

RECORD OF DECISION AMENDMENT #3

FOR

OPERABLE UNIT 2 (OU2)

**NEW BRIGHTON/ARDEN HILLS SUPERFUND SITE
ARDEN HILLS, MINNESOTA**

May 2009

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1.0 INTRODUCTION

This decision document amends the 1997 Record of Decision (ROD) for Operable Unit 2 (OU2) (U.S. Army Environmental Command [USAEC], 1997). There was a previous amendment to the OU2 ROD in 2007, and there is a separate Amendment #2 being issued concurrently, so this decision document is referred to as Amendment #3. This decision document presents the amended selected remedial actions for Grenade Range, 135 Primer/Tracer Area Stormwater Ditch, Outdoor Firing Range, the Trap Range Site, the Water Tower Area and Sites D, G, E, H, and 129-15 at the New Brighton/Arden Hills (NB/AH) Superfund Site, also known as the Twin Cities Army Ammunition Plant (TCAAP), located in Arden Hills, Minnesota. The Superfund site includes TCAAP (a former small arms ammunition plant) as well as portions of several surrounding residential communities. The NB/AH site was placed on the National Priorities List (NPL) for cleanup in September 1983, and is CERCLIS # MN7213820908. Figure 1 shows the site location map.

Under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. §9601, et seq., and Executive Order 12580, the United States Army (Army) is the lead federal agency for remedial actions at the site. All remedial actions are subject to the provisions of the Federal Facilities Agreement (FFA) among the Army, U.S. Environmental Protection Agency (USEPA) and the Minnesota Pollution Control Agency (MPCA).

This decision document was developed in accordance with the CERCLA of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), the Minnesota Environmental Response and Liability Act, and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) promulgated in Title 40 of the Code of Federal Regulations (CFR) Part 300 (40 CFR 300). Specifically, this decision document has been prepared in compliance with CERCLA Section 117 and the NCP in 40 CFR 300.435(c)(2)(ii). This decision is based on the Administrative Record file for OU2 within NB/AH Superfund Site. The NB/AH Superfund Site has been divided into three Operable Units (OU). OU1 consists of the North Plume of off-TCAAP contaminated groundwater. OU2 consists of affected environmental media on the original TCAAP facility. OU3 consists of the South Plume of off-TCAAP contaminated groundwater.

1.1 Proposed Changes in the Remedies

A Feasibility Study (FS) was completed for OU2 that identified the environmental contamination associated with OU2 and provided remedial alternatives for addressing the contamination (Montgomery Watson [MW], 1997). In December 1997, the ROD for OU2 was issued that documented the selected remedies and cleanup levels for shallow soil sites (Sites A, C, E, H, 129-3, and 129-5), dumps (Sites B and 129-15), deep soil sites (Sites D and G), shallow groundwater sites (Sites A, I, and K), and deep groundwater. Of these sites that were included in the original OU2 ROD, this Amendment #3 specifically addresses Sites D, E, G, H, and 129-15. In addition, investigations and/or removal actions have been conducted at other areas on the original TCAAP property that did not have remedies selected in the 1997 OU2 ROD, namely the Grenade Range, Outdoor Firing Range, 135 Primer/Tracer Area Stormwater Ditch, the Trap Range Site and the

Water Tower Area. These sites were not included in the OU2 FS or ROD, because at the time of the TCAAP remedial investigations, they were considered to still be operational areas. These sites are located within OU2 as shown in Figure 2.

Based on the completion of the removal/remedial actions and/or the outcome of additional investigations, amended remedies are warranted for the sites addressed in this Amendment #3. Because of similarities in the amended remedy, and for the purposes of this amendment, Sites D, E, G, H, 129-15, Grenade Range, and Outdoor Firing Range are grouped together under the heading of "soil/dump sites." The following subsections discuss the proposed changes for the soil/dump sites and 135 Primer/Tracer Area Stormwater Ditch, the Trap Range Site and the Water Tower Area.

1.1.1 Soil/Dump Sites

The removal and/or remedial actions and/or investigations are completed for the Grenade Range, Outdoor Firing Range, and Sites D, G, E, H, and 129-15. These actions were completed between the years 1999 and 2004, and were documented in close out reports. MPCA and USEPA provided conditional approval of these reports in various years as noted in more detail in Section 2.0. Once LUCS have been incorporated into the close out reports, MPCA and USEPA will make a determination that the reports are final documents and pass the Consistency Test in accordance with Chapter XIV of the Federal Facility Agreement. The cleanup levels for these sites are based on a site-specific industrial land use scenario.

The 1997 OU2 ROD that was signed by USEPA, MPCA, and Army outlined the selected remedies for Sites D, G, E, H, and 129-15 (USAEC, 1999). The selected remedies are listed as follow:

- Shallow Soil Sites E and H: The selected remedy was excavation, stabilization, and off-site disposal.
- Dump at Site 129-15: The selected remedy was to characterize the dump contents and to utilize a remedy for a landfill if contents were found to be toxic, hazardous, or contaminated.
- Deep Soil Sites D and G: The selected remedy was to expand the Soil Vapor Extraction (SVE) systems vertically and to characterize soil and/or dump materials following cessation of the SVE system operation.

Separate Action Memorandums were approved by MPCA and USEPA and signed in 1999 for the Grenade Range and Outdoor Firing Range, which selected Excavation, Stabilization, and Off-site Disposal as the approved removal actions.

The selected remedies and/or removal actions at the Grenade Range have been completed and the remedial action objectives (RAOs) and cleanup levels have been attained; however, the Army has determined that a modification to the selected remedies is necessary to restrict land use. The field work that was completed has been documented in close out reports for these two sites. MPCA and USEPA provided conditional approval of these reports in various years as noted in more detail in Section 2.0. Once LUCS have been incorporated into the close out reports, MPCA and USEPA

will make a determination that the reports are final documents and pass the Consistency Test in accordance with Chapter XIV of the Federal Facility Agreement.

The RAOs have been attained at the Outdoor Firing Range and Sites D, E, G, H, and 129-15; portions of these six sites have attained cleanup levels through the excavation, stabilization, and off-site disposal of contaminated soil. However, soil covers were constructed over portions of these sites with contaminated soil (i.e., Contaminant of Concern [COC] concentrations greater than the cleanup levels) and/or Asbestos Containing Material (ACM) remaining in place. Therefore, the Army has determined that a modification to the selected remedies is necessary to consider the additional actions that were completed to be part of the final remedy, to restrict land use, and to protect the soil covers.

The proposed additions for these soil/dump sites are to implement land use controls (LUCs).

1.1.2 135 Primer/Tracer Area Stormwater Ditch

Removal actions were conducted for contaminated sediments at a stormwater outfall structure and downstream ditch associated with the 135 Primer/Tracer Area. The removal action consisted of excavation and off-site disposal, resulting in remedial objectives being met for unrestricted land use. The removal actions were completed in 2005 and the close out report was approved by the MPCA and USEPA in 2006 (Wenck, 2006).

Based on the results of the 2005 removal action at the stormwater outfall structure and downstream ditch area associated with the 135 Primer/Tracer Area, no further action is warranted. This Amendment #3 will formally adopt the work completed as the final remedy for this ditch area.

1.1.3 Trap Range Site

A Preliminary Assessment (PA) was conducted at the Trap Range Site to determine if lead from shotgun ammunition contaminated the groundwater, air, soil, sediment, or surface water. The results of the assessment indicated that there was no impact to groundwater, air, soil or surface water. No further action was recommended for the Trap Range Site (Alliant, 2000) and the MPCA and USEPA approved this report in 2000. This Amendment #3 will formally adopt the No Further Action finding for this site.

1.1.4 Water Tower Area

Investigations were conducted at the Water Tower Area to determine if shell casings, trim rings and head turn shavings that were observed on the surface were a source of contamination. Soil samples were collected and analyzed to determine if the soil was hazardous with respect to Toxicity Characteristic Leaching Procedure (TCLP) limits for metals. The results of the investigation showed that surface and subsurface soils were not hazardous and could be left in place. (FCC, 1991). Although the soil/metal presented no known health, safety, or environmental threat, the Army completed physical removal of the soil and metal from the Water Tower Area in 1993 (FCC, 1993). In 1995, additional sampling and analysis of the soils remaining in-place at the Water Tower Area was completed and the results showed that the soil concentrations were below the residential preliminary remediation goals (PRGs). A report was prepared documenting the results and recommending no further action (FCC, 1995). The residential and industrial PRGs for

metals are identified in Table 4 of the Water Tower Report. The report was approved by the MPCA and USEPA in 1996. This Amendment #3 will formally adopt the No Further Action finding for this site.

1.2 Procedures for Changing the Remedies and Documenting a No Further Action

Under Section 117 of CERCLA and Section 300.435(c)(2)(ii) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), if the remedial action differs significantly with respect to the scope, performance or cost from a final ROD, the Lead Agency shall either issue an explanation of the significant differences with the reasons such changes were made or propose an amendment to the ROD if the basic features of remedy are fundamentally altered in regard to scope, performance or cost. The decision to change the remedies for Grenade Range, Outdoor Firing Range, and Sites D, G, E, H, and 129-15 constitutes such a fundamental difference, necessitating the issuance of a new proposed plan and an amended ROD.

Furthermore, previous removal actions associated with the stormwater outfall and the downstream ditch at the 135 Primer/Tracer Area, the Trap Range Site and the Water Tower Area have eliminated any unacceptable risks to human health and environment so that no further action is necessary.

This ROD Amendment and all supporting documents will become part of the NB/AH Administrative Record file in accordance with Section 300.825(a)(2) of the NCP. The Administrative Record is available during business hours and is located at:

Twin Cities Army Ammunition Plant Office
470 West Hwy 96, Ste. 100
Shoreview, MN 55126

2.0 BACKGROUND

The NB/AH site consists of a 25-square-mile area located in Ramsey County, Minnesota (Figure 1). This includes the 4-square-mile area of the original TCAAP facility and portions of seven nearby communities: New Brighton, Arden Hills, St. Anthony, Shoreview, Mounds View, Columbia Heights, and Minneapolis. TCAAP is a former small arms ammunition manufacturing plant.

TCAAP was constructed in 1941 to produce small-caliber ammunition for the United States military. Production activities included manufacturing small arms ammunition and related materials, proof-testing small arms ammunition and items as required, and handling and storing strategic and critical materials for other government agencies. Ammunition production and related activities have occurred periodically, commensurate with operations in wars, conflicts, and other national emergencies. Information from past studies indicates that between 1941 and 1981, waste materials such as volatile organic compounds (VOCs), heavy metals, corrosive materials, and explosives were used and disposed at a number of locations within TCAAP. The use and disposal of these materials at TCAAP resulted in contamination of soil, sediments, surface water and groundwater at the facility.

2.1 Grenade Range

The Grenade Range, approximately 19 acres, is located in the northeast portion of the original TCAAP (see Figure 3), and is on property now controlled by the Army National Guard. The Grenade Range consisted of two Proofhouses (A and B) and three targets (Small Range, Large Range, and the Sand Pad), three catchers (two on the large range and one on the small range), a drainfield, a site of a former underground storage tank near Proofhouse A, and several other concrete bunkers and wood structures. The ranges were constructed by placing 3-13 feet of fill along the edge of Marsden Lake (the 13 feet actually represents the mounded catchers). The range was operated by Honeywell Defense Systems, now Alliant Techsystems, from March 1967 until July 1975 for testing rifle grenade fuzes. The grenades were loaded using inert materials, not explosives.

The Grenade Range, located along Marsden Lake, a large wetland area, is known to be the habitat for the Blanding's Turtle (a Minnesota Threatened Species). Surface water runoff from the Grenade Range flows directly into Marsden Lake, which eventually flows into Rice Creek (a tributary of the Mississippi River). Marsden also receives surface water runoff from Lexington Avenue, located outside TCAAP.

Field investigations conducted in 1993 and 1994 identified source areas of metal-contaminated soils at the Small Range, Large Range, and the Sand Pad as shown on Figures 4, 5, and 6, respectively. In addition, an unexploded ordnance (UXO) survey and removal was conducted in 1993 where UXO clearance was issued to a depth of two feet. An Engineer Evaluation/Cost Analysis (EE/CA) was completed for the Grenade Range that recommended excavation, stabilization and off-site disposal at a permitted landfill. The contaminants of concern (COCs) identified for the Grenade Range included antimony, cadmium, and lead, and the "to be considered" (TBC) compounds included arsenic, nickel, and zinc.

Based on the EE/CA (1999) and an Action Memorandum (1999), which were approved by USEPA and MPCA, a Removal Action was implemented, consisting of excavation, stabilization, and off-site disposal of contaminated soil at the Small Range and Large Range as shown on Figures 4 and 5, respectively. All of the catcher structures and two observation bunkers were also removed. The Grenade Range site was cleaned up to site-specific industrial standards. Approximately 2,180 cubic yards (cy) of contaminated soil were removed in 1999. The final Closeout Report for the Grenade Range Removal Action was completed in 2001 (Alliant, 2001a). MPCA and USEPA provided conditional approval of the report in 2001. Once LUCS have been incorporated into the report, MPCA and USEPA will make a determination that the report is a final document and passes the Consistency Test in accordance with Chapter XIV of the Federal Facility Agreement.

2.2 Outdoor Firing Range

The Outdoor Firing Range is located in the northeast quadrant of the original TCAAP (now on property controlled by the Army National Guard) and is approximately 150 acres (see Figure 7). The Outdoor Firing Range was built in 1943 during the original construction of TCAAP and served as an area to test the outdoor accuracy and performance of small arms ammunition manufactured at TCAAP. The original range was composed of Proofhouse Building No. 145 (Proofhouse), from which .30 and .50 caliber ammunition were test-fired, and the Earthen Barricade located approximately 1,200 yards from the Proofhouse. In 1955, three new bullet-catching structures were constructed along the firing line at distances of 600, 840, and 1,900 yards from the Proofhouse. Each bullet catcher was built into the steep slope of a manmade hill that acted as an earthen backstop. At least four observation houses, which were used to view the performance of the test ammunition, were located within the boundary of the Outdoor Firing Range.

From 1961 to 1967, the Proofhouse was leased and operated by the Honeywell Defense Systems Division, now Alliant Techsystems Inc. Honeywell used the Outdoor Firing Range to test 40mm grenades until the summer of 1966. Honeywell's grenade testing area also included a grenade catcher located 200 yards down range (Building 170/173 and Grenade Catcher). The Outdoor Firing Range was last utilized for ammunition testing in 1974. The original barricade and the three bullet catchers were demolished and cleaned up. Proofhouse Building 145 was demolished in 1987 to clear land for construction of the Arden Hills U.S. Army Reserve Center.

Field investigations conducted in 1993 and 1994 identified sources of metal-contaminated soils at the 200-Yard Range, 600-Yard Range, and 840-Yard Range areas and polynuclear aromatic hydrocarbons (PAHs) contaminated soil at the 1,900-Yard Range area. An UXO survey and removal was conducted in 1993 where UXO clearance was issued to a depth of two feet. The COCs identified for the Outdoor Firing Range included antimony, copper, lead, and the TBC compounds included PAHs. An EE/CA was completed and approved by USEPA and MPCA in 1998 for the Outdoor Firing Range for the metal-contaminated soil that recommended excavation, stabilization and off-site disposal at a permitted landfill.

Unrelated to the Outdoor Firing Range, a previously undetected pile of debris containing small caliber ammunition parts was detected during a property assessment of #150 Reservoir. The pile of debris was located on the hillside off the road on the east side of the #150 Reservoir.

Subsequent investigations identified lead and antimony as the COCs, which are two of the COCs for the Outdoor Firing Range. Since the debris and the type of contamination were similar to the Outdoor Firing Range, the #150 Reservoir Site was included with the Outdoor Firing Range Removal Action.

Based on an EE/CA (1998) and an Action Memorandum (approved by USEPA and MPCA in 1999), a Removal Action was implemented, consisting of excavation, stabilization, and off-site disposal of metal-contaminated soil. The 1999 Removal Action focused on removal of metal-contaminated soil and metal debris. Metal-contaminated soil that had been identified near the #150 Reservoir was also removed during this 1999 Removal Action. The Outdoor Firing Range and the #150 Reservoir sites were cleaned up to site-specific industrial standards. Approximately 990 cy of contaminated soil were removed in 1999. Figures 8 through 12 provide details of the excavated areas. A close out report for the Outdoor Firing Range Removal Action was completed in 2001 (Alliant, 2001b). MPCA and USEPA provided conditional approval of the close out report in 2001. Once LUCS have been incorporated into the close out report, MPCA and USEPA will make a determination that the report is a final document and passes the Consistency Test in accordance with Chapter XIV of the Federal Facility Agreement.

An additional investigation was conducted in 1999 at the 1,900-Yard Range to further test for PAHs in the soils. Benzo(a)anthracene, benzo(a)pyrene, and indeno(1,2,3-cd)pyrene were identified at concentrations greater than the cleanup levels established at other OU2 sites. Based on the results, a soil cover was recommended as the remedy. With the approval of USEPA and MPCA, a permanent 24-inch thick soil cover was constructed in 2003-2004 over the PAH-contaminated soil to eliminate the potential for human exposure to the contaminants in the soil. The soil cover is constructed over roughly 0.5 acres (see Figure 13). An Addendum to the close out report for the Outdoor Firing Range was completed for the 1900 Yard Range Cover Construction in 2006.

2.3 135 Primer/Tracer Area Stormwater Ditch

The 135 Primer/Tracer Area is located in the northwest portion of TCAAP (see Figure 14). This area, approximately 65 acres, consists of Building 135 and associated structures and utilities dedicated to the manufacture of small caliber ammunition primer and tracer compounds associated with the TCAAP small caliber arms production. The manufacturing period included all of TCAAP production.

A site-wide Preliminary Assessment was performed for TCAAP in 1988; however, the primer/tracer areas were part of an Army mobilization mission at that time, so these areas were not investigated. Likewise, during the site-wide remedial investigation completed in 1991, these primer/tracer areas were not included. Thus, the 135 Primer/Tracer Area was not included in the 1997 OU2 ROD.

A site-specific Preliminary Assessment was completed in 2001, which recommended that a Site Inspection be conducted to determine if there were releases of hazardous substances to the environment. The Site Inspection included sampling of soil and groundwater throughout the entire 135 Primer/Tracer Area. The Site Inspection Report, approved by USEPA and MPCA in

2005, recommended that an EE/CA be performed to further delineate the extent and magnitude of contamination, and to evaluate response actions. This work has not yet been completed.

Relevant to this ROD Amendment is the fact that the Site Inspection included sediment sampling at a stormwater outfall to assess whether contamination had been conveyed from the 135 Primer/Tracer Area. Results for the location at the stormwater outfall showed that total metals, TCLP metals, VOCs, and explosives did not represent a concern; however, there were PAH concentrations greater than MPCA Tier II Soil Reference Values (SRVs) for residential use (or unrestricted use). In 2004, as the Site Inspection report was being reviewed, the Army proposed to transfer approximately 112 acres of the excess property bordering Rice Creek as a Public Benefit Conveyance to Ramsey County for use as recreational space. As shown on Figure 14 this parcel, known as the "Rice Creek Area," does not include the 135 Primer/Tracer Area, but does include the subject stormwater outfall and ditch leading to Rice Creek. A condition of the transfer was that the property must be suitable for unrestricted use. In late-summer 2004, it came to light that the sample collected as part of the Site Inspection indicated that this condition would not be met. Additional investigation was conducted in 2004-2005 to delineate the extent of the PAH contamination in the ditch.

The Preliminary Constituents of Concern (PCOCs) identified at the 135 Primer/Tracer Area Stormwater Outfall included the following constituents:

- Naphthalene
- Acenaphthylene
- Acenaphthene
- Fluorene
- Phenanthrene
- Anthracene
- Fluoranthene
- Pyrene
- Benzo[a]anthracene
- Chrysene
- Benzo[b]fluoranthene
- Benzo[k]fluoranthene
- Benzo[a]pyrene
- Indeno[1,2,3,-c,d]pyrene
- Dibenz(a,h)anthracene
- 2-Methylnaphthalene

The Army agreed that contaminated sediment near the outfall would be removed to satisfy the land transfer conditions with Ramsey County, and the following actions were completed:

- 1 The storm sewer from Mounds View Road to the outfall structure was cleaned using jet-rodding techniques, thereby removing sediment. Likewise, the culvert beneath the railroad tracks (west of the outfall structure) was also cleaned.

- 2 Two stages of excavation were performed, which together removed approximately 970 cy of PAH-contaminated sediment from the ditch. The material was disposed at the Onyx FCR Landfill.
- 3 Post-excavation sampling and analysis was performed to verify that the project objectives were met. The testing showed that the remaining PAH concentrations are less than the MPCA Tier II Soil Reference Values and Level II Sediment Quality Targets for protection of human health and the environment.

Based on the results of confirmation soil sampling, the ditch has been cleaned up for unrestricted land use. Figure 15 shows the excavation boundaries. A close out report was prepared and approved by USEPA and MPCA in 2006 (Wenck, 2006).

2.4 Trap Range Site

The TCAAP Trap Range Site is located in the northwest corner of the original TCAAP (Figure 16). A portion of the former Trap Range is on property now owned by the State of Minnesota. When the Trap Range was identified as a potential site, the boundary was determined to be Patrol Road to the north and west, and Rice Creek to the east and south. Upon further examination of the aerial photographs and discussions with the Federal Cartridge Company personnel who had experience with trap shooting, it was determined that any probable lead shot impact area was north of the original site boundary. The revised boundary of the assumed lead shot impact area was estimated to be an arc radiating generally north from the shooting area. The total area of the Trap Range Site is about 4 acres. The Trap Range Site is located on relatively flat terrain that slopes gently towards Rice Creek. Most of the site is grassland with scattered trees. There are no buildings or structures on the Trap Range Site. The Trap Range Site is assumed to be a recreational trap-shooting range. The Trap Range was originally identified as a potential site when an article was discovered in a historical Plant Newspaper that referred to plant workers forming trap-shooting leagues at the "recreational area" of TCAAP. The newspaper article indicated that the range was open for trap shooting every Wednesday. The nature of the suspected release from the Trap Range Site is the metal (primarily lead) contained in shotgun ammunition that may have contaminated the presumed impact area.

A Preliminary Assessment (PA) was conducted at the Trap Range Site in July 1999. The purpose of the assessment was to collect information concerning conditions at the Trap Range Site sufficient to assess the threat posed to human health and the environment and to determine the need for additional CERCLA/SARA or other appropriate action. The PA concluded that based on the lack of evidence of contamination and the minimal likelihood of human exposure to contamination, no further action was recommended for the Trap Range Site. A report documenting the PA was prepared (Alliant, 2000), and MPCA and USEPA provided a determination that the report is a final document and passes the Consistency Test in accordance with Chapter XIV of the Federal Facility Agreement. The PA included an ecological assessment; a UXO survey and clearance; and a Relative Risk Site Evaluation (RRSE) study, and a Tier I Screening Risk Assessment of Aquatic Ecosystems Creek. A brief summary of the studies are listed below. Detailed information can be found in the PA.

Army Environmental Hygiene Agency Ecological Assessment

An Ecological Assessment of TCAAP was conducted by the Army Environmental Hygiene Agency from February 1990 through April 1991 to evaluate the extent to which the resident plants and animals had been exposed to TCAAP- related contaminants and to discover evidence of adverse effects which may have resulted from contaminant exposure. As part of the Ecological Assessment, surface soil and sediment samples were collected and analyzed for many compounds, including metals. The mean values of the lead and antimony samples were lower than the reported Minnesota background levels identified in the Ecological Risk Assessment. Shaw compared the results to the Minnesota Tier I Residential Soil Reference Values (residential SRVs) for these metals. All results were below the Minnesota residential SRVs.

UXO Survey, Removal, and Clearance

In 1995, a UXO survey was conducted in the Trap Range Site by Environmental Hazards Specialists International, Inc. The objectives of the project were to: determine the quantity and location of UXO and metallic debris in the surface soils; properly dispose of any recovered UXO; collect and containerize projectiles; and clear the site to a depth of 2 feet. Nine metallic anomaly locations were identified on the Trap Range Site. Each location was excavated and observed and none of the anomalies contained UXO. One anomaly, located in the approximate location where trap shooters would have stood, contained 24 expended shotgun shells. The other eight anomalies were identified as old building materials or farm machinery. The shotgun shells were removed and the other anomalies were left in place.

RRSE Sampling and Site Scoring

A study was conducted by the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) at the Trap Range Site in 1996 to evaluate the site under the Army's Relative Risk Site Evaluation (RRSE) guidelines. The purpose of the study was to provide sufficient data to score the site for Army cleanup funding purposes. The study establishes qualitative measures to evaluate the contamination hazard, migration pathways, and potential receptors. Eight soil samples and three sediment samples were collected and analyzed for lead concentrations in the assumed lead shot impact area currently within installation boundaries at the Trap Range Site during the RRSE study. Lead contamination was below laboratory detection limits in both the soil and sediment samples collected at the Trap Range Site. The detection limits are well below the MN residential SRVs (this was checked by Shaw and is not documented in the report). Based on the sampling results and RRSE guidelines, the Trap Range Site was scored as "LOW".

Tier I Screening Risk Assessment of Aquatic Ecosystems

Between October 1992 and July 1993 USACHPPM performed a Tier I Screening Risk Assessment of Aquatic Ecosystems at TCAAP. The purpose of the assessment was to identify chemicals of concern in surface water and sediment and to evaluate their potential to cause adverse ecological impact. This assessment included collection of surface water and sediment samples in and around TCAAP. Ten sediment samples were collected along Rice Creek for the Tier I Ecological Risk Assessment. Lead was not detected in any of the sediment samples. The detection limits are well below the MN residential SRVs and the Ecological Risk Assessment (ERA) Level II Sediment Quality Target (SQT) (the comparison was made by Shaw and is not documented in the report).

2.5 Water Tower Area

The Water Tower Area is located near the central portion of the TCAAP, 210 ft. northwest of the water tower. The area is approximately 350 ft. in the east-west direction by 300 ft. in the north-south direction (Figure 17). The topography slopes gently to the west and southwesterly directions and towards a ravine on the north side which runs from east to west.

Investigations were conducted at the Water Tower Area to determine if shell casings, trim rings and head turn shavings that were observed on the surface were a source of contamination. Soil samples were collected and analyzed to determine if the soil was hazardous with respect to Toxicity Characteristic Leaching Procedure (TCLP) limits for metals. The results of the investigation showed that surface and subsurface soils were not hazardous and could be left in place. (FCC, 1991).

Although the soil/metal presented no known health, safety, or environmental threat, the Army completed physical removal of the soil and metal from the Water Tower Area in 1993 (FCC, 1993). The Water Tower Area was excavated to an average depth of 2 feet below ground surface totaling approximately 5,525 cy of soil (including scrap metal). The excavated soil and scrap was transported to an off-site facility for disposal. The area was backfilled with clean material from an on-site borrow source and seeded.

In 1995, at the request of the MPCA and USEPA, additional sampling and analysis of the soils remaining in-place at the Water Tower Area was completed. Soil samples were collected and analyzed for metals, cyanide, VOCs, SVOCs, explosives, dioxins/furans and radionuclides. The results for all metals were below their respective residential PRGs. The results for cyanide, VOCs and SVOCs were below their respective detection limits. The results for dioxins/furans showed that 2378-TCDD was not detected. The results for radionuclides were within naturally occurring levels for soils. No further action was recommended for the Water Tower Area. (FCC, 1995). The residential and industrial PRGs for metals are identified in Table 4 of the Water Tower Report. In 1996, the MPCA and USEPA provided a determination that the report is a final document and passed the Consistency Test in accordance with Chapter XIV of the Federal Facility Agreement.

2.6 Site D

Site D is located in the central portion of the original TCAAP (now on Army National Guard property). Pits at Site D were used for burning of sump wastes, scrap propellants, solvents, paint thinners, oils, rags and chemicals, in addition to the dumping of neutralized cyanide wastes from approximately 1949/1950 to 1968. Site D is approximately 1.8 acres.

Remedial and removal activities were conducted at Site D in 1985, 1986 through 2001, and 2002. Interim remedial actions were completed in 1985 for the excavation of approximately 1,470 cy of polychlorinated biphenyl (PCB)-contaminated soil from the southeast part of Site D and subsequent onsite incineration of soils with PCB concentrations greater than 50 mg/Kg. The excavated material consisted of stained soil located beneath 6 to 7 feet of overburden. After the excavation was completed, confirmation analyses in the remaining soil detected PCB concentrations ranging from less than 1 mg/Kg to 7 mg/Kg. Treated soil ash and the residual water treatment filter materials with PCB concentrations of less than 2 mg/Kg were placed just

east of the excavated areas. The excavated area was backfilled with untreated overburden, which had PCB concentrations ranging from less than 1 to 38 mg/Kg. Finally, 4 to 6 feet of clean backfill soil were placed over the untreated overburden soils. The clean backfill soil secures the soils containing PCB concentrations of greater than 10 mg/Kg and less than 50 mg/Kg in-place and prevents contact with these soils. The top two feet is considered a protective soil cover that will be maintained.

When the PCB excavation was completed, a separate interim remedial action was initiated as a source control measure related to VOC contamination in deep groundwater. An SVE operated from January 1986 through 1998 to extract and treat VOCs, primarily trichloroethylene (TCE). Prior to drilling the vents, an 18-inch-thick clay cap was placed over the site to prevent infiltration of surface water through the site soils and to increase the SVE system's radius of influence. The SVE system was made part of the final remedy in the 1997 OU2 ROD. The SVE system removed 116,119 pounds of chlorinated solvents from the time it was installed as an interim remedy to the time it was shut down and dismantled. After the SVE system was shut down, the system was dismantled in 2001. Thus, the deep soils have been remediated through treatment with the SVE system.

Following the completion of the SVE remedy and per the Site D remedy selected in the 1997 OU2 ROD, an additional characterization investigation was conducted in November 2001. This field subsurface investigation of the shallow soil involved identifying, delineating, and characterizing historical disposal pits. Three areas of concern were identified during the investigation as shown in Figure 18. The COCs identified for Site D include antimony, lead, nitroglycerine, and TCE with cleanup levels of 67.2 mg/Kg, 1,200 mg/Kg, 61.2 mg/Kg, and 0.416 mg/Kg, respectively. The cleanup levels are based on a site-specific industrial land use scenario.

Based on the outcome of the 2001 investigation at Site D, it was determined that an action was warranted. During the 2002 field season, contaminated soil with COC concentrations in excess of the cleanup levels was excavated, stabilized with Ecobond[®], and disposed off-site at a landfill. Approximately 1,300 cy of stabilized soil were disposed off-site. The COC concentrations remaining at Site D are less than the cleanup levels. The excavated areas were backfilled with clean fill and the area was graded and reseeded. A close out report was prepared in 2004 (Shaw, 2004b). MPCA and USEPA provided conditional approval of the close out report in 2004. Once LUCS have been incorporated into the close out report, MPCA and USEPA will make a determination that the report is a final document and passes the Consistency Test in accordance with Chapter XIV of the Federal Facility Agreement.

The soil cover securing the PCB-contaminated soil still remains in effect. The soil cover is considered the top two feet of clean backfill soil. The boundary of the soil cover is shown on Figure 18.

2.7 Site E

Site E is located in the central portion of the original TCAAP, immediately north of Sand Pit Road (now on Army National Guard property). Site E is approximately 7.6 acres. In the early 1940s, Site E was used as both a construction debris and trash dump and as a burning ground for

ammunition boxes and other materials, including large quantities of unknown chemicals. Both the dump and the burning area were closed in 1949.

During the initial investigations, Site E was divided into two areas, Areas E-1 and E-2, to better define past disposal activities. Area E-1 was further divided into four sections, Areas E1-1 through E1-4 (also known as the areas of concern [AOCs]). Area E-1 also contained one dump (Area E1-2 dump) (see Figure 19). AOCs were not identified at Area E-2 and, therefore, did not require any remedial action.

Site E is identified in the 1997 OU2 ROD as a shallow soil site and a dump. The selected remedy for Site E required excavation, stabilization, and off-site disposal of the contaminated soil. The COCs were identified as antimony, barium, copper, lead, and manganese with the cleanup levels at 22.4 mg/Kg, 21,745 mg/Kg, 13,062 mg/Kg, 1,200 mg/Kg, and 834 mg/Kg, respectively. The cleanup levels are based on a site-specific industrial land use scenario.

From 1999 through 2001, approximately 21,100 cy of contaminated soil were excavated from Areas E1-1 through E-4 and the Area E1-2 dump and disposed off-site. ACM was identified in the Site E soils in 1999. Specifically, an extensive amount of debris containing suspected ACM was found in soils west of the Area E1-2 dump. A complete description of the materials found at the site is contained in the *Final Remedial Action Completion and Shallow Soils Closeout Report, Site E Activities, Volume IV, Rev. 2* dated June 13, 2002.

A soil cover, which is referred to as the Area E1-2 West Dump (see Figure 20), was constructed in 2001 over the area with ACM since it was determined that complete removal of ACM was not feasible. The soil cover was constructed as a 2-foot-thick soil layer. The area of the Area E1-2 west dump is approximately 1.5 acres.

A close out report for Site E was completed in 2002 (Stone & Webster, 2002a). MPCA and USEPA provided conditional approval of the close out report in 2002. Once LUCS have been incorporated into the close out report, MPCA and USEPA will make a determination that the report is a final document and passes the Consistency Test in accordance with Chapter XIV of the Federal Facility Agreement.

2.8 Site G

Site G is located in the central portion of the original TCAAP (now on Army National Guard property). Site G, approximately 4.6 acres, was used as a general dump area for the disposal of rubble, asphalt pavement, barrels, oil filters, rocket propellant research materials, floor-absorbent sweepings, metal dusts and grindings, burning operation ashes, and scrap roofing debris. Operations appear to have begun during WWII and continued through 1976.

Site G was identified in the 1997 OU2 ROD as a deep soil site impacted primarily by VOCs. Under a previous interim remedial action to initiate source control, an SVE system operated from January 1986 through August 1998 to extract and treat TCE. As a component of the SVE remedy, an 18-inch thick clay and a 6-inch-thick protective soil layer cover was installed at the site in 1985 for the dual purpose of protecting groundwater from contaminant leaching and for the efficient operation of the SVE system. The interim remedial action was declared part of the selected

remedy in the 1997 OU2 ROD. The SVE system removed 104,418 pounds of chlorinated solvents from 1986 through 1998, at which time the SVE system was shut down. Thus, the deep soils have been remediated through treatment with the SVE system.

Per the Site G remedy selected in the 1997 OU2 ROD, the Site G dump was characterized following the completion of the SVE remedy. An investigation was conducted in October 1998 to characterize and delineate a black tar-like material observed at the site in 1997. Based on field observations, the tar-like material is believed to be located intermittently throughout the Site G dump (Stone & Webster, 1999).

A review and evaluation of the previous investigations and remedial actions conducted at Site G showed that the Site G dump has been adequately characterized to satisfy the 1997 OU2 ROD requirements (Shaw, 2004c). Between 1983 and 2000, eleven separate investigations were conducted at Site G that resulted in the drilling of 67 soil borings (not including the 89 SVE wells). The notations on the soil boring logs and visual observations indicated that the Site G dump contains bricks, glass, wire, rubber, nails, metal pieces, ash, concrete, asphalt, and tar-like material. The dump contents are considered industrial solid waste according to the Minnesota Solid Waste Management Facility Rule definition. Concentrations of lead in excess of the 1,200-mg/Kg cleanup level were detected in two composite soil samples, which were collected from soil borings during the 1984 pre-remedial investigation. The size of the dump is approximately 2.8 acres. The existing clay cap covers the top portion of the Site G dump area.

In 2002, the regulators approved revised cleanup levels based on the existing cover minimizing the potential for leaching to groundwater. The COCs identified for Site G include TCE and lead. The cleanup level TCE, 36.1 mg/Kg, was calculated using the MPCA's Risk Based Guidance for Evaluating the Soil Leaching Pathways (MPCA, 2001). The cleanup level for TCE is based on a site-specific industrial land use scenario and the existence of a 24-inch-thick soil cover with specific characteristics (i.e., good vegetation, consists of silty or clayey sand, and maintains a permeability of 2.7×10^{-6} centimeters per second) (Shaw, 2004c). The cleanup level for lead is 1,200 mg/Kg.

A containment remedy was determined to be the most appropriate action for the Site G dump using the Minnesota Industrial Solid Waste Land Disposal Facility rules (Minnesota Rule 7035.2500) as guidance for the soil cover design. Four alternatives were developed and evaluated for a cover containment remedy at Site G. A 2-foot-thick soil cover was selected as the appropriate action. The existing 2-foot-thick clay cap serves as the cover for the top portion of the dump. The side slopes of the dump required the addition of the 2-foot-thick soil cover.

Prior to constructing the soil cover, the SVE system was removed in August 2003. The SVE vents were sealed in place cutting off the vents 4 inches below grade. The soil cover was constructed during September and October 2003. At least 21 inches of fill material (clayey sand) and 3 inches of topsoil were placed over the slopes of the dump and a vegetative cover consisting of an annual/perennial seed mixture was added over the soil cover. The final area of the soil cover is approximately 3.5 acres. Figure 21 shows the final grading contours of the Site G soil cover.

A close out report for Site G was completed in 2004 (Stone & Webster, 2004c). MPCA and USEPA provided conditional approval of the close out report in 2004. Once LUCS have been incorporated into the close out report, MPCA and USEPA will make a determination that the report is a final document and passes the Consistency Test in accordance with Chapter XIV of the Federal Facility Agreement.

2.9 Site H

Site H is located at the southeast corner of the original TCAAP along the northwest side of Sunfish Lake, immediately east of Hamline Avenue (now on Army National Guard property). Site H is approximately 11.7 acres and was a burning site with a burning cage located in the center. Burning (primarily wood, paper, cardboard, and combustible trash) took place from the early 1940s until the late 1960s. In addition to waste burning, portions of the site may have been used for burial and dumping of industrial sludge, paint residue, incineration ash, and solvents. Dumping activities began at the end of World War II and continued until 1967.

Site H is identified in the 1997 OU2 ROD as a shallow soil site. The selected remedy for Site H required excavation, stabilization and off-site disposal of the contaminated soil. The COCs were identified as antimony, arsenic, copper, lead, and manganese with the cleanup levels at 33.6 mg/Kg, 10 mg/Kg, 19,593 mg/Kg, 1,200 mg/Kg, and 2,503 mg/Kg, respectively. The cleanup levels are based on a site-specific industrial land use scenario.

Site H was divided into Areas H-1 and H-2 to better define past disposal activities. Area H-1 was identified to contain four AOCs and the Site H dump. Area H-1 was divided into four sections (H1-1 through H1-4). AOCs were not identified at Area H-2 and, therefore, did not require any remedial action. The Site H dump is located on the northern shore of Sunfish Lake. Investigations at Site H delineated the Site H dump at 10 feet deep and the aerial extent shown in Figure 22.

Hazardous and nonhazardous materials, debris, and ordnance were excavated and disposed off-site from 1999 through 2001. ACM was identified in the AOCs. Approximately 1,620 cy of contaminated soil were excavated from the four AOCs. About 7,000 cy of contaminated soil and debris were excavated from the Site H dump. All excavated areas were backfilled with clean soil. A detailed description of the materials excavated from Site H is presented in the *Final Remedial Action Completion and Shallow Soils Closeout Report, Site H Activities, Volume III, Rev. 2* dated February 7, 2002.

At Area H1-3, which is near the Sunfish Lake shoreline, excavation activities stopped when groundwater was encountered. Thus, debris below the groundwater table was left in place. A soil cover was constructed over the area of remaining debris with suspected ACM and is referred to as the Area H1-3 dump. The soil cover was designed to prevent human contact with debris and ACM and to manage surface water runoff to prevent adverse impact on Sunfish Lake. The soil cover consisted of 28 inches of fill and a minimum of 2 inches of topsoil. The Area H1-3 dump is approximately 0.6 acres (see Figure 23).

A close out report for the Site H remedial activities was completed in 2002 (Stone & Webster, 2002b). MPCA and USEPA provided conditional approval of the close out report in 2002. Once LUCS have been incorporated into the close out report, MPCA and USEPA will make a

determination that the report is a final document and passes the Consistency Test in accordance with Chapter XIV of the Federal Facility Agreement.

2.10 Site 129-15

Site 129-15 is located in the central portion of the original TCAAP, east of Snelling Road (now on Army National Guard property). The site covers approximately 1.4 acres and appears to have been used as a general dump for building materials. Although the site may have been used prior to 1970, the first documented evidence of use as a dump dates from about 1970.

In 1998, an investigation was conducted to fulfill the 1997 OU2 ROD objectives of the selected remedy to characterize the dump at Site 129-15 to determine the contents. The 1998 investigation consisted of excavating six test trenches to characterize the dump and eight test trenches to locate the perimeter of the dump. Construction debris was observed during the excavation of the characterization trenches, indicating that the area was used as a general dump for building materials. A total of 38 subsurface soil samples were collected and analyzed for total metals, TCLP metals, VOCs, and TCLP VOCs. Fifteen samples were collected and analyzed for semivolatile organic compounds (SVOCs); cyanide; and reactivity, ignitability, corrosivity, and oxidation potential (RICO).

The 1998 results showed detections of various metals, VOCs, and SVOCs. Cyanide was not detected in any samples. The dump contents were determined to not exhibit any hazardous characteristics based on the results of the TCLP metals, TCLP VOCs, and RICO analyses. Lead was detected at 1,839 mg/Kg in one of the soil samples, which is greater than the cleanup level. The COCs identified for Site 129-15 based on the 1992 and 1998 investigations include lead, benzo(a)anthracene, and benzo(a)pyrene with cleanup levels at 1,200 mg/Kg, 0.215 mg/Kg, and 0.0215 mg/Kg, respectively.

For all other detected constituents, risk-based preliminary remediation goals were developed for a site-specific industrial land use scenario representing a one-time construction event. The one-time construction event was selected based on the location of the contaminants at the site, the location of the site, and the site topography. The exposure scenario assumes that a worker is present at the site for 2 months, with an average exposure frequency of 40 days per year for 2 years. Comparison of the constituent concentrations (except lead) to these new preliminary remediation goals showed no exceedences; hence, there is no significant risk in the subsurface soils.

However, it was determined that an action was warranted for the dump based on the following reasons:

- The 1992 findings cited in the OU2 FS Supplemental Data Report (MW, 1996), where benzo(a)anthracene and benzo(a)pyrene (commonly referred to as PAHs) were found to exceed the cleanup levels in the surface soils.
- The 1998 investigation findings, where lead was found to exceed the cleanup level in one subsurface soil sample.
- The presence of physical hazards associated with the dump contents.

A vegetative soil cover and LUCs were selected by the Army and approved by the USEPA and accepted by the MPCA to protect human health by eliminating exposure to PAH-contaminated

surface and lead-contaminated subsurface soils, by eliminating PAH-contaminated fugitive dust from leaving the site, and by reducing the physical safety hazards associated with the dump contents. A 24-inch-thick soil cover was constructed during the period from August through November 2001. A minimum of 21 inches of fill material, which was obtained from an onsite borrow source, and 3 inches of topsoil, which was obtained from an off-site borrow source, were placed over the dump area. Approximately 18,000 cy of general fill material and 580 cy of topsoil were used to construct the soil cover. Vegetation was then established on the soil cover. The actual surface area of the soil cover over the dump area is approximately 1.5 acres (Stone & Webster, 2002). Figure 24 shows the final grading contours of the soil cover. At this time, LUCs for Site 129-15 have not yet been identified. LUCS will be identified in the LUCRD which will require approval by USEPA and MPCA. The close out report was prepared in 2002 (Stone & Webster, 2002c). MPCA and USEPA provided conditional approval of the close out report in 2002. Once LUCS have been incorporated into the close out report, MPCA and USEPA will make a determination that the report is a final document and passes the Consistency Test in accordance with Chapter XIV of the Federal Facility Agreement.

3.0 BASIS FOR THE FUNDAMENTAL CHANGE TO THE SELECTED REMEDY

The need for this ROD Amendment is based upon the completion of the selected remedies for Sites E and H and the additional investigations and/or removal actions conducted at the Grenade Range, a ditch associated with the 135 Primer/Tracer Area, Outdoor Firing Range, the Trap Range Site, the Water Tower Area and Sites D, G, and 129-15. Based on the new information, the remedies selected for Sites D, G, E, H, and 129-15 in the 1997 OU2 ROD required fundamental change. In addition, the Grenade Range, the ditch associated with the 135 Primer/Tracer Area, the Trap Range, Site and Water Tower Area, and Outdoor Firing Range are included as OU2 shallow soils sites with the selected remedies documented in this ROD Amendment.

The following sections discuss the specific basis for the fundamental change for each site.

3.1 Grenade Range

Field investigations conducted in 1993 and 1994 identified source areas of metal-contaminated soils at the Grenade Range. UXO survey and removal was conducted in 1993. Based on the recommended alternative in the EE/CA (1999) and authorized in an Action Memorandum (1999), a removal action was completed for the excavation, stabilization and off-site disposal of 2,179 cy of contaminated soil at the Large Range and Small Range. The health-risk based cleanup levels were based on a site-specific industrial land use scenario.

This decision document contains documentation that, for purposes of source remediation at the Grenade Range, no additional actions, either removal or remedial, are necessary beyond the actions already performed other than the implementation of LUCs to restrict the land use to industrial. The major differences between the 1997 OU2 ROD and this ROD Amendment for Grenade Range are summarized as follows:

1997 OU2 ROD	Investigation Results and/or Remedial/Removal Actions	2008 OU2 ROD Amendment
<p><u>Grenade Range</u> No remedy selected.</p>	<p>UXO was removed in a 1993 removal action. During a 1999 removal action, about 2,180 cy of contaminated soil were excavated and disposed off-site. The cleanup levels were based on a site-specific industrial land use scenario.</p>	<p>Declaration that the removal actions constitute the final remedy for the site with the addition of LUCs that restrict area to industrial use.</p>

3.2 Outdoor Firing Range

Field investigations conducted in 1993 and 1994 identified source areas of metal-contaminated soils at the 200-Yard Range, 600-Yard Range, and 840-Yard Range areas and PAH-contaminated soil at the 1,900 Yard Range area. A UXO survey and removal was conducted in 1993. Based on the recommended alternative in the EE/CA (1998) and authorized in an Action Memorandum (1999), a removal action was completed including excavation, stabilization and off-site disposal of

990 cy of soil. Based on a 1999 investigation at the 1,900-Yard Range, PAHs were detected at concentrations greater than the cleanup levels. In 2003, regulators approved a work plan for constructing a soil cover over one half acre area of PAH-contaminated soil. The cover was initially constructed in 2003, with additional cover material placed in 2004. The health-risk based cleanup levels were based on a site-specific industrial land use scenario.

This decision document contains documentation that, for purposes of source remediation at the Outdoor Firing Range, no additional actions, either removal or remedial, are necessary beyond the actions already performed other than the implementation of LUCs to restrict the land use to industrial.

The major differences between the 1997 OU2 ROD and this ROD Amendment for the Outdoor Firing Range are summarized as follows:

1997 OU2 ROD	Investigation Results and/or Remedial/Removal Actions	2008 OU2 ROD Amendment
<p>Outdoor Firing Range No remedy selected.</p>	<p>UXO was removed in a 1993 removal action. During a 1999 removal action, about 990 cy of contaminated soil were excavated and disposed off-site. A soil cover was constructed at the 1,900-Yard Range in 2003-2004. The cleanup levels were based on a site-specific industrial land use scenario.</p>	<p>Declaration that the removal actions and cover construction constitute the final remedy for the site with the addition of LUCs to maintain the integrity of the soil cover, to prohibit unauthorized disturbance to underlying soils, and to restrict the area to site-specific industrial use.</p>

3.3 135 Primer/Tracer Area Stormwater Ditch

Activities at the 135 Primer/Tracer Area resulted in impacts to a stormwater outfall and downstream ditch. Due to land transfer considerations, a removal action was conducted in 2005 with excavation and off-site disposal of the PAH-contaminated sediment. The cleanup of the stormwater outfall and downstream ditch achieved cleanup goals suitable for unrestricted use of the ditch.

The actual 135 Primer/Tracer Area, which is distinct and separate area from the stormwater outfall and downstream ditch, still needs further investigation and/or remediation, therefore, is not addressed in this ROD Amendment. The land transfer area and the area subject to this ROD Amendment are specific to the stormwater outfall and ditch area.

The major differences between the 1997 OU2 ROD and this ROD Amendment for the 135 Primer/Tracer Area stormwater ditch are summarized as follows:

1997 OU2 ROD	Investigation Results and/or Remedial/Removal Actions	2008 OU2 ROD Amendment
<u>135 Primer/Tracer Area</u> <u>Stormwater Ditch</u> No remedy selected.	During a 2005 removal action, about 970 cy of contaminated sediment were excavated and disposed of off-site. The remaining soils were cleaned up to concentrations allowing for unrestricted use.	Declaration that the removal actions constitute the final remedy for the ditch (No Further Action). The ditch can be used for unrestricted use.

3.4 Trap Range Site

A Preliminary Assessment was conducted at the Trap Range Site that was approved by the MPCA and USEPA in 2000. The results of the Preliminary Assessment showed that, based on the lack of evidence of contamination and the minimal likelihood of human exposure to contamination, no further action is recommended for the Trap Range Site.

This decision document contains documentation that no additional actions are necessary beyond the actions already performed. The major differences between the 1997 OU2 ROD and this ROD Amendment for the Trap Range Site are summarized as follows:

1997 OU2 ROD	Investigation Results and/or Remedial/Removal Actions	2008 OU2 ROD Amendment
<u>Trap Range Site</u> No remedy selected.	A PA was conducted at the Trap Range Site in July 1999. The PA results concluded that there is no evidence that a release to air, groundwater, surface water, soil or sediment has occurred as the result of activities at the Trap Range Site.	No Action. The Trap Range Site can be used for unrestricted use.

3.5 Water Tower Area

Investigations were conducted at the Water Tower Area to determine if shell casings, trim rings and head turn shavings that were observed on the surface were a source of contamination. Samples were collected and analyzed for TCLP metals to determine if the soil was hazardous with respect to TCLP limits. The results of the investigation showed that surface and subsurface soils were not hazardous and could be left in place. Although the soil/metal presented no known health, safety, or environmental threat, the Army completed physical removal of the soil and metal from the Water Tower Area in 1993. In 1995, an additional investigation/characterization effort was completed and the results showed that the soil concentrations were below the residential PRGs. The residential and industrial PRGs for metals are identified in Table 4 of the Water Tower Report. No further action was recommended for the Water Tower Area.

This decision document contains documentation that no additional actions are necessary beyond the actions already performed. The major differences between the 1997 OU2 ROD and this ROD Amendment for the Water Tower Area are summarized as follows:

1997 OU2 ROD	Investigation Results and/or Remedial/Removal Actions	2008 OU2 ROD Amendment
<p>Water Tower Area No remedy selected.</p>	<p>An investigation was conducted at the Water Tower Area in July 1990. The investigation concluded that the metal turnings could be left in the place because the soil at the Water Tower Area was determined to be non-hazardous with respect to TCLP limits. Although the soil/metal presented no known health, safety, or environmental threat, the Army completed physical removal of the soil and metal from the Water Tower Area in 1993. In additional investigation in 1995 showed that the soil concentrations were below the residential PRGs.</p>	<p>No Action. The Water Tower Area can be used for unrestricted use.</p>

3.6 Site D

The need for this ROD Amendment is based upon additional investigations at Site D. Based on the new information, the remedy selected for the Site D in the OU2 1997 ROD required fundamental change. The selected remedy identified in the 1997 OU2 ROD for Site D was to characterize the site following completion of the SVE remediation of deep soils to determine appropriate action. The results from an investigation conducted in 2001 indicated that lead, antimony, and nitroglycerine concentrations in the soils exceeded the cleanup levels and that some debris consistent with construction materials was observed.

Based on the outcome of the 2001 investigation at Site D, and following the presumptive remedy guidance for landfills, shallow soil with COC concentrations in excess of the industrial use based cleanup levels was excavated, stabilized, and disposed at an off-site landfill.

Also, the 1985 interim remedial action for PCB-contaminated soil resulted in soils with residual PCB concentrations above the PRGs and MPCA industrial SRVs, remaining on-site, but contained in-place beneath a soil cover.

This decision document contains documentation that, for purposes of source remediation at Site D, no additional actions, either removal or remedial, are necessary beyond the actions already performed other than the implementation of LUCs to restrict the land use to industrial.

The major differences between the 1997 OU2 ROD and this ROD Amendment for Site D are summarized as follows:

1997 OU2 ROD	Investigation Results and/or Remedial/Removal Actions	2008 OU2 ROD Amendment
<p>Site D Following completion of the SVE remediation of deep soils, characterize Site D shallow soil to determine appropriate action.</p>	<p>During a 1985 interim remedial action, 1,470 cy of PCB contaminated soil was incinerated on site; some backfilled soil has PCB concentrations exceeding unrestricted use levels, but it is covered by clean soil. A SVE remedial action operated from 1986 through 1998 to extract and treat TCE. A 2000 investigation confirmed that the SVE system could be discontinued. The 2001 investigation results indicated that concentrations of lead, antimony, and nitroglycerine in the shallow soil exceeded the industrial use based cleanup levels. In 2002, 1,300 cy of contaminated soil was excavated, stabilized, and transported to an off-site landfill for disposal.</p>	<p>Declaration that the removal actions and PCB soil cover are part of the final remedy for the site, with the addition of LUCs to maintain the integrity of the soil cover, to prohibit unauthorized disturbance to underlying soils, and to restrict the area to site-specific industrial use.</p>

3.7 Site E

Based on the completion of the 1997 OU2 ROD selected remedy for Site E, shallow soil with COC concentrations in excess of the health-risk based cleanup levels was excavated, stabilized, and disposed at an off-site landfill. In addition, an excessive amount of ACM was identified in soils during the remedial actions in 1999. Because it was determined that complete removal of ACM was not feasible, a soil cover was constructed in 2001 over the area with ACM. This soil cover is referred to as the Area E1-2 west dump.

This decision document contains documentation that, for purposes of source remediation at Site E, no additional actions, either removal or remedial, are necessary beyond the actions already performed other than the implementation of LUCs to restrict the land use to industrial.

The major differences between the 1997 OU2 ROD and this ROD Amendment for Site E are summarized as follows:

1997 OU2 ROD	Investigation Results and/or Remedial/Removal Actions	2008 OU2 ROD Amendment
<p>Site E Excavation, stabilization, and off-site disposal of contaminated shallow soils.</p>	<p>During the remedial actions from 1999 through 2001, approximately 20,900 cy of metal-contaminated soil was excavated and disposed off-site. The cleanup levels were based on a site-specific industrial land use scenario. In addition, a soil cover was constructed over an area containing ACM (Area E1-2 west dump).</p>	<p>Declaration that the cover construction is part of the final remedy, with the addition of LUCs to maintain the integrity of the soil cover, to prohibit unauthorized disturbance to underlying soils, and to restrict the area to site-specific industrial use.</p>

3.8 Site G

The need for this ROD Amendment is based upon the results of additional investigations at Site G. Based on the new information, the remedy selected for Site G in the 1997 OU2 ROD required fundamental change.

The selected remedy identified in the 1997 OU2 ROD for Site G was to expand the SVE system vertically and characterize the dump materials after cessation of the SVE system operation. Investigations were conducted at Site G in 1998 and 1999. The analytical results presented in field investigation reports indicate that TCE impact was limited to the central portion of the site. The results called into question whether it was necessary to install deep SVE vents or to modify the shallow SVE system. Coincidentally, the VOC emissions had declined to a point where the regulators approved a temporary shutdown pending resolution of investigation work.

In 2000, an additional subsurface investigation was performed to verify that concentrations in deep and shallow soils at Site G were less than the cleanup levels. Results from the deep soil samples were less than the TCE cleanup level. One soil sample from the shallow soil (15 feet bgs) showed concentrations of TCE greater than the cleanup level of 3.95 mg/Kg. In discussions among the Army, USEPA, and MPCA, it was decided to review the cleanup level calculation using a leaching model approach with current site conditions (existing clay cap). Using the *Risk Based Guidance for Evaluating Soil Leaching Pathway* (MPCA, 2001), the recalculated cleanup level for TCE is 36.1 mg/Kg. All analytical results were less than this value of 36.1 mg/Kg; therefore, USEPA and MPCA agreed that no further action with regard to TCE was warranted for the shallow and deep soils at Site G as long as site conditions remain the same (the clay cap remains in place).

Then, in accordance with the OU2 ROD, the dump contents were characterized. The results from 11 investigations conducted at Site G between 1983 and 2000 were reviewed and evaluated. A total of 67 soil borings (not including the 89 SVE wells) were installed at Site G during these investigations. The dump contents noted in the soil boring logs were considered industrial solid waste. Elevated concentrations of lead above the cleanup level were noted from the 1984 - pre-remedial investigation. The evaluation of the 11 investigations and remedial actions showed that the Site G dump had been adequately characterized and that a soil cover would be the most appropriate action to contain the dump contents.

In August 2003, the SVE system was removed and the SVE wells were sealed in place. In October 2003, a two-foot thick soil cover was constructed on the side slopes of the dump. The previously installed clay cap (from the SVE system) serves as the cover for the top portion of the dump. The final area of the soil cover is approximately 3.5 acres.

This decision document contains documentation that, for purposes of source remediation at Site G, no additional actions, either removal or remedial, are necessary beyond the actions already performed other than the implementation of LUCs to restrict the land use to industrial.

The major differences between the 1997 OU2 ROD and this ROD Amendment for Site G are summarized as follows:

1997 OU2 ROD	Investigation Results and/or Remedial/Removal Actions	2008 OU2 ROD Amendment
<p>Site G Following completion of the SVE remediation of deep soils, characterize Site G dump to determine appropriate action.</p>	<p>A SVE remedial action operated from 1986 through 1998 to extract and treat chlorinated solvents. A clay layer was constructed for the SVE system. A 2000 investigation confirmed that the SVE system could be discontinued. The TCE cleanup level was revised to reflect existing conditions (i.e., clay cap). Based on a review and evaluation of the information collected from the 1983 through 2000 investigations, the Site G dump has been adequately characterized as industrial solid waste and delineated as required. A soil cover was constructed during a 2003 removal action to contain the dump contents.</p>	<p>Documentation of a revision to the cleanup level for TCE in soil, declaration that the dump cover construction is part of the final remedy, with the addition of LUCs to maintain the integrity of the soil cover, to prohibit unauthorized disturbance to underlying soils, and to restrict the area to site-specific industrial use.</p>

3.9 Site H

Based on the completion of the 1997 OU2 ROD selected remedy for Site H, shallow soil with COC concentrations in excess of the industrial use based cleanup levels was excavated, stabilized, and disposed at an off-site landfill. Excavation stopped at Area H1-3 when groundwater was encountered, thereby leaving debris in place below the groundwater table. A soil cover was constructed over the area of remaining debris with suspected ACM. This area with a soil cover over remaining debris and suspect ACM is referred to as the Area H1-3 dump.

This decision document contains documentation that, for purposes of source remediation at Site H, no additional actions, either removal or remedial, are necessary beyond the actions already performed other than the implementation of LUCs to restrict the land use to industrial.

The major differences between the 1997 OU2 ROD and this ROD Amendment for Site H are summarized as follows:

1997 OU2 ROD	Investigation Results and/or Remedial/Removal Actions	2008 OU2 ROD Amendment
<p>Site H Excavation, stabilization, and off-site disposal of contaminated shallow soils.</p>	<p>During the remedial actions from 1999 through 2001, approximately 8,620 cy of contaminated soil was excavated and disposed off-site. The cleanup levels were based on a site-specific industrial land use scenario. In addition, a soil cover was constructed over an area containing debris and ACM (Area H1-3 dump).</p>	<p>Declaration that the cover construction is part of the final remedy, with the addition of LUCs to maintain the integrity of the soil cover, to prohibit unauthorized disturbance to underlying soils, and to restrict the area to site-specific industrial use.</p>

3.10 Site 129-15

The need for this ROD Amendment is based upon additional investigations at Site 129-15. Based on the new information, the remedy selected for Site 129-15 in the 1997 OU2 ROD required fundamental change.

The selected remedy identified in the 1997 OU2 ROD for Site 129-15 was to characterize the dump to determine its contents. A 1998 investigation determined that the dump contents did not exhibit any hazardous characteristics based on TCLP metals, TCLP VOCs, and RICO analyses. However, lead was detected in one of the soil samples in excess of the cleanup level. In addition, PAHs exceeded the cleanup levels in the surface soil based on 1992 findings. Therefore, it was determined that an action was warranted.

A vegetative soil cover was selected as the remedy and was constructed during the 2001 field season. This ROD Amendment addresses the outcome of the 2001 action. The vegetative soil cover serves to prevent or control the release or threatened release of hazardous substances in excess of the health-risk based levels from the contamination sources identified at Site 129-15, such that there are no unacceptable risks to human health and the environment from these sources.

This decision document contains documentation that, for purposes of source remediation at Site 129-15, no additional actions, either removal or remedial, are necessary beyond the actions already performed.

The major differences between the 1997 OU2 ROD and this ROD Amendment for Site 129-15 are summarized as follows:

1997 OU2 ROD	Investigation Results and/or Remedial/Removal Actions	2008 OU2 ROD Amendment
<p>Site 129-15 Characterization of dump at Site 129-15 to determine its contents. If contents are found to be toxic, hazardous, or contaminated, then a remedy for the landfill will be used and documented through a post-ROD amendment. If contents are not toxic, hazardous, or contaminated, a no further action remedy would be employed.</p>	<p>Dump contents were characterized during a 1998 investigation. A soil cover was constructed during a 2001 removal action to contain the dump contents.</p>	<p>Declaration that the cover construction is part of the final remedy, with the addition of LUCs to maintain the integrity of the soil cover, to prohibit unauthorized disturbance to underlying soils, and to restrict the area to site-specific industrial use.</p>

4.0 DESCRIPTION OF REMEDY CHANGES

Representative groupings for the sites were assembled into three categories based on the existing condition of the sites. Each category was formed to provide a general approach to the amended remedies. The first category includes shallow soil sites (Grenade Range) that have been cleaned up to reasonably anticipated land use (industrial). The second category includes six deep and/or shallow sites (Outdoor Firing Range and Sites D, E, G, H, and 129-15) that have been cleaned up to the reasonably anticipated land use and also contain areas with soil covers over remaining contamination. The third category includes sites with no further action required for unrestricted use. The categories are listed as follow:

- Sites with Restricted Land Use
- Sites with Restricted Land Use and Soil Covers
- 135 Primer/Tracer Area Stormwater Ditch, the Trap Range Site and the Water Tower Area – Unrestricted Land Use

For all sites where LUCs are implemented, general LUCs would include actions to be taken by the Army and/or Army National Guard while the property is under Federal control, and if transferred from Federal control, then deed restrictions and State Environmental Covenants. In the event that property is transferred out of Army control, the Army will retain responsibility for those sites where LUCs are implemented. The Army and/or Army National Guard have already been restricting the use of these sites to activities consistent with the industrial use cleanup levels and in a manner that is protective of the soil covers. Therefore, the formal adoption of the LUCs in this Amendment will not cause any change in the outcome of the remedy, other than to add greater assurance. Procedures for the implementation of LUCs, such as maintenance of soil covers, will be included in the Land Use Controls Remedial Design (LUCRD) document that will be prepared after this ROD Amendment is signed. The LUCRD will be reviewed and approved by the MPCA and USEPA.

The LUCRD will include a detailed map or a descriptive survey plan with specific locations and design details for each LUC. If these sites are subsequently remediated to unrestricted use, LUCs can be changed or eliminated in the future, provided that the landowner demonstrates that the property is suitable for unrestricted (or less restricted) use and obtains the approvals of Army, USEPA and MPCA. CERCLA 121(c) five-year reviews will be conducted to assess the long-term effectiveness of the remedy, including LUCs.

The LUCRD will be submitted in accordance with the RD schedule provisions of the FFA and will include a LUC component describing the details of LUC implementation and maintenance, including periodic inspections. The Army shall be responsible for implementation, maintenance, periodic reporting, and enforcement of LUCs in accordance with the LUCRD. Although the Army may transfer these responsibilities to another party by contract, property transfer agreement, or through other means, the Army shall remain ultimately responsible for remedy integrity to include; (1) CERCLA 121(c) five year reviews; (2) notification of the appropriate regulators and/or local government representatives of any known LUC deficiencies or violations; (3) reservation of access to the property to conduct any necessary response; (4) the ability to change,

modify or terminate LUCs and any related deed or lease provisions; and (5) ensure that the LUC objective is met to maintain remedy protectiveness.

As a condition of property transfer or lease, the Army may require the transferee or lessee in cooperation with other stakeholders to assume responsibility for various implementation actions. Third party LUC responsibility will be incorporated into pertinent contractual, property and remedial documentation, such as a purchase agreement, deed, lease, and RD addendum. To the extent permitted by law, a transfer deed shall require the LUCs imposed as part of a CERCLA remedy to run with the land and bind all property owners and users.

The sites addressed in this ROD Amendment that require LUCs are all currently on property controlled by the Army National Guard. If in the future, the Army intends to transfer ownership outside of Federal control, the Army may, if Federal and/or State law allows, upon transfer of fee title grant the State an environmental covenant or easement that would allow the State to enforce LUC terms and conditions against the transferee(s), as well as subsequent property owner(s) or user(s) or their contractors, tenants, lessees or other parties. This covenant will be incorporated by reference in the transfer deed and will run with the land in accordance with State realty law. This state and USEPA enforcement right would supplement, not replace, the Army's right and responsibility to enforce the LUCs.

4.1 Sites with Restricted Land Use

The Grenade Range has been cleaned up to the health-based risk cleanup levels, which are based on a site-specific industrial land use scenario.

4.1.1 Description of New Alternatives

This section presents a narrative summary of the alternatives considered in the Proposed Plan. Present worth cost estimates are based on a 7 percent discount rate. The two alternatives evaluated for the Grenade Range, which was cleaned up to restricted use, are listed below:

- Alternative 1: No Further Action
- Alternative 2: Land Use Controls

Alternative 1: No Further Action

Development of the no further action alternative is required by CERCLA. This alternative serves as baseline for comparison with other technologies. Under this alternative, no further action would be taken for the existing shallow soil with COC concentrations less than the health-based risk cleanup levels, which are based on a site-specific industrial land use scenario. In addition, no LUCs would be implemented to protect the land use as site specific industrial. Consequently, this alternative may not be protective of human health if the land use changes at the site. The FS indicated that remedy reviews every 5 years would be conducted because of the contamination potentially remaining onsite may not allow for unlimited use and unrestricted exposure. The cost estimate is based on performing the remedy reviews six times during a 30-year period. The cost estimate is presented in Table 1.

Capital Costs:	\$0
Periodic Costs: 5-Year Review	\$15,000

Total 30-Year Present Worth: \$32,400

Implementation Time: Immediate

Alternative 2: Land Use Controls (Selected Remedy)

This alternative consists of the implementation of LUCs to maintain the land use as site-specific industrial. General LUCs would include actions to be taken by the Army and/or Army National Guard while the property is under Federal control, and if transferred from Federal control, then would include deed restrictions and State Environmental Covenants. Five-year reviews would be conducted because hazardous substances, pollutants, or contaminants may remain on site above levels that allow for unlimited use and unrestricted exposure. The cost estimate is presented in Table 2.

Capital Costs: \$16,900

Periodic Costs: O & M and 5-Year Review \$18,000

Total 30-Year Present Worth: \$55,700

Implementation Time: 1 year

4.1.2 Summary of Comparative Analysis of Alternatives

Each of the alternatives considered for the ROD Amendment are evaluated and compared based on the nine NCP criteria listed below. This section briefly summarizes the evaluation of the alternatives against the nine NCP criteria.

Overall Protection of Human Health and the Environment

The contaminated soils (i.e., soils with COC concentrations greater than the cleanup levels, which are based on industrial use) have been previously remediated or removed. Existing conditions meet the RAOs and are protective of human health and the environment. Alternative 1 (No Further Action) would be protective of human health and the environment if the site remains industrial, but may not be protective if the site was used differently. Alternative 2 (Land Use Controls) would meet RAOs and ensure protectiveness of human health and the environment by restricting site use to industrial purposes. The following RAO is designed to protect human health and the environment from exposure to contaminants in shallow soil (defined as shallow soils 0 to 12 feet bgs) at the TCAAP site:

Protect human receptors from unacceptable risk associated with ingestion and dermal contact exposure with contaminants in the shallow soil.

Compliance with ARARs

Alternative 1 and Alternative 2 would comply with the ARARs listed in the 1997 OU2 ROD (USAEC, 1997) and Table 5.

Long-Term Effectiveness

The contaminated soils have been previously remediated or removed. Alternative 1 may not provide long-term effectiveness or permanence because there would not be adequate or reliable controls to ensure that the site usage would remain as restricted. Alternative 2 would have

excellent long-term effectiveness and permanence because the LUCs would ensure that site usage would remain as industrial unless additional remediation occurs.

Reduction of Toxicity, Mobility, or Volume

Treatment is not applicable because the soils with COC concentrations greater than the cleanup levels have been previously remediated or removed.

Short-Term Effectiveness

Alternatives 1 and 2 would not cause community or site worker risks because there would not be any construction activities involved during the implementation of either alternative.

Implementability

This criterion is based on the ability to perform construction and to implement administrative actions. Alternative 1 would be easy to implement since no action is required, but some administrative effort would be required because the site contains COCs concentrations above levels that allow for unlimited use and unrestricted exposure. Alternative 2 would be administratively implementable; however, establishing LUCs would require administrative effort.

Cost

The estimated present worth costs for Alternatives 1 and 2 are \$32,400 and \$55,700, respectively.

State Acceptance

The State has been consulted throughout this process and concurs with the selected alternative.

Community Acceptance

Compliance with the public participation requirements of Section 113(k)(2)(i-v) of CERCLA/SARA has been achieved for the New Brighton/Arden Hills Superfund Site by the following activities for this ROD Amendment:

- The Army has prepared an update to the Administration Record. The Administrative Record is located at 470 W. Highway 96, Suite 100, Shoreview, MN 55126.
- The Army placed a formal advertisement in the Minnesota Star Tribune on June 8, 2008 and in the Arden Hills/New Brighton Bulletin, and the Shoreview-Arden Hills Bulletin on June 11, 2008, and the Fridley Focus on June 12, 2008 announcing the availability of the Proposed Plan.
- Public comment on the Proposed Plan was solicited during a formal public comment period extending from June 11, 2008 to July 11, 2008.
- A public meeting was held on June 24, 2008 at Ramsey County Public Works/Partners Facility. Representatives of the Army, the EPA, and the MPCA were at the meeting to answer questions about the site and the changes to and additional remedial alternatives.
- Two members of the public attended the public meeting.
- No comments were received regarding the Amendment #3 during the public comment period.

4.1.3 The Land Use Controls Amended Remedy

The component of the amended selected remedy for the Grenade Range, which was cleaned up to restricted (industrial) use, is listed below:

- LUCs that restrict area to site-specific industrial use.

4.2 Sites with Restricted Land Use and Soil Covers

The Outdoor Firing Range and Sites D, E, G, H, and 129-15 contain soil covers over remaining contamination and contain areas without soil cover that have been cleaned up to the health-based risk cleanup levels, which are based on site-specific industrial land use scenario.

4.2.1 Description of New Alternatives

This section presents a narrative summary of the alternatives considered in the Proposed Plan. Present worth cost estimates are based on a 7 percent discount rate. The alternatives were developed for one generic site and can be applied individually to each of the six sites. The two alternatives evaluated for the five sites that were cleaned up to restricted use are listed below:

- Alternative 1: No Further Action
- Alternative 2: Land Use Controls

Alternative 1: No Further Action

Development of the no further action alternative is required by CERCLA. This alternative serves as baseline for comparison with other technologies. Under this alternative, no further action would be taken for the existing shallow soil with COC concentrations less than the health-based risk cleanup levels. There would be no protection of the soil cover and there would be no land use restriction. Consequently, this alternative may not be protective of human health if the land use at the site changes. The FS (MW, 1997) indicated that remedy reviews every 5 years would be conducted because of the contamination potentially remaining on site may not allow for unlimited use and unrestricted exposure. The cost estimate is based on performing the remedy reviews six times during a 30-year period. The cost estimate is presented in Table 3.

Capital Costs:	\$0
Periodic Costs: 5-Year Review	\$15,000
Total 30-Year Present Worth:	\$32,400

Implementation Time: Immediate

Alternative 2: Land Use Controls (Selected Remedy)

This alternative consists of implementing LUCs to protect the integrity of the soil covers, to prohibit unauthorized disturbance to underlying shallow soils, and to restrict the area to site-specific industrial use. General LUCs would include actions to be taken by the Army and/or Army National Guard while the property is under Federal control, and if transferred from Federal control, then would include deed restrictions and State Environmental Covenants. Because contaminated soil would remain on site in excess of the health-based risk cleanup levels, or soil that contains ACM, CERCLA 121(c) 5-year reviews would be conducted. The existing soil cover would be maintained. The cost estimate is presented in Table 4.

Capital Costs:	\$21,900
Periodic Costs: O & M and 5-Year Review	\$20,000
Total 30-Year Present Worth:	\$65,100

Implementation Time:	1 year
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4.2.2 Summary of Comparative Analysis of Alternatives

Each of the alternatives considered for the ROD Amendment are evaluated and compared based on the nine NCP criteria listed below. This section briefly summarizes the evaluation of the alternatives against the nine NCP criteria.

Overall Protection of Human Health and the Environment

Alternative 1 (No Further Action) would be protective of human health and the environment as long as the soil cover remained in place and land use remained unchanged, but would not be protective if the site was used differently and allowed uncontrolled invasive work. Alternative 2 (Land Use Controls) would meet RAOs and be protective of human health and the environment.

Compliance with ARARs

Alternative 1 and Alternative 2 would comply with the ARARs listed in the 1997 OU2 ROD (USAEC, 1997) and Table 5.

Long-Term Effectiveness

The existing soil cover prevents contact with contaminants in the soils. Alternative 2 would have excellent long-term effectiveness and permanence because the LUCs would ensure the integrity of the soil cover and prevent exposure to subsurface soils from indiscriminate digging. Alternative 1 would not be as effective or provide long-term permanence as compared to Alternative 2 because there would not be adequate or reliable controls to ensure that the site use would remain restricted and restrict or limit construction into the soil cover.

Reduction of Toxicity, Mobility, or Volume

Neither alternative would reduce toxicity, mobility or volume through treatment. Treatment to reduce toxicity, mobility, or volume is not practical because the dump, contaminated soil, and/or ACM contents are contained.

Short-Term Effectiveness

Alternatives 1 and 2 would not cause community or site worker risks because there would not be any construction activities involved during implementation of either alternative.

Implementability

This criterion is based on the ability to perform construction and implement administrative actions. Alternative 1 would be easy to implement since no action is required. Alternative 2 would be administratively implementable; however, LUCs would require administrative effort.

Cost

The estimated present worth costs for Alternatives 1 and 2 are \$36,700 and \$65,100, respectively.

State Acceptance

The State has been consulted throughout this process and concurs with the selected alternative.

Community Acceptance

Compliance with the public participation requirements of Section 113(k)(2)(i-v) of CERCLA/SARA has been achieved for the New Brighton/Arden Hills Superfund Site by the following activities for this ROD Amendment:

- The Army has prepared an update to the Administration Record. The Administrative Record is located at 470 W. Highway 96, Suite 100, Shoreview, MN 55126.
- The Army placed a formal advertisement in the Minnesota Star Tribune on June 8, 2008 and in the Arden Hills/New Brighton Bulletin, and the Shoreview-Arden Hills Bulletin on June 11, 2008, and the Fridley Focus on June 12, 2008 announcing the availability of the Proposed Plan.
- Public comment on the Proposed Plan was solicited during a formal public comment period extending from June 11, 2008 to July 11, 2008.
- A public meeting was held on June 24, 2008 at Ramsey County Public Works/Partners Facility. Representatives of the Army, the EPA, and the MPCA were at the meeting to answer questions about the site and the changes to and additional remedial alternatives.
- Two members of the public attended the public meeting.
- No comments were received regarding the Amendment #3 during the public comment period.

4.2.3 The Land Use Controls Amended Remedy

The components of the amended selected remedy for the five sites (Outdoor Firing Range and Sites D, E, G, H, and 129-15) that were cleaned up to restricted (industrial) use and also contain areas with soil covers over remaining contamination or ACM are listed below:

- LUCs to maintain the land use as site-specific industrial.
- LUCs to prevent indiscriminate digging and to protect the integrity of the soil cover.

4.3 135 Primer/Tracer Area Stormwater Ditch, the Trap Range Site and the Water Tower Area

No remedial action or no further remedial action is necessary at the stormwater outfall and downstream ditch associated with the 135 Primer/Tracer Area, the Trap Range Site or the Water Tower Area. For the stormwater outfall and ditch at the 135 Primer Tracer Area, the 2005 removal action at the stormwater outfall and ditch in the Rice Creek Area eliminated the risks and potential risks to human health and the environment so that no further action is necessary. The site is cleaned up for unrestricted use. Investigations/assessments at the Trap Range Site and the Water Tower Area showed that activities associated with those sites did not cause the sites to be contaminated. For all three areas, unacceptable exposures to hazardous substances will not occur.

5.0 STATUTORY DETERMINATIONS

This section discusses how the new and amended remedies for the Grenade Range, Outdoor Firing Range, and Sites D, G, E, H, and 129-15 meet the five statutory requirements established by Section 121 of CERCLA. The discussion for the 12 noted sites is simplified into the following three general categories:

- Sites with restricted land use
- Sites with restricted land use and soil covers

The 135 Primer/Tracer Area Stormwater Ditch, Trap Range Site, and Water Tower Area meet the statutory requirements because no remedial action or no further remedial action is necessary to ensure protection of human health and the environment.

5.1 Protection of Human Health and the Environment

5.1.1 Sites with Restricted Land Use

The amended selected remedy protects human health and the environment because no threats to human health or the environment are currently associated with the site soils since all the contaminated soils have been removed in excess of the industrial use based cleanup levels. In addition, LUCs will be implemented to maintain the land use as site-specific industrial.

5.1.2 Sites with Restricted Land Use and Soil Covers

The amended selected remedy protects human health and the environment because the LUCs will help to maintain the land use as site-specific industrial, to maintain the integrity of the soil cover, and to prevent exposure to subsurface soils from indiscriminate digging.

5.2 Compliance with ARARs

5.2.1 Sites with Restricted Land Use

The amended selected remedies will comply with all ARARs identified in the 1997 OU2 ROD.

5.2.2 Sites with Restricted Land Use and Soil Covers

The amended selected remedies will comply with all ARARs identified in the 1997 OU2 ROD.

5.3 Cost-Effectiveness

Section 300.430(f)(ii)(D) of the NCP requires evaluation of cost effectiveness.

5.3.1 Sites with Restricted Land Use

The amended selected remedies are cost effective in mitigating any potential risks posed by contaminated soil.

5.3.2 Sites with Restricted Land Use and Soil Covers

The amended selected remedies are cost effective in mitigating the potential risks posed by contaminated soil and/or dump debris.

5.4 Utilization of Permanent Solutions and Alternative Treatment Technologies (or Resource Recovery Technologies) to the Maximum Extent Practicable

5.4.1 Sites with Restricted Land Use

Utilization of permanent solutions and alternative treatment technologies to the maximum extent practicable was considered as part of earlier remedy selection. By the fact that the selected remedies were intended to achieve cleanup levels compatible with industrial land use, the need for land use controls was implied. The action taken through this ROD Amendment is to make land use controls an explicit requirement as part of the permanent solution.

5.4.2 Sites with Restricted Land Use and Soil Covers

Utilization of permanent solutions and alternative treatment technologies to the maximum extent practicable was considered as part of earlier remedy selection. By the fact that the selected remedies were intended to achieve cleanup levels compatible with industrial land use, the need for land use controls was implied. The action taken through this ROD Amendment is to make land use controls an explicit requirement as part of the permanent solution.

5.5 Preference for Treatment as a Principal Element

5.5.1 Sites with Restricted Land Use

Various treatment options for contaminated shallow soil were considered early in the FS process, including Alternative 1 – No Action, Alternative 2 – In-Situ Fixation and Capping, Alternative 3 – Soil Washing/Soil Leaching and Extraction, and Alternative 4 – Stabilization and Off-site Disposal. Due to the nature and quantity of contaminated soil, Alternatives 1, 2, and 3 were determined to be not protective, technically impracticable, and/or not cost effective. Alternative 4 was the selected remedy for shallow soils. Details for each alternative are documented in the 1997 OU2 ROD.

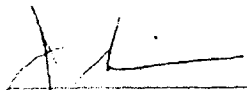
5.5.2 Sites with Restricted Land Use and Soil Covers

Various treatment options for contaminated shallow soil were considered early in the FS process including Alternative 1 – No Action, Alternative 2 – In-Situ Fixation and Capping, Alternative 3 – Soil Washing/Soil Leaching and Extraction, and Alternative 4 – Stabilization and Off-site Disposal. Due to the nature and quantity of contaminated soil, Alternatives 1, 2, and 3 were determined to be not protective, technically impracticable, and/or not cost effective. Alternative 4 was the selected remedy for shallow soils. Details for each alternative are documented in the 1997 OU2 ROD.

5.6 Five-Year Review Requirements

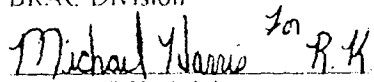
Because the remedy for the Grenade Range, Outdoor Firing Range, and Sites D, G, E, H, and 129-15 will result in hazardous substances, pollutants, or contaminants remaining on site above levels that allow for unlimited use and unrestricted exposure, 5-year reviews under Section 121(c) of CERCLA and Section 300.430(f)(4)(ii) of the NCP are required for each of these sites.

The 135 Primer/Tracer Area Stormwater Ditch, Trap Range Site, and Water Tower Area do not have hazardous substances, pollutants, or contaminants remaining on site above levels that allow for unlimited use and unrestricted exposure, so 5-year reviews under Section 121(c) of CERCLA and Section 300.430(f)(4)(ii) of the NCP are not required.



Jeffrey Willis, Chief
Operational Army and Medical Branch
BRAC Division

9/22/2008
Date



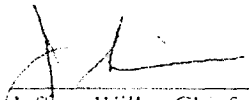
Richard C. Karl, Director
Superfund Division
U.S. Environmental Protection Agency, Region V

5/01/2009
Date

Kathryn Sather, Director
Remediation Division
Minnesota Pollution Control Agency

Date

The 135 Primer/Tracer Area Stormwater Ditch, Trap Range Site, and Water Tower Area do not have hazardous substances, pollutants, or contaminants remaining on site above levels that allow for unlimited use and unrestricted exposure, so 5-year reviews under Section 121(c) of CERCLA and Section 300.430(d)(4)(ii) of the NCP are not required.

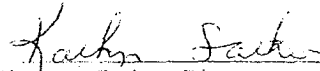


Jeffrey Willis, Chief
Operational Army and Medical Branch
BRAC Division

9/22/2008
Date

Richard C Karl, Director
Superfund Division
U.S. Environmental Protection Agency, Region V

Date

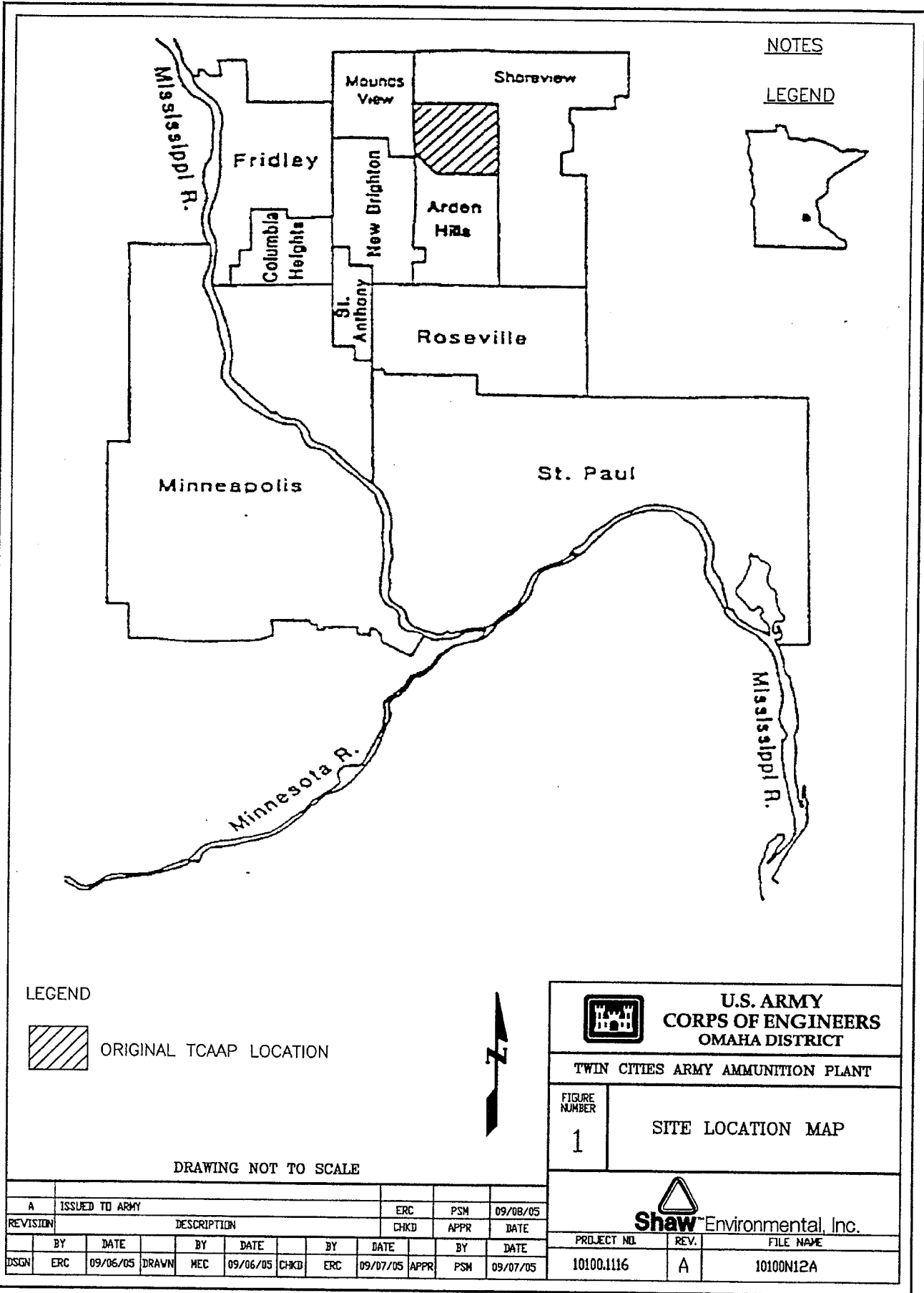


Kathryn Sather, Director
Remediation Division
Minnesota Pollution Control Agency

3/20/09
Date

FIGURES

FIGURES



NOTES

LEGEND



LEGEND



ORIGINAL TCAAP LOCATION



DRAWING NOT TO SCALE



U.S. ARMY
CORPS OF ENGINEERS
OMAHA DISTRICT

TWIN CITIES ARMY AMMUNITION PLANT

FIGURE
NUMBER

1

SITE LOCATION MAP



Shaw Environmental, Inc.

A	ISSUED TO ARMY					ERC	PSM	09/08/05
REVISION	DESCRIPTION					CHKD	APPR	DATE
DSGN	BY	DATE	DRAWN	BY	DATE	CHKD	BY	DATE
	ERC	09/06/05		MEC	09/06/05		ERC	09/07/05
							APPR	PSM
								09/07/05

PROJECT NO.

REV.

FILE NAME

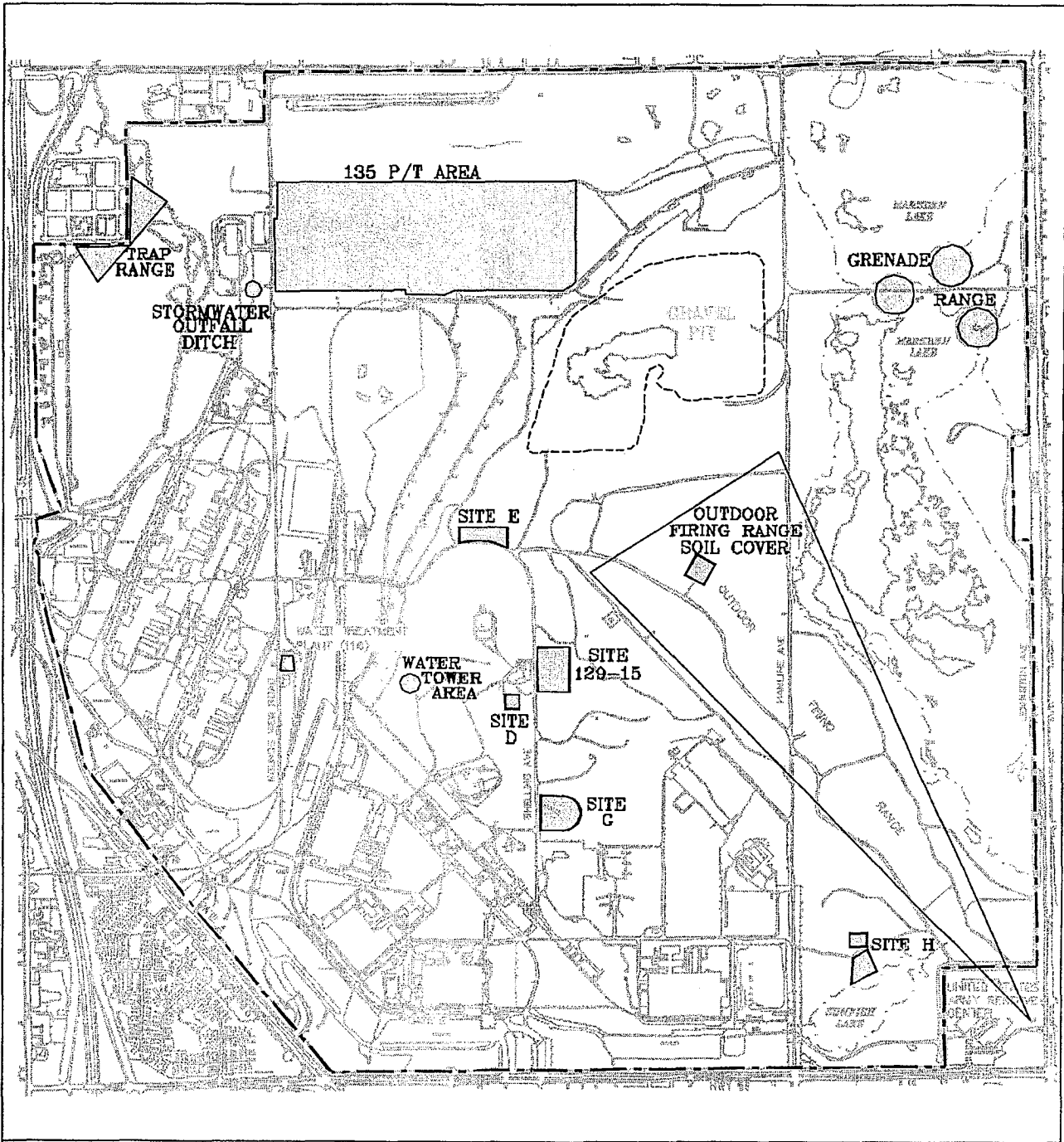
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10100N12A

FRI, SEP 16, 2005 09:27 A MEC C:\TCAAP\N10100.1116\REV-A\10100N12A.DWG

FRI, JAN 20, 2006 10:03 A MEC O:\TCAAP\Y10100.1504\REV-A\10100Y01A.DWG



LEGEND

- FORMER TCAAP BOUNDARY
- REMEDIATION SITES



0 1500 3000

 SCALE: 1" = 1500'



**U.S. ARMY
 CORPS OF ENGINEERS
 OMAHA DISTRICT**

TWIN CITIES ARMY AMMUNITION PLANT

FIGURE NUMBER

2

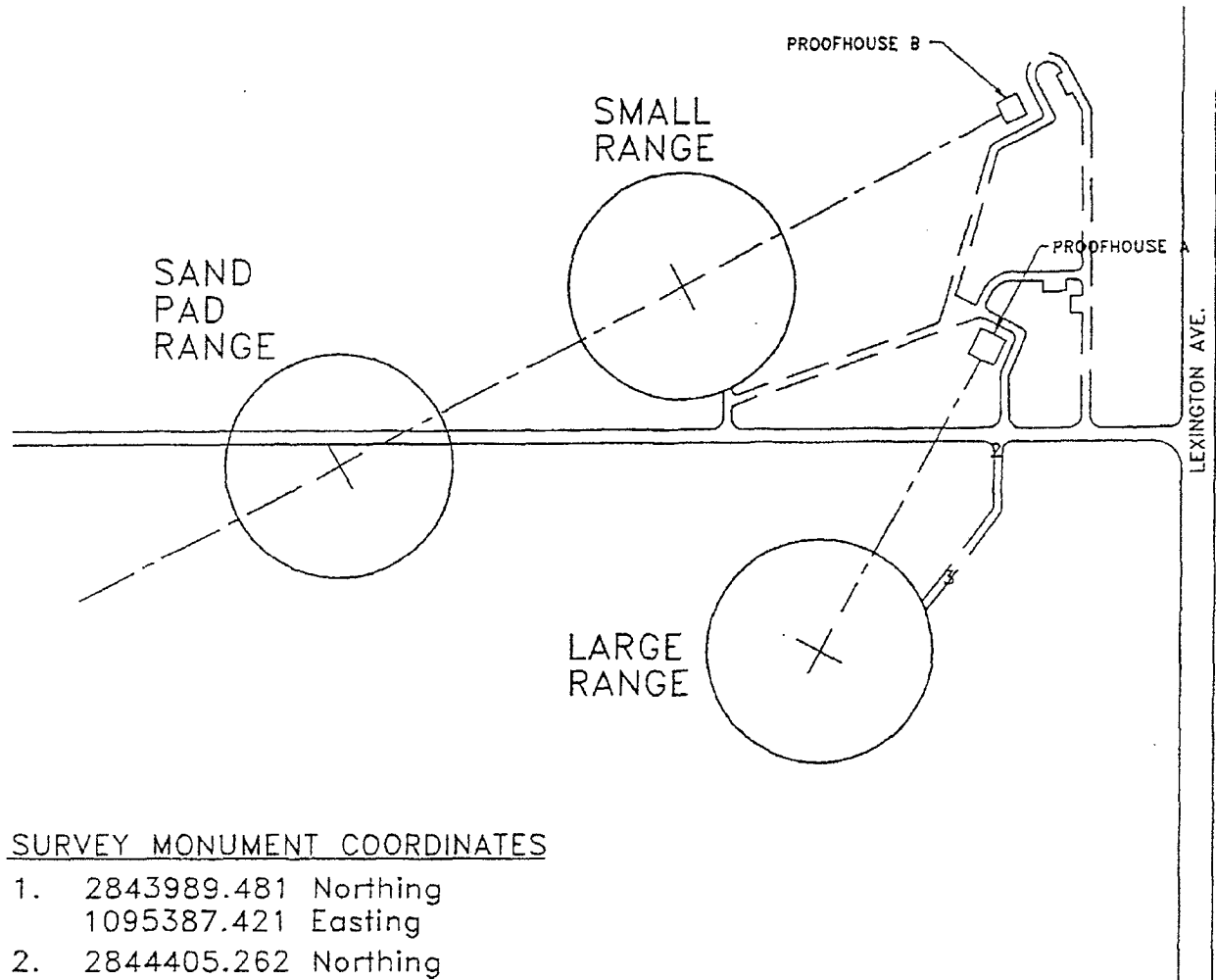
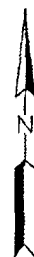
TCAAP SITE LAYOUT



Shaw Environmental, Inc.

REVISION	BY	DATE	DESCRIPTION	CHKD	APPR	DATE	BY	DATE	DESCRIPTION
B	DPW	KR	12/03/07						
A	ERC	PSM	01/20/06						
	BY	DATE	BY	DATE	BY	DATE	BY	DATE	
DSGN	ERC	01/20/06	DRAWN	MEC	01/20/06	CHKD	ERC	01/20/06	APPR
									PSM
									01/20/06

PROJECT NO.	REV.	FILE NAME
10100.1504	B	10100Y01B



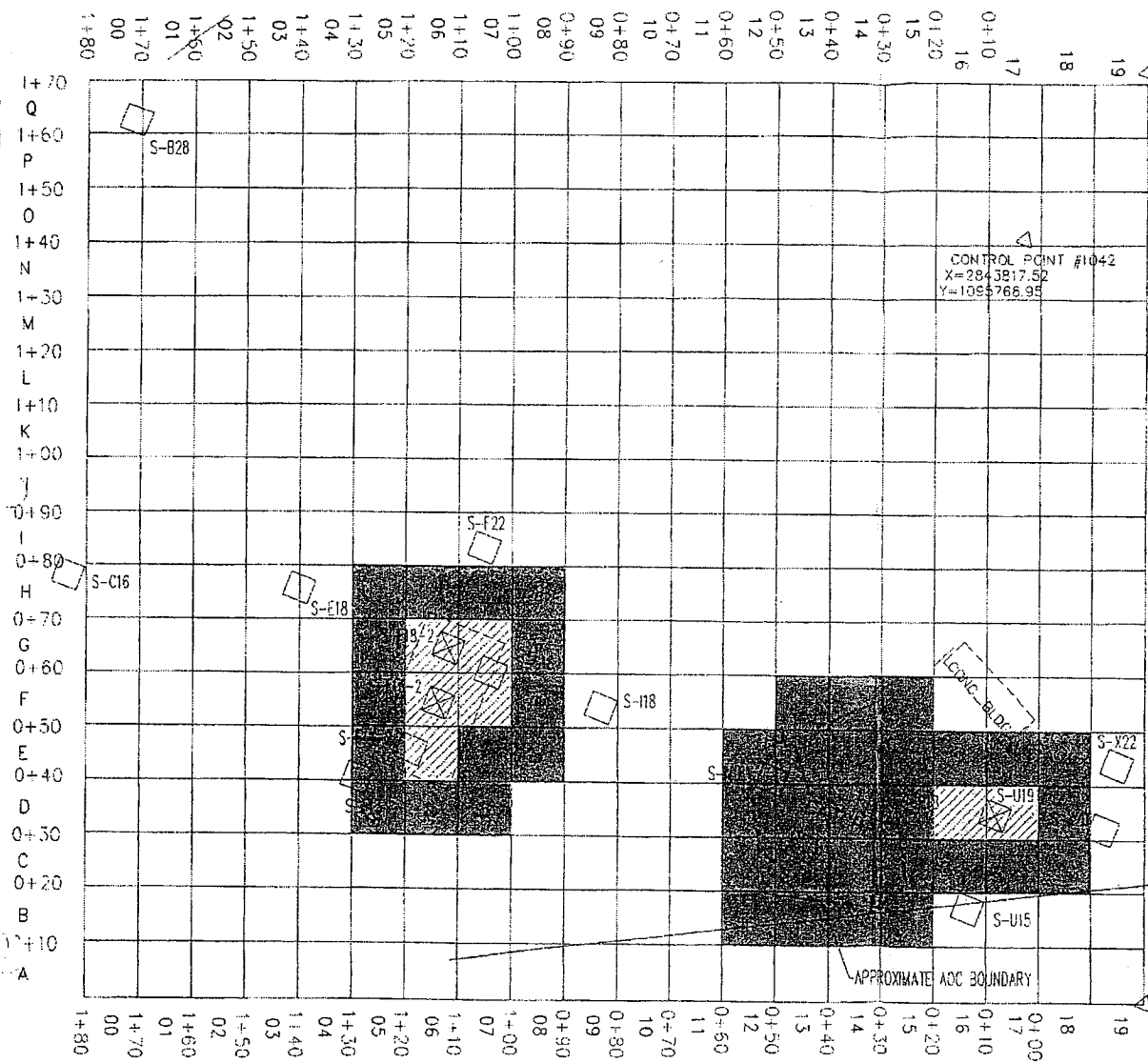
SURVEY MONUMENT COORDINATES

- 1. 2843989.481 Northing
1095387.421 Easting
- 2. 2844405.262 Northing
1095361.069 Easting
- 3. 2844323.077 Northing
109595.787 Easting

VICINITY MAP



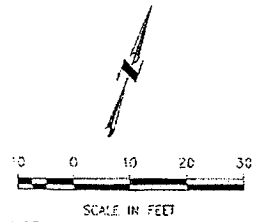
<p>ALLIANT TECHSYSTEMS INC. TWIN CITIES ARMY AMMUNITION PLANT ARDEN HILLS, MINNESOTA 55112</p>	<p>FIGURE 3 GRENADE RANGE LAYOUT MAP</p>
--	--



CONTROL POINT #5002
 X=2843827.70
 Y=1095806.33

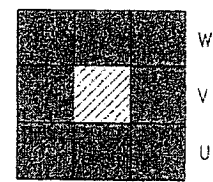
CONTROL POINT #1042
 X=2843817.52
 Y=1095766.95

P
1+50
O
1+40
N
1+30
M
1+20
L
1+10
K
1+00
J
0+90
I
0+80
H
0+70
G
0+60
F
0+50
E
0+40
D
0+30
C
0+20
B
0+10
A



CONTROL POINT #1038
 X=2843874.65
 Y=1095802.29

- LEGEND**
- LOCATION REESTABLISHED FROM NEMPER SEPTEMBER 1999 SURVEY
 - GARP SURFACE BOUNDING SAMPLE
 - ▨ EXCAVATED AREA BOUNDED AT DEPTH BY GARP SAMPLE



INSET, SMALL RANGE "DEBRIS PILE-DUCK BLIND"

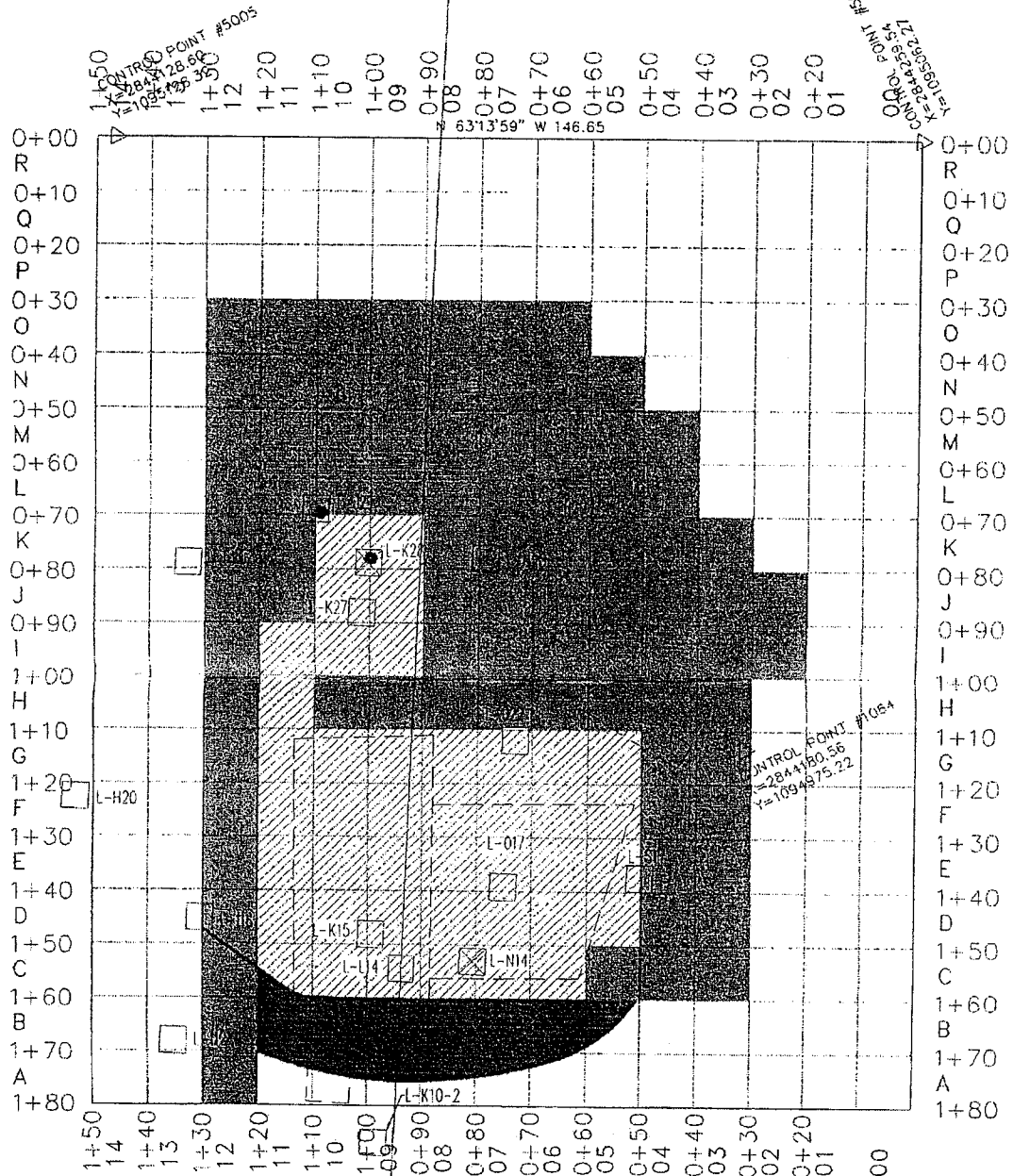
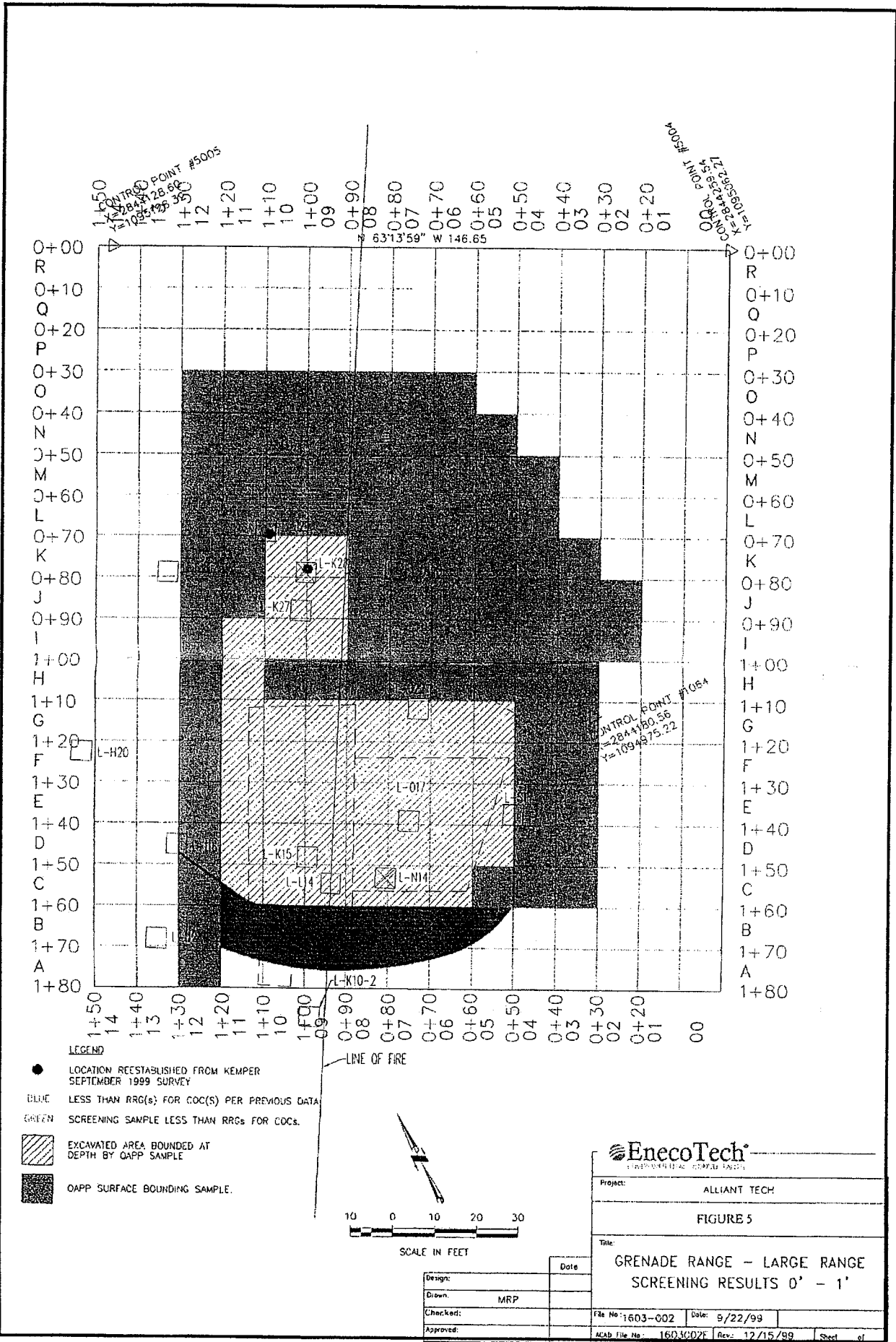
EnecoTech
THE ENGINEERING COMPANY

Project:	ALLIANT TECH		
	TCAAP - GRENADE FIRING RANGE		
Title:	FIGURE 4		
	GRENADE RANGE - SMALL RANGE		
	SCREENING RESULTS 0' - 1'		
Design:		Date:	
Drawn:	MRP		
Checked:		File No.:	1603-002
Approved:		Date:	9/22/99
		Fig. No.:	
		ACAD File No.:	1603001G
		Rev.:	12/22/99
		Sheet	of

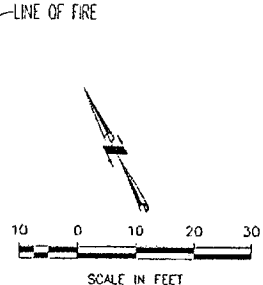
CONTROL POINT #5003
 X=2843890.60
 Y=1095646.06

LINE OF FIRE

APPROXIMATE AOC BOUNDARY

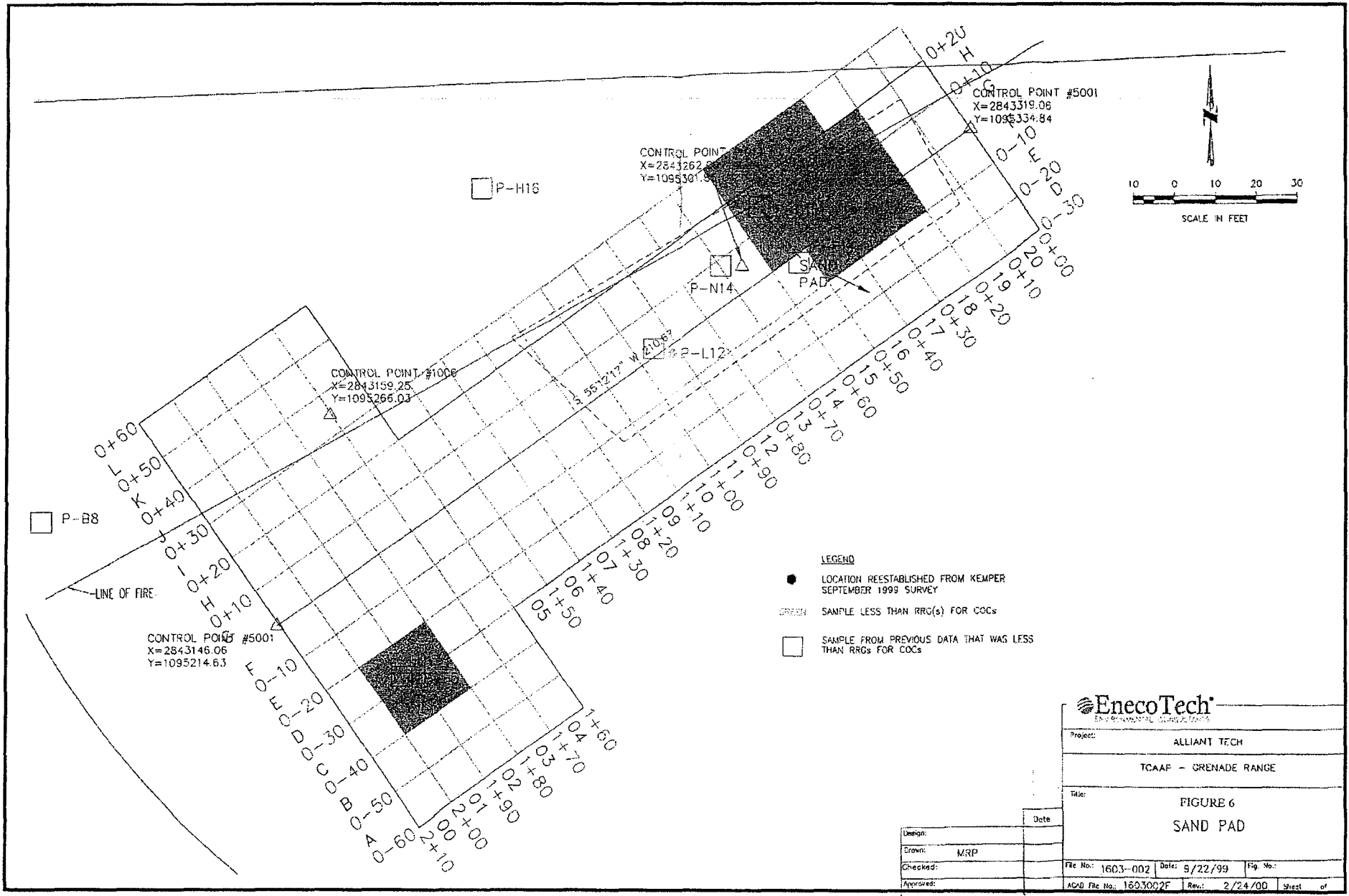


- LEGEND**
- LOCATION REESTABLISHED FROM KEMPER SEPTEMBER 1999 SURVEY
 - BLUE LESS THAN RRG(s); FOR COC(S) PER PREVIOUS DATA
 - GREEN SCREENING SAMPLE LESS THAN RRGs FOR COCs.
 - [Hatched Box] EXCAVATED AREA BOUNDED AT DEPTH BY QAPP SAMPLE
 - [Dark Stippled Box] QAPP SURFACE BOUNDING SAMPLE.

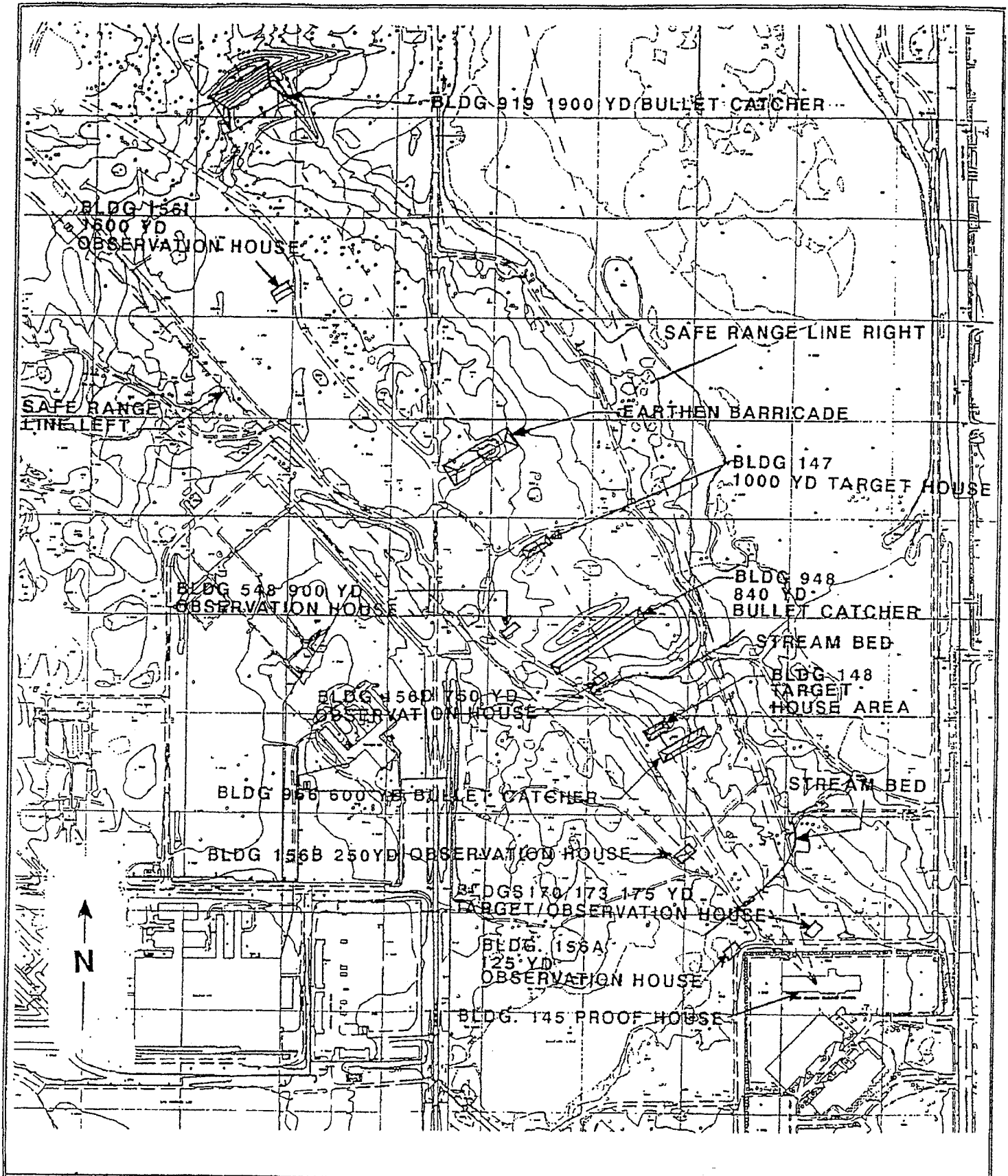


Design:	Date:
Drawn: MRP	
Checked:	
Approved:	

EnecoTech <small>ENVIRONMENTAL CONSULTANTS</small>	
Project: ALLIANT TECH	
FIGURE 5	
Title: GRENADE RANGE - LARGE RANGE SCREENING RESULTS 0' - 1'	
File No: 1603-002	Date: 9/22/99
ACAB File No: 1603002E	Rev: 12/15/89
Sheet	of

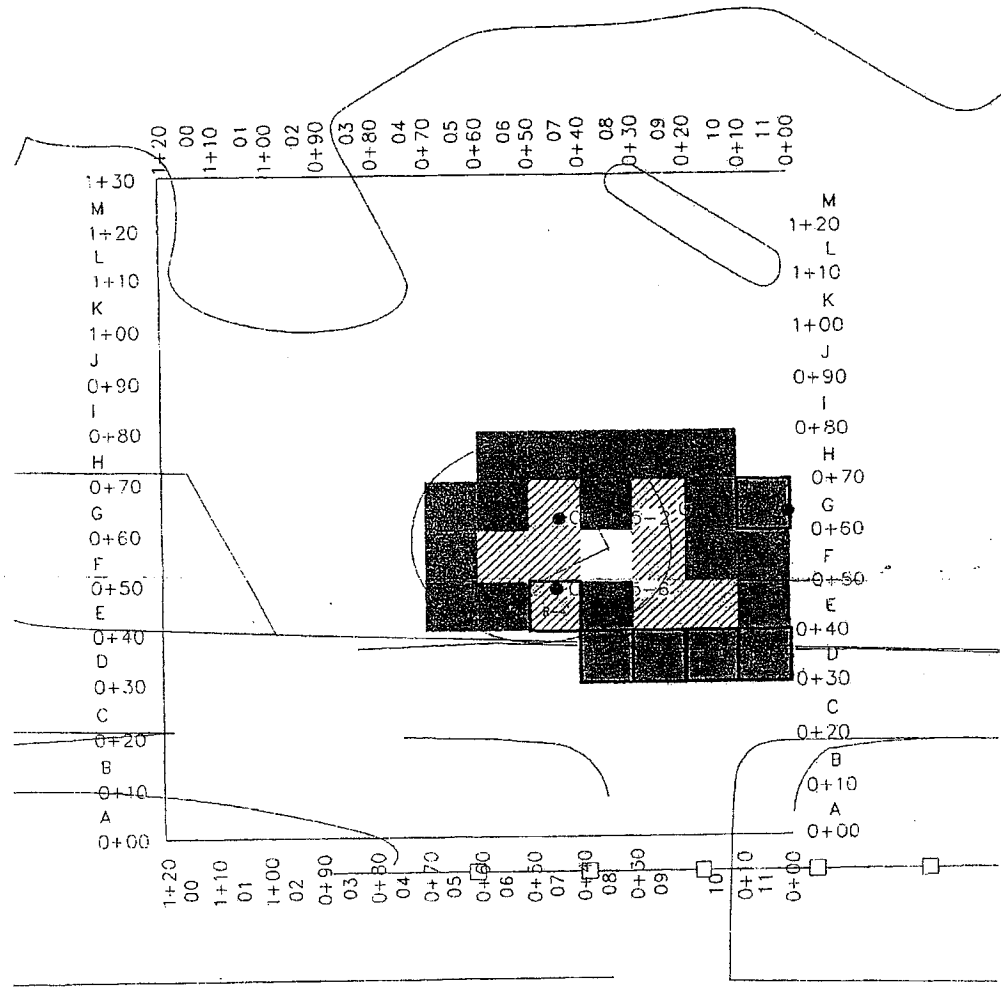
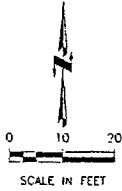


EnecoTech Environmental Services			
Project:		ALLIANT TECH	
		TCAAF - GRENADE RANGE	
Title:		FIGURE 6 SAND PAD	
Design:		Date:	
Drawn:	MRP		
Checked:		File No.: 1603-002	Date: 9/22/99
Appraised:		ACAD File No.: 1603002F	Rev.: 2/24/00
		Fig. No.:	Sheet of



ALLIANT TECHSYSTEMS INC.
 TWIN CITIES ARMY AMMUNITION PLANT
 ARDEN HILLS, MINNESOTA 55112

FIGURE 7
 OUTDOOR FIRING RANGE SITE DETAIL

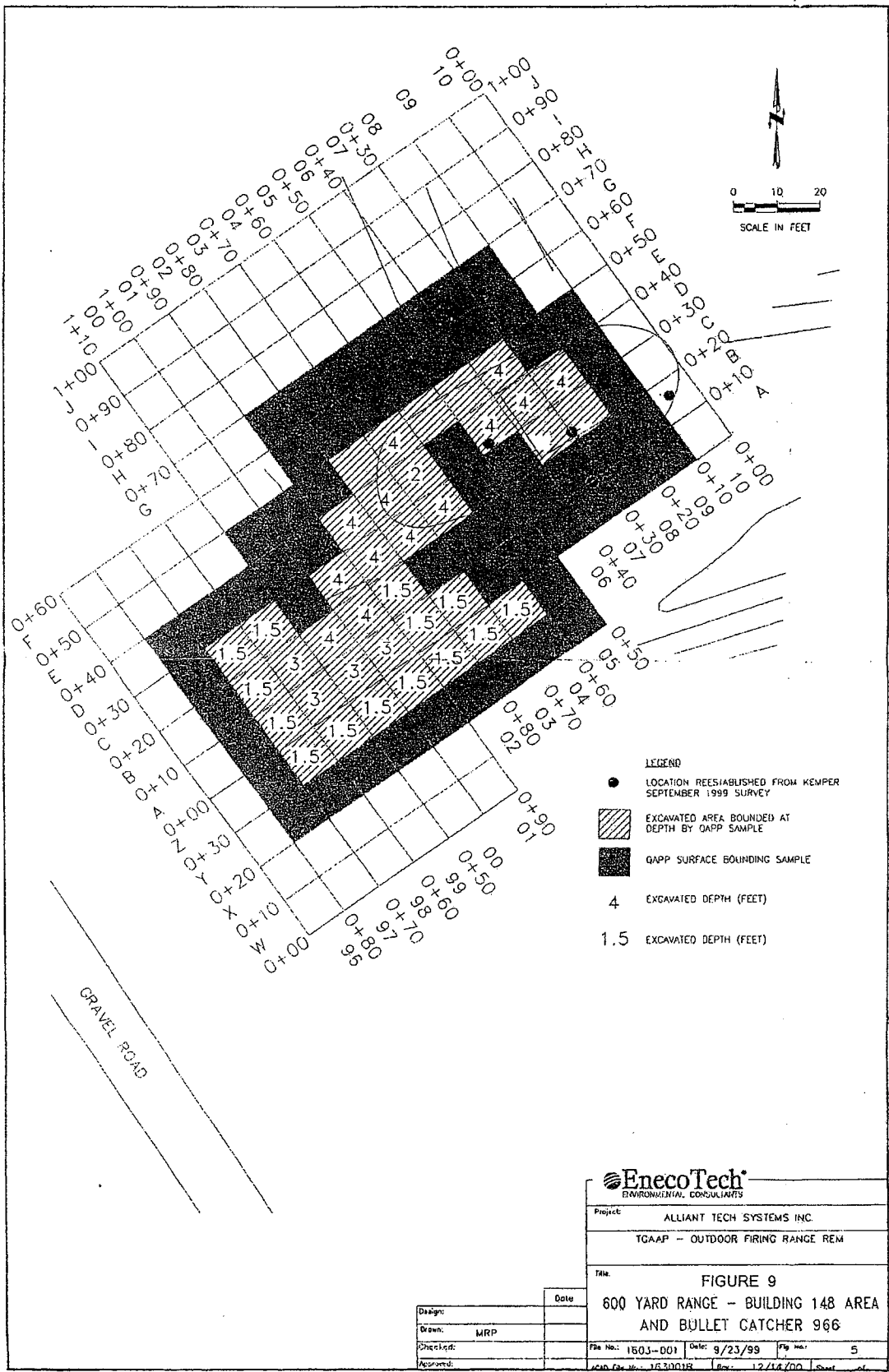


LEGEND

- LOCATION REESTABLISHED FROM KEMPER SEPTEMBER 1999 SURVEY
- QAPP SURFACE BOUNDING SAMPLES COLLECTED. RESULTS PENDING.
- ▨ EXCAVATED AREA BOUNDED AT DEPTH BY QAPP SAMPLE
- ▩ EXCAVATED AREA BOUNDED AT DEPTH BY CONCRETE. SAMPLE NOT COLLECTED.
- R-1 CENTER OF CELL REESTABLISHED BY KEMPER SURVEY IN AUGUST 2000 DEPTH INTERVAL OF REJECTED ANTIMONY SAMPLE INDICATED. (NOTE: THESE SIX LOCATIONS WERE RESAMPLED AT THE LOWER DEPTH IN CELL ON AUGUST 9, 2000, IN RESPONSE TO THE MPCA'S JULY 19, 2000, LETTER REQUESTING THIS ACTION).



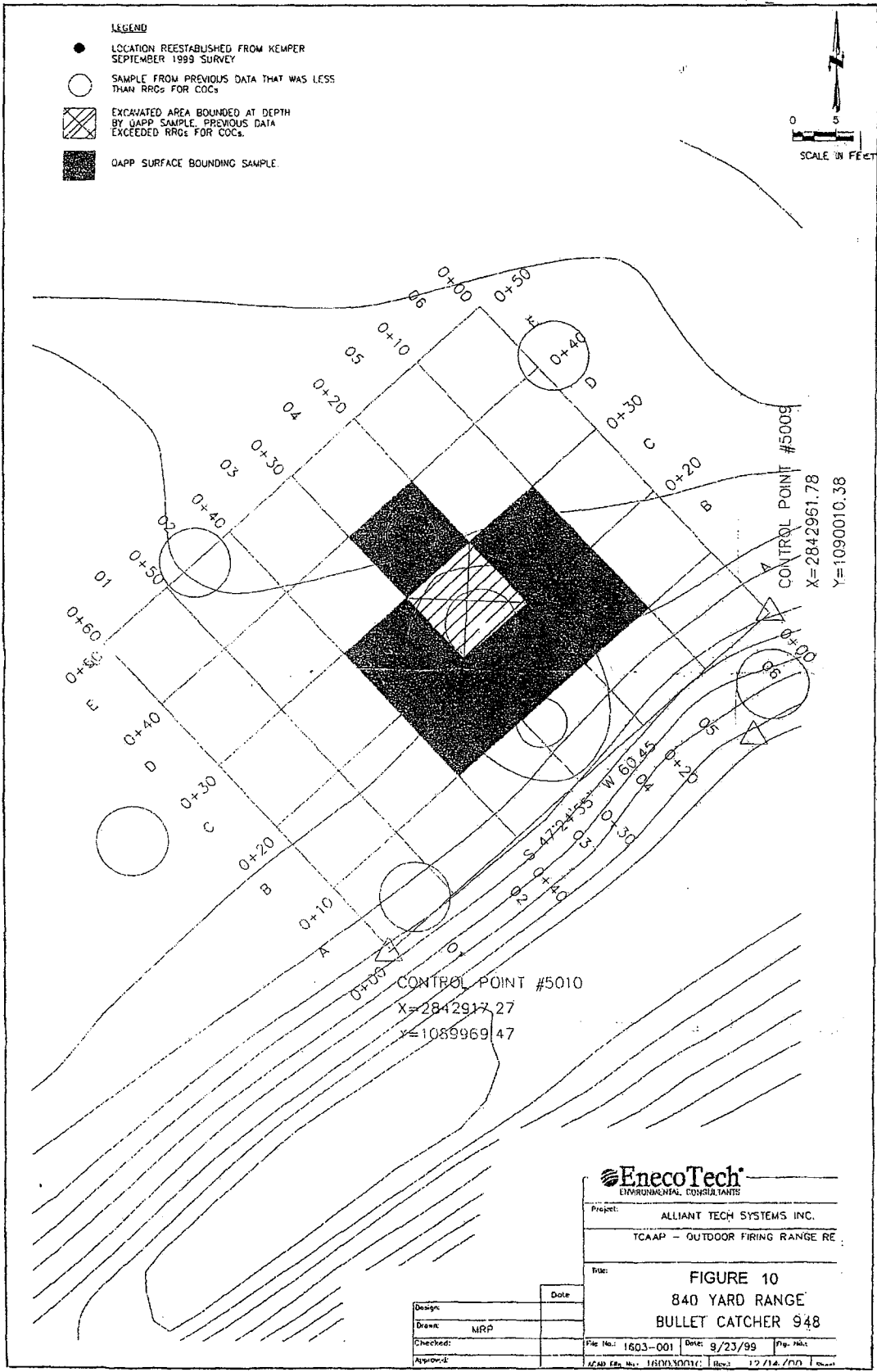
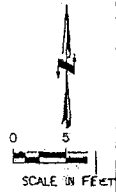
Project:		ALJANT TECH SYSTEM INC.	
		TCAAP - OUTDOOR FIRING RANGE REM	
Title:		FIGURE 8	
		200 YARD RANGE - BUILDINGS 170/173 & GRENADE CATCHER	
Design:		File No.:	1603-001
Drawn:	MPP	Date:	9/24/99
Checked:		Page No.:	4
Approved:		Print Date:	10/30/00



 ENVIRONMENTAL CONSULTANTS		Project: ALLIANT TECH SYSTEMS INC.	
		TGAAP - OUTDOOR FIRING RANGE REM	
Title: FIGURE 9		600 YARD RANGE - BUILDING 148 AREA AND BULLET CATCHER 966	
Design:	Date:	File No.: 150J-001	Date: 9/23/99
Drawn: MRP		Fig. No.: 5	
Checked:		Rev. No.: 12/14/00	Sheet: 1 of 1
Approved:			

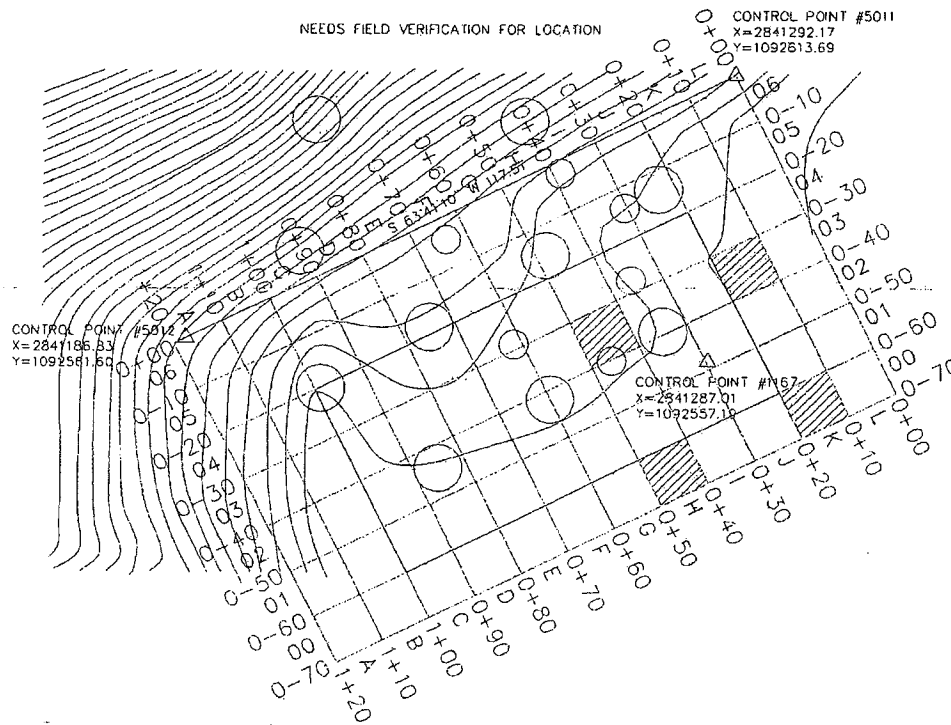
LEGEND

- LOCATION REESTABLISHED FROM KEMPER SEPTEMBER 1999 SURVEY
- SAMPLE FROM PREVIOUS DATA THAT WAS LESS THAN RRGs FOR COCs
- ▨ EXCAVATED AREA BOUNDED AT DEPTH BY GAPP SAMPLE, PREVIOUS DATA EXCEEDED RRGs FOR COCs.
- GAPP SURFACE BOUNDING SAMPLE.



EnecoTech ENVIRONMENTAL CONSULTANTS	
Project: ALLIANT TECH SYSTEMS INC.	
TGAAP - OUTDOOR FIRING RANGE RE	
Title: FIGURE 10 840 YARD RANGE BULLET CATCHER 948	
File No.: 1803-001	Date: 9/23/99
ACAP Est. No.: 18030010	Rev: 12/14/00

Design:	Date:
Drawn: MRP	
Checked:	
Approved:	



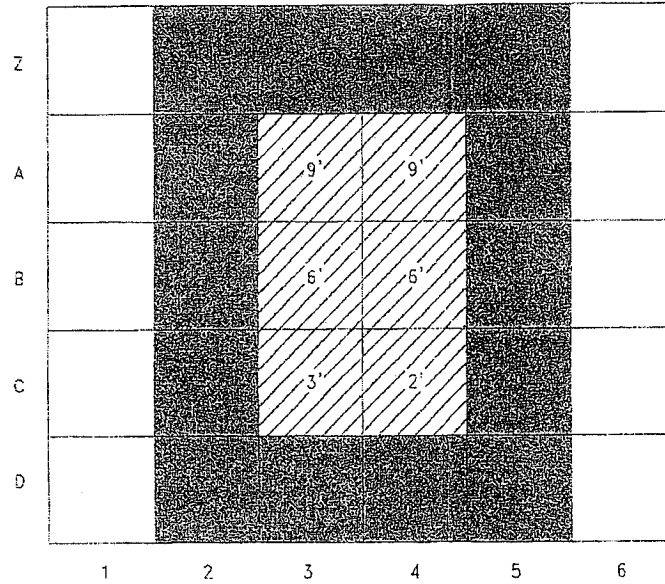
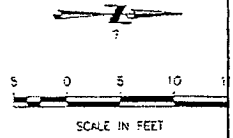
- LEGEND**
- LOCATION REESTABLISHED FROM KEMPER SEPTEMBER 1999 SURVEY
 - ▨ SAMPLE LESS THAN RRG(s) FOR COCs
 - SOUNDING SAMPLE FROM CELL SENT TO QAPP LAB
 - ⊗ SAMPLE FROM PREVIOUS DATA THAT EXCEEDED RRG(s) FOR COCs
 - SAMPLE FROM PREVIOUS DATA THAT WAS LESS THAN RRGs FOR COCs

Design	Date
Drawn: MRP	
Checked:	
Approved:	

EnecoTech
ENVIRONMENTAL CONSULTANTS

Project: ALLIANT TECH SYSTEM INC.			
TCAAP - OUTDOOR FIRING RANGE REM			
Title: FIGURE 11 1,900 YARD RANGE BULLET CATCHER 919			
File No.: 1603-001	Date: 9/24/99	Fig. No.: 7	
MAP No. 1603001U	Rev: 12/7/00	Sheet of	

ROAD



LEGEND

- EXCAVATED AREA BOUNDED AT DEPTH BY DAPP SAMPLE
- DAPP SURFACE BOUNDING SAMPLE

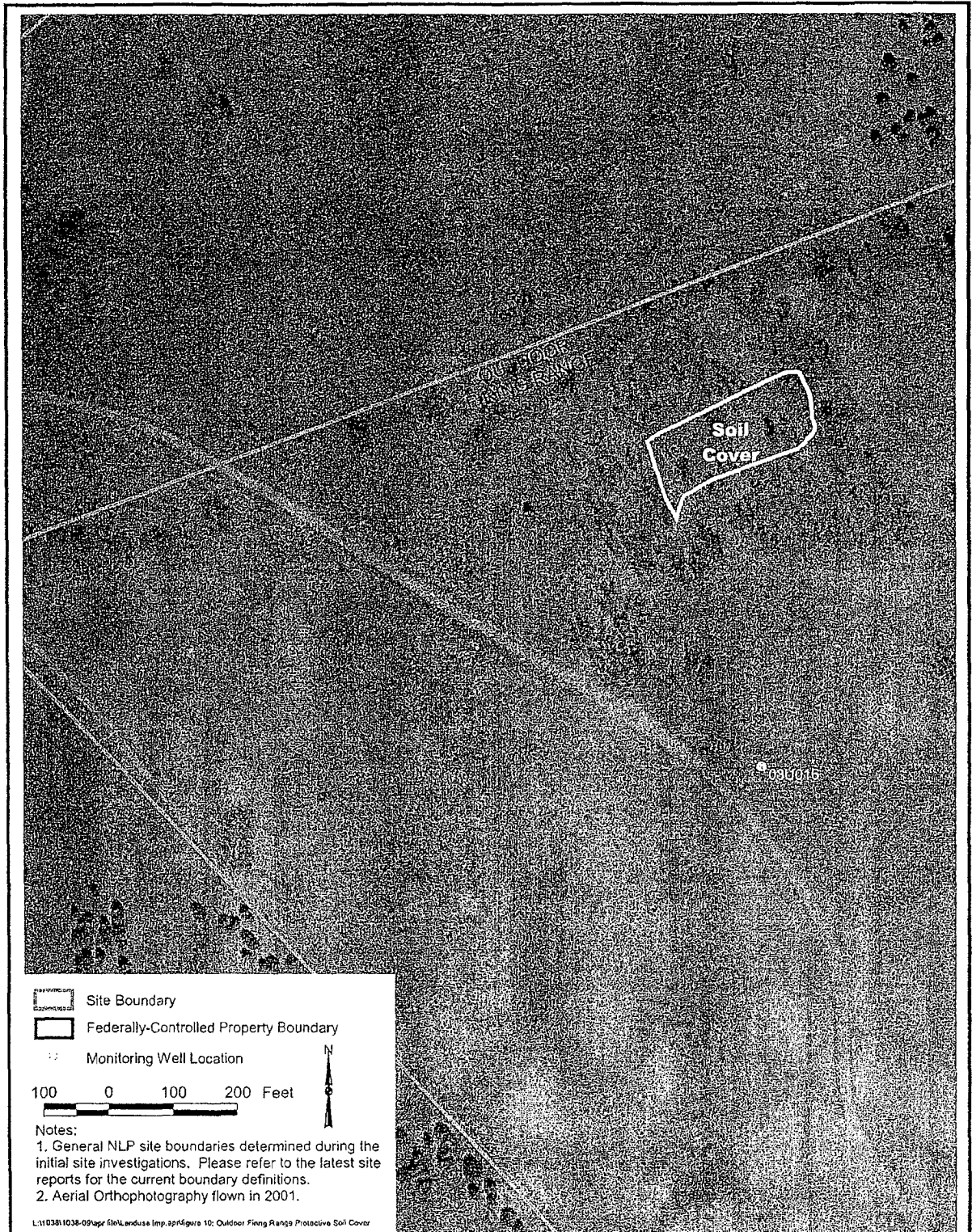
EnecoTech
ENVIRONMENTAL CONSULTANTS




Project: ALLIANT TECH SYSTEMS INC.
TCAAP - OUTDOOR FIRING RANGE REM

Title: **FIGURE 12**
#150 RESERVOIR DEBRIS PILE

Design:	Date:
Drawn: MRP	
Checked:	
Approved:	

File No: 1603-001	Date: 12/7/99	Fig. No.: 8
ACAD File No.: 16300:H	Rev.: 12/14/00	Sheet of



 Site Boundary
 Federally-Controlled Property Boundary
 Monitoring Well Location

100 0 100 200 Feet

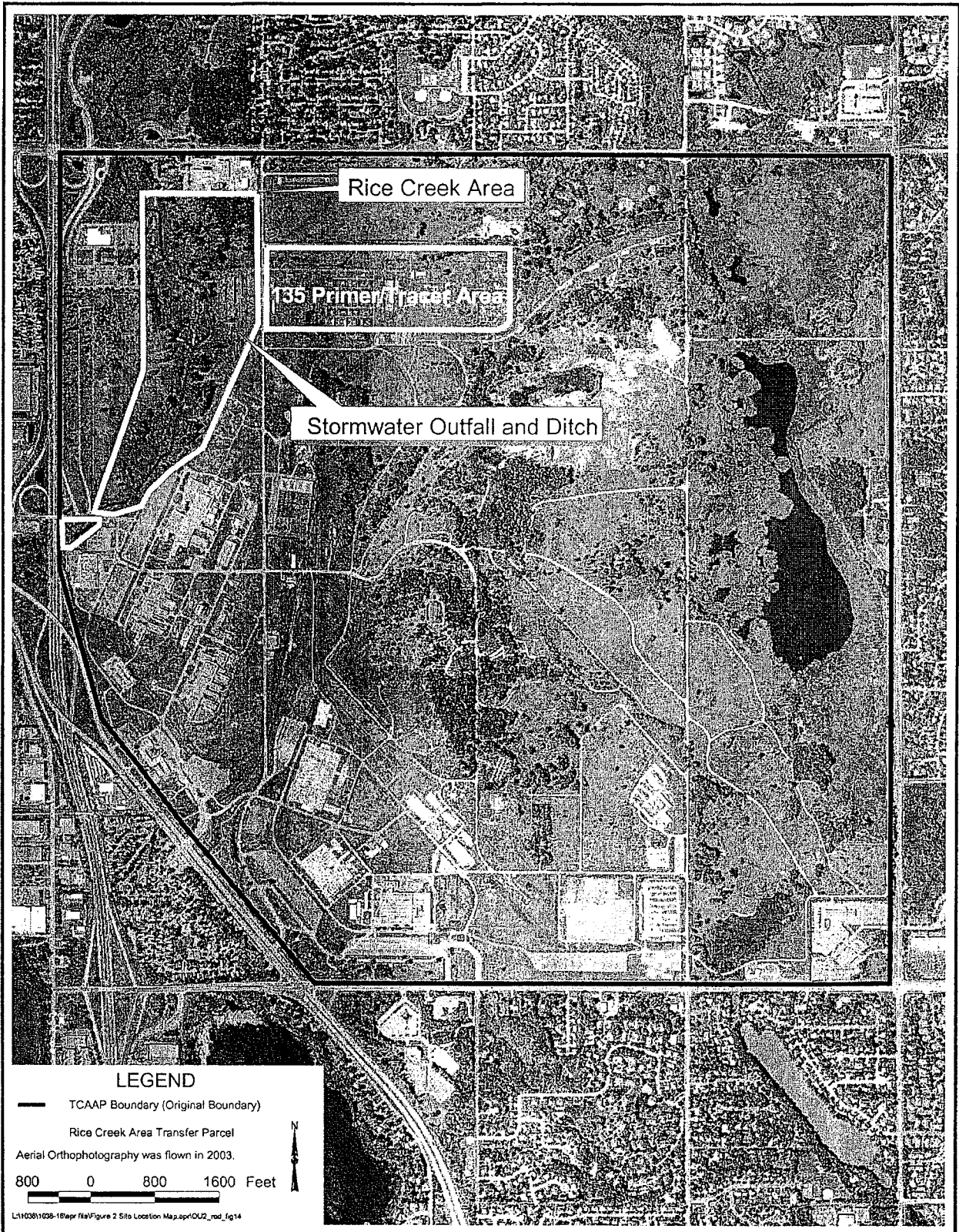
Notes:
 1. General NLP site boundaries determined during the initial site investigations. Please refer to the latest site reports for the current boundary definitions.
 2. Aerial Orthophotography flown in 2001.

L:\1038\1038-09\agr file\andusa imp.apr\figure 10: Outdoor Firing Range Protective Soil Cover

TWIN CITIES ARMY AMMUNITION PLANT
 Outdoor Firing Range
 Protective Soil Cover Location

 **Wenck**
 Wenck Associates, Inc. 1800 Pioneer Creek Center
 Environmental Engineers Maple Plain, MN 55359-0249

JUN 2003
FIGURE 13



TWIN CITIES ARMY AMMUNITION PLANT

Location of 135 Primer/Tracer Area Stormwater Ditch



Wenck

Wenck Associates, Inc. 1800 Pioneer Creek Center
Environmental Engineers Maple Plain, MN 55359-0249

MAY 2006

Figure 14



TWIN CITIES ARMY AMMUNITION PLANT

Stage 2 Verification Sample Locations


Wenck
 Wenck Associates, Inc. 1200 Pioneer Creek Center
 Environmental Engineers Maple Plain, MN 55359-0429

JAN 2006

FIGURE 15

*Twin Cities Army Ammunition Plant
Arden Hills, Minnesota*



LEGEND

- ⊙ RRSE SURFACE SOIL SAMPLE POINT
- ⊕ RRSE SEDIMENT SAMPLE POINT



AREA OF CONCERN FOR PA

Alliant Techsystems

*Twin Cities Army Ammunition Plant
Arden Hills, Minnesota*

FIGURE 16

**TRAP RANGE SITE BOUNDARY
AND RRSE SAMPLE LOCATIONS**

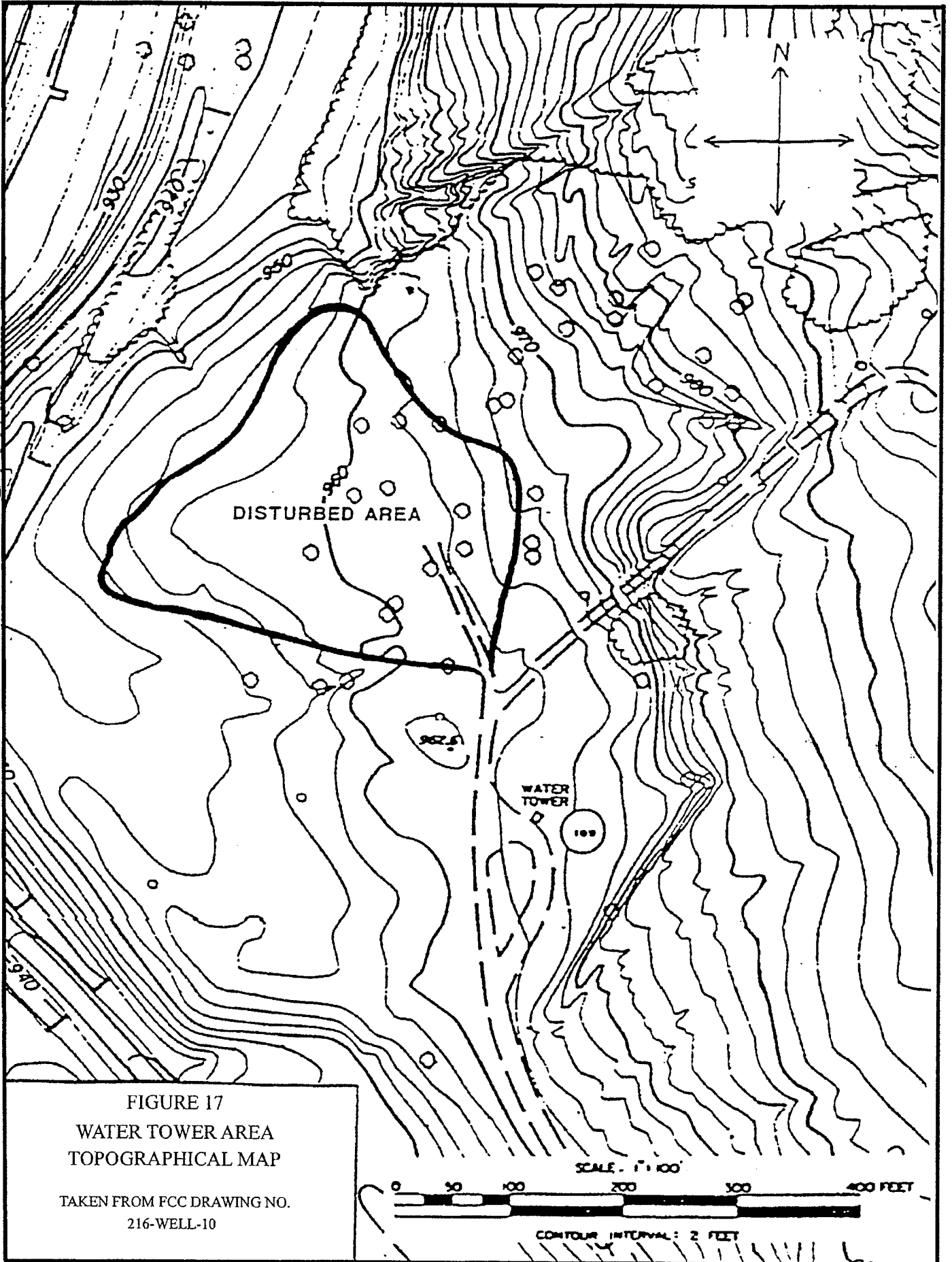
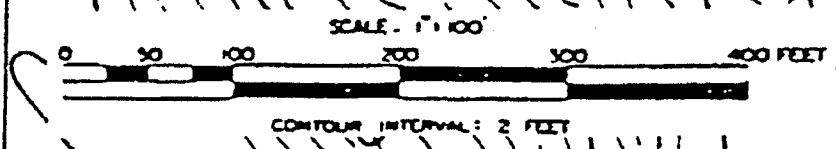


FIGURE 17
WATER TOWER AREA
TOPOGRAPHICAL MAP

TAKEN FROM FCC DRAWING NO.
216-WELL-10



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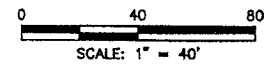


NOTE

1. EXCAVATION BOUNDARIES ARE APPROXIMATE.

LEGEND

- CLAY CAP BOUNDARY
- APPROXIMATE SITE D BOUNDARY
- EXCAVATION BOUNDARY
- SAMPLE GRIDS
- SAMPLE POINT
- AREA OF CONCERN
- CLEAN OVERBURDEN STOCKPILES (APPROXIMATE SIZES AND LOCATIONS)
- BLENDING PAD (APPROXIMATE SIZE AND LOCATION)



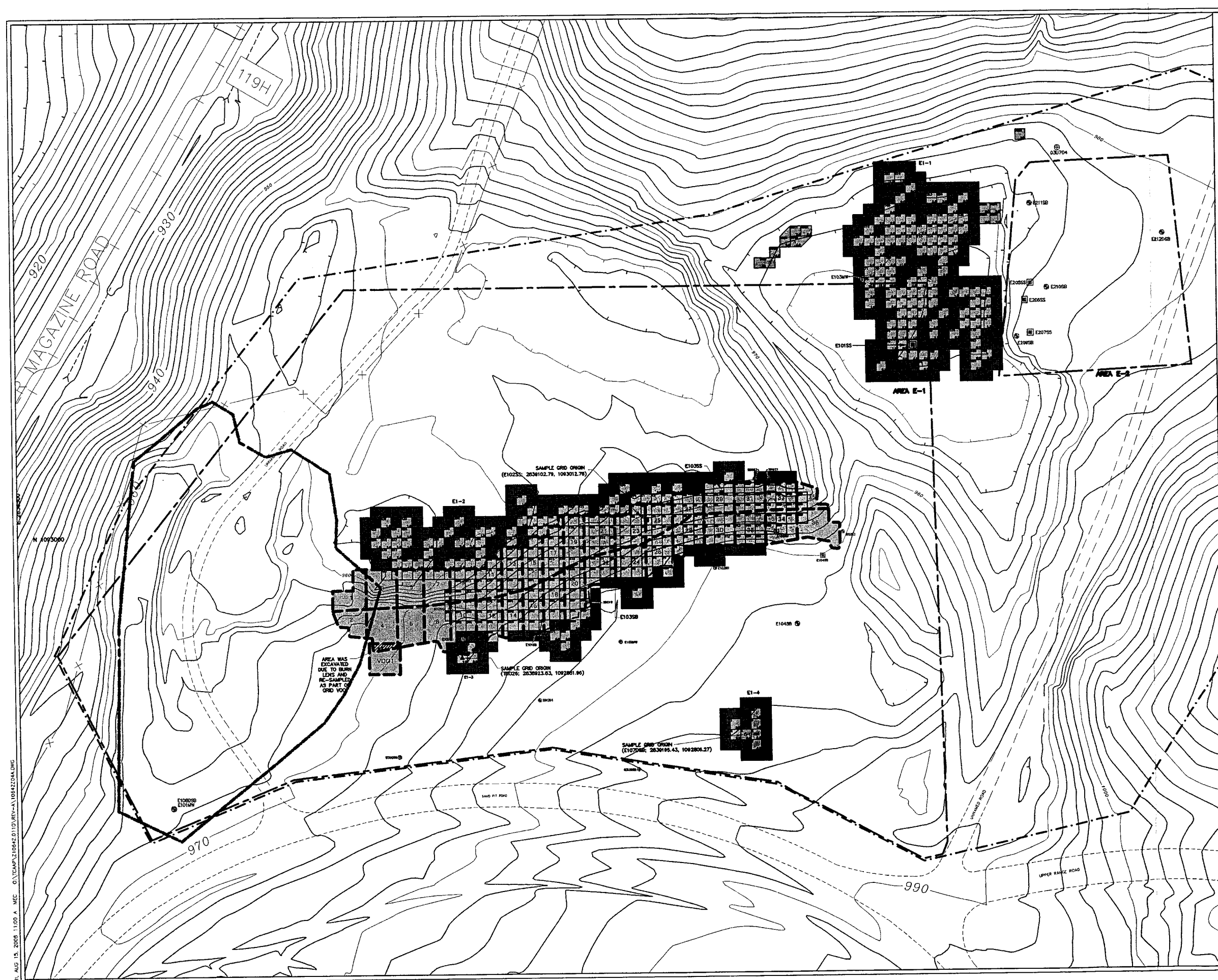
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**U.S. ARMY
CORPS OF ENGINEERS
OMAHA DISTRICT**
TWIN CITIES ARMY AMMUNITION PLANT

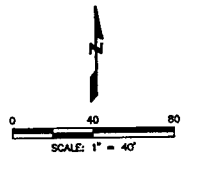
FIGURE NUMBER
18

**SITE D
EXCAVATION AREAS AND
GRID LAYOUT**

BY	DATE	BY	DATE	PROJECT NO.	REV.	DRAWING NUMBER
DSND	JRL 02/10/03	CRKD	JRL 03/12/03	10100.1127	0	10100T030
DRAWN	MED 02/10/03	APPR	KER 03/12/03			

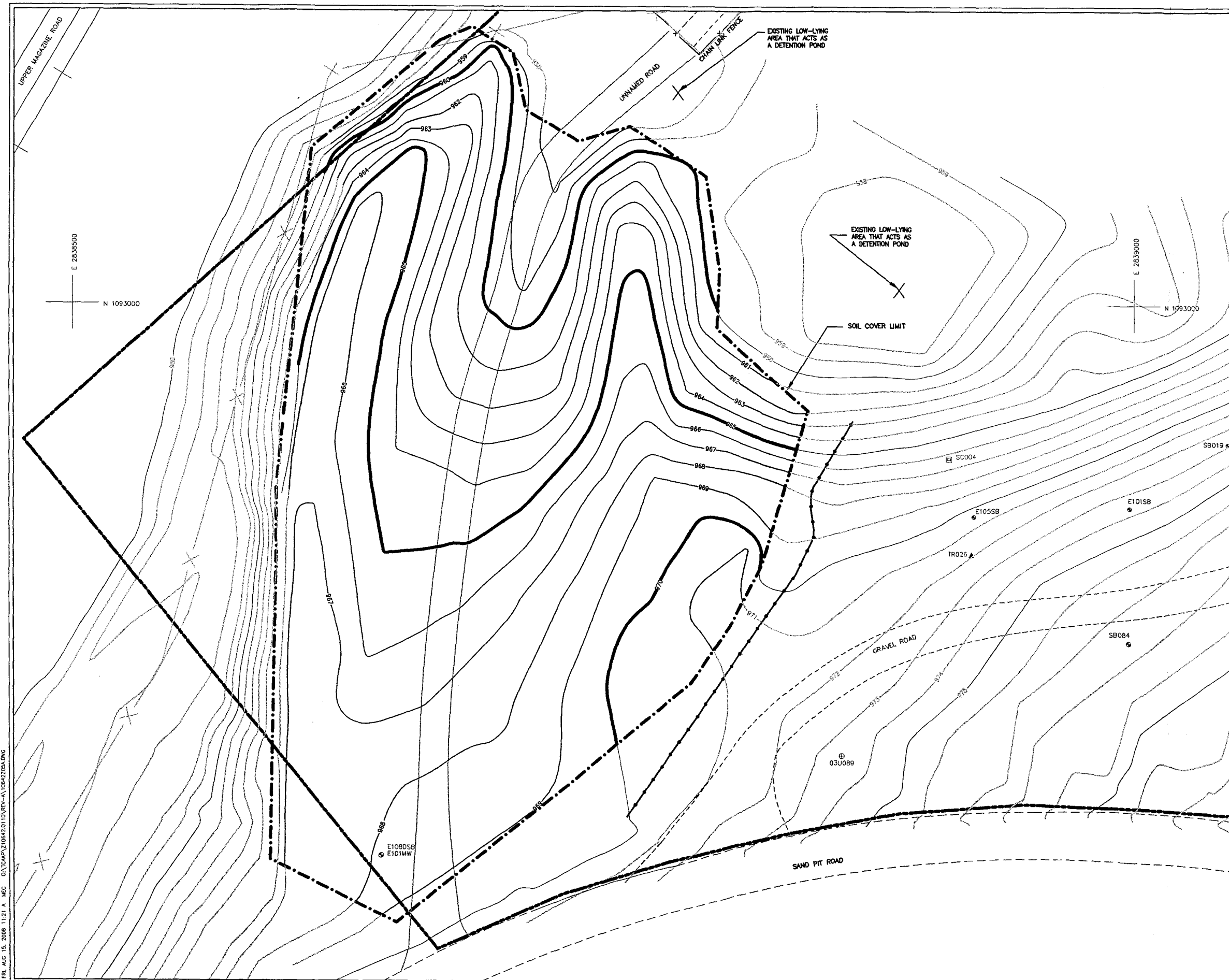


- LEGEND**
- SITE BOUNDARY
 - - - AREA BOUNDARY
 - - - E1-2 DUMP BOUNDARY
 - ⊙ SOIL BORING
 - ▲ TRENCH SAMPLE
 - SURFACE SOIL SAMPLE
 - ⊠ SEDIMENT SAMPLE
 - ⊕ MONITORING WELL
 - GRID NUMBER
 - DEPTH OF EXCAVATION
 - EXCAVATION, CONFIRMED CLEAN BY VERIFICATION SAMPLING AND BACKFILLED.
 - PERIMETER GRID CONFIRMED CLEAN BY XRF AND VERIFICATION SAMPLING



FR: AUG 15, 2008 11:00 A. MEC. C:\TAMP\21094C.01\01\REV-A\10642204A.DWG

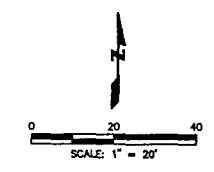
ISSUED TO ARMY AND AGENCIES	SRL	KER	08/15/08
REVISION	DESCRIPTION	CHECKED	APPROVED DATE
U.S. ARMY CORPS OF ENGINEERS OMAHA DISTRICT			
TWIN CITIES ARMY AMMUNITION PLANT			
DRAWING NUMBER	SITE E PLAN VIEW CONSTRUCTION AND SAMPLING GRID LAYOUT		
19			
DESIGNED	BY	CHECKED	FILE NAME
SRL	ME/15/08	SRL	08/15/08
DRAWN	MEC	APPROVED	10642.0110 A 10642204A
		KER	08/15/08



NOTES
 1. ALL COORDINATES, ELEVATIONS AND DIMENSIONS ARE IN UNITS OF FEET, UNLESS OTHERWISE SHOWN.
 2. UNNAMED ROAD WAS RECONSTRUCTED OVER THE FINAL SOIL COVER.

LEGEND
 - - - - - SITE BOUNDARY
 - - - - - 970 - - - - - EXISTING GRADE MAJOR CONTOUR
 - - - - - EXISTING GRADE MINOR CONTOUR
 - - - - - COVER FINAL GRADE MAJOR CONTOUR
 - - - - - COVER FINAL GRADE MINOR CONTOUR
 - - - - - SOIL COVER LIMIT
 - - - - - DRAINAGE CHANNEL
 ⊕ - - - - - MONITORING WELL
 ⊙ - - - - - SOIL BORING
 ⊞ - - - - - SURFACE SOIL

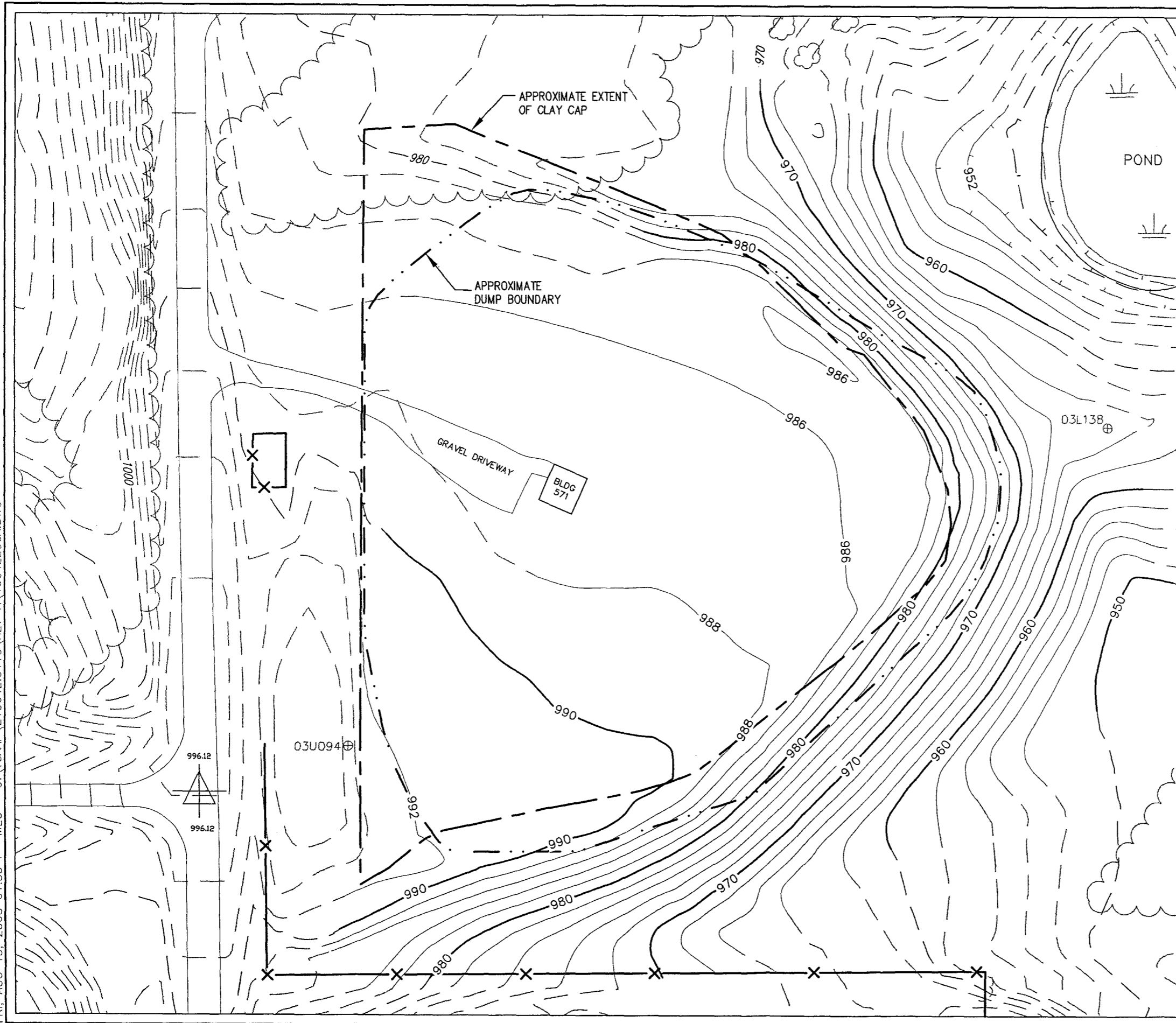
REFERENCE: MELCHERT WALKKY SURVEYORS



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ISSUED TO ARMY AND AGENCIES		SBL	REV	DATE							
REVISION	DESCRIPTION	CHECKED	APPROVED	DATE							
U.S. ARMY CORPS OF ENGINEERS OMAHA DISTRICT											
TWIN CITIES ARMY AMMUNITION PLANT											
DRAWING NUMBER	AREA E1-2 WEST DUMP SOIL COVER FINAL GRADE										
20											
Shaw Environmental, Inc.											
DESIGNED	SBL	08/15/08	CHECKED	SBL	08/15/08	PROJECT NO.	10642.0110	REV.	A	FILE NAME	10642205A
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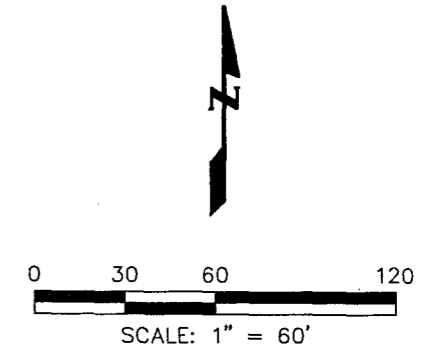


NOTE

1. ORIGINAL TOPOGRAPHY AS PER FIELD SURVEY BY KEMPER & ASSOCIATES, INC. PERFORMED SEPTEMBER 3-5, 2003.
2. AS-BUILT SITE CONDITIONS SURVED BY KEMPER & ASSOCIATES ON OCTOBER 20, 2003

LEGEND

- - - 953 - - - ORIGINAL GRADE CONTOUR
- 980 — FINAL GRADE CONTOUR INTERVAL (INDICATES EXTENT OF SOIL COVER)
- ⊕ MONITORING WELL
- - - - - APPROXIMATE EXTENT OF CLAY CAP
- - - - - APPROXIMATE DUMP BOUNDARY



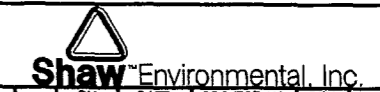
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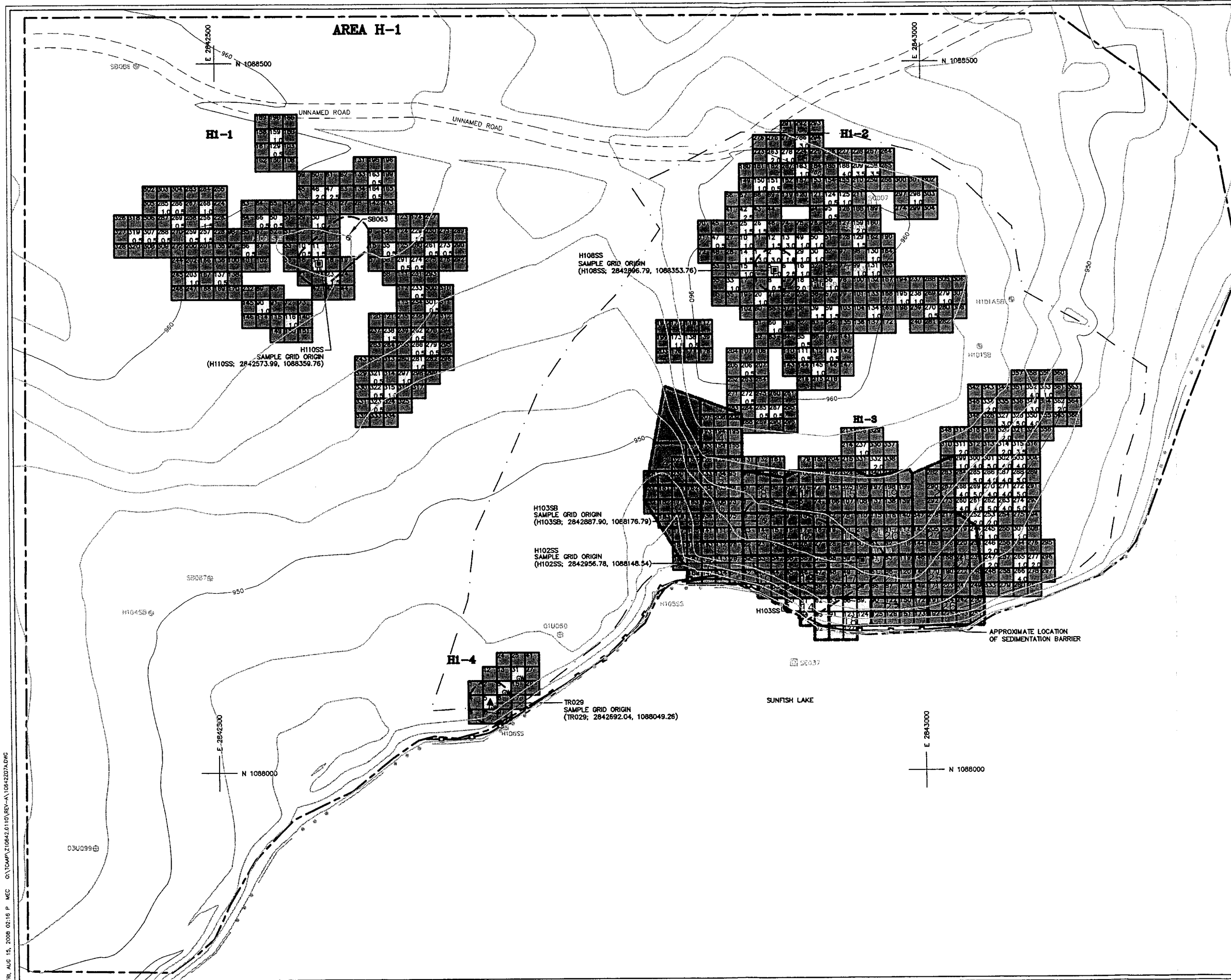
**U.S. ARMY
CORPS OF ENGINEERS
OMAHA DISTRICT**

TWIN CITIES ARMY AMMUNITION PLANT

FIGURE NUMBER	21
	SITE G AS-BUILT FINAL GRADING CONTOURS



BY	DATE	BY	DATE	PROJECT NO.	REV.	FILE NAME
DSND	LSD	CHKD	LSD	10642.0110	A	10642Z06A
DRAWN	MEC	APPR	KR			

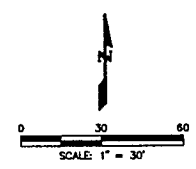


NOTE
 1. ARSENIC RESULTS FOR SB063 (H1-1) WAS ABOVE THE ORIGINAL RRG OF 4.0 mg/Kg AND THEREFORE, INCLUDED IN THE ORIGINAL AOC. HOWEVER, ONCE THE RRG FOR ARSENIC WAS UPDATED TO 10 mg/Kg CONCENTRATIONS FOR ALL COCS AT SB063 WERE BELOW RRGs AND SB063 WAS REMOVED FROM THE AOC.

- LEGEND**
- AREA BOUNDARY
 - SEDIMENTATION BARRIER
 - FINAL COVER EDGE
 - ⊙ SOIL BORING
 - ▲ TRENCH SAMPLE
 - SURFACE SOIL SAMPLE
 - SEDIMENT SAMPLE
 - ⊕ MONITORING WELL
 - AREA OF CONCERN
 - DUMP BOUNDARY
 - 308 GRID NUMBER
 - 1.0 DEPTH OF EXCAVATION
 - 308 EXCAVATION, CONFIRMED CLEAN BY VERIFICATION SAMPLING AND BACKFILLED.
 - 248 PERIMETER GRID CONFIRMED CLEAN BY XRF AND VERIFICATION SAMPLING

VERTICAL DATUM = NGVD (1929)
 HORIZONTAL DATUM = STATE PLANE COORDINATES (NAD-1983)
 CONTOUR INTERVAL = 2-FOOT

- REFERENCES**
1. MONTGOMERY WATSON WAYZATA, MINNESOTA CONESTOGA ROVERS ASSOCIATES NEW BRIGHTON, MINNESOTA OPERABLE UNIT 2 FEASIBILITY STUDY FINAL REPORT MARCH, 1997
 2. MONTGOMERY WATSON WAYZATA, MINNESOTA DRAFT FINAL O&M-2 FEASIBILITY STUDY JUNE, 1994
 3. MONTGOMERY WATSON WAYZATA, MINNESOTA OPERABLE UNIT 2 FEASIBILITY STUDY SUPPLEMENTAL DATA REPORT JUNE, 1994
 4. ARGONNE NATIONAL LABORATORY ARGONNE, ILLINOIS INSTALLATION RESTORATION PROGRAM: REMEDIAL INVESTIGATION REPORT APRIL, 1991
 5. KEMPER AND ASSOCIATES, INC. TABLE 1: TCAAP ON-PLANT MONITORING WELLS SEPTEMBER, 1992
 6. TOPOGRAPHY PROVIDED BY MARKHURD MAY, 1993



ISSUED TO ARMY AND AGENCIES	LSO	KER	DR/T/AM
REVISION	DESCRIPTION	CHECKED	APPROVED DATE

**U.S. ARMY
CORPS OF ENGINEERS
OMAHA DISTRICT**

TWIN CITIES ARMY AMMUNITION PLANT

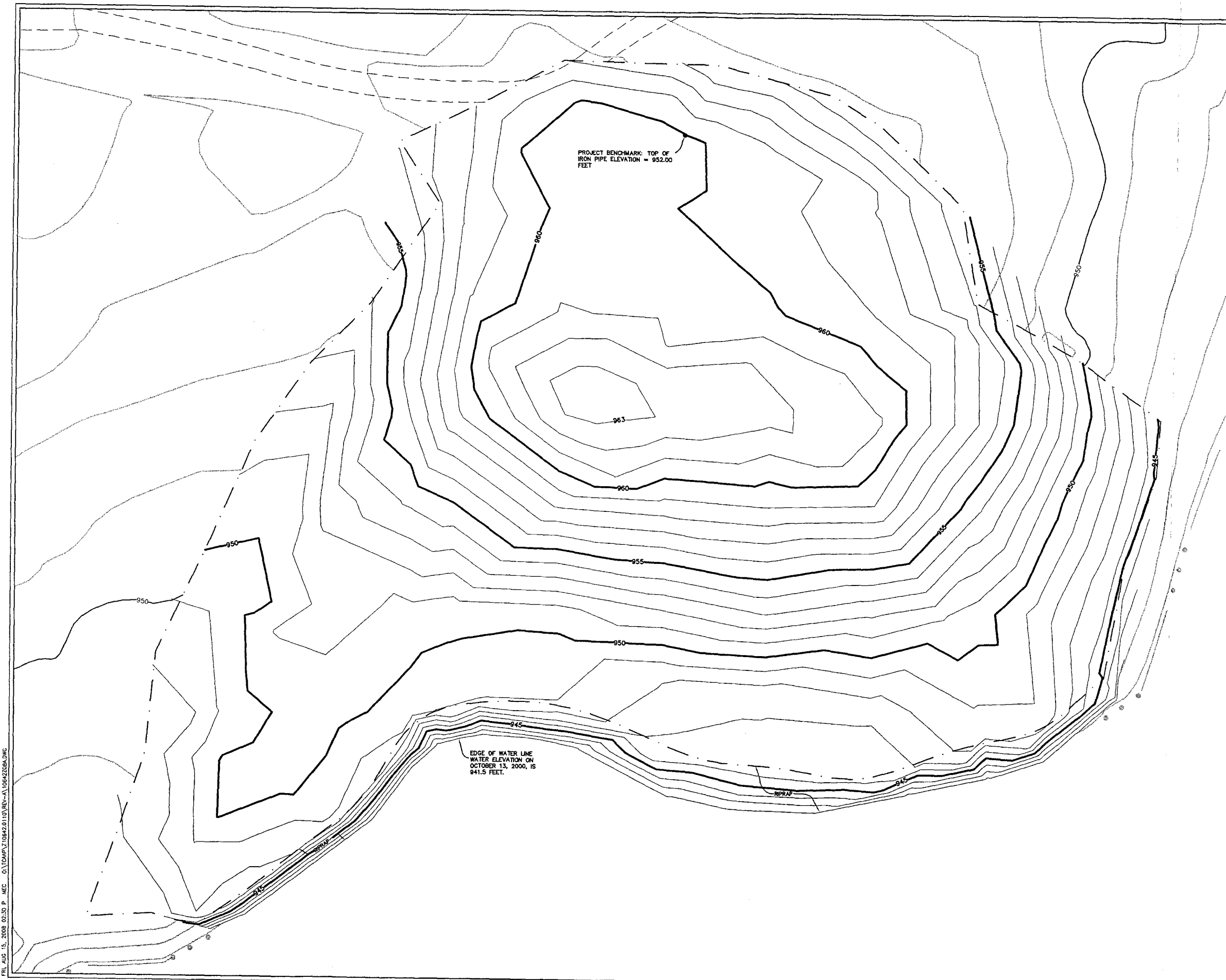
DRAWING NUMBER
22

**SITE H PLAN VIEW
CONSTRUCTION AND SAMPLING
GRID LAYOUT**

Shaw Environmental, Inc.

DESIGNED	LSO	08/15/98	CHECKED	LSO	08/15/98	PROJECT NO.	10642.0110	REV.	A	FILE NAME	10642207A
DRAWN	MEC	08/15/98	APPROVED	KER	08/15/98						

FR. AUG 15, 2008 02:16 P. MEC G:\TCAMP\10642.0110\REV-A\10642207A.DWG

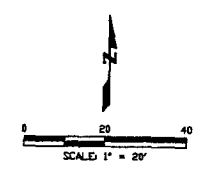


NOTES
 1. DRAWING DOES NOT REFLECT CHANGE IN GRADE BETWEEN DUMP COVER AND EXISTING GROUND SURFACE.



LEGEND
 ——— 950 EXISTING CONTOUR
 ——— 950 FINAL GRADE CONTOUR
 ——— FINAL COVER EDGE

VERTICAL DATUM = NVD (1928)
 HORIZONTAL DATUM = STATE PLANE COORDINATES (NAD-1983)
 CONTOUR INTERVAL = 2-FOOT

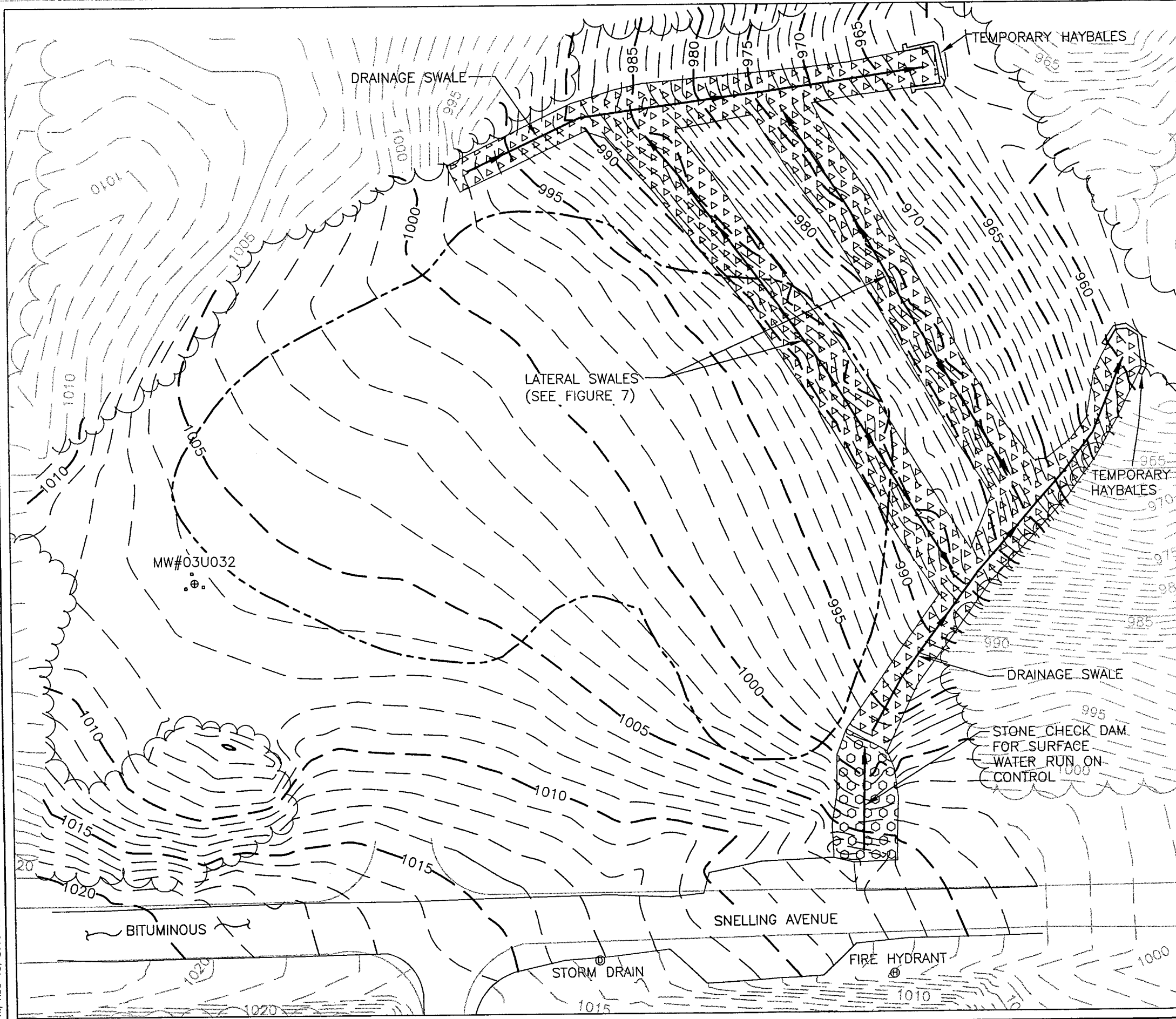
- REFERENCES**
- EGAN FIELD & NOWAK, INC. SURVEYORS
 7415 WAYZATA BOULEVARD MINNEAPOLIS,
 MINNESOTA TELE: (612) 546-6837
 OCTOBER 13, 2000
 - STONE & WEBSTER INC.
 GREENWOOD VILLAGE, CO.
 FIELD ADDENDUM 2
 COMPREHENSIVE WORK PLAN, RD/RA
 ACTIVITIES
 SITE H DUMP COVER
 OCTOBER 10, 2000
 - TOPOGRAPHY PROVIDED BY
 MARKHURD
 MAY, 1993



P:\AUG 15, 2008 02:30 P. MEC. 0:\TCAMP\21084\2.01\REV-A\10642206A.DWG

ISSUED TO ARMY AND AGENCIES		LSO	KEK	08/28/08
REVISION	DESCRIPTION	CHECKED	APPROVED	DATE
 U.S. ARMY CORPS OF ENGINEERS OMAHA DISTRICT				
TWIN CITIES ARMY AMMUNITION PLANT				
DRAWING NUMBER	AREA H1-3 DUMP SOIL COVER FINAL GRADE			
 Shaw Environmental, Inc.				
BY	DATE	BY	DATE	PROJECT NO.
DESIGNED	08/25/08	CHECKED	08/25/08	106422110
DRAWN	08/25/08	APPROVED	08/25/08	A
				10642206A

FRI, AUG 15, 2008 02:47 P MEC D:\TCAP\FZ\10642.0110\REV-A\10642Z09A.DWG

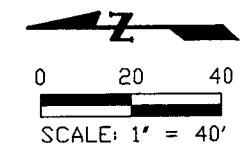


NOTES

1. TOPOGRAPHIC SURVEY OF SITE 129-15 DUMP COVER PROVIDED BY MELCHERT WALKKY, OCTOBER 2001.
2. REMAINING TOPOGRAPHIC PROVIDED BY MARKHURD, MAY 1993.
3. MONITORING WELL MW#03U032 WAS RAISED ABOVE THE SOIL COVER. THREE BOLLARDS WERE CONSTRUCTED FOR PROTECTION. THE NEW TOP OF CASING ELEVATION IS 1,008.14 FEET.
4. APPROXIMATE 2 CUBIC YARDS OF CONCRETE RUBBLE FOUND AT SITE 129-3 WAS PLACED ON SOUTHEASTERN PORTION OF THE SITE 129-15 DUMP COVER. THE LOCATION OF THE RUBBLE IS 130 FEET EAST OF THE FIRE HYDRANT.

LEGEND

- FINAL GRADE INDEX CONTOUR
- EXISTING GRADE CONTOUR
- ESTIMATED DUMP PERIMETER
- APPROXIMATE TREE LINE
- DRAINAGE CRUSHED ROCK BEDS (6 OZ NONWOVEN GEOTEXTILE FILTER FABRIC AND #2 KEY LIMESTONE)
- STONE CHECK DAM (6 OZ NONWOVEN GEOTEXTILE FILTER FABRIC AND CLASS 1 RIP-RAP)



REVISION	A	ISSUED TO ARMY AND AGENCIES	LSD	KER	08/18/08
		DESCRIPTION	CHECKED	APPROVED	DATE

**U.S. ARMY
CORPS OF ENGINEERS
OMAHA DISTRICT**

TWIN CITIES ARMY AMMUNITION PLANT

FIGURE NUMBER: **24**
 SITE 129-15
 AS-BUILT FINAL GRADING CONTOURS

Shaw Environmental, Inc.

BY	DATE	PROJECT NO.	REV.	FILE NAME				
DSND	LSD	08/15/08	CHKD	LSD	08/15/08	10642.0110	A	10642Z09A
DRAWN	TH	08/15/08	APPR	TH	08/15/08			

TABLES

TABLES

TABLE 1
TYPICAL SITE WITH RESTRICTED LAND USE
ALTERNATIVE 1: NO FURTHER ACTION
TWIN CITIES ARMY AMMUNITION PLANT

CAPITAL COSTS

	Unit	Quantity	Unit Cost	Cost	Comments
TOTAL COST				\$0	

5-YEAR REVIEW COST

	Unit	Quantity	Unit Cost	Cost	Comments
5-Year Review	LS	1	\$15,000	\$15,000	Site review and prepare report
TOTAL COST				\$15,000	

TABLE 1 (Cont.)
TYPICAL SITE WITH RESTRICTED LAND USE
ALTERNATIVE 1: NO FURTHER ACTION
TWIN CITIES ARMY AMMUNITION PLANT

PRESENT WORTH ANALYSIS

Year	Capital Costs	Periodic Costs	Total Annual Expenditure	Discount Factor (7%)	Present Worth
0	\$0	\$0	\$0	1.0000	\$0
1		\$0	\$0	0.9346	\$0
2		\$0	\$0	0.8734	\$0
3		\$0	\$0	0.8163	\$0
4		\$0	\$0	0.7629	\$0
5		\$15,000	\$15,000	0.7130	\$10,695
6		\$0	\$0	0.6663	\$0
7		\$0	\$0	0.6227	\$0
8		\$0	\$0	0.5820	\$0
9		\$0	\$0	0.5439	\$0
10		\$15,000	\$15,000	0.5083	\$7,625
11		\$0	\$0	0.4751	\$0
12		\$0	\$0	0.4440	\$0
13		\$0	\$0	0.4150	\$0
14		\$0	\$0	0.3878	\$0
15		\$15,000	\$15,000	0.3624	\$5,436
16		\$0	\$0	0.3387	\$0
17		\$0	\$0	0.3166	\$0
18		\$0	\$0	0.2959	\$0
19		\$0	\$0	0.2765	\$0
20		\$15,000	\$15,000	0.2584	\$3,876
21		\$0	\$0	0.2415	\$0
22		\$0	\$0	0.2257	\$0
23		\$0	\$0	0.2109	\$0
24		\$0	\$0	0.1971	\$0
25		\$15,000	\$15,000	0.1842	\$2,763
26		\$0	\$0	0.1722	\$0
27		\$0	\$0	0.1609	\$0
28		\$0	\$0	0.1504	\$0
29		\$0	\$0	0.1406	\$0
30		\$15,000	\$15,000	0.1314	\$1,971
TOTAL PRESENT WORTH					\$32,400

TABLE 2
TYPICAL SITE WITH RESTRICTED LAND USE
ALTERNATIVE 2: LAND USE CONTROLS
TWIN CITIES ARMY AMMUNITION PLANT

CAPITAL COSTS

	Unit	Quantity	Unit Cost	Cost	Comments
Land Use Controls					
Land Use Controls Remedial Design	LS	1	\$10,900	\$10,900	Describes controls and implementation (\$80/hr x 80 hrs + \$150/hr x 30 hrs)
Land Use Restrictions	LS	1	\$6,000	\$6,000	Legal fees (\$150/hr x 40 hrs)
TOTAL COST				\$16,900	

O&M AND 5-YEAR REVIEW COST

	Unit	Quantity	Unit Cost	Cost	Comments
5-Year Review					
5-Year Review	LS	1	\$15,000	\$15,000	Site review and prepare report
Land Use Controls	LS	1	\$3,000	\$3,000	Implementation and inspection
TOTAL COST				\$18,000	

**TABLE 2 (Cont.)
TYPICAL SITE WITH RESTRICTED LAND USE
ALTERNATIVE 2: LAND USE CONTROLS
TWIN CITIES ARMY AMMUNITION PLANT**

PRESENT WORTH ANALYSIS

Year	Capital Costs	Periodic Costs	Total Annual Expenditure	Discount Factor (7%)	Present Worth
0	\$16,900	\$0	\$16,900	1.0000	\$16,900
1		\$0	\$0	0.9346	\$0
2		\$0	\$0	0.8734	\$0
3		\$0	\$0	0.8163	\$0
4		\$0	\$0	0.7629	\$0
5		\$18,000	\$18,000	0.7130	\$12,834
6		\$0	\$0	0.6663	\$0
7		\$0	\$0	0.6227	\$0
8		\$0	\$0	0.5820	\$0
9		\$0	\$0	0.5439	\$0
10		\$18,000	\$18,000	0.5083	\$9,149
11		\$0	\$0	0.4751	\$0
12		\$0	\$0	0.4440	\$0
13		\$0	\$0	0.4150	\$0
14		\$0	\$0	0.3878	\$0
15		\$18,000	\$18,000	0.3624	\$6,523
16		\$0	\$0	0.3387	\$0
17		\$0	\$0	0.3166	\$0
18		\$0	\$0	0.2959	\$0
19		\$0	\$0	0.2765	\$0
20		\$18,000	\$18,000	0.2584	\$4,651
21		\$0	\$0	0.2415	\$0
22		\$0	\$0	0.2257	\$0
23		\$0	\$0	0.2109	\$0
24		\$0	\$0	0.1971	\$0
25		\$18,000	\$18,000	0.1842	\$3,316
26		\$0	\$0	0.1722	\$0
27		\$0	\$0	0.1609	\$0
28		\$0	\$0	0.1504	\$0
29		\$0	\$0	0.1406	\$0
30		\$18,000	\$18,000	0.1314	\$2,365
TOTAL PRESENT WORTH					\$55,700

TABLE 3
 TYPICAL SITE WITH RESTRICTED LAND USE AND SOIL COVER
 ALTERNATIVE 1: NO FURTHER ACTION
 TWIN CITIES ARMY AMMUNITION PLANT

CAPITAL COSTS

	Unit	Quantity	Unit Cost	Cost	Comments
TOTAL COST				\$0	

O&M AND 5-YEAR REVIEW COST

	Unit	Quantity	Unit Cost	Cost	Comments
O&M	LS	1	\$2,000	\$2,000	Minor repairs of soil cover (about 2 days of work)
5-Year Review	LS	1	\$15,000	\$15,000	Site review and prepare report
TOTAL COST				\$17,000	

TABLE 3 (Cont.)
TYPICAL SITE WITH RESTRICTED LAND USE AND SOIL COVER
ALTERNATIVE 1: NO FURTHER ACTION
TWIN CITIES ARMY AMMUNITION PLANT

PRESENT WORTH ANALYSIS

Year	Capital Costs	Perodic Costs	Total Annual Expenditure	Discount Factor (7%)	Present Worth
0	\$0	\$0	\$0	1.0000	\$0
1		\$0	\$0	0.9346	\$0
2		\$0	\$0	0.8734	\$0
3		\$0	\$0	0.8163	\$0
4		\$0	\$0	0.7629	\$0
5		\$17,000	\$17,000	0.7130	\$12,121
6		\$0	\$0	0.6663	\$0
7		\$0	\$0	0.6227	\$0
8		\$0	\$0	0.5820	\$0
9		\$0	\$0	0.5439	\$0
10		\$17,000	\$17,000	0.5083	\$8,641
11		\$0	\$0	0.4751	\$0
12		\$0	\$0	0.4440	\$0
13		\$0	\$0	0.4150	\$0
14		\$0	\$0	0.3878	\$0
15		\$17,000	\$17,000	0.3624	\$6,161
16		\$0	\$0	0.3387	\$0
17		\$0	\$0	0.3166	\$0
18		\$0	\$0	0.2959	\$0
19		\$0	\$0	0.2765	\$0
20		\$17,000	\$17,000	0.2584	\$4,393
21		\$0	\$0	0.2415	\$0
22		\$0	\$0	0.2257	\$0
23		\$0	\$0	0.2109	\$0
24		\$0	\$0	0.1971	\$0
25		\$17,000	\$17,000	0.1842	\$3,131
26		\$0	\$0	0.1722	\$0
27		\$0	\$0	0.1609	\$0
28		\$0	\$0	0.1504	\$0
29		\$0	\$0	0.1406	\$0
30		\$17,000	\$17,000	0.1314	\$2,234
TOTAL PRESENT WORTH					\$36,700

TABLE 4
TYPICAL SITE WITH RESTRICTED LAND USE AND SOIL COVER
ALTERNATIVE 2: LAND USE CONTROLS
TWIN CITIES ARMY AMMUNITION PLANT

CAPITAL COSTS

	Unit	Quantity	Unit Cost	Cost	Comments
Land Use Controls					
Land Use Controls Remedial Design	LS	1	\$10,900	\$10,900	Describes controls and implementation (\$80/hr x 80 hrs + \$150/hr x 30 hrs)
Land Use Restrictions	LS	1	\$6,000	\$6,000	Legal fees (\$150/hr x 40 hrs)
TOTAL COST				\$16,900	

O&M AND 5-YEAR REVIEW COST

	Unit	Quantity	Unit Cost	Cost	Comments
O&M	LS	1	\$2,000	\$2,000	Minor repairs of soil cover (about 2 days of work)
5-Year Review	LS	1	\$15,000	\$15,000	Site review and prepare report
Land Use Controls	LS	1	\$3,000	\$3,000	Implementation and inspection
TOTAL COST				\$20,000	

TABLE 4 (Cont.)
TYPICAL SITE WITH RESTRICTED LAND USE AND SOIL COVER
ALTERNATIVE 2: LAND USE CONTROLS
TWIN CITIES ARMY AMMUNITION PLANT

PRESENT WORTH ANALYSIS

Year	Capital Costs	Perodic Costs	Total Annual Expenditure	Discount Factor (7%)	Present Worth
0	\$16,900	\$0	\$16,900	1.0000	\$16,900
1		\$0	\$0	0.9346	\$0
2		\$0	\$0	0.8734	\$0
3		\$0	\$0	0.8163	\$0
4		\$0	\$0	0.7629	\$0
5		\$20,000	\$20,000	0.7130	\$14,260
6		\$0	\$0	0.6663	\$0
7		\$0	\$0	0.6227	\$0
8		\$0	\$0	0.5820	\$0
9		\$0	\$0	0.5439	\$0
10		\$20,000	\$20,000	0.5083	\$10,166
11		\$0	\$0	0.4751	\$0
12		\$0	\$0	0.4440	\$0
13		\$0	\$0	0.4150	\$0
14		\$0	\$0	0.3878	\$0
15		\$20,000	\$20,000	0.3624	\$7,248
16		\$0	\$0	0.3387	\$0
17		\$0	\$0	0.3166	\$0
18		\$0	\$0	0.2959	\$0
19		\$0	\$0	0.2765	\$0
20		\$20,000	\$20,000	0.2584	\$5,168
21		\$0	\$0	0.2415	\$0
22		\$0	\$0	0.2257	\$0
23		\$0	\$0	0.2109	\$0
24		\$0	\$0	0.1971	\$0
25		\$20,000	\$20,000	0.1842	\$3,684
26		\$0	\$0	0.1722	\$0
27		\$0	\$0	0.1609	\$0
28		\$0	\$0	0.1504	\$0
29		\$0	\$0	0.1406	\$0
30		\$20,000	\$20,000	0.1314	\$2,628
TOTAL PRESENT WORTH					\$60,100

**TABLE 5
 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
 TWIN CITIES ARMY AMMUNITION PLANT**

Standard, Requirement, Criteria, or Limitation	Citation	Description of Requirement	ARAR Status
Chemical-Specific			
Safe Drinking Water Act – Maximum Contaminant Level Goals	40 Code of Federal Regulations (CFR) Parts 141 and 142.	Establishes drinking water quality goals set at levels of no known or anticipated adverse health effects, with an adequate margin of safety.	Relevant & Appropriate
Clean Water Act – NPDES Storm Water Regulations	40 CFR Part 122	Establishes requirements for discharge of stormwater.	Applicable
Clean Air Act – Ambient Air Quality Standards	42 U.S. Code (USC) Section 4201, et. seq, as amended	National primary and secondary ambient air quality standards.	Applicable
Clean Air Act – Nation Emissions Standards for Hazardous Air Pollutants	40 CFR Parts 60 and 61, Subpart A	Establishes regulatory standards for specific hazardous air pollutants	Relevant & Appropriate
Minnesota Ambient Air Quality Standards	Minn. Rules Chapter 7009	Primary and secondary standards for PM10 in ambient air.	Applicable
Minnesota Residential Lead Abatement	Minn. Rules Chapter 4761.2510, Subpart 3	Bare soil on residential or playgrounds must not contain lead exceeding 100 parts per million (ppm) or more by weight.	Not Applicable or Relevant & Appropriate
Waters of the State	Minn. Rules Chapter 7050.0222	Water quality standards for class 2 water of the state.	Applicable

**TABLE 5 (Cont.)
 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS)
 TWIN CITIES ARMY AMMUNITION PLANT**

Standard, Requirement, Criteria, or Limitation	Citation	Description of Requirement	ARAR Status
Chemical-Specific (continued)			
Non-degradation of underground waters	Minn. Rule Chapter 7060	Prevent any new pollution and abate existing pollution.	Applicable
Metropolitan Council discharge criteria	Minn. Stat. Chapter 115	Municipal districts may establish standards necessary to protect water quality, including allowed concentrations in sanitary sewers to the local publicly owned treatment works.	Applicable
Minnesota Pollution Control Agency (MPCA) Risk Based Site Evaluation Manual	www.pca.state.mn.us/cleanup/pubs/intro.pdf	Outlines a risk-based approach to decision making during site investigation and remedy selection under the state's Superfund and Voluntary Investigation and Cleanup Program.	Relevant & Appropriate
Clean Water Act (CWA)	CWA Section 404, 33 CFR 320, 322, 323, 325-330	Wetland protection requirements.	Applicable
Protection of Wetlands	Exec. Order 11990 40 CFR Part 6.302(a), Appendix A	Requires federal agencies to minimize destruction, loss or degradation of wetlands.	Applicable

**TABLE 5 (Cont.)
 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS)
 TWIN CITIES ARMY AMMUNITION PLANT**

Standard, Requirement, Criteria, or Limitation	Citation	Description of Requirement	ARAR Status
Location-Specific			
National Historic Preservation Act of 1966 (NHPA)	16 USC Section 470 et. seq	Expands historic preservation programs; requires preservation of resources included in or eligible for listing on the National Register of Historic Places.	Relevant & Appropriate
National Archeological and Historical Preservation Act of 1974	16 USC Section 469	Provides procedures for preservation of historical and archaeological items when terrain is altered as a result of federal or federally licensed construction activity.	Relevant & Appropriate
Archeological Resources Protection Act of 1979	16 USC Section 470 aa-mm	Requires a permit for any excavation or removal of archaeological resources from public lands or Indian lands.	Relevant & Appropriate
Native American Graves and Repatriation Act of 1990	25 USC Section 3001 et seq.	Provides requirements for the protection of Native American cultural items that are excavated or discovered on federal or tribal lands	Relevant & Appropriate
Fish and Wildlife Coordination Act	16 USC Section 661 et seq.	Requirements for discharges of pollutants into a body of water or wetland	Relevant & Appropriate
Endangered Species Act	16 USC Section 1531 et seq,	Provides protection for endangered species and habitat	none
Waters of the State	Minn. Rules Chapter 7050.0185	Non-degradation for all Waters	Applicable

**TABLE 5 (Cont.)
 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS)
 TWIN CITIES ARMY AMMUNITION PLANT**

Standard, Requirement, Criteria, or Limitation	Citation	Description of Requirement	ARAR Status
Location-Specific (continued)			
Waters of the State	Minn. Rules Chapter 7050.0185, Subpart 9	Physical Alteration of Wetlands	Applicable
Waters of the State	Minn. Rules Chapter 7050.0186	Wetland Mitigation	Applicable
Wetland Conservation Act	Minn. Rules Chapter 8420	Requirements for allowing impacts to a wetland.	Applicable
Wetland Conservation Act	Minn. Rules 8420.0546	Requires replacement of jurisdictional wetland values lost at a minimum of a 1:1 ratio. The Wetland Conservation Act has explicit replacement ratios for the Local Unit of Government decisions.	Applicable
Public Water Resources	Minn. Statute Chapter 103G Minn. Rules Chapter 6115.0190, Subpart 5	Permit required for placement of fill in public waters.	Applicable.
Water Pollution Control	Minn. Statute Chapter 115.03	MPCA has authority to establish rules and standards for water quality.	Applicable

**TABLE 5 (Cont.)
 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS)
 TWIN CITIES ARMY AMMUNITION PLANT**

Standard, Requirement, Criteria, or Limitation	Citation	Description of Requirement	ARAR Status
Location-Specific (continued)			
Waters of the State	Minn. Rules Chapter 7050.0210, Subpart 13a	General standards for discharges to waters of the state	Applicable
Air Quality Controls	Minn. Rules-Chapters 7009.0020, 7009.0080, and 7009.0150.	Precautions and control of emissions during excavation to eliminate potential for emissions beyond the property boundary.	Applicable
Generation of Hazardous Wastes	40 CFR Part 262.11 Minn. Rules Chapters 7045.0214-.0218	Waste evaluation required to determine if hazardous.	Applicable if hazardous waste is generated during actions.

**TABLE 5 (Cont.)
 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS)
 TWIN CITIES ARMY AMMUNITION PLANT**

Standard, Requirement, Criteria, or Limitation	Citation	Description of Requirement	ARAR Status
Action-Specific			
Minnesota's National Pollutant Discharge Elimination System (NPDES)	Minn. Statutes Chapters 115 and 116 Minn. Rules Chapter 7001	Discharge Storm Water Associated with a Construction Activity	Applicable
Management of Hazardous Wastes	40 CFR Part 262 Minn. Rules Chapters 7045.0205, .0208, .0270, .0292, .0294	Generator standards, including pre-transport, storage, and record-keeping requirements.	Applicable if hazardous waste is generated
Management of Hazardous Wastes	40 CFR Part 262.23 Minn. Rules Chapters 7045.0261-.0265	Preparation and use of hazardous waste manifests.	Applicable if hazardous waste is transported off-site
Management of Hazardous Wastes	40 CFR Part 268 Minn. Rules Chapters 7045.0214, .1300	Restrictions on land disposal of hazardous wastes.	Applicable
Management of Hazardous Wastes	40 CFR Part 268.3; Minn. Rules Chapter 7045.1305	Land Disposal Restrictions. Dilution prohibited as a substitute for treatment.	Relevant & Appropriate
Procedures for planning and implementing offsite actions.	40 CFR Part 300.440	Hazardous substances, pollutants, or contaminants transferred offsite must be transferred to acceptable facilities.	Applicable

**TABLE 5 (Cont.)
 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS)
 TWIN CITIES ARMY AMMUNITION PLANT**

Standard, Requirement, Criteria, or Limitation	Citation	Description of Requirement	ARAR Status
Action-Specific (continued)			
Hazardous Materials Transportation Act	49 USC Sections 1801 – 1813 49 CFR Parts 107, 171-177	Regulates transportation of hazardous materials	Potentially Applicable
Well Abandonment	Minn. Rules Chapters 4725.3850, 3875, .7450	Standards for monitoring well and dewatering well abandonment.	Applicable
Wells and Borings	Minn. Rules Chapters 4725.1825 .6150, 3150	Dewatering Well Permitting and Installation	Applicable
Industrial Solid Waste Land Disposal Facility	Minn. Rules 7035.2500, Subpart 3C, 3D, 3E, and 3F	Cover system design and maintenance requirements	Applicable
Remedy selection criteria	40 CFR Part 300.430 (a)(1)(iii)(D)	Defines expectations regarding use of institutional controls as part of the selected remedy.	Applicable
Institutional Controls	Minn. Statute Chapter 115B.16 subdivision 1	Use of property of a closed disposal facility	Relevant & Appropriate
Institutional Controls	Minn. Statute Chapter 115B.16 subdivision 2	Recording of affidavit	Applicable
Reporting Requirements for Property Transfer	40 CFR Part 373	Requires Federal agencies to report hazardous waste activity when transferring property.	Applicable

Notes: For a listing of ARARs in the original OU2 ROD, refer to the October 1997 Record of Decision for the "Twin Cities Army Ammunition Plant New Brighton/Arden Hills Superfund Site Operable Unit 2" (USACE, 1997).

APPENDIX A

APPENDIX A
RESPONSIVENESS SUMMARY

**RESPONSIVENESS SUMMARY
FOR
RECORD OF DECISION AMENDMENT #3
OPERABLE UNIT 2 – OTHER SITES
NEW BRIGHTON/ARDEN HILLS SUPERFUND SITE
ARDEN HILLS, MINNESOTA**

OVERVIEW

This Responsiveness Summary was prepared to document and respond to issues and comments raised by the public regarding the Proposed Plan for Other Sites including the Grenade Range, 135 Primer/Tracer Area Stormwater Ditch, Outdoor Firing Range, the Trap Range Site, the Water Tower Area and Sites D, G, E, H, and 129-15 within Operable Unit 2 (OU2) of the New Brighton/Arden Hills Superfund Site. The preferred alternatives and the remedies selected in the Record of Decision (ROD) Amendment #3 are listed below:

For Site D,

- Declaration that the removal actions and PCB soil cover are part of the final remedy for the site, with the addition of LUCs to maintain the integrity of the soil cover, to prohibit unauthorized disturbance to underlying soils, and to restrict the area to site-specific industrial use.

For Sites E, H, 129-15:

- Declaration that the cover construction is part of the final remedy, with the addition of LUCs to maintain the integrity of the soil cover, to prohibit unauthorized disturbance to underlying soils, and to restrict the area to site-specific industrial use.

For the Grenade Range:

- Declaration that the removal actions constitute the final remedy for the site with the addition of LUCs that restrict area to industrial use.

For the 135 Primer/Tracer Area Stormwater Ditch:

- Declaration that the removal actions constitute the final remedy for the ditch (No Further Action). The ditch can be used for unrestricted use.

For the Outdoor Firing Range:

- Declaration that the removal actions and cover construction constitute the final remedy for the site with the addition of LUCs to maintain the integrity of the soil cover, to prohibit unauthorized disturbance to underlying soils, and to restrict the area to site-specific industrial use.

For the Trap Range and the Water Tower Area:

- No Action. The Sites can be used for unrestricted use.

A public meeting was held on June 24, 2008 at 7:00 p.m. at the Ramsey County Public Works/Partners Facility in Arden Hills, Minnesota to present the preferred alternatives to the public. No comments were received regarding Amendment #3 during the public comment period, which began on June 11, 2008 and ended on July 11, 2008.

This Responsiveness Summary documents includes the following sections:

- Background on recent community involvement,
- Summary of comments received during the public comment period and response, and
- Remaining concerns.

BACKGROUND ON RECENT COMMUNITY INVOLVEMENT

The TCAAP Restoration Advisory Board (RAB) has been involved with the discussions regarding remedies for the Grenade Range, 135 Primer/Tracer Area Stormwater Ditch, Outdoor Firing Range, the Trap Range Site, the Water Tower Area and Sites D, G, E, H, and 129-15 since 1996.

Compliance with the public participation requirements of Section 113(k)(2)(i-v) of CERCLA/SARA has been achieved for the New Brighton/Arden Hills Superfund Site by the following activities for this ROD Amendment:

- The Army has compiled an update to the Administration Record. The Administrative Record is located at 470 W. Highway 96, Suite 100, Shoreview, MN 55126.
- The Army placed a formal advertisement in the Minnesota Star Tribune on June 8, 2008 and in the Arden Hills/New Brighton Bulletin, and the Shoreview-Arden Hills Bulletin on June 11, 2008, and the Fridley Focus on June 12, 2008 announcing the availability of the Proposed Plan.
- Public comment on the Proposed Plan was solicited during a formal public comment period extending from June 11, 2008 to July 11, 2008.
- A public meeting was held on June 24, 2008 at Ramsey County Public Works/Partners Facility. Representatives of the Army, the EPA, and the MPCA were at the meeting to answer questions about the site and the changes to and additional remedial alternatives.
- Two members of the public attended the public meeting.
- No comments were received regarding the Amendment #3 during the public comment period.

The Proposed Plan for amended remedies at OU2 was published on June 16, 2008 and describes the preferred alternatives for each site. Based upon consideration of the National Oil and Hazardous Substance Pollution Contingency Plan (NCP) criteria, the appropriate remedy for each site is listed as follow:

For Site D,

- Declaration that the removal actions and PCB soil cover are part of the final remedy for the site, with the addition of LUCs to maintain the integrity of the soil cover, to prohibit unauthorized disturbance to underlying soils, and to restrict the area to site-specific industrial use.

For Sites E, H, 129-15:

- Declaration that the cover construction is part of the final remedy, with the addition of LUCs to maintain the integrity of the soil cover, to prohibit unauthorized disturbance to underlying soils, and to restrict the area to site-specific industrial use.

For the Grenade Range:

- Declaration that the removal actions constitute the final remedy for the site with the addition of LUCs that restrict area to industrial use.

APPENDIX B

APPENDIX B
REFERENCES

REFERENCES

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