APPENDIX F - AGENCY CORRESPONDENCE

environmental
properties management, LLC

May 6, 2016

Ms. Hillary Young
Chief Environmental Engineer
Oklahoma Department of Environmental Quality
707 North Robinson
Oklahoma City, OK 73102

Re: Cimarron Environmental Response Trust
Approval to Inject Treated Water Under Oklahoma's UIC Program

Dear Ms. Young:

Environmental Properties Management LLC (EPM) is the Trustee for the Cimarron Environmental Response Trust, which owns the former nuclear fuel production facility located in Logan County, OK. In December 2015, EPM submitted a decommissioning plan to complete the radiological decommissioning of the site to obtain termination of the Special Nuclear Materials license issued by the US Nuclear Regulatory Commission (NRC). Remediation of impacted groundwater at the site is the last remaining phase of remediation; this effort is jointly regulated by NRC and DEQ.

Groundwater remediation will consist of extracting impacted groundwater from the Cimarron River floodplain and treating the groundwater to remove uranium (the radiological contaminant) and/or nitrate (the non-radiological contaminant). The treated groundwater will comply with the drinking water standards of 30 micrograms per liter (ug/L) uranium and 10 milligrams per liter (mg/L) nitrate. Our plan is to discharge a portion of the treated water to the Cimarron River in accordance with an Oklahoma Pollution Discharge Elimination System (OPDES) permit.

The rest of the treated water will be injected into the shallow sandstones south of the floodplain to flush contaminants to recovery wells located in the floodplain, where it will be recovered for treatment. In the uppermost sandstone, treated water will be injected via shallow wells installed in injection trenches. Trenches will be excavated and backfilled with gravel to provide adequate hydraulic connection with the fractures and bedding planes within the sandstone. All trenches will be installed in an unconfined water-bearing zone, extending below the existing water table. In one area, treated water will be injected into a deeper (approximately 70 feet below ground surface) sandstone via injection wells.

Treated water will not be injected under significant pressure to prevent hydraulic fracturing of the receiving bedrock formations. Shut-off switches will be installed in injection wells to cut off flow when the water reaches a point approximately 3 feet below grade, and to restore flow when the water reaches a point approximately 5 feet below grade. Consequently, injection will be gravity flow, with the pressure head being the difference between the potentiometric head in the well and the water table.

9400 Ward Parkway • Kansas City, MO 64114
Tel: 405-642-5152 • jlux@envpm.com

Enclosed are two "Inventory of Injection Wells" forms, one for each of the quarter sections in which groundwater remediation will be performed. Also enclosed are four drawings from the Decommissioning Plan. Figure 2-1 provides an aerial image of the site, showing the property boundaries. Drawing BMCD-GWREMED-C002 provides an aerial image of most of the site, showing the locations of the groundwater remediation infrastructure.

Injection of treated water will occur within the areas identified on BMCD-GWREMED-C002 as "C004" and "C005". All of the injection infrastructure located in C004 lies within the northwest quarter of Section 12, T16N, R4W. All the injection infrastructure located in C005 lies within the northeast quarter of Section 12, T16N, R4W. The level of detail on this drawing is not sufficient to locate each injection trench and well. Drawings BMCD-GWREMED-C004 and BMCD-GWREMED-C005 are also enclosed to provide a more detailed picture of the groundwater remediation infrastructure in these two areas. For your convenience, I have annotated the locations of injection wells by placing a red dot on each one.

It is our understanding that these injection trenches and wells are Class 5 injection wells, and that no permit is required, as DEQ regulates Class 5 injection wells through "permit by rule". It is also our understanding that DEQ must be provided an inventory of wells and monthly reports of injection during operations. Due to the nature of the inventory, EPM attached a table to the "Inventory of Wells" form that describes the depth and length of each injection trench, as well as the depth, screened interval, and proposed maximum flow rate for each injection well.

DEQ approval to inject treated water during this remediation effort is requested herein. Please contact me at 405-642-5152 or via e-mail at jlux@envpm.com should you have questions or desire clarification.

Sincerely,

Jeff Lux

Jeff Lux, PE
Project Manager

Attachments

cc: Paul Davis, Oklahoma Department of Environmental Quality
Ken Kalman, US Nuclear Regulatory Commission

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Division of Ecological Services
9014 East 21st Street
Tulsa, Oklahoma 74129
918/581-7458 / (FAX) 918/581-7467

August 25, 2015

Online Project Review Concurrence Letter

To: Bryan R. Gasper
Burns & McDonnell Engineering Company, Inc.
9400 Ward Parkway
Kansas City, Missouri 64114

Project Name: Cimarron Environmental Response Trust Site in Logan County, Oklahoma
Burns & McDonnell Project No. 72454
USFWS Consultation Code: 02EKOK00-2015-SLI-1367

Dear Applicant:

Thank you for using the U.S. Fish and Wildlife Service (Service) Oklahoma Ecological Services Field Office online project review process. By providing this letter in conjunction with your project review package, you are certifying that you have accurately completed the online project review process for the referenced project in accordance with all instructions provided, using the best available information to reach your conclusions. Concurrence with "not likely to adversely affect" determinations does not provide any exemption for violations of section 9 of the ESA or "take" of federally-listed species. The Federal action agency is ultimately responsible for ensuring compliance with the ESA and any take that occurs due to your proposed action would be considered a violation under section 9 of the ESA.

This letter and the enclosed project review package complete the review of your project in accordance with the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended (ESA). This letter also provides information for your project review under the National Environmental Policy Act (National Environmental Policy Act of 1969 (P.L. 91-190, 42 U.S.C. 4321-4347, 83 Stat. 852), as amended. A copy of this letter and the project review package must be emailed to **okprojectreview@fws.gov** for this certification to be valid. This letter and the project review package will be maintained in Service records. **Please allow the OKESFO 60 days to review your information. If the OKESFO determines that the package is not complete, or that additional coordination is necessary, we will contact your office. If after 60 days from the time you emailed your project review package the OKESFO has not contacted your office, consider your section 7 consultation complete.**

The proposed action consists of

Burns & McDonnell Engineering Company, Inc. (Burns & McDonnell) is providing environmental support services for the Cimarron Environmental Response Trust (CERT) at a site formerly owned and operated by Kerr-McGee Nuclear Corporation (KMNC) in Logan County, Oklahoma (Project) (Appendix A). For the purpose of informal consultation with the U.S. Fish and Wildlife Service (USFWS), Burns & McDonnell conducted desktop analyses to evaluate threats to species protected by the Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.), Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668), and the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703).

Burns & McDonnell and CERT are requesting a concurrence with the findings of this desktop habitat assessment that the proposed Project has no effect or is not likely to adversely affect species protected under the jurisdiction of the USFWS.

The Project is located at a site that was formerly owned and operated by Kerr-McGee Nuclear Corporation. The onsite facilities were utilized for the production of mixed oxide fuel and uranium fuel, including enriched uranium reactor fuel pellets and eventually fuel rods from 1966 to 1975. During this time, exposure of process water and material to the environment resulted in the contamination of the site groundwater. The site is now owned by the CERT. The concentration of uranium, nitrates, and fluorides in the groundwater must be reduced to achieve unrestricted release of the site and license termination from the Nuclear Regulatory Commission (NRC). Additionally, other mitigation and compliance efforts will be completed to obtain a No Further Remediation Required notice from the Oklahoma Department of Environmental Quality (ODEQ). Mitigation of these constituents will be achieved through the extraction, treatment, and discharge of affected groundwater. These processes will require the construction of groundwater extraction wells, groundwater extraction trenches, groundwater injection wells, groundwater injection trenches, process piping, two outfalls to the Cimarron River, and groundwater treatment facilities. All best management practices (BMPs) will be implemented in compliance with associated erosion and sedimentation regulations for disturbance; thereby minimizing those associated impacts.

The project is expected to be completed:

July 2018

This project review is needed for:

The concentration of uranium, nitrates, and fluorides in the groundwater must be reduced to achieve unrestricted release of the site and license termination from the NRC. License termination from the NRC, in addition to other mitigation and compliance efforts, is needed for a No Further Remediation Required determination from the ODEQ.

The species conclusions table in the enclosed project review package summarizes your ESA conclusions. These conclusions resulted in "not likely to adversely affect/modify" determinations for listed species and critical habitat in relation to potential effects of your proposed project. We certify that the use of the online project review process in strict accordance with the instructions provided as documented in the enclosed project review package results in reaching the appropriate determinations. Therefore, we concur with determinations of "not likely to adversely affect" for listed species and critical habitat reached by proper use of this process. For projects where this particular determination is reached, additional coordination with this office is not needed.

Candidate species are not legally protected pursuant to the ESA. However, the Service encourages efforts to avoid or minimize adverse impacts to them from project effects. Some federal agencies have standing policies that grant limited protections to candidate species. Conservation of candidate species now may preclude future needs to federally list them as endangered or threatened, at which point their legal protection would become required. Please contact this office for additional coordination if your project action area contains candidate species.

Should project plans change or if additional information on the distribution of listed species or critical habitat becomes available, this determination may be reconsidered. You should re-visit the Service's Information, Planning, and Conservation (IPaC) website at http://ecos/fws.gov/ipac/ within 90 days of project inititaion to ensure species information is correct. If new species or critical habitat is identified, this letter is no longer valid and a new project package should be submitted to the OKESFO.

Information about the online project review process including instructions and use, species information, and other information regarding project reviews within Oklahoma is available at our website: <http://www.fws.gov/southwest/es/oklahoma/ >. If you have any questions, please call 918-581-7458 or send an email message to OKProjectReview@fws.gov.

Sincerely,
/s/ Jontie Aldrich
Acting Field Supervisor
Oklahoma Ecological Services Field Office

Enclosures:

1) ENTIRE PROJECT REVIEW PACKAGE:
   - ☑ Species Conclusion Table
   - ☑ IPaC Species List and Action Area map
   - ☑ This letter (Online Concurrence Letter)
   - ☑ (Optional) Additional maps
2) Other relevant project data/documents

ODWC state list of protected species by county - Logan County, OK.

Weis, Brian

From: Ok Project Review, FW2 <okprojectreview@fws.gov>
Sent: Monday, August 31, 2015 11:25 AM
To: Gasper, Bryan R.
Subject: Email received by FWS Re: USFWS-OK Kerr-McGee Cimarron project review

Thank you for submitting your project through the U.S. Fish and Wildlife Service's Oklahoma Ecological Service Field Office project review website. This email serves as verification of your submission to OKprojectreview@fws.gov.

For future requests, please note the following Issues and Updates with the Project Review Webpage:

Recent Updates	
8/19/2015	Please note that response times described in Steps 7a and 7b have changed from 60 days (65 for hardcopy submissions) to **45 days (50 for hard copy submissions).**
8/19/2015	The **Online Concurrence Letter** (from Step 7a) and the **Online Project Review Request Form** (Step 7b) have been updated. Please use these new documents with your project request.
3/25/2015	The range of the American burying beetle in Oklahoma has been updated, as a result of positive survey findings along the western edge of the ABB's range in 2014. This change results in a range expansion by 3% in Oklahoma, or an additional 576,738 acres.
Project Review Website Known Issues	
6/24/2014	Our email return receipt for okprojectreview@fws.gov can provide only one response per email address every four hours. If you submit multiple requests within a four hour window, you may use the return receipt email from your initial project request as proof of additional project submittals.

BURNS McDONNELL

September 8, 2015

Division Chief
U.S. Army Corps of Engineers
CESWT-RO
1645 South 101st East Ave
Tulsa, OK 74128

Re: Cimarron Remediation Project

Dear Sir/Madam:

Burns & McDonnell Engineering Company, Inc. (Burns & McDonnell) was retained by the Cimarron Environmental Response Trust (Trust) to provide wetland delineation and permitting services for the proposed Cimarron Remediation Project (Project). These actions are part of a larger effort to remediate groundwater contaminated by a former uranium enrichment facility.

INTRODUCTION

The Project is located at a site that was formerly owned and operated by Kerr-McGee Nuclear Corporation (KMNC) (Figure A-1 in Appendix A). From 1966 to 1975, the onsite facilities were utilized for the production of mixed oxide fuel and uranium fuel including enriched uranium reactor fuel pellets and eventually fuel rods. During this time, exposure of process water and material to the environment resulted in the contamination of site groundwater. The site is now owned by the Trust. The concentration of uranium, nitrates, and fluorides in the groundwater must be reduced to achieve unrestricted release of the site and license termination from the U.S. Nuclear Regulatory Commission (NRC) and the Oklahoma Department of Environmental Quality (DEQ). Mitigation of these constituents will be achieved through the extraction, treatment, and discharge of affected groundwater. These processes will require the construction of groundwater extraction wells, groundwater extraction trenches, groundwater injection wells, groundwater injection trenches, process piping, two outfalls to the Cimarron River, and groundwater treatment facilities.

The Project has the potential to impact wetlands or other waters of the U.S. that may be under the jurisdiction of the U.S. Army Corps of Engineers (USACE) as designated by Section 404 of the Clean Water Act. Burns & McDonnell conducted a wetland delineation for the Project to evaluate for the presence of waters of the U.S., including streams, creeks, and ponds. This report has been prepared to identify and assess potential impacts to these waters.

The Project Survey Area included in the wetland delineation (Figures A-2 and A-3) consists of land that may be disturbed during the construction and operation of groundwater remediation activities and totals approximately 600 acres. Some trenching will occur outside of the Survey Area, but will be confined to existing low-maintenance roads in these areas.

9400 Ward Parkway \ Kansas City, MO 64114
O 816-333-9400 \ F 816-333-3690 \ burnsmcd.com

METHODS

The following sections summarize the methods used to review existing data for the Survey Area and to conduct the onsite wetland delineation.

Desktop Evaluation

Burns & McDonnell reviewed available background information for the Survey Area to identify locations where wetlands or streams were likely to be present. This information included:

- U.S. Geological Survey (USGS) 1:24,000 Topographic Quadrangle: Crescent, Oklahoma (2002)
- U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) Quadrangle: Crescent, Oklahoma (2002)
- USGS National Hydrography Dataset (NHD) (2014)
- Natural Resources Conservation Service (NRCS) 2012 Soil Survey Geographic (SSURGO) digital data for Logan County, Oklahoma
- Geographic Information System (GIS) User Community aerial images (2015)
- Guidance from the Tulsa office of the USACE regarding the presence/absence of Section 10 Waters.

Wetland presence/absence depicted on the NWI maps was compared with local soil and hydrological data, aerial photography, and topographic maps to assess the most likely locations for wetlands and other waters of the U.S. based on available data. These maps are included as Figures A-2 and A-3.

Wetland Delineation

A jurisdictional wetland delineation was conducted on April 23 through 25, 2015, by Jack Finley, senior wetland scientist, and Michael Hogan, Global Positioning System (GPS) specialist, both with Burns & McDonnell. The wetland delineation was conducted in accordance with the 1987 *Corps of Engineers Wetlands Delineation Manual* (1987 Manual) and Version 2.0 (2010) of the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region* (Regional Supplement). Sample plots were established and Wetland Determination Data Forms from the Regional Supplement were completed to characterize the Survey Area (Appendix B). Vegetation, soil conditions, and hydrologic indicators were recorded at each of these sample plots. Locations of the sample plots and water features were recorded using a sub-meter-accurate GPS unit. Natural color photographs of sample plots, wetlands, streams, and uplands were taken onsite and are included as Photographs C-1 through C-21 in Appendix C.

RESULTS
The following sections describe the results of the existing data review and the completed wetland delineation.

Desktop Evaluation
Topographic, NWI, and NHD information is shown in Figure A-2. The Survey Area is located in the Cross Timbers Transition Zone of the Central Great Plains Ecoregion.[1] It consists of rough plains that are covered by prairie grasses and eastern red cedar, scattered oaks, and elms. Terrain and vegetation are transitional between the less rugged, grass-covered ecoregions to the west and the hilly oak savanna to the east. Today, land use is a mixture of grassland and fallow ground. This area has ridge and plain topography, with the ridges generally running north-south and the plains flat or gently sloped. The topography of the Survey Area ranges from an elevation of 1,010 feet on the bluffs overlooking the Cimarron River Floodplain to 930 feet within the floodplain. Topographic contours suggest that numerous drainageways likely to contain ephemeral or intermittent streams emanate from the bluffs into the floodplain.

NHD data indicates that the Project lies within the Lower Cimarron-Skelton Drainage Hydrologic Unit Code (HUC8) 11050002. NWI data indicate the presence of two freshwater ponds and one emergent wetland near the southern edge of the western Survey Area. NHD data shows an intermittent stream flowing through the eastern Survey Area toward the Cimarron River, which is a perennial river, with numerous freshwater wetlands evident throughout the channel.

As shown in Figure A-3, the NRCS SSURGO digital data indicate that the Survey Area includes 12 soil types:

- CoIC2 Coyle-Ironmound complex, 3 to 5 percent slopes, eroded
- DiRG Darsil-Rock outcrop complex, 15 to 45 percent slopes
- GaGA Gaddy-Gracemore complex, 0 to 1 percent slopes, frequently flooded
- GadA Gaddy loamy fine sand, 0 to 1 percent slopes, occasionally flooded
- GooE Goodnight fine sand, 1 to 15 percent slopes
- IrCE Ironmound-Coyle complex, 5 to 15 percent slopes
- LerA Lebron clay, 0 to 1 percent slopes, occasionally flooded
- PIT Pits
- URB Urban land
- YaaA Yahola loam, 0 to 1 percent slopes, occasionally flooded

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[1] Woods, A.J., Omernik, J.M., Butler, D.R., Ford, J.G., Henley, J.E., Hoagland, B.W., Arndt, D.S., and Moran, B.C., 2005, *Ecoregions of Oklahoma* (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,250,000).

- YahA Yahola fine sandy loam, 0 to 1 percent slopes, occasionally flooded
- W Water

Of these 12 soil types, 6 (Gaddy-Gracemore complex, 0 to 1 percent slopes, frequently flooded; Gaddy loamy fine sand, 0 to 1 percent slopes, occasionally flooded; Goodnight fine sand, 1 to 15 percent slopes; Lebron clay, 0 to 1 percent slopes, occasionally flooded; Yahola loam, 0 to 1 percent slopes, occasionally flooded; and the Yahola fine sandy loam, 0 to 1 percent slopes) are included on the local and national hydric soil lists.

Aerial imagery indicates a river system with a forested riparian buffer followed by a broad herbaceous community. This community ends abruptly at another woody community that runs in a southwest to northeast direction. Several prominent wooded drainageways emanate from this community in a southerly direction. Numerous areas of disturbance including roads and excavated areas are present. Several dammed impoundments are adjacent to the Survey Area.

Wetland Delineation
On April 22 through 24, 2015, Jack Finley, senior wetland scientist, and Michael Hogan, Global Positioning System (GPS) Specialist, both with Burns & McDonnell, conducted a wetland delineation of the Survey Area. The vegetation, soils, and hydrology within the Survey Area are described below.

Vegetation. The Survey Area was largely composed of grassland. Typical vegetation in the upland portions of the Survey Area included drooping brome (*Bromus tectorum*), southern sedge (*Carex austrina*), goldenrod (*Solidago* sp.), common hackberry (*Celtis occidentalis*), and green ash (*Fraxinus pennsyvanica*).

Soils. Typical upland soils were dark reddish brown (5YR 3/4 or 5YR 4/6) or dark red (2.5YR 4/4 or 2.5YR 3/4) and silt or sand in texture. Wetland soils were also dark reddish brown (5YR 3/4 or 5YR 4/6) and sandy or silty in texture.

Hydrology. The primary sources of hydrology within the Survey Area are precipitation and surface water runoff. Common hydrology indicators included geomorphic position and a positive FAC-Neutral Test.

Jurisdictional Areas
One Palustrine Emergent (PEM) wetland, one perennial stream, and two intermittent streams were identified during the wetland delineation (Figure A-4; Photographs C-3 through C-21). Sample plots were located in the wetlands and adjacent uplands. USACE data forms from the Regional Supplement were completed for each sample plot (Appendix B).

Wetlands

Wetland 1 (W-1). W-1 (0.28 acre) is a PEM wetland located in the northern portion of the Survey Area (Figure A-4; Photographs C-6, C-7, and C-9). Vegetation in this wetland was dominated by littletooth sedge (*Carex microdonta*), reed canary grass (*Phalaris arundinacea*), and stinging nettle (*Urtica dioica*). The hydrology was indicated by Geomorphic Position (D2) and a positive FAC-Neutral Test (A2).

Streams

Stream 1 (S-1) S-1 is a perennial stream (Cimarron River) that flows in an easterly direction at the northern boundary of the Survey Area (Figure A-4; Photographs C-15 and C-16). S-1 averaged more than 400 feet wide, and 988 linear feet of its length were delineated within the Survey Area. S-1 is approximately 6 feet deep at the ordinary high water mark (OHWM). Surrounding vegetation included sandbar willow (*Salix interior*) and eastern red cedar (*Juniperus virginiana).*

Stream 2 (S-2) S-2 is an intermittent stream that flows in a northerly direction through the Survey Area (Figure A-4; Photographs C-17 and C-18). S-2 averaged 3 feet wide, and 326 linear feet of its length were delineated within the Survey Area. S-2 had a depth of 0.5 foot at the OHWM, and the substrate of S-2 consisted of silt and sandstone.

Stream 3 (S-3) S-3 is an intermittent stream that flows in a northerly direction through the Survey Area (Figure A-4; Photographs C-20 and C-21). S-3 averaged 3 feet wide, and 1,395 linear feet of its length were delineated within the Survey Area. The substrate of S-3 consisted of silt and sandstone, and the depth at the OHWM was 0.3 foot.

SUMMARY

Burns & McDonnell conducted a wetland delineation of the Survey Area to identify wetlands and other waters of the U.S. One wetland and three stream channels were identified. Although impacts to these waters will be avoided to the extent practicable, the installation of the two outfall structures will create permanent, unavoidable impacts at the Cimarron River (S-1). Additionally, temporary impacts will occur at W-1 due to open trenching during construction of the outfall at that location. As a result, it is anticipated that the Project will require authorization under a Nationwide Permit 7 (NWP 7) for intake and outfall structures, requiring formal notification to the USACE.

Burns & McDonnell on behalf of the Trust would like to respectfully request a preliminary jurisdictional determination of the waters described in this report. Additionally, we would like to request concurrence that the Project, as currently designed, would qualify for authorization under a NWP 7.

If you have any questions or require additional information, please contact me by telephone at (816) 822-4311 or by e-mail at jbailey@burnsmcd.com.

Sincerely,

Justin E. Bailey, PWS
Senior Wetland Specialist

Attachments:

Appendix A - Figures
Appendix B - USACE Data Forms
Appendix C - Ground Photographs

cc: Brian Weis – Burns & McDonnell
John Hesemann – Burns & McDonnell
Jeff Lux – Environmental Properties Management

BURNS McDONNELL

02/09/2017

David Ball
Logan County Emergency Management
312 East Harrison
Guthrie, OK 73044

Re: Floodplain Permit Application for the Environmental Properties Management, LLC Groundwater Remediation Project

Dear Mr. Ball,

Environmental Properties Management LLC (EPM), a Trustee for the Cimarron Environmental Response Trust (CERT), has retained Burns & McDonnell Engineering Company, Inc. (Burns & McDonnell) to provide FEMA floodplain permitting for the proposed Groundwater Remediation Project (Project). These actions are part of a larger effort to remediate groundwater contaminated by a former nuclear fuel production facility.

The Project is located at a site that was formerly owned and operated by Kerr-McGee Nuclear Corporation (KMNC) in Logan County, Oklahoma. From 1966 to 1975, the onsite facilities were utilized for the production of mixed oxide fuel and uranium fuel including enriched uranium reactor fuel pellets and eventually fuel rods. During this time, exposure of process water and material to the environment resulted in the contamination of site groundwater. The site is now owned by CERT. The concentration of uranium, nitrates, and fluorides in the groundwater must be reduced to achieve unrestricted release of the site and license termination from the U.S. Nuclear Regulatory Commission (NRC) and the Oklahoma Department of Environmental Quality (DEQ). Mitigation of these constituents will be achieved through the extraction, treatment, and discharge of affected groundwater.

This phase of the Project will construct four water injection trenches and one groundwater extraction trench, followed by testing of injection and extraction efficiencies as part of final design for the Project. Two of the test trenches will be within the FEMA 100-year floodplain. These test trenches will be excavated to the specified dimensions. The injection wells will be constructed in the trenches and the then the trench will be partially backfilled with aggregate. The trenches will then be returned to their previous contours using the excavated spoils and stabilized.

The groundwater injection and extraction efficiency will be tested by placing a frac tank, utilized to supply clean water, near the targeted injection trench and moved as necessary. Following completion of injection testing activities, this frac tank will be removed from the Project site. Two frac tanks will be utilized to store water generated during the extraction trench tests. These frac tanks will remain onsite pending characterization and treatment (as necessary) of the extracted water. These tanks will be staged outside of the FEMA 100-year floodplain to avoid any potential impacts, to the extent practicable, should flooding occur.

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O 972-455-3100 \ F 972-386-4026 \ burnsmcd.com

Per our phone conversation, the following procedures will be followed during construction:

- The spoils will be stockpiled outside of the FEMA 100-year floodplain during construction activities.
- Equipment and materials will not be staged within the limits of the FEMA 100-year floodplain.
- Excess spoils will be spread and stabilized outside of the FEMA 100-year floodplain.

Enclosed is the Logan County Floodplain Development Application, General Vicinity Map, Excavation and Grading Plans, and $100 permit fee. If you require any additional information or clarification, please contact me by phone at (816) 605-7821, or by email at kgouvion@burnsmcd.com.

Sincerely,

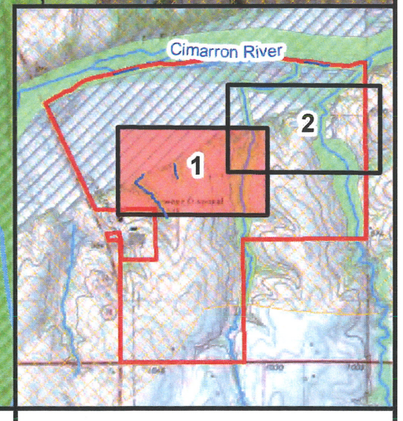
Ken Gouvion, CISEC
Staff Environmental Scientist

Enclosure

APPENDIX G - EROSION AND SEDIMENT CONTROL PLAN

Disclaimer: BMPs on map may not be exact or to scale. The authorized contractor/owner's representative will determine the appropriate BMPs to be used onsite and their locations prior to the start of soil-disturbing activities. The ESC Plan will be updated accordingly.

Dry detention basin will be used for dewatering activities.



Injection Well
Extraction Well
Trench
Soil Stockpile
Silt Fence
Project Boundary
Wetland Survey Boundary
Delineated Stream
NHD Stream
NHD Waterbody
100-foot Natural Vegetated Buffer
100-year FEMA Floodplain
ARC Corridor
NWI Freshwater Emergent
NWI Freshwater Forested/Shrub
NWI Freshwater Pond

NORTH

200 100 0 200
Scale in Feet

BURNS McDONNELL

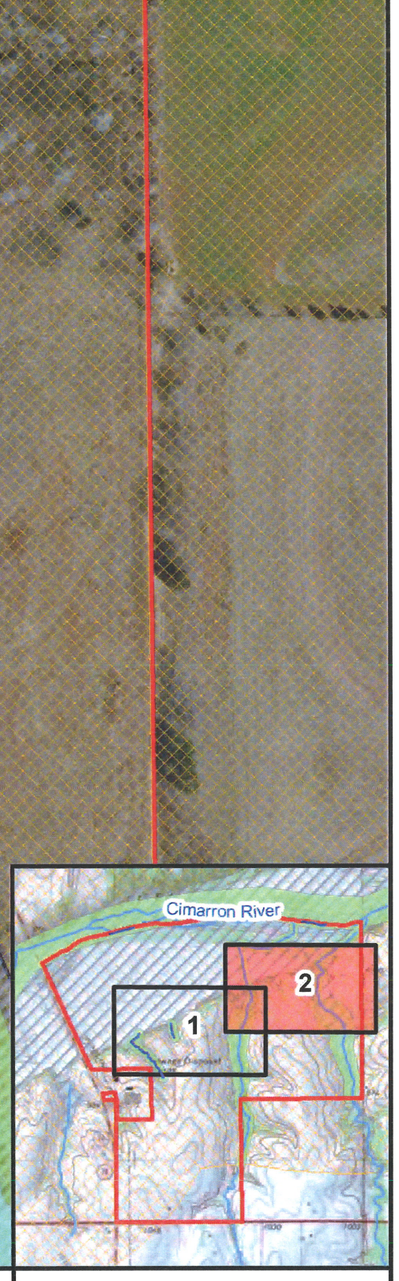
Erosion and Sediment Control Plan
Groundwater Remediation Project
Cimarron Environmental Response Trust
Logan County, Oklahoma
Page 1 of 2

Source: ESRI; USGS NHD; USFWS NWI; FEMA Floodplains; OK DEQ; Cimarron Environmental Response Trust; Burns & McDonnell Engineering Company, Inc.

Issued: 1/31/2017

Path: Z:\General\KCMES\PlDept\Enviro_Monitoring\SWPPP\02) Working Documents\89761 CERT Groundwater Remediation Project, OK\(01) GIS\DataFiles\ArcDocs\CERT ESC Plan.mxd kgouvion 1/31/2017

Disclaimer: BMPs on map may not be exact or to scale. The authorized contractor/owner's representative will determine the appropriate BMPs to be used onsite and their locations prior to the start of soil-disturbing activities. The ESC Plan will be updated accordingly.



Injection Well
Extraction Well
Trench
Soil Stockpile
Silt Fence
Project Boundary
Wetland Survey Boundary
Delineated Stream
NHD Stream
NHD Waterbody
100-foot Natural Vegetated Buffer
100-year FEMA Floodplain
ARC Corridor
NWI Freshwater Emergent
NWI Freshwater Forested/Shrub
NWI Freshwater Pond

NORTH

200 100 0 200
Scale in Feet

BURNS McDONNELL

Erosion and Sediment Control Plan
Groundwater Remediation Project
Cimarron Environmental Response Trust
Logan County, Oklahoma
Page 2 of 2

Source: ESRI; USGS NHD; USFWS NWI; FEMA Floodplains; OK DEQ; Cimarron Environmental Response Trust; Burns & McDonnell Engineering Company, Inc.

Issued: 1/31/2017

no.	date	by	ckd	description
A	2/01/17	BC	JH	FOR REVIEW

NOTE:
TOPOGRAPHY SHOWN IS FROM AN AERIAL SURVEY DATED MAY 2014.

PRELIMINARY - NOT FOR CONSTRUCTION

BURNS McDONNELL

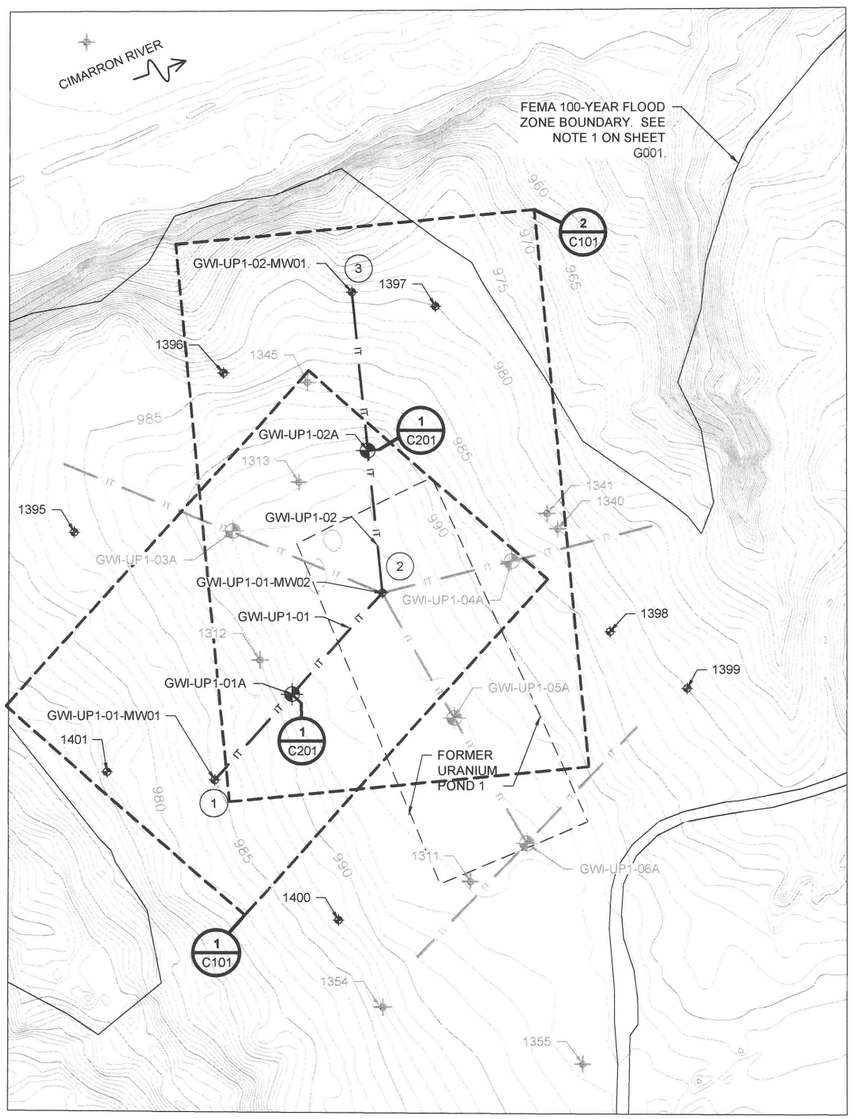
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
OKLAHOMA FIRM LICENSEE NO. 421

JANUARY 2017	B. CLEMENT
B. CLEMENT	checked J. HESEMANN

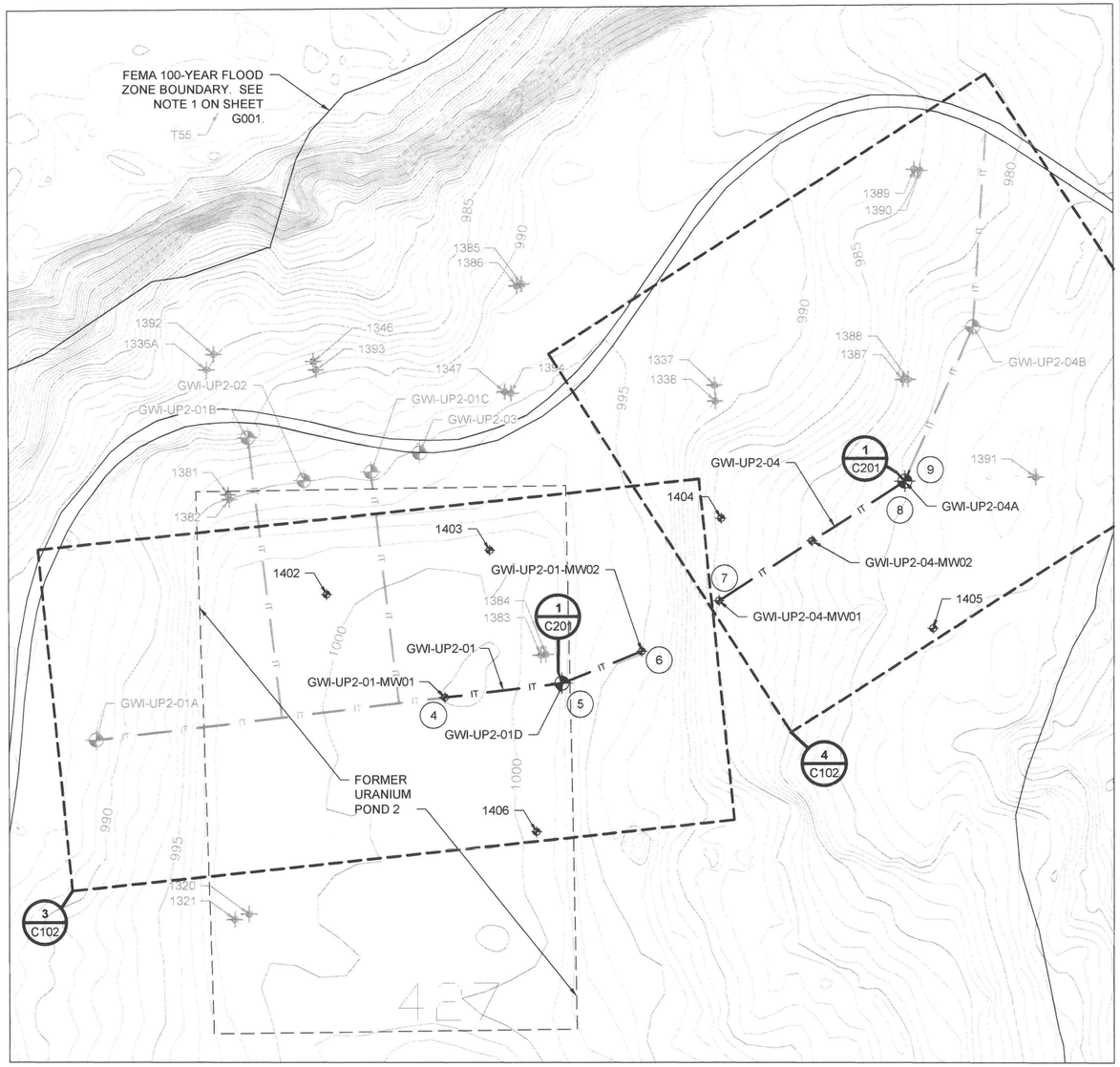
Cimmaron Environmental Response Trust
OVERALL SITE PLAN

project 96785	contract
drawing **BMCD-GWREMED-C001**	rev. **A**
sheet 3 of 11 sheets	
file C001-OVERALL SITE PLAN.DWG	

Inches



UP-1 PILOT TESTING AREA



UP-2 PILOT TESTING AREA

NOTES:

1. FRAC TANKS, EQUIPMENT TRENCH SPOILS, ETC. SHALL BE STAGED AT AN ELEVATION ABOVE THE FEMA 100-YEAR FLOOD ELEVATION, IN ACCORDANCE WITH THE SWPPP AT THE END OF EACH WORK DAY.
2. MONITOR WELL CONSTRUCTION MATERIALS SHALL BE IN ACCORDANCE WITH THE MONITOR WELL SCHEDULE INCLUDED ON M101.
3. MONITOR WELL CONSTRUCTION AND INSTALLATION SHALL BE COMPLETED BY A LICENSED DRILLER IN THE STATE OF OKLAHOMA AND SHALL BE REGISTERED WITH THE OKLAHOMA DEPARTMENT OF ENVIRONMENTAL EQUALITY.
4. MONITOR WELLS INSTALLED WITHIN INJECTION AND EXTRACTION TRENCHES SHALL HAVE TOTAL DEPTHS AND SCREEN INTERVALS THAT COMPLETELY PENETRATE THE DEPTH OF THE TRENCH AT EACH LOCATION
5. CONTRACTOR SHALL PROTECT EXISTING MONITOR WELLS DURING INJECTION AND EXTRACTION TRENCH INSTALLATION AND PILOT TESTING ACTIVITIES. CONTRACTOR MAY SUBMIT ALTERNATE TRENCH ALIGNMENT FOR ENGINEER APPROVAL IN EFFORT TO PROTECT EXISTING MONITOR WELLS.
6. TOPOGRAPHY SHOWN IS FROM AN AERIAL SURVEY DATED MAY 2014.
7. GROUNDWATER ELEVATION CONTOURS FOR WESTERN AREA TREATMENT FACILITY CREATED FROM WATER LEVEL MEASUREMENTS FROM SANDSTONE A MONITOR WELLS ON MARCH 18, 2015.
8. SEE SHEET C202 FOR CONSTRUCTION DETAILS OF MONITOR WELLS AND INJECTION WELLS.

no.	date	by	ckd	description
A	2/01/17	BC	JH	FOR REVIEW

NORTH

0 60' 120'
SCALE IN FEET

PRELIMINARY - NOT FOR CONSTRUCTION

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
OKLAHOMA FIRM LICENSEE NO. 421

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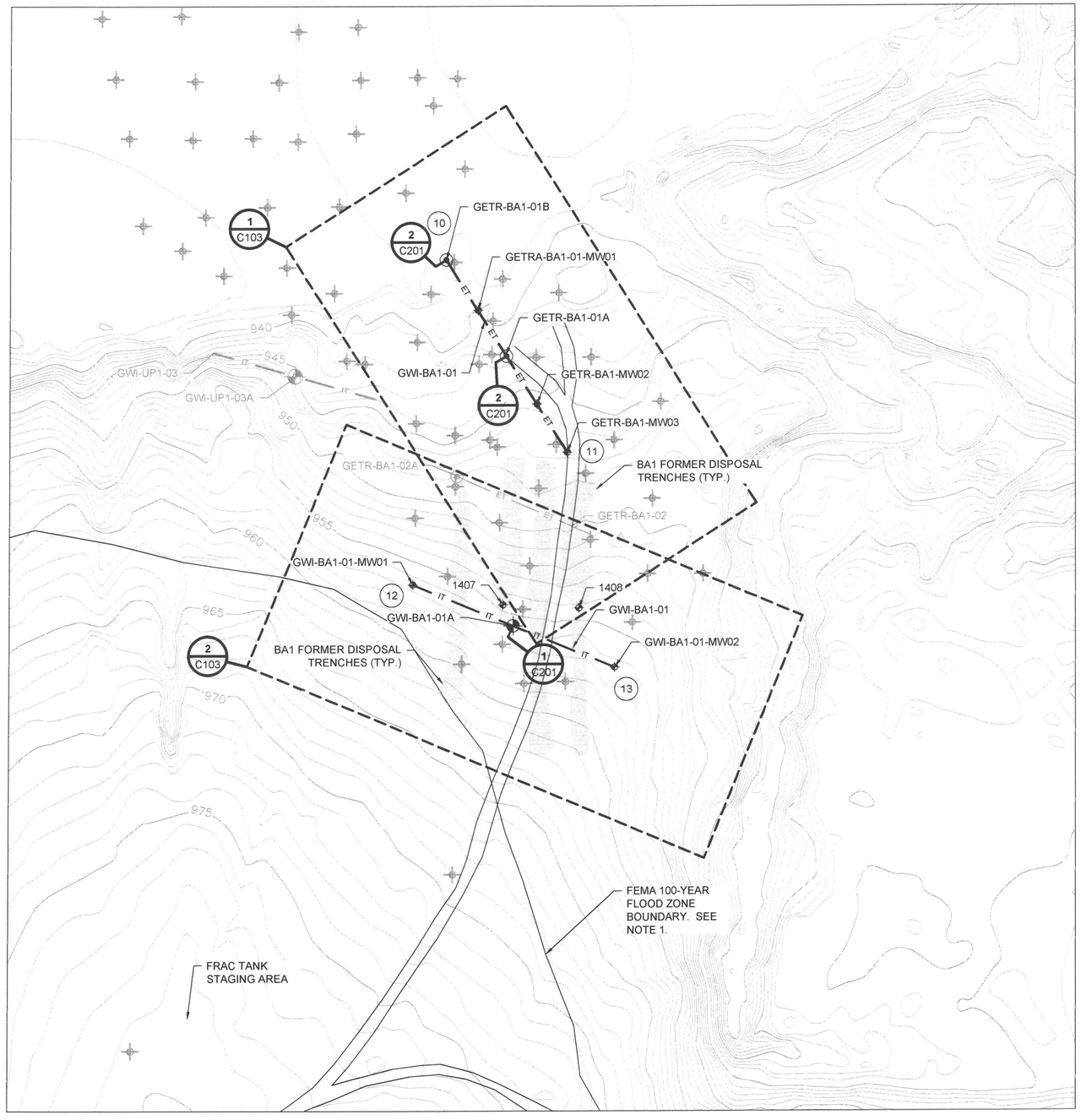
Cimmaron Environmental Response Trust
WESTERN AREA SITE PLAN

96785	contract
BMCD-GWREMED-C002	rev. A

sheet 4 of 11 sheets
file C001-OVERALL SITE PLAN.DWG



no.	date	by	ckd	description
A	2/01/17	BC	JH	FOR REVIEW

NOTES:
1. FRAC TANKS, EQUIPMENT, TRENCH SPOILS, ETC. SHALL BE STAGED AT AN ELEVATION ABOVE THE FEMA 100-YEAR FLOOD ELEVATION IN ACCORDANCE WITH THE SWPPP.
2. CONTRACTOR SHALL PROTECT EXISTING MONITOR WELLS DURING INJECTION AND EXTRACTION TRENCH INSTALLATION AND PILOT TESTING ACTIVITIES. CONTRACTOR MAY SUBMIT ALTERNATE TRENCH ALIGNMENT FOR ENGINEER APPROVAL IN EFFORT TO PROTECT EXISTING MONITOR WELLS.
3. TOPOGRAPHY SHOWN IS FROM AN AERIAL SURVEY DATED MAY 2014.

NORTH

0 50' 100'
SCALE IN FEET

PRELIMINARY - NOT FOR CONSTRUCTION

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9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
OKLAHOMA FIRM LICENSEE NO. 421

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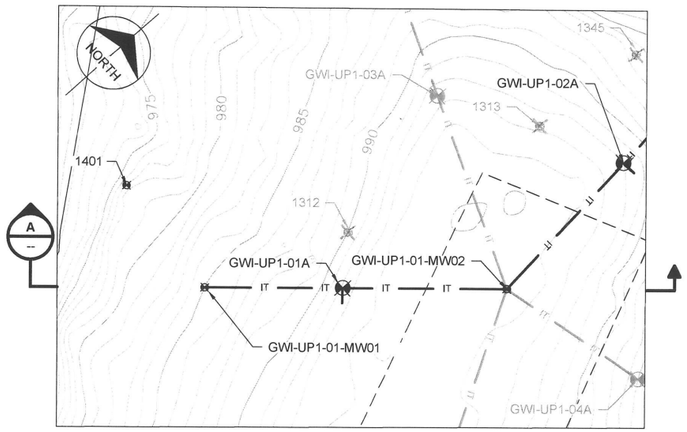
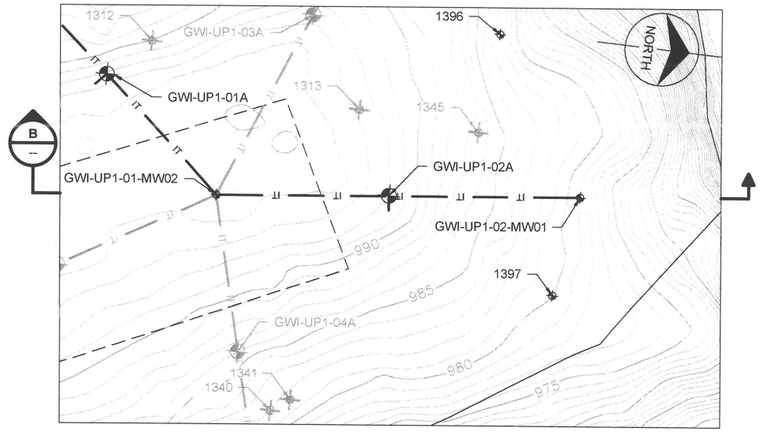
Cimmaron Environmental Response Trust
BURIAL AREA 1
SITE PLAN

96785	contract
BMCD-GWREMED-C002	rev. A

sheet 5 of 11 sheets
file C001-OVERALL SITE PLAN.DWG

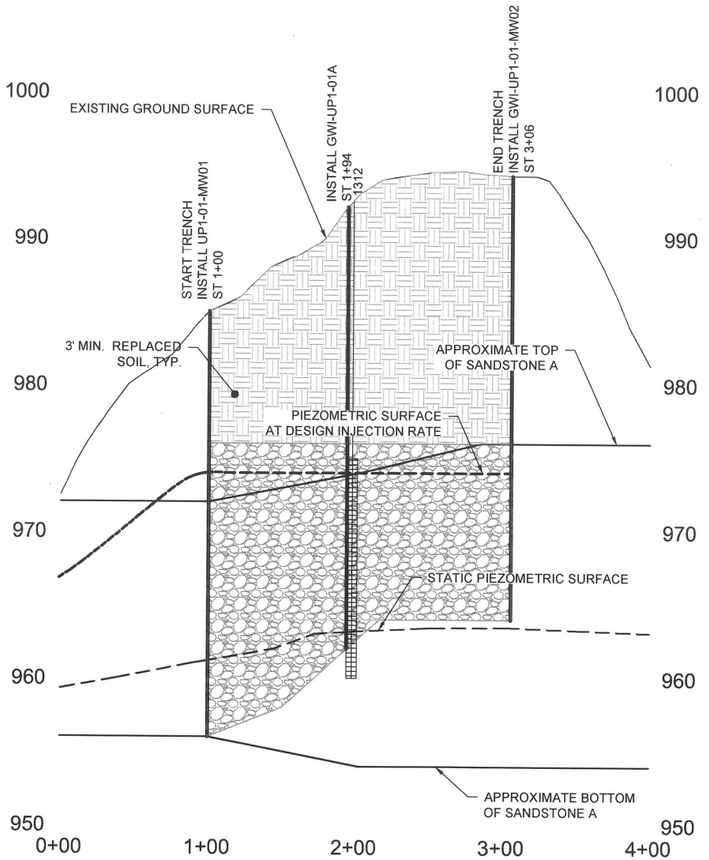


INJECTION TRENCH GWI-UP1-01
DETAIL — 1 / C002

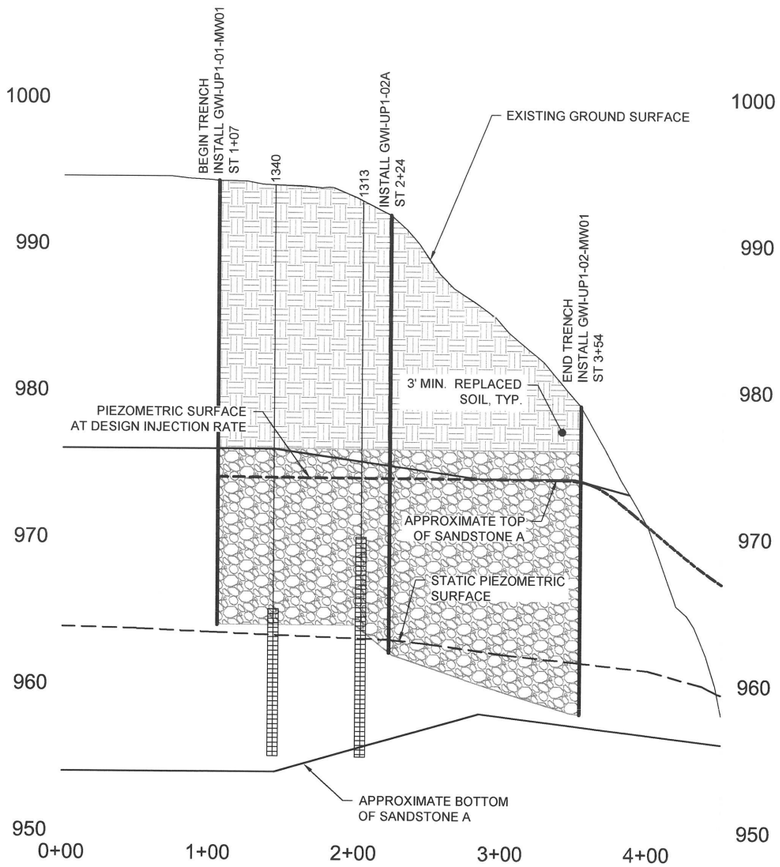


INJECTION TRENCH GWI-UP1-02
DETAIL — 2 / C002

NOTES:
1. TOPOGRAPHY SHOWN IS FROM AN AERIAL SURVEY DATED MAY 2014.
2. STATIC PIEZOMETRIC SURFACE FOR WESTERN AREA TREATMENT FACILITY CREATED FROM WATER LEVEL MEASUREMENTS FROM SANDSTONE A MONITOR WELLS ON MARCH 18, 2015.
3. SUBSURFACE INFORMATION SHOWN IS BASED ON LIMITED DATA AVAILABLE FROM BORING LOGS COMPLETED AT MONITOR WELLS 1341, 1345, AND 1354 THAT IS PROJECTED TO THE TRENCH ALIGNMENTS. SUBSURFACE INFORMATION SHOWN SHOULD BE CONSIDERED APPROXIMATE.
4. EXISTING SANDSTONE A MONITOR WELL LOCATIONS AND SCREEN INTERVALS ARE PROJECTED IN CROSS SECTION.
5. INJECTION WELLS AND MONITOR WELLS INSTALLED IN INJECTION TRENCHES WILL BE CONSTRUCTED SO THAT SCREEN INTERVAL COMPLETELY PENETRATE THE THE VERTICAL THICKNESS OF THE INJECTION TRENCH.
6. DISTURBED AREAS SHALL BE SEEDED AND STABILIZED IN ACCORDANCE WITH THE ODOT COMMISSION SPECIFICATIONS. SEED MIXTURE SHALL BE IN ACCORDANCE WITH TABLE 735.1 OF THE ODOT COMMISSION CHAPTER 735. SUBMIT SEED MIXTURE TO ENGINEER FOR APPROVAL PRIOR TO APPLICATION.
7. TRENCH DEPTH SHALL EXTEND TO THE BASE OF SANDSTONE A AS ENCOUNTERED IN THE FIELD OR UP TO 30 FEET BELOW GROUND SURFACE, WHICHEVER IS SHALLOWER.
8. SEE SHEET C202 FOR MONITOR WELL AND INJECTION WELL CONSTRUCTION DETAILS.



INJECTION TRENCH GWI-UP1-01
ELEVATION VIEW — A / --



INJECTION TRENCH GWI-UP1-02
ELEVATION VIEW — B / --

no.	date	by	ckd	description
A	2/01/17	BC	JH	FOR REVIEW

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KANSAS CITY, MO 64114
816-333-9400
OKLAHOMA FIRM LICENSEE NO. 421

JANUARY 2017	B. CLEMENT
B. CLEMENT	checked J. HESEMANN

VERTICAL SCALE
0 5' 10'
SCALE IN FEET

HORIZONTAL SCALE
0 50' 100'
SCALE IN FEET

Cimmaron Environmental Response Trust
UP-1 INJECTION TRENCH DETAILS

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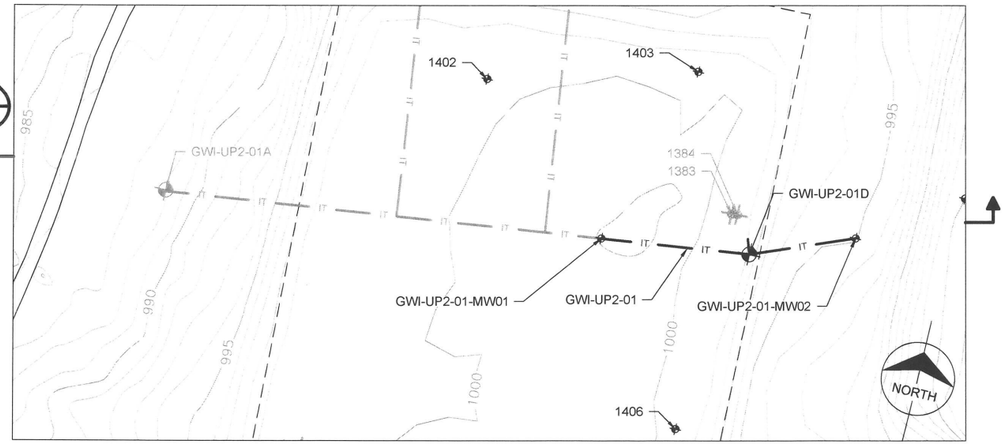
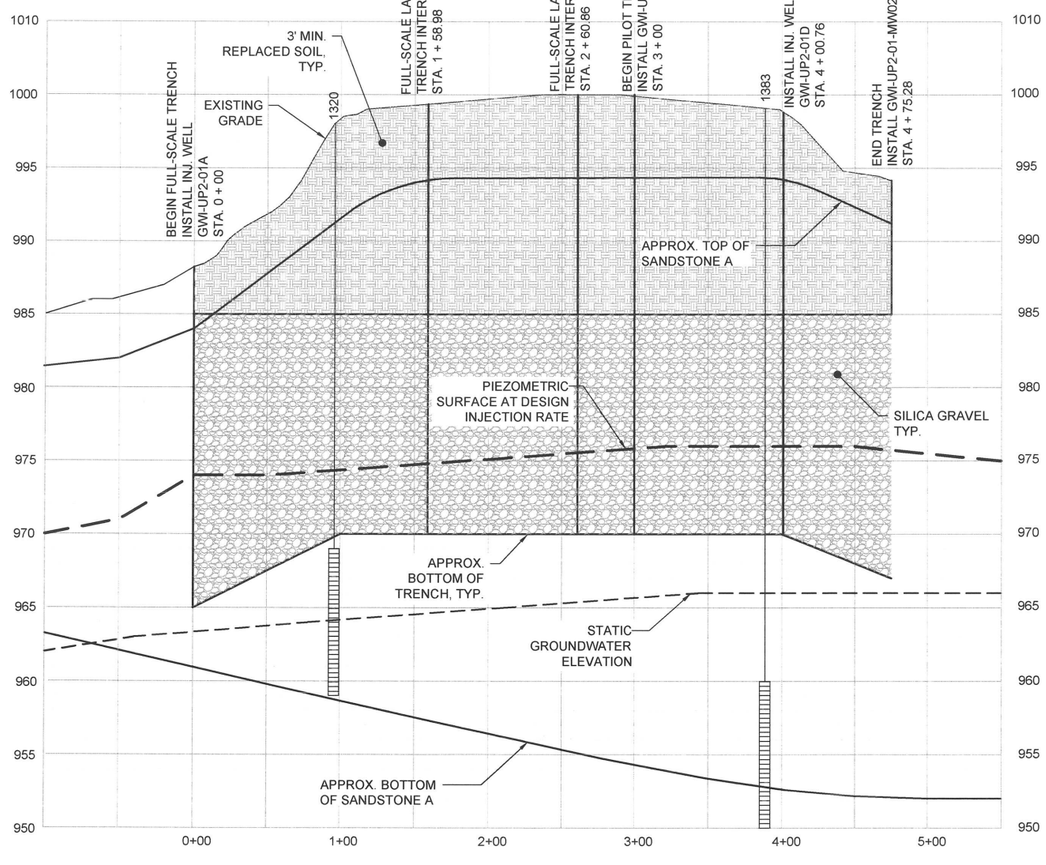
BMCD-GWREMED-C101

sheet 6 of 10 sheets
file C001-OVERALL SITE PLAN.DWG

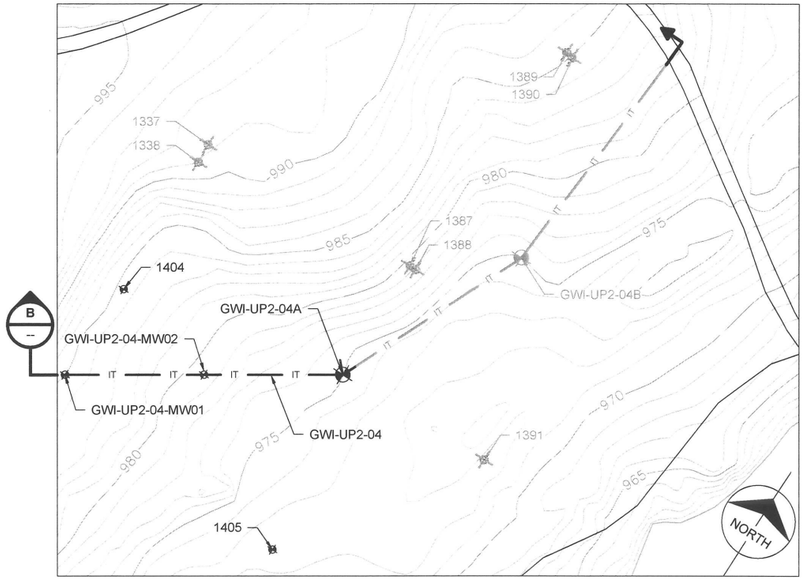
Inches



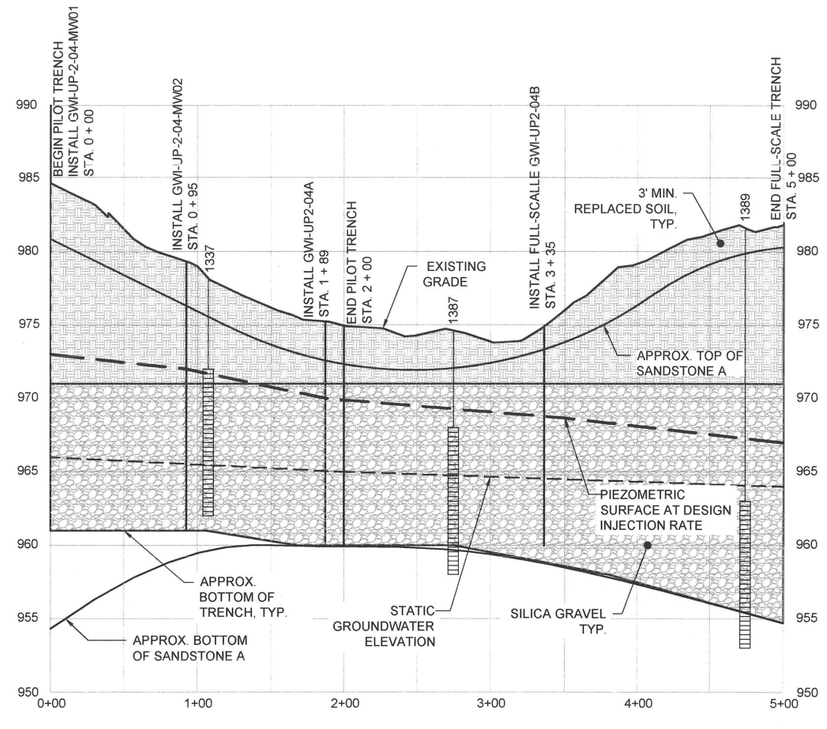
INJECTION TRENCH GWI-UP2-01 DETAIL — 3 / C002



INJECTION TRENCH GWI-UP2-01 ELEVATION VIEW — A / --



INJECTION TRENCH GWI-UP2-04 DETAIL — 4 / C002



INJECTION TRENCH GWI-UP2-04 ELEVATION VIEW — B / --

no.	date	by	ckd	description
A	2/01/17	BC	JH	FOR REVIEW

NOTES:
1. TOPOGRAPHY SHOWN IS FROM AN AERIAL SURVEY DATED MAY 2014.
2. STATIC PIEZOMETRIC SURFACE CREATED FROM WATER LEVEL MEASUREMENTS FROM SANDSTONE A MONITOR WELLS ON MARCH 18, 2015.
3. SUBSURFACE INFORMATION SHOWN IS BASED ON AVAILABLE BORING LOGS FOR NEARBY MONITOR WELLS. SUBSURFACE INFORMATION SHOWN SHOULD BE CONSIDERED APPROXIMATE.
4. EXISTING SANDSTONE A MONITOR WELL LOCATIONS AND SCREEN INTERVALS ARE PROJECTED IN CROSS SECTION.
5. INJECTION WELLS AND MONITOR WELLS INSTALLED IN INJECTION TRENCHES WILL BE CONSTRUCTED SO THAT SCREEN INTERVAL COMPLETELY PENETRATE THE THE VERTICAL THICKNESS OF THE INJECTION TRENCH.
6. TRENCH DEPTH SHALL EXTEND TO THE BASE OF SANDSTONE A AS ENCOUNTERED IN THE FIELD OR UP TO 30 FEET BELOW GROUND SURFACE, WHICHEVER IS SHALLOWER.
7. SEE SHEET C202 FOR ADDITIONAL MONITOR WELL AND INJECTION WELL CONSTRUCTION DETAILS.

0 50' 100'
SCALE IN FEET

PRELIMINARY - NOT FOR CONSTRUCTION

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UP-2 INJECTION TRENCH DETAILS

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rev. **A**

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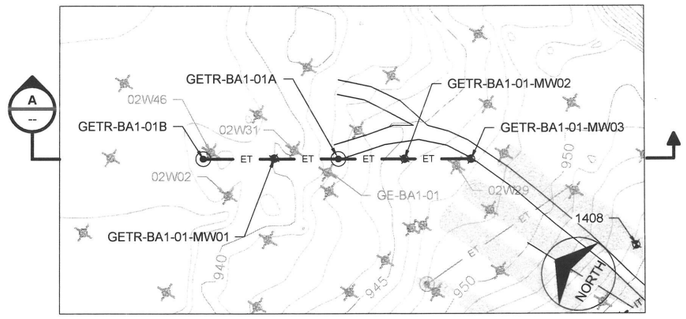
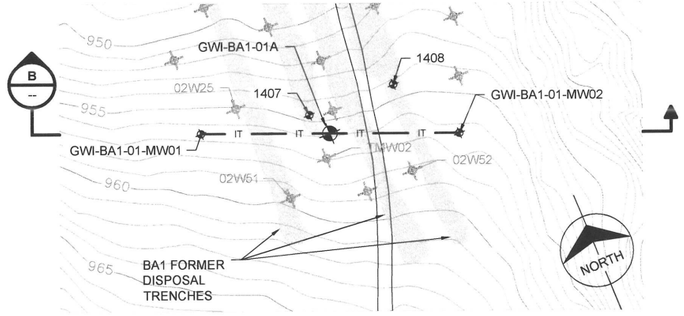
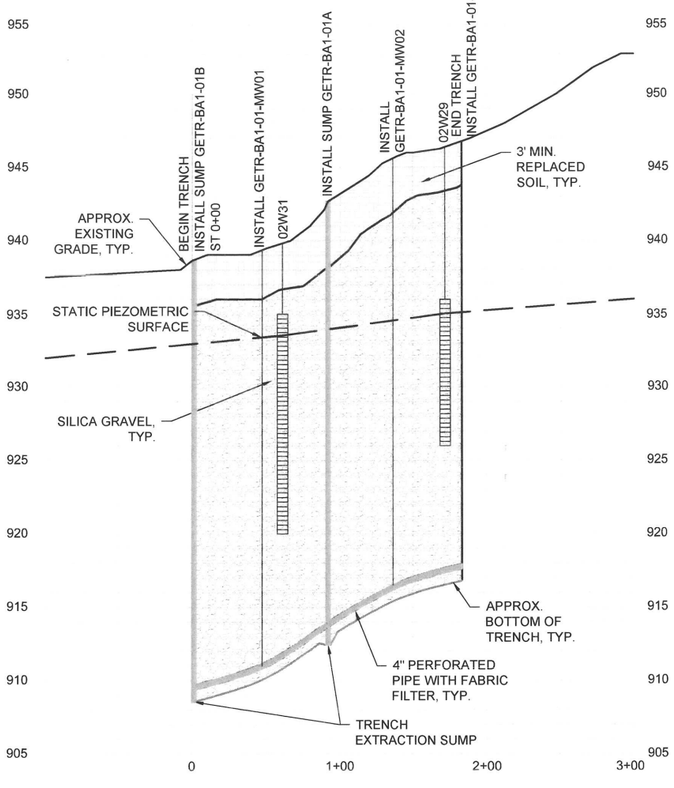
sheet 7 of 11 sheets
file C001-OVERALL SITE PLAN.DWG



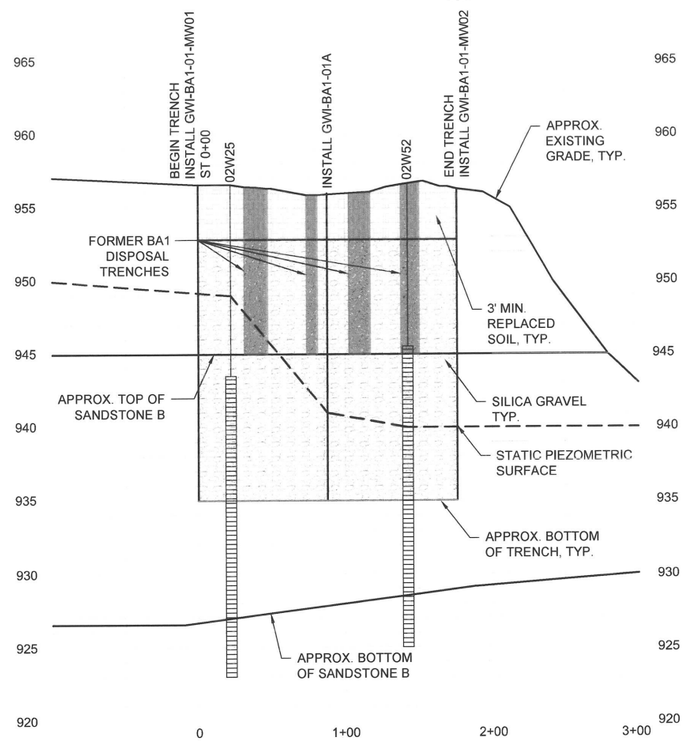
EXTRACTION TRENCH GETR-BA1-01 DETAIL — 1 / C003



INJECTION TRENCH GWI-BA1-01 DETAIL — 2 / C003



EXTRACTION TRENCH GETR-BA1-01 ELEVATION VIEW — A / --



INJECTION TRENCH GWI-BA1-01 ELEVATION VIEW — B / --

NOTES:
1. TOPOGRAPHY SHOWN IS FROM AN AERIAL SURVEY DATED MAY 2014.
2. STATIC PIEZOMETRIC SURFACE FOR BURIAL AREA 1 CREATED FROM WATER LEVEL MEASUREMENTS FROM SANDSTONE B AND TRANSITION ZONE MONITOR WELLS ON AUGUST 8, 2016.
3. EXISTING SANDSTONE B AND TRANSITION ZONE MONITOR WELL LOCATIONS AND SCREEN INTERVALS ARE PROJECTED IN CROSS SECTION.
4. CONTRACTOR SHALL ABANDON EXISTING MONITOR WELLS PRIOR TO TRENCH CONSTRUCTION AS DIRECTED BY ENGINEER. FOLLOWING COMPLETION OF TRENCH INSTALLATION, CONTRACTOR SHALL RE-INSTALL MONITOR WELLS AS DIRECTED BY ENGINEER. ENGINEER WILL PROVIDE MONITOR WELL LOCATIONS AND WELL CONSTRUCTION DETAILS FOR BA1 MONITOR WELLS NOT DEPICTED ON SHEET C103 UPON COMPLETION AND ACCEPTANCE OF TRENCH INSTALLATION.
5. MONITOR WELL 1407 SHALL BE CONSTRUCTED WITH A SCREEN INTERVAL FROM 8 TO 13 FEET BELOW GROUND SURFACE. MONITOR WELL 1408 SHALL BE CONSTRUCTED WITH A SCREEN INTERVAL ACROSS BOTH THE TRANSITION ZONE AND SANDSTONE B. SEE SHEET C202 FOR CONSTRUCTION DETAILS FOR ALL OTHER MONITOR WELL, INJECTION WELL, AND SUMPS DEPICTED ON SHEETS C003 AND C103.

no.	date	by	ckd	description
A	2/01/17	BC	JH	FOR REVIEW

PRELIMINARY - NOT FOR CONSTRUCTION

BURNS McDONNELL
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KANSAS CITY, MO 64114
816-333-9400
OKLAHOMA FIRM LICENSEE NO. 421

JANUARY 2017	B. CLEMENT
B. CLEMENT	checked J. HESEMANN

VERTICAL SCALE
0 5' 10'
SCALE IN FEET

HORIZONTAL SCALE
0 50' 100'
SCALE IN FEET

Cimmaron Environmental Response Trust
BA1 INJECTION AND EXTRACTION TRENCH DETAILS

96785 | contract
rev.

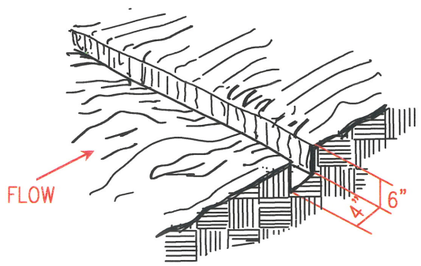
BMCD-GWREMED-C103

sheet 8 of 11 sheets
file C001-OVERALL SITE PLAN.DWG

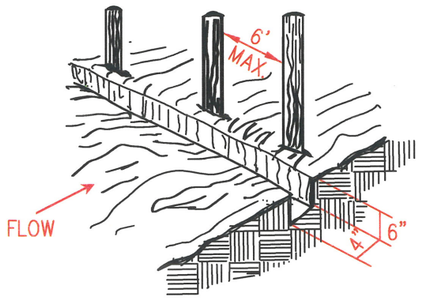
APPENDIX H - BEST MANAGEMENT PRACTICE DETAILS

SEDIMENT FENCE

1. EXCAVATE A 6"x4" TRENCH.

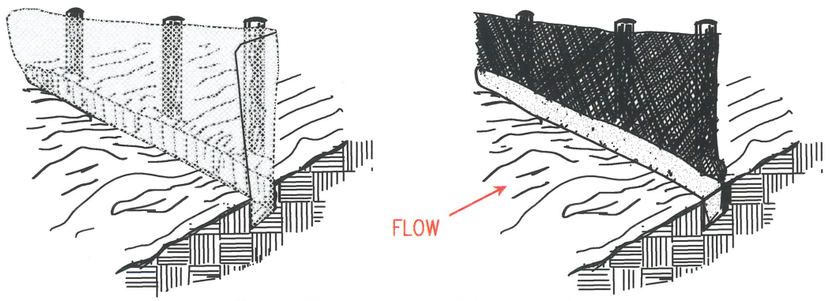


2. SET THE STAKES ALONG THE DOWN SLOPE SIDE OF THE TRENCH.

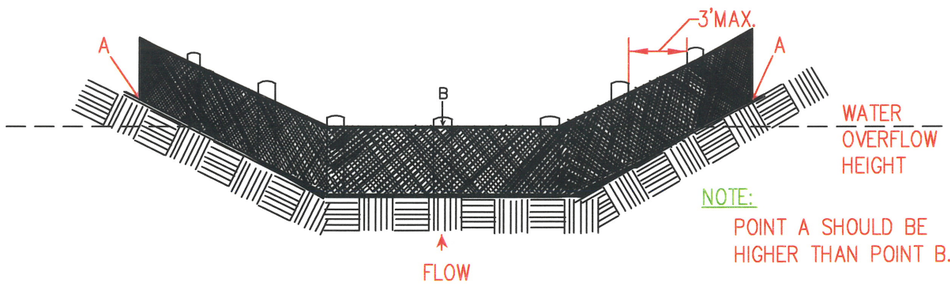


3. STAPLE GEOTEXTILE MATERIAL TO STAKES AND EXTEND IT INTO AND AROUND THE BOTTOM OF THE TRENCH.

4. BACKFILL AND COMPACT THE EXCAVATED SOIL OVER THE GEOTEXTILE IN THE TRENCH.



SHEET FLOW INSTALLATION
(PERSPECTIVE VIEW)
NOT TO SCALE



NOTE:
POINT A SHOULD BE HIGHER THAN POINT B.

DRAINAGEWAY INSTALLATION
(FRONT ELEVATION)
NOT TO SCALE

SOURCE: MODIFIED FROM VA. DCR, 1992

SEDIMENT FENCE NOTES:

A) INSTALLATION:

1. THE HEIGHT OF SEDIMENT FENCE SHALL BE A MINIMUM OF 16 INCHES ABOVE THE ORIGINAL GROUND SURFACE AND SHALL NOT EXCEED 34 INCHES ABOVE THE GROUND SURFACE.
2. THE FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL CUT TO THE LENGTH OF THE BARRIER TO AVOID THE USE OF JOINTS. WHEN JOINTS ARE UNAVOIDABLE, FILTER CLOTH SHALL BE SECURELY SPLICED TOGETHER ONLY AT SUPPORT POSTS, WITH A MAX 6-INCH OVERLAP.
3. DIG A TRENCH AT LEAST 6 INCHES DEEP AND 4 INCHES WIDE ALONG THE FENCE ALIGNMENT.
4. DRIVE POSTS AT LEAST 24 INCHES INTO THE GROUND ON THE DOWNSLOPE SIDE OF THE TRENCH. SPACE POSTS A MAXIMUM OF 6 FEET APART.
5. EXTRA-STRENGTH SEDIMENT FENCE FABRIC SHALL BE USED. POSTS FOR THIS TYPE OF FABRIC SHALL BE PLACED A MAXIMUM OF 6 FEET APART. THE SEDIMENT FABRIC SHALL BE FASTENED SECURELY TO THE UPSLOPE SIDE OF THE POSTS USING A MINIMUM OF ONE INCH LONG, HEAVY-DUTY WIRE STAPLES OR TIE-WIRES, AND EIGHT INCHES OF THE FABRIC SHALL BE EXTENDED INTO THE TRENCH. THE FABRIC SHALL NOT BE STAPLED TO EXISTING TREES.
6. PLACE THE BOTTOM 1 FOOT OF FABRIC IN THE MINIMUM-OF-6-INCH DEEP TRENCH, LAPPING TOWARD THE UPSLOPE SIDE. BACKFILL WITH COMPACTED EARTH OR GRAVEL.
7. IF A SEDIMENT FENCE IS TO BE CONSTRUCTED ACROSS A DITCH LINE OR SWALE, IT MUST BE OF SUFFICIENT LENGTH TO ELIMINATE ENDFLOW, AND THE PLAN CONFIGURATION SHALL RESEMBLE AN ARC OR HORSESHOE, PLACED ON A CONTOUR, WITH THE ENDS ORIENTED UPSLOPE. EXTRA-STRENGTH SEDIMENT FABRIC SHALL BE USED WITH A MAXIMUM 3-FOOT SPACING OF POSTS.
8. TO REDUCE MAINTENANCE, EXCAVATE A SHALLOW SEDIMENT STORAGE AREA IN THE UPSLOPE SIDE OF THE FENCE. PROVIDE GOOD ACCESS IN AREAS OF HEAVY SEDIMENTATION FOR CLEAN OUT AND MAINTENANCE.
9. SEDIMENT FENCES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY STABILIZED.

B) TROUBLESHOOTING:

1. DETERMINE THE EXACT LOCATION OF UNDERGROUND UTILITIES, BEFORE FENCE INSTALLATION SO UTILITIES ARE NOT DISTURBED.
2. GRADE ALIGNMENT OF FENCE AS NEEDED TO PROVIDE A BROAD, NEARLY LEVEL AREA UPSTREAM OF FENCE TO ALLOW SEDIMENT COLLECTION AREA.

C) INSPECTION MAINTENANCE:

1. INSPECT SEDIMENT FENCES AT LEAST ONCE A WEEK AND AFTER EACH RAINFALL. MAKE ANY REQUIRED REPAIRS IMMEDIATELY.
2. SHOULD THE FABRIC OF A SEDIMENT FENCE COLLAPSE, TEAR, DECOMPOSE, OR BECOME INEFFECTIVE, REPLACE IT PROMPTLY.
3. REMOVE SEDIMENT DEPOSITS AS NECESSARY TO PROVIDE ADEQUATE STORAGE VOLUME FOR THE NEXT RAIN AND TO REDUCE PRESSURE ON THE FENCE. AVOID DAMAGING OR UNDERMINING THE FENCE DURING CLEANOUT. SEDIMENT ACCUMULATION SHOULD NOT EXCEED 1/2 THE HEIGHT OF THE FENCE.
4. REMOVE ALL FENCING MATERIALS AND UNSTABLE SEDIMENT DEPOSITS, AND BRING THE AREA TO GRADE AND STABILIZE IT AFTER THE CONTRIBUTING DRAINAGE AREA HAS BEEN PROPERLY AND COMPLETELY STABILIZED.

AMERICAN PUBLIC WORKS ASSOCIATION

APWA

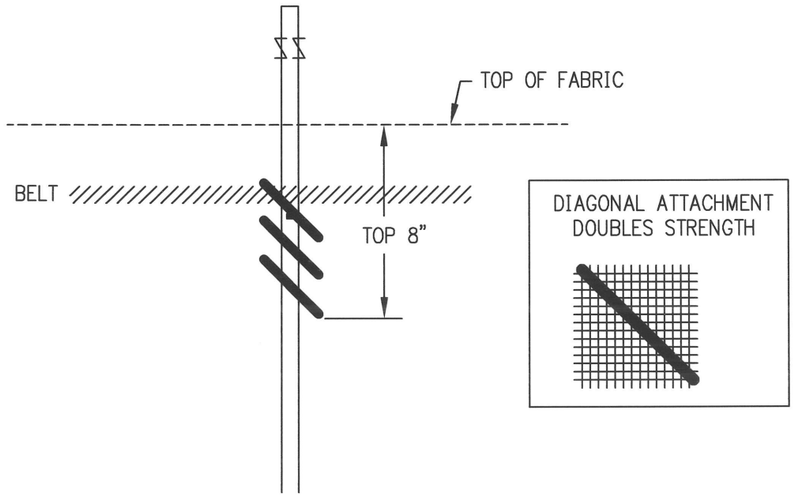
KANSAS CITY METROPOLITAN CHAPTER

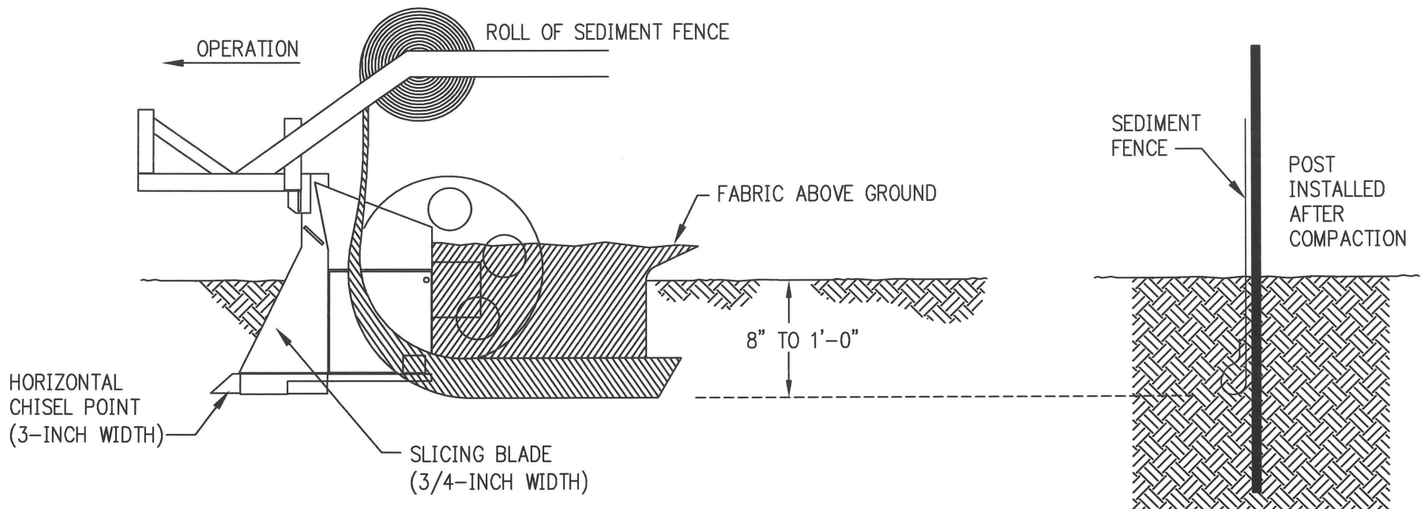
SEDIMENT FENCE

STANDARD DRAWING NUMBER ESC-10

ADOPTED:

SEDIMENT FENCE INSTALLATION SLICING METHOD



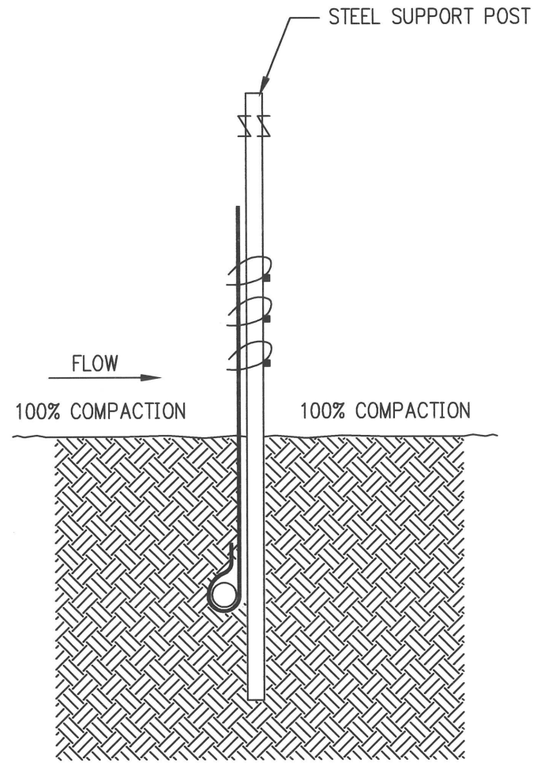


NOTE

VIBRATORY PLOW IS NOT ACCEPTABLE BECAUSE OF HORIZONTAL COMPACTION.

SEDIMENT FENCE INSTALLATION SLICING METHOD NOTES:

1. LIMIT PONDING HEIGHT TO 24"
2. ATTACH FABRIC TO UPSTREAM SIDE OF POST.
3. DRIVE OVER EACH SIDE OF SEDIMENT FENCE 2 TO 4 TIMES WITH DEVICE EXERTING 60 PSI OR GREATER AFTER MATERIAL IS SLICED INTO THE GROUND.
4. SPACE POSTS A MAX OF
   7' ON OPEN RUNS AND
   4' ON POOLING AREAS.
5. SINK POSTS AS FAR BELOW GROUND AS FABRIC ABOVE GROUND.



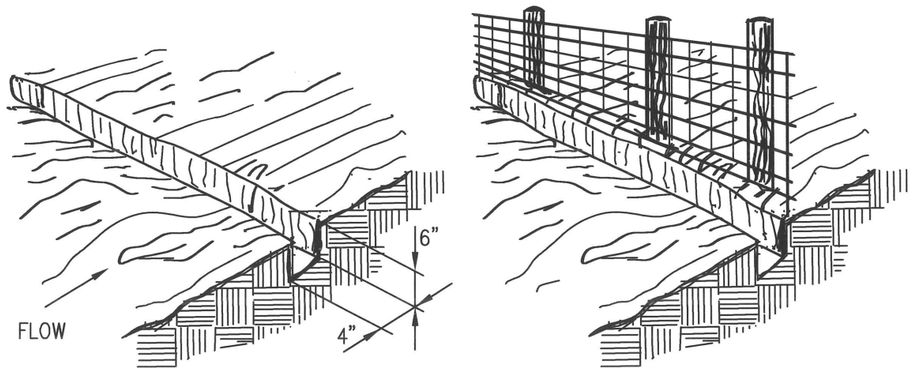
SOURCE: TOM CARPENTER, 2000

AMERICAN PUBLIC WORKS ASSOCIATION	
APWA	KANSAS CITY METROPOLITAN CHAPTER
SEDIMENT FENCE INSTALLATION SLICING METHOD	STANDARD DRAWING NUMBER ESC-11 ADOPTED:

SUPER SEDIMENT FENCE

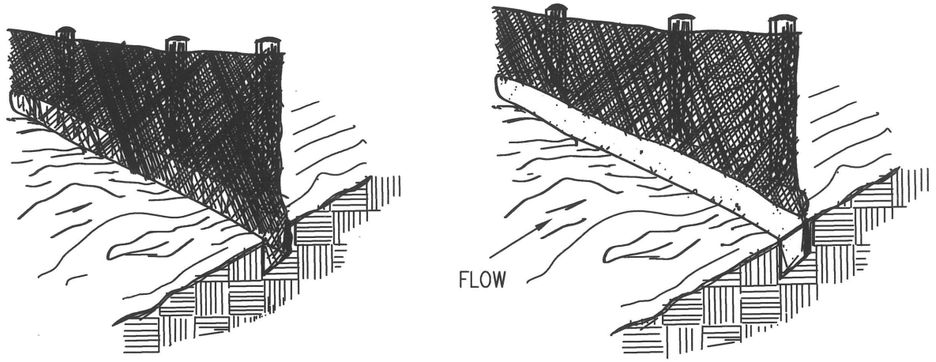
1. EXCAVATE A 6"X4" TRENCH

2. SET THE METAL T-POSTS OR FENCE POSTS ON THE DOWNSLOPE SIDE OF THE TRENCH. SECURE WIRE FENCING TO THE POSTS.



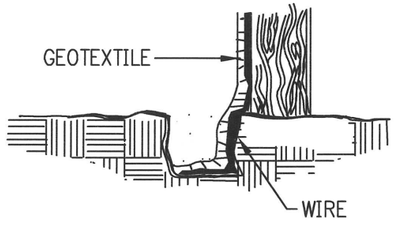
3. ATTACH THE GEOTEXTILE FABRIC TO THE WIRE FENCE AND EXTEND IT INTO AND AROUND THE BOTTOM OF THE TRENCH.

4. BACKFILL AND COMPACT THE EXCAVATED SOIL.



EXTENSION OF FABRIC AND WIRE INTO THE TRENCH

NOT TO SCALE



SECTIONAL FENCE ANCHOR DETAIL

SOURCE: MODIFIED FROM VA. DCR, 1992

SUPER SEDIMENT FENCE NOTES:

A) CONSTRUCTION SPECIFICATIONS:

1. FENCING SHALL BE 42-INCHES IN HEIGHT.
2. WIRE FENCE SHALL BE FASTENED SECURELY TO THE FENCE POSTS WITH WIRE TIES AND STAPLES. THE LOWER TENSION WIRE, BRACE AND TRUSS RODS, DRIVE ANCHORS, AND POST CAPS ARE NOT REQUIRED EXCEPT ON THE ENDS OF THE FENCE.
3. SEDIMENT FENCE SHALL BE FASTENED SECURELY TO THE WIRE FENCE WITH TIES SPACED EVERY 24 INCHES AT THE TOP AND MID-SECTION.
4. SEDIMENT FENCE AND WIRE SHALL BE EMBEDDED A MINIMUM OF 8-INCHES INTO THE GROUND.
5. WHEN TWO SECTIONS OF GEOTEXTILE FABRIC ADJOIN EACH OTHER, THEY SHALL BE OVERLAPPED BY 6-INCHES AND FOLDED.
6. WIRE FENCE WILL BE BETWEEN 9 AND 14 GAUGE AND SHALL HAVE A MAXIMUM MESH SPACING OF 6-INCHES.
7. SEDIMENT FENCE SHALL MEET THE FOLLOWING REQUIREMENTS FOR GEOTEXTILE CLASS F: ADDITIONAL SPECIFICATIONS ARE FOUND IN ASTM 6461.

SEDIMENT FENCE REQUIREMENTS

TENSION STRENGTH	50 LB/IN OR MORE	ASTM 4632
TENSION MODULUS	20 LB/IN OR MORE	ASTM 4632
FLOW RATE	0.3 GAL/FT^2/MINUTE OR LESS	ASTM 5141
FILTERING EFFICIENCY	75 % OR MORE	ASTM 5141

B) INSTALLATION:

1. THE HEIGHT OF A SEDIMENT FENCE SHALL BE A MINIMUM OF 16 INCHES ABOVE THE ORIGINAL GROUND SURFACE AND SHALL NOT EXCEED 34-INCHES ABOVE GROUND SURFACE.
2. THE FILTER FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL AND CUT TO THE LENGTH OF THE BARRIER TO AVOID THE USE OF JOINTS. WHEN JOINTS ARE UNAVOIDABLE, FILTER CLOTH SHALL BE SPLICED TOGETHER ONLY AT A SUPPORT POST, WITH A MINIMUM 6-INCH OVERLAP, AND SECURELY
3. SEALED.
   A TRENCH SHALL BE EXCAVATED APPROXIMATELY 4 INCHES WIDE AND 6 INCHES DEEP ON THE UPSLOPE
4. SIDE OF THE PROPOSED LOCATION OF THE FENCE.
   WHEN WIRE SUPPORT IS USED, STANDARD-STRENGTH FILTER CLOTH MAY BE USED. POSTS FOR THIS TYPE OF INSTALLATION SHALL BE PLACED A MAXIMUM OF 10 FEET APART. THE WIRE MESH FENCE MUST BE FASTENED SECURELY TO THE UPSLOPE SIDE OF THE POSTS USING HEAVY DUTY WIRE STAPLES AT LEAST 1 INCH LONG, TIE WIRES, OR HOG RINGS. THE WIRE SHALL EXTEND INTO THE TRENCH A MINIMUM OF 2 INCHES AND SHALL NOT EXTEND MORE THAN 34 INCHES ABOVE THE ORIGINAL GROUND SURFACE. THE STANDARD-STRENGTH FABRIC SHALL BE STAPLED OR WIRED TO THE FENCE, AND 8 INCHES OF THE FABRIC
5. SHALL BE EXTENDED INTO THE TRENCH. THE FABRIC SHALL NOT BE STAPLED TO EXISTING TREES.
   IF A SEDIMENT FENCE IS TO BE CONSTRUCTED ACROSS A DITCH LINE OR SWALE, IT MUST BE OF SUFFICIENT LENGTH TO ELIMINATE ENDFLOW, AND THE PLAN CONFIGURATION SHALL RESEMBLE AN ARC OR HORSESHOE WITH THE ENDS ORIENTED UPSLOPE. EXTRA-STRENGTH FILTER FABRIC SHALL BE USED FOR
6. THIS APPLICATION WITH A MAXIMUM 3-FOOT SPACING OF POSTS.
   THE 4 INCH BY 6 INCH TRENCH SHALL BE BACKFIELD AND THE SOIL COMPACTED OVER THE FILTER
7. FABRIC.
   SEDIMENT FENCES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY STABILIZED. SEDIMENT ACCUMULATION SHOULD NOT EXCEED 1/2 THE HEIGHT OF THE FENCE.

C) INSPECTION AND MAINTENANCE:

1. INSPECT SEDIMENT FENCES AT LEAST ONCE A WEEK AND AFTER EACH RAINFALL. MAKE ANY REQUIRED REPAIRS IMMEDIATELY.
2. SHOULD THE FABRIC OF A SEDIMENT FENCE COLLAPSE, TEAR, DECOMPOSE, OR BECOME INEFFECTIVE, REPLACE IT PROMPTLY.
3. MAINTENACE SHALL BE PERFORMED AS NEEDED AND SEDIMENT BUILD-UPS REMOVED WHEN BULGES DEVELOP IN THE SEDIMENT FENCE OR WHEN SEDIMENT REACHES 50% OF THE FENCE HEIGHT. AVOID DAMAGING OR UNDERMINING THE FENCE DURING CLEANOUT.
4. REMOVE ALL FENCING MATERIALS AND UNSTABLE SEDIMENT DEPOSITS, AND BRING THE AREA TO GRADE AND STABILIZE IT AFTER THE CONTRIBUTING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

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APWA | KANSAS CITY METROPOLITAN CHAPTER

SUPER SEDIMENT FENCE

STANDARD DRAWING NUMBER ESC-12

ADOPTED:

J: \KCMOAPWA \27787\CIVIL\details\draft 4-22-03\division III\ESC-12.DWG 04-23-2003 08:58 JRA

SECTION 32 91 00 - RIGHT-OF-WAY RESTORATION

PART 1 - GENERAL

1.01 SUMMARY: This Section covers restoration of the right-of-way (ROW) associated with the T-Line Contractor, including site preparation, top soiling, mulching and seeding, for all disturbed areas except cropland fields. Cropland fields will be re-established to the desired crop rotation by the landowner following construction.

1.02 REFERENCES:

A. Applicable Standards:

1. AASHTO M140 Standard Specification for Emulsified Asphalt - American Association of State Highway and Transportation Officials Standard Method of Test.

1.03 SUBMITTALS:

A. Submit as specified in DIVISION 01.

B. Compliance Submittals:

1. Include, but not limited to, the following:
   a. Certification from vendor that seed meets requirements of these specifications.
   b. Seed mix showing purity and germination of each seed type and total pounds of seed required per acre.
   c. T-Line Contractor is responsible for determining the choice of mulch most suitable for the Project area. Documentation is to be submitted to the Owner's Agent for approval. Reference Part 2.02 paragraph A of this section for more information.
   d. Documentation from the manufacturer regarding appropriate methods for determining use/effectiveness, installation, and maintanence for all Best Management Practices (BMP's) to be installed throughout construction.

PART 2 - PRODUCTS

2.01 SEED:

A. Seed shall be fresh, clean, new crop seed.

B. Seed mix will be provided in PART 3 - SEEDING.

C. Seed shall conform to all applicable laws of the State of Oklahoma.

D. Seed shall be labeled according to the U.S. Department of Agriculture Federal Seed Act and shall be furnished in containers with tags showing seed mixture, purity, germination, weed content, name of seller, and date on which seed was tested.

E. Wet, moldy, or seed that has been damaged in storage shall not be used.

2.02 MULCH: May be vegetative mulch or wood cellulose fiber.

A. Check with the local Agriculture County Extension Service office to determine choice of mulch most suitable for the Project area. Specify only one type of mulch that shall be free from noxious weed seed, mold, and other deleterious materials. Chosen mulch shall be submitted to Owner's Agent for approval.

B. Asphalt Emulsion: Conform to AASHTO M140, Type SS-1.

C. Wood-Cellulose Fiber:
   1. Mulch shall not contain germination or growth-inhibiting ingredients.
   2. Mulch shall be dyed an appropriate color to aid in visual inspection.
   3. Mulch material shall be easily and evenly dispersed when agitated in water.
   4. Supply in packages of not more than 100 pounds gross weight, and be marked by the manufacturer to show the air dry weight content.

D. Mulch: Furnish in air-dry condition and of proper consistency for placing with commercial mulch blowing equipment. Mulch shall contain no fertile seed.

E. This does not include any mulch produced onsite from vegetation within the ROW.

2.03 JUTE NETTING:

A. Jute netting or other equal approved by the Owner's Agent shall consist of a uniform, open, plain-weave mesh of smolder-resistant, unbleached single jute yarn.
   1. Yarn shall be of loosely twisted construction and shall not vary in thickness by more than one-half its normal diameter.
   2. Jute mesh shall be furnished in rolled strips and shall be as follows:
      a. Minimum width of 42 inches.
      b. 5.5 wrap yarns by 3.5 filling yarns per inch.
   3. Staples shall be of No. 11 gauge, or heavier, steel wire, "U" shaped and not less than 6 inches in length.
   4. Additional staples may be required depending on the existing soil and or weather conditions.

PART 3 - EXECUTION

3.01 RIGHT-OF-WAY RESTORATION: Following line construction activities, remove construction roads and restore right-of-way as follows:

A. All ruts in existing roads shall be filled and compacted in 6-inch lifts and the roads graded to approximately the original contours.

B. Construction roads and ruts in agricultural land shall be plowed and disced to remove any hard compacted areas and shall be graded to the original contours.

C. All disturbed areas shall be finish graded to the original ground contours. Dockets, swales, and high points shall be graded, using hand methods where necessary, to provide an unconcentrated flow of runoff around foundations and through structures.

D. Annual Ryegrass shall not be used in or around wheat fields.

E. T-Line Contractor shall provide Owner's Agent with two days notice of planned seeding, mulching, and fertilizing so Owner/Owner's Agent may view the process, if he/she chooses to do so.

F. Topsoil:
   1. Distribute over required areas without compaction other than that obtained with spreading equipment.
   2. Place to the extent material is available within the following limits:
      a. Not less than 4 inches in depth.

b. Do not exceed 6 inches in depth.

G. Shape and grade to match contours of adjacent areas and permit good natural drainage.

H. Maintenance and Repair:

1. Maintenance: T-Line Contractor is responsible for protecting newly topsoiled areas from actions of the elements.
2. Correction of Settlement: T-Line Contractor is responsible for correcting settlement in excess of 18 inches and damages created thereby within one year after acceptance of the Work.
3. T-Line Contractor is responsible for making repairs within ten days from and after due notification by Owner of embankment or backfill settlement and resulting damage.
4. T-Line Contractor is responsible for making own arrangements for access to the site for purposes of repair.

3.02 SEEDING AND SPRIGGING:

A. Seedbed Preparation:

1. Where practical, remove any rocks or other obstructions which might interfere with tilling, seeding, and sprigging operations.
2. In areas where ground surface is compacted hard enough to prevent drill penetration, thoroughly loosen and pulverize topsoil to a depth of at least 3 inches.
3. Maintain tilled areas until seeded or sprigged.

B. Seeding:

1. The rate of application shall be in accordance with Table 1.

TABLE 1

PLANTING ZONES Number/Pounds per Acre (Ac)						
Plant Species	**Adapted Varieties**	**Size**	**Type 1**	**Type 2**	**Type 3**	**Type 4**
Big Bluestem (Andropogon gerardii)	Kaw or Comparable	PLS	6	6	--	--
Little Bluestem (Schizachyrium scoparium)	Aldous, Cimarron (only in SW), or Comparable	PLS	5	5	--	--
Indiangrass (Sorghastrum nutans)	Cheyenne, Lometa, or Comparable	PLS	6	6	--	--
Switchgrass (Panicum virgatum)	Blackwell, Caddo, Alamo, Kanlow, or Comparable	PLS	5	5	--	--
Sideoats Grama (Bouteloua curtipendula)	El Reno, Haskell, or Comparable	PLS	5	5	--	--
Sand Lovegrass (Eragrostis trichodes)	Bend, Mason, or Comparable	PLS	2	--	--	--
Costal Bermudagrass (Cynodon dactylon)	--	Bushels of sprigs/acre	--	--	30	--
Tall Fescue (Festuca arundinacea)	(Only in SE)	PLS	--	--	20	--
Wheat Grass (Bromus inermis)	Western or comparable	PLS	--	--	112	--
Alfalfa (Medicago spp.)	--	PLS	--	--	10-20	--
Red Clover[1] (Trifolium pretense L.)	All	PLS	--	--	5	
Wheat (Triticum spp.)	--	Bulk	--	--	--	100
Annual Ryegrass[2] (Lolium multiflorum)	--	Bulk	--	--	--	100

Notes:
Do not use non-regionally specific cultivar (i.e. something such as Cave-In-Rock)
Switchgrass developed in Illinois is not to be used.
All seed mixes shall be approved by the Owner's Agent or on-site environmental inspector.
[1]Inoculate legume seed.
[2]Annual Ryegrass shall not be used in or around wheat fields.

Type 1	Grassland Sandy	Use Mixture
Type 2	Grassland Upland	Use Mixture
Type 3	Hay Land/Pasture Land	Use one species
Type 4	Temporary Cover	Use one species

1. The Pure Live Seed Index (PLS) shall be determined by the following formula:

$$PLS = \frac{\% \text{ Germination X } \% \text{ Purity}}{100}$$

2. Methods of Application:
   a. Dry Seeding: Accomplish sowing by use of a rangeland drill, having drills no more than 4 inches apart.
      (1) Drill seed to a depth of 1/2-inch to 1 inch.
      (2) Overlap successive seed strips to provide uniform coverage.
   b. In areas that cannot be drilled, broadcast seed at double the application rate for drilling and harrow into the soil.
   c. Sprigging of bermudagrass will be done with traditional sprigging equipment into a tilled seed bed.

C. Seeding shall be performed at all disturbed areas, on Dry Ditch Crossings and on all other areas as appropriate.

D. Temporary Seeding:
1. Construction Requirements – This work shall consist of preparing a seedbed and sowing a temporary cover crop during the construction process. Seeding shall be monitored until a uniform vegetative cover can be established on a continuous basis on all cut and fill slopes, waste sites and borrow pits during construction.
2. Bulk seeding rates shall be adjusted upward so that seeding is accomplished in quantities linked with the PLS.
3. Seeding Rate:
   a. Mar 1 – Dec 1 100 lbs/acre cereal rye or wheat.
4. Maintenance – The cover crop shall be maintained until permanent vegetation is installed.
5. Seasonal Limitations - Perform Grassland seeding from December 1 to June 1 (the optimal seeding period being March 1 through May 15) unless otherwise authorized, in writing, by the Project Engineer. Perform Hay Land and Pasture Land seeding September 1 through October 31, Bermuda grass February 1 through June 15, unless otherwise authorized in writing, by the Project Engineer.

3.03 MULCHING:

A. Apply mulch to all seeded areas. On slopes exceeding 15 percent, apply with an asphalt emulsion.

B. Apply to seeded areas within 48 hours after seeding.

C. Apply vegetative mulch at the rate of 2-1/2 tons per acre by means of a mechanical spreader or other approved methods.

D. Apply wood cellulose - fiber mulch hydraulically at the rate of 1,000 gallons per acre.

E. Vegetative mulch with asphalt emulsion:
1. Apply vegetative mulch at the rate of 2-1/2 tons per acre.
2. Apply asphalt emulsion at the rate of 100 gallons per ton of straw (250 gallons per acre).

3. Mulching machine shall inject emulsified asphalt at the proper rate directly into the air stream carrying the straw.

3.04 JUTE NETTING:

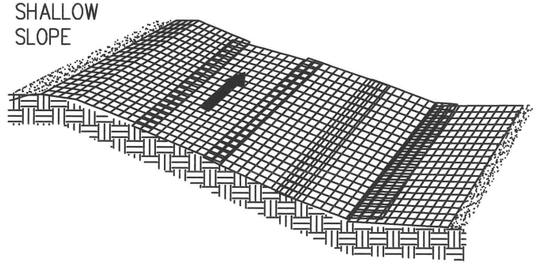
A. Where other restorative measures do not result in stable slopes, further stabilize those slopes by means of jute netting, or other approved method.

B. Install jute netting in accordance with manufacturer's recommendations.

END OF SECTION 32 91 00

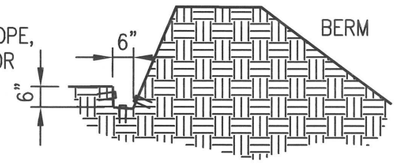
EROSION CONTROL BLANKET

SHALLOW SLOPE

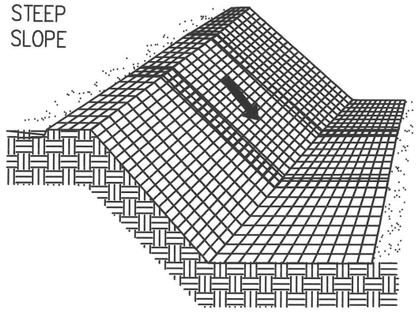


NOTE:
ON SHALLOW SLOPES, PROTECTIVE EROSION CONTROL BLANKETS MAY BE APPLIED ACROSS THE SLOPE.

NOTE:
WHERE THERE IS A BERM AT THE TOP OF THE SLOPE, BRING THE MATERIAL OVER THE BERM AND ANCHOR IT BEHIND THE BERM.



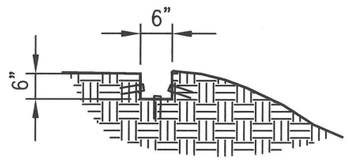
STEEP SLOPE

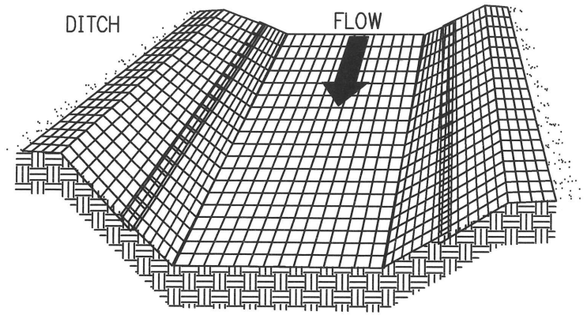


NOTE:
ON STEEP SLOPES, APPLY PROTECTIVE BLANKET PERPENDICULAR TO THE DIRECTION OF FLOW AND ANCHOR SECURELY.

NOTE:
BRING MATERIAL DOWN TO A LEVEL AREA BEFORE TERMINATING THE INSTALLATION.

TOP OF SLOPE BLANKET ANCHOR SLOT





NOTE:
IN DITCHES, APPLY PROTECTIVE COVERING PARALLEL TO THE DIRECTION OF FLOW. USE CHECK SLOTS AS REQUIRED. AVOID JOINING MATERIAL IN THE CENTER OF THE DITCH IF AT ALL POSSIBLE. FOLLOW BLANKET MANUFACTURER'S RECOMMENDATIONS FOR ALLOWABLE VELOCITY AND SHEAR STRESS.

SOURCE: MODIFIED FROM VA. DCR, 1992

EROSION CONTROL BLANKET NOTES (1 OF 2):

A) SITE PREPARATION:

AFTER SITE HAS BEEN SHAPED AND GRADED, PREPARE A FRIABLE SEEDBED RELATIVELY FREE FROM CLODS AND ROCKS MORE THAN 1 1/2 INCHES IN DIAMETER AND ANY FOREIGN MATERIAL THAT WILL PREVENT UNIFORM CONTACT OF THE PROTECTIVE COVERING WITH THE SOIL SURFACE.

B) PLANTING:

LIME, FERTILIZE, AND SEED IN ACCORDANCE WITH SEEDING OR PLANTING PLAN. WHEN USING JUTE MESH ON A SEEDED AREA, APPLY APPROXIMATELY ONE HALF THE SEED AFTER LAYING THE MAT. THE PROTECTIVE COVERING CAN BE LAID OVER SPRIGGED AREAS WHERE SMALL GRASS PLANTS HAVE BEEN INSERTED INTO THE SOIL. WHERE GROUND COVERS ARE TO BE PLANTED, LAY THE PROTECTIVE COVERING FIRST AND THEN PLANT THROUGH THE MATERIAL AS PER PLANTING PLAN.

C) LAYING AND STAPLING:

IF INSTRUCTIONS HAVE BEEN FOLLOWED, ALL NEEDED CHECK SLOTS WILL HAVE BEEN INSTALLED, AND THE PROTECTIVE COVERING WILL BE LAID ON A FRIABLE SEEDBED FREE FROM CLODS, ROCKS, ROOTS, ETC. THAT MIGHT IMPEDE GOOD CONTACT.

1. START LAYING THE PROTECTIVE COVERING FROM THE TOP OF THE CHANNEL OR SLOPE AND UNROLL DOWN-GRADE. ALLOW TO LAY LOOSELY ON SOIL; DO NOT STRETCH.
2. UPSLOPE ENDS OF THE BLANKET SHOULD BE BURIED IN AN ANCHOR SLOT NO LESS THAN 6-INCHES DEEP. TAMP EARTH
3. FIRMLY OVER THE MATERIAL. WHEN TOP IS RELATIVELY FLAT, EXTEND BLANKET ABOUT 40 INCHES AWAY FROM SLOPE. STAPLE THE MATERIAL AT A MINIMUM OF EVERY 12 INCHES ACROSS THE TOP END.
4. EDGES OF THE MATERIAL SHALL BE STAPLED EVERY 3 FEET. WHERE MULTIPLE WIDTHS ARE LAID SIDE BY SIDE, THE ADJACENT EDGES SHALL BE OVERLAPPED A MINIMUM OF 6 INCHES AND STAPLED TOGETHER.
5. STAPLES SHALL BE PLACED DOWN THE CENTER, STAGGERED WITH THE EDGES AT 3-FOOT INTERVALS.

D) TROUBLESHOOTING:

CONSULT WITH A QUALIFIED DESIGN PROFESSIONAL, IF ANY OF THE FOLLOWING OCCUR:

1. MOVEMENT OF THE BLANKET OR EROSION UNDER THE BLANKET IS OBSERVED.
2. VARIATIONS IN TOPOGRAPHY ON SITE INDICATE EROSION CONTROL MAT WILL NOT FUNCTION AS INTENDED; CHANGES IN PLAN MAY BE NEEDED, OR A BLANKET WITH A SHORTER OR LONGER LIFE MAY BE NEEDED.
3. DESIGN SPECIFICATIONS FOR SEED VARIETY, SEEDING DATES, OR EROSION CONTROL MATERIALS CANNOT BE MET; SUBSTITUTION MAY BE REQUIRED. UNAPPROVED SUBSTITUTIONS COULD RESULT IN FAILURE TO ESTABLISH VEGETATION.

E) MAINTENANCE & INSPECTION

INSPECT CONTROLS AFTER EACH RAIN EVENT OF 1/2 INCH OR GREATER, AND EVERY 7 DAYS UNTIL VEGETATION IS ESTABLISHED, FOR EROSION OR UNDERMINING BENEATH THE NETTING, BLANKETS, OR MATS. IF ANY AREA SHOWS EROSION, PULL BACK THAT PORTION OF THE MATERIAL, ADD SOIL, TAMP DOWN, AND RESEED; RESECURE THE MATERIAL IN PLACE. IF NETTING, BLANKETS OR MATS BECOME DISLOCATED OR DAMAGED, REPAIR OR REPLACE AND RESECURE IMMEDIATELY.

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APWA | KANSAS CITY METROPOLITAN CHAPTER

EROSION CONTROL BLANKET
SHEET 1 OF 2

STANDARD DRAWING NUMBER ESC-04

ADOPTED:

APPENDIX I - INSPECTION AND MAINTENANCE REPORT FORMS

Site Inspection Report

Inspection Date: _____

General Information (OKR10 Part 4.3.13.E)			
Name of Project:	**Groundwater Remediation Project**	**DEQ Permit No.:**	**1027644**
Inspector Name:		**Inspector Title:**	
Inspector's Contact Information:			
Inspection Frequency: **Standard Frequency**: ☐ Every 7 days and within 24 hours of a 0.50" rain, or discharge from snowmelt ☐ Every 14 days and within 24 hours of a 0.50" rain, or discharge from snowmelt **Reduced Frequency**: ☐ Once per month (for stabilized areas)			
Weather at the time of this inspection: _____ **Was this inspection after a 0.50" storm event?** ☐ Yes ☐ No, **Total rainfall that triggered the inspection** (in inches):			
Are there any discharges at the time of inspection? ☐ Yes ☐ No			

List all areas where soil stabilization is required to begin because construction work in that area has permanently or temporarily stopped and all areas where stabilization has been implemented:

Stabilization of Exposed Soil (OKR10 Part 4.3.13.D)			
Stabilization Area	**Stabilization Method**	**Have You Initiated Stabilization?**	**Notes** (describe your observation)
		☐ Yes ☐ No If yes, provide date:	
		☐ Yes ☐ No If yes, provide date:	
		☐ Yes ☐ No If yes, provide date:	
		☐ Yes ☐ No If yes, provide date:	
		☐ Yes ☐ No If yes, provide date:	

(Notes: *For each area where stabilization has been initiated, describe the progress that has been made, and what additional actions are necessary to complete stabilization. Note the effectiveness of stabilization in preventing erosion. If stabilization has been initiated but not completed, make a note of the date it is to be completed. If stabilization has been completed, make a note of the date it was completed. If stabilization has not yet been initiated, make a note of the date it is to be initiated, and the date it is to be completed.)*

Provide a list/description of all structural and non-structural BMPs that your SWP3 indicates will be installed and implemented at your site. You must separately identify the **location** of each control. During Inspection, identify whether they are **installed and operating properly**, or any **corrective action** is necessary. Provide the **date** on which the condition that triggered the need for maintenance or corrective action was first identified. In the notes section you must describe the **specifics about the problem** you observed.

Condition and Effectiveness of BMP Controls & Pollution Prevention (OKR10 Part 3.3, 4 & 5)					
No.	**BMP Description & Location**	**Is BMP Installed & Operating Properly?**	**Corrective Action (CA) Required?**	**Date on Which Maintenance or CA First Identified?**	**Notes** (describe if you observed any problem)
1.	Silt Fence/Fiber Rolls/Berm/Wattles Location:	☐ Yes ☐ No	☐ Yes ☐ No		
2.	Silt Dikes/Check Dams/Rock Dams Location:	☐ Yes ☐ No	☐ Yes ☐ No		
3.	Stabilized Construction Entrance/Exit Location:	☐ Yes ☐ No	☐ Yes ☐ No		
4.	Inlet Protection on all storm drain Location:	☐ Yes ☐ No	☐ Yes ☐ No		
5.	Sand Bag Barrier/Gravel Bag Barrier Location:	☐ Yes ☐ No	☐ Yes ☐ No		
6.	Vegetated Swales Location:	☐ Yes ☐ No	☐ Yes ☐ No		
7.	Compost Blankets/Geotextiles/Mats Location:	☐ Yes ☐ No	☐ Yes ☐ No		
8.	Vegetative Buffers Location:	☐ Yes ☐ No	☐ Yes ☐ No		
9.	Sediment Trap/ Sediment Basin Location:	☐ Yes ☐ No	☐ Yes ☐ No		
10.	Concrete Washout Pit Location:	☐ Yes ☐ No	☐ Yes ☐ No		
11.	Dust Control/Prevention	☐ Yes ☐ No	☐ Yes ☐ No		
12.		☐ Yes ☐ No	☐ Yes ☐ No		
13.		☐ Yes ☐ No	☐ Yes ☐ No		
14.		☐ Yes ☐ No	☐ Yes ☐ No		
15.		☐ Yes ☐ No	☐ Yes ☐ No		
16.		☐ Yes ☐ No	☐ Yes ☐ No		

(**Note:** *The permit differentiates between conditions requiring repairs and maintenance, and those requiring corrective action. The permit requires maintenance in order to keep controls in effective operating condition and requires repairs if controls are not operating as intended. Corrective actions are triggered only for specific, more serious conditions – whether a required stormwater control was never installed, or was installed incorrectly, or not installed in accordance with the requirements of OKR10*)

Pollution Prevention and Waste Management (OKR10 Part 3.3.3)		
Items of Inspection	**Response & Reason**	**Action(s) Needed**
Is the site free of floatables, litter, and construction debris?	☐ Yes ☐ No If no, reason:	
Are material storage and handling areas, including fueling areas, free of spills and leaks?	☐ Yes ☐ No If no, reason:	
Are spill kits available where spills and leaks are likely to occur?	☐ Yes ☐ No If no, reason:	
Are dumpsters and waste receptacles covered when not in use?	☐ Yes ☐ No If no, reason:	
Has preventative maintenance been conducted on equipment and machinery?	☐ Yes ☐ No If no, reason:	
Are material stockpiles sufficiently contained?	☐ Yes ☐ No If no, reason:	
Has there been any sediment tracked-out from the site onto the surface of paved street, sidewalks or other paved areas outside of the site?	☐ Yes ☐ No If no, reason:	
Is the project free from visible erosion and/or sedimentation?	☐ Yes ☐ No If no, reason:	

Complete the following section if a discharge is occurring at the time of inspection:

Description of Discharges (OKR10 Part 4.3.13.D.2.f)	
Was a stormwater discharge or other discharge occurring from any part of your site at the time of the inspection? ☐ Yes ☐ No, **If yes, provide the following information for each point of discharge:**	
Specify Discharge Location	**Observations (Visual Quality of the Discharge)**
1.	Describe the discharge (color, odor, floating, settled/suspended solids, foam, & oil sheen): Are there any visible signs of erosion and/or sediment accumulation that can be attributed to your discharge? ☐ Yes ☐ No, If yes, describe what you see, specify the location(s) where these conditions were found, and indicate whether modification, maintenance, or corrective action is needed to resolve the issue:
2.	Describe the discharge (color, odor, floating, settled/suspended solids, foam, & oil sheen): Are there any visible signs of erosion and/or sediment accumulation that can be attributed to your discharge? ☐ Yes ☐ No, If yes, describe what you see, specify the location(s) where these conditions were found, and indicate whether modification, maintenance, or corrective action is needed to resolve the issue:

Contractor or Subcontractor Certification and Signature:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature:_____ **Date:** _____

Print Name: _____ **Affiliation:** _____

Corrective Action Report

Today's Date:_____

(You are only required to fill out this form if any of the corrective action triggering conditions occurs on your site. Routine maintenance and repairs are generally not considered to be a corrective action triggering condition.)

Section A: Initial Report (Part 4.3.14.B.1 of OKR10) (Complete this section within **24 hours** of discovering the condition that triggered corrective action)	
Name of Project: **Groundwater Remediation Project**	**DEQ's Permit No.** OKR1027644
Date Problem First Discovered:	**Time Problem First Discovered:**
Name & Contact Information of the Individual:	
What site conditions triggered the requirement to conduct corrective action *(check the box that applies)*: ☐ A required stormwater control was never installed or was installed incorrectly, or not in accordance with the corresponding OKR10 permit requirement ☐ A stormwater control is not effective enough for the discharge to meet applicable water quality standards ☐ A prohibited discharge (OKR10 Parts 3.1 and 3.3.3.A) is occurring or has occurred. ☐ DEQ requires corrective action as a result of permit violations found during an DEQ inspection	
Provide a description of the problem:	
Deadline for completing corrective action:	***not more than 7 calendar days after the date you discovered the problem***

Section B: Corrective Action Progress (Part 4.3.14.B.2 of OKR10) (Complete this section no later than **7 calendar days** after discovering the condition that triggered corrective action)			
Section B.1: Why the Problem Occurred			
Cause(s) of Problem	**How It Was Determined & Date of Determining the Cause**		
1.	1.		
2.	2.		
Section B.2: Stormwater Control Modifications to be Implemented to Correct the Problem			
Stormwater Control Modification(s) Needed to Correct Problem	**Date of Completion**	**SWP3 Update Necessary?**	**SWP3 Modifications Notes**
1.		☐Yes ☐ No, If yes, provide date SWP3 modified:	
2.		☐ Yes ☐ No, If yes, provide date SWP3 modified:	

Section C: Certification and Signature by Permittee

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: _____ **Title:** _____

Signature: _____ **Date:** _____

Groundwater Remediation Project
SWP3 Modification Log

No.	Description of the Modification	Date of Modification	Modification Prepared by [Name(s) and Title]	Signature by Designated Corporate Official
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				

Groundwater Remediation Project
Grading and Stabilization Activities Log

Date Grading Initiated	Description of Grading Activity	Description of Stabilization Measure and Location	Date Grading Activity Ceased (Temporary or Permanent)	Date When Stabilization Initiated

APPENDIX J - SPILL REPORT FORM

Procedures for Determining if a Hazardous Material Spill is a Reportable Quantity

1) First determine the type and quantity of material that has been spilled.

2) Obtain a safety data sheet (SDS) for the spilled material and determine whether any of the constituents are listed in Table 302.4 in 40 CFR 302.

3) If none of the constituents in the spilled material are listed in the table (excluding ethylene glycol), the spill is not reportable.

4) If the constituents in the spilled material are listed in the table, use the following equation to determine the pounds of material spilled:

$$\text{Pounds Spilled} = (V)\,(Wt\%)\,(Sg)\,(0.0834)$$

Where:

V = Volume of the material spilled, in gallons

Wt% = The weight percent of the constituents in the spilled material (see the SDS)

Sg = Specific gravity of spilled material (see SDS)

For Example:

V = 7 gallons

Wt% = 3.5

Sg = 1.04

Pounds Spilled = (7) (3.5) (1.04) (0.0834) = 2.13 pounds

5) If, based on the calculation, the pounds spilled are greater than the Final RQ (reportable quantity) value listed in Table 302.4 of 40 CFR 302 or the State's reportable quantity minimum amount, the spill must be reported to the appropriate Federal, State, and local agencies.

Groundwater Remediation Project

Storm Water Pollution Prevention Plan

SPILL REPORT FORM

Spill Reported By: _____ _____
Name Phone Number

Date Reported: _____ Time: _____

Date of Spill: _____ Time: _____

Name of Facility: _____

Legal Description: ____ 1/4 ____ 1/4 ____ 1/4 SEC ____, TWP ____, Range ____,

County _____

Describe Spill Location and Events Leading to Spill: _____

_____

_____

_____

Material Spilled: _____

Source of Spill: _____

Amount Spilled (Gallons or Pounds): _____

Amount Spilled to Waterway (Gallons or Pounds): _____

Nearest Municipality: _____

Containment or Cleanup Action: _____

_____

List Environmental Damage (fish kill, etc.): _____

_____

List Injuries or Personal Contamination: _____

_____

Date and Time Cleanup Completed or Terminated: _____

If Cleanup Delayed, Nature and Duration of Delay: _____

_____

Description of Materials Contaminated: _____

_____

Approximate Depth of Soil Excavation: _____

Action To Be Taken to Prevent Future Spills: _____

_____

_____

Agencies Notified:

Local: _____ Date: _____

State: _____ Date: _____

Federal: _____ Date: _____

Signed: _____
Contractor Superintendent or
Environmental Inspector

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