02/13/13	01/30/13	01/30/13	All parties concur.
2013-003	Notification of third-time detection of Endrin Aldehyde (ENDRNA) and NNDMEA in the HWL LDS sumps during the October 2012 and April 2012 sampling events, respectively.	HWL	01/22/13 01/29/13	02/13/13	01/29/13	02/13/13	01/30/13	01/30/13	All parties concur.
2013-004	Notification of third-time detection of Dicyclopentadiene (DCPD) in the ELF LBLDS2 during the July 2012 sampling event.	ELF	05/03/13	05/08/13	05/08/13	05/09/13	05/16/13	05/16/13	All parties concur.
2013-005	Notification that the Watch List Trigger Level for Chloroform was exceeded in ELF LBLDS2 wastewater samples during the second, third, and fourth quarterly sampling events of 2012.	ELF	05/16/13	05/16/13	05/16/13	05/16/13	05/16/13	05/16/13	All parties concur.
2013-006	Notification that the Watch List Trigger Level for Chloroform was exceeded in ELF WPLDS2 wastewater samples during the second quarterly sampling event of 2013.	ELF	05/28/13	05/28/13	05/28/13	07/18/13	07/18/13	07/18/13	All parties concur.
2013-007	Excavation of pull box on the north face of the ELF cap.	ELF		Army/Shell has decided not to pursue this action at this time.					Suspended

NON-ROUTINE ACTION PLAN LOG

Projects: Long-Term Maintenance of the HWL, ELF, ICS, and Basin F RCRA-Equivalent Cover

WBS: 4.01.01, 4.01.02, 4.01.03, and 4.01.04

Number	Description of Condition and Non-Routine Action	Cover/Cap Affected	Consultation Date(s)	Concurrence Dates					Status
				Covers Manager	Army PM	EPA	CDPHE	TCHD	
2013-008	Notification of tipping bucket failure at Lysimeter 003.	ICS	09/19/13	10/24/13	10/24/13	11/20/13	11/20/13	11/20/13	All parties concur.
2013-009	Notification of non-routine action trigger exceedance for percolation at Lysimeter 003.	ICS	09/19/13 09/30/13 10/09/13	10/24/13	10/24/13	11/20/13	11/20/13	11/20/13	All parties concur.
2013-010	Notification of non-routine action trigger exceedance for percolation at Lysimeter 10.	ICS	10/04/13	11/07/13	11/07/13	11/20/13	11/20/13	11/20/13	All parties concur.
2014-001	Plans for a prescribed burn over ICS and Basin F. The burns will include the entirety of the ICS AMA (approximately 670 acres). Basin F burn is optional (112 acres).	ICS and Basin F	10/23/13 01/15/14	02/03/14	02/03/14	02/12/14	02/12/14	02/12/14	All parties concur.
2014-002	Notification that the Watch List Trigger Level for Endrin was exceeded in HWL LDS4 during the third quarterly sampling event of 2013.	HWL	01/29/14	02/05/14	02/05/14	02/12/14	02/12/14	02/12/14	All parties concur.
2014-003	Notification the PPDDT was detected in HWL LDS4 during the third quarterly sampling event of 2013.	HWL	03/27/14 05/30/14	06/02/14	06/02/14	07/29/14	07/29/14	07/29/14	All parties concur.
2014-004	Notification that chloroform exceeded the Watch List Trigger Level in LBLDS2 in the first quarter of 2013 and that TCLEE was detected in WPLDS2 above the MRL in the second quarter of 2014.	ELF	05/29/14 06/17/14	06/17/14	06/17/14	03/04/15	03/04/15	07/09/14	All parties concur.

NON-ROUTINE ACTION PLAN LOG

Projects: Long-Term Maintenance of the HWL, ELF, ICS, and Basin F RCRA-Equivalent Cover

WBS: 4.01.01, 4.01.02, 4.01.03, and 4.01.04

Number	Description of Condition and Non-Routine Action	Cover/Cap Affected	Consultation Date(s)	Concurrence Dates					Status
				Covers Manager	Army PM	EPA	CDPHE	TCHD	
2014-005	Notification that dieldrin exceeded the Watch List Trigger Level in HWL LDS2 in the first quarter of 2013.	HWL	05/29/14	06/17/14	06/17/14	07/29/14	07/29/14	07/09/14	All parties concur.
2014-006	Notification that dieldrin exceeded the prediction limit in well 25194 in the second quarter of 2014.	HWL	06/03/14 07/30/14 10/22/14 04/29/15	NRAP-2014-006 has been superseded by NRAP-2016-004.					Superseded
2014-008	Notification that percolation exceeded the Non-Routine Action Trigger Level in Lysimeters 001, 002, and 003 in June 2014.	ICS	06/09/14 07/09/14 10/28/15	05/02/16	05/04/16	06/16/16	05/26/16	05/26/16	All parties concur.
2014-009	Notification that tipping buckets failed in Lysimeters 001, 002, 003, and 003A.	ICS	07/10/14	07/28/14	07/28/14	07/29/14	07/29/14	07/29/14	All parties concur.
2014-010	Holes in the ICS cover soil	ICS	06/01/15 01/27/16						
2014-011	Notification that toluene was detected for the first time in HWL LDS2 during the July 2014 sampling event.	HWL	08/27/14 02/06/15	02/19/15	02/19/15	03/04/15	03/04/15	03/04/15	All parties concur.
2015-001	Notification that alpha-chlordane exceeded the Watch List Trigger Level in HWL LDS4 in the second quarter of 2015.	HWL	07/13/15	08/11/15	08/11/15	08/20/15	08/20/15	08/11/15	All parties concur.
2015-002	Notification that cyanide was detected for the first time in ELF sump LBLDS2 during the April/May 2015 sampling event.	ELF	07/24/15	08/11/15	08/11/15	08/20/15	08/20/15	08/11/15	All parties concur.

NON-ROUTINE ACTION PLAN LOG

Projects: Long-Term Maintenance of the HWL, ELF, ICS, and Basin F RCRA-Equivalent Cover

WBS: 4.01.01, 4.01.02, 4.01.03, and 4.01.04

Number	Description of Condition and Non-Routine Action	Cover/Cap Affected	Consultation Date(s)	Concurrence Dates					Status
				Covers Manager	Army PM	EPA	CDPHE	TCHD	
2015-003	Notification that tipping buckets failed in Lysimeters 001, 002, 003, and 003A.	ICS	07/16/15	08/11/15	08/11/15	08/11/15	08/11/15	08/11/15	All parties concur.
2015-004	Plans for a prescribed burn over ICS. The burn will include the entirety of the ICS AMA (approximately 670 acres).	ICS	09/15/15	09/17/15	09/17/15	10/15/15	10/13/15	10/13/15	All parties concur.
2015-005	Notification that aldrin exceeded the Watch List Trigger Level in HWL LDS4 in the third quarter of 2015.	HWL	07/13/15	09/17/15	09/17/15	10/15/15	10/13/15	10/13/15	All parties concur.
2015-006	Notification that PPDDT, PPDDE, and MEXCLR was detected for the first or third time in ELF LDS sumps during the July 2015 sampling event.	ELF	09/03/15 09/17/15	09/17/15	09/17/15	10/15/15	10/13/15	10/13/15	All parties concur.
2015-007	Modifications to the ICS Type II Inspection scheduled for the fall of 2015	ICS	09/10/15 10/28/15	05/02/16	05/03/16	05/24/16 (email)	05/03/16	05/03/16	All parties concur.
2016-001	Notification that MEXCLR was detected in HWL sump LDS4 during the October 2015 sampling event.	HWL	04/07/16	04/12/16	04/12/16	05/24/16 (email)	05/03/16	04/20/16	All parties concur.
2016-002	Plans for a prescribed burn over ICS. The burn will include the entirety of the ICS AMA (approximately 670 acres).	ICS	09/10/15 10/28/15 01/27/16	02/18/16	02/18/16	03/10/16	03/10/16	03/10/16	All parties concur.
2016-003	Notification that MEK and TCLEA were detected in ELF sump LBLDS2 during the October 2015	ELF	04/13/16	04/12/16	04/12/16	05/24/16 (email)	05/03/16	04/20/16	All parties concur.

NON-ROUTINE ACTION PLAN LOG

Projects: Long-Term Maintenance of the HWL, ELF, ICS, and Basin F RCRA-Equivalent Cover

WBS: 4.01.01, 4.01.02, 4.01.03, and 4.01.04

Number	Description of Condition and Non-Routine Action	Cover/Cap Affected	Consultation Date(s)	Concurrence Dates					Status
				Covers Manager	Army PM	EPA	CDPHE	TCHD	
	sampling event.								
2016-004	Dieldrin exceeded the prediction limit in well 25194. Army/Shell will sample subsurface soil and stormwater runoff, and new well 25184 will be installed.	HWL	06/03/14 08/26/15	07/21/16	07/21/16	07/27/16	09/22/16	08/10/16	All parties concur.
2016-005	Notification that TDGCL was detected in the HWL LDS for the first time during the April 2016 sampling event. ACLDAN and PB were also detected above the watch list trigger level.	HWL	07/27/16 08/24/16	08/31/16	08/31/16	09/22/16	09/22/16	09/22/16	All parties concur.
2016-006	Notification that PPDDT was detected for the third time and CR was detected for the first time in the ELF LDS system during the April 2016 sampling event.	ELF	07/27/16 08/24/16	08/31/16	08/31/16	09/22/16	09/22/16	09/22/16	All parties concur.
2016-007	Notification that ENDRIN and DLDRN concentrations exceeded the watch list trigger level in LDS4 in the October 2016 sampling event.	HWL	01/04/17	01/04/17	01/04/17	01/19/17	01/19/17	01/19/17	All parties concur.
2017-001	Notification that ENDRIN concentrations exceeded the watch list trigger level in LDS4 in the January 2017 sampling event.	HWL	03/13/17	03/14/17	03/14/17	04/26/17	03/23/17 (email) 04/26/17 (wet ink)	03/21/17 (email) 04/26/17 (wet ink)	All parties concur.
2017-002	Notification that DLDRN concentrations exceeded the watch list trigger level in LDS4 in the July 2017 sampling event.	HWL	09/05/17	09/26/17	09/26/17	10/25/17	10/25/17	10/25/17	All parties concur.

NON-ROUTINE ACTION PLAN LOG

Projects: Long-Term Maintenance of the HWL, ELF, ICS, and Basin F RCRA-Equivalent Cover

WBS: 4.01.01, 4.01.02, 4.01.03, and 4.01.04

Number	Description of Condition and Non-Routine Action	Cover/Cap Affected	Consultation Date(s)	Concurrence Dates					Status
				Covers Manager	Army PM	EPA	CDPHE	TCHD	
2019-001	Plans for a prescribed burn over ICS. The burn will include the entirety of the ICS AMA (approximately 670 acres).	ICS	03/04/19	03/04/19	03/04/19	05/02/19	03/14/19	03/07/19	All parties concur.
2019-002	Plans for a prescribed burn over Basin F. The burn will include the entirety of the Basin F AMA (approximately 112 acres).	Basin F	03/04/19	03/04/19	03/04/19	05/02/19	03/14/19	03/07/19	All parties concur.
2019-003	Notification that HG was detected for the first time in the ELF sump LB LDS2 during the February 2018 sampling event.	ELF	03/07/19	03/11/19	03/11/19	05/02/19	04/16/19	04/16/19	All parties concur.
2019-004	Installation of monitoring well 36255 near the southeast corner of the Shell Trenches slurry wall.	SDT	07/25/19	08/14/19	08/14/19	08/14/19	08/14/19	08/14/19	All parties concur.
2020-001	Borehole drilling and installation of well 36258 in the west central Shell Disposal Trenches.	SDT	02/20/20	03/23/20	03/24/20	03/25/20	03/25/20	03/25/20	All parties concur.
2020-002	Notification that ICS erosion monument ER90 exceeded the non-routine trigger level of greater than 3.0 inches of soil thickness loss.	ICS	10/21/20	10/22/20	10/23/20	10/23/20	10/23/20	10/26/20	All parties concur.
2021-001	Intrusive activity at well 36305 to investigate power failure at the extraction well.	ICS	06/17/21	06/18/21	06/21/21	06/21/21	06/22/21	06/23/21	All parties concur.
2021-002	Intrusive activity to install new electrical conduit in cover soil between extraction well 36305 and the control panel.	ICS	07/28/21	07/30/21	08/02/21	08/02/21	08/04/21	08/02/21	All parties concur.

NON-ROUTINE ACTION PLAN LOG

Projects: Long-Term Maintenance of the HWL, ELF, ICS, and Basin F RCRA-Equivalent Cover

WBS: 4.01.01, 4.01.02, 4.01.03, and 4.01.04

Number	Description of Condition and Non-Routine Action	Cover/Cap Affected	Consultation Date(s)	Concurrence Dates					Status
				Covers Manager	Army PM	EPA	CDPHE	TCHD	
2021-003	Plans for a prescribed burn over ICS. The burn will include the entirety of the ICS AMA (approximately 670 acres).	ICS	09/30/21	10/04/21	10/04/21	10/04/21	10/05/21	10/04/21	All parties concur.
2021-004	Plans for a prescribed burn over Basin F. The burn will include the entirety of the Basin F AMA (approximately 112 acres).	Basin F	09/30/21	10/04/21	10/04/21	10/04/21	10/05/21	10/04/21	All parties concur.
2021-005	Plans to overseed approximately 100 acres in the southwest corner of the ICS after sparse growth in 2021.	ICS	05/13/21 06/02/21 06/03/21 07/28/21 07/29/21 10/04/21	10/07/21	10/07/21	10/12/21	10/12/21	10/12/21	All parties concur.
2022-001	Notification that the copper concentration exceeded the watch list trigger level in LDS1 in the March 2021 sampling event.	HWL	01/17/22 01/26/22	01/26/22	01/27/22	01/31/22	02/02/22	02/03/22	All parties concur.
2022-002	Plans for a prescribed burn over ICS. The burn will include the entirety of the ICS AMA (approximately 670 acres).	ICS	09/21/22	09/21/22	09/21/22	09/21/22	09/22/22	09/22/22	All parties concur.