Department of Energy

Ohio Field Office
Fernald Area Office
P. O. Box 538705
Cincinnati, Ohio 45253-8705
(513) 648-3155

3054

MAY 15 2000

DOE-0674-00

Mr. Gene Jablonowski, Remedial Project Manager
U.S. Environmental Protection Agency
Region V, SRF-5J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
401 East 5th Street
Dayton, Ohio 45402-2911

Dear Mr. Jablonowski and Mr. Schneider:

RESPONSE TO COMMENTS ON SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT SITE PREPARATION PACKAGE

References:
1) Letter, G. Jablonowski to J.W. Reising, "Approval of Silos 1 and 2 Accelerated Waste Retrieval (AWR) Project Site Preparation," dated May 8, 2000

2) Letter, T. Schneider to J. W. Reising, "Comments – AWR Site Preparation Package," dated April 28, 2000

3) Letter, J. W. Reising to G. Jablonowski and T. Schneider, "Silos 1 and 2 Accelerated Waste Retrieval Project Site Preparation Package," dated April 5, 2000

Enclosed for your review and approval is documentation responding to the U.S. Environmental Protection Agency (U.S. EPA) and Ohio Environmental Protection Agency (OEPA) comments on the Silos 1 and 2 Accelerated Waste Retrieval (AWR) Project Site Preparation Package:

- A comment response document providing responses to the two comments provided with the U.S. EPA approval (Reference 1), and to the OEPA comments (Reference 2)

- A revised Introduction and Pre-Operational Environmental Control Plan

Recycled and Recyclable

- Revised copies of drawings 66FCD001, 66FCD002, and 66FCD003
- Revised Construction Specifications 02302, 02370, 02530, and 02924

The enclosed responses to the OEPA comments have been informally reviewed and accepted as adequate by the OEPA.

If you have any questions, please contact Nina Akgündüz at (513) 648-3110.

Sincerely,

Johnny W. Reising
Fernald Remedial Action
Project Manager

FEMP:Akgündüz

Enclosure:

cc w/enclosure:
T. Schneider, OEPA-Dayton (three copies of enclosures)
M. Schupe, HSI GeoTrans
F. Hodge, Tetra Tech
AR Coordinator, Fluor Fernald, Inc./78

cc w/o enclosure:
S. Fauver, EM-31/CLOV
N. Akgündüz, OH/FEMP
J. Lorence, OH/FEMP
A. Murphy, OH/FEMP
A. Tanner, OH/FEMP
J. Saric, USEPA-V, SRF-5J
R. Vandegrift, ODH
D. Carr, Fluor Fernald, Inc./2
R. Fellman, Fluor Fernald, Inc./2
T. Hagen, Fluor Fernald, Inc./65-2
J. Harmon, Fluor Fernald, Inc./90
S. Hinnefeld, Fluor Fernald, Inc./31
D. Nixon, Fluor Fernald, Inc./52-4
D. Paine, Fluor Fernald, Inc./52-4
T. Walsh, Fluor Fernald, Inc./65-2
ECDC, Fluor Fernald, Inc./52-7

RESPONSES TO OEPA AND USEPA COMMENTS ON AWR PROJECT SITE PREPARATION PACKAGE

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(1) Commenting Organization: Ohio EPA Commentor: OFFO
Section #:General Comment Pg #: Line #: Code: C
Original Comment #:

Comment: The document does not address the proposed laydown area located within A2P2 yet is shown on drawing #05FCD014. Since no discussion or details on the area are provided in the document it obviously won't be utilized or disturbed during site prep activities. If use of the area is planned during site prep the document will require modification.

Response: The area outside the W-52 gate shown on drawing #05FCD014 will be used as a laydown area. Modification of the area will be limited to installation of gravel within the currently disturbed area. A specific note will be added to the Remedial Design Site Preparation Scope under the sixth bullet noting the use of this area. Also a note is on the drawing stating "Area shown to be used only for equipment/material laydown or staging and shall be limited to the current disturbed area.

(2) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 8.0 Pg #: 6 Line #: Code: C
Original Comment #:
Comment: Since DCNs constitute changes to an approved CERCLA deliverable, Ohio EPA expects the opportunity to review and approve DCNs prior to implementation. Submittal simply for information is not acceptable.

Response: Agreed. The DCN's impacting the approved Site Preparation Package, and subsequently the Remedial Design Package, will be forwarded to OEPA and USEPA for review and approval prior to implementation. Consistent with the practice used on Soils Characterization and Excavation Project, OEPA will target for E-mail or verbal approval within three days.

<u>Pre-Operational Control Plan</u>

(3) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Attachment A, section 2.1 Pg #: 3 Line #: Code: C
Original Comment #:
Comment: Trucks should be covered at all times whether full or empty to prevent fugitive emissions and to comply with the site Dust BAT plan.

Response: Agreed. The Pre-Operational Control Plan Section 2.1 Fugitive Dust Control will be updated to comply with the site Dust BAT Plan. Under the Specific BAT dust controls and/or work practices, will text to the seventh bullet stating: " Cover truck load beds, whether full or empty, as required by RM-0047, 'FEMP Fugitive Dust Control Requirements.'

(4) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Attachment A, section 2.2 Pg #: 4 Line #: Code: C
Original Comment #:
Comment: The last paragraph references sediment traps on drawing 66FCDOO2 though that drawing shows no sediment traps. Please correct.

Response: The sediment traps and silt fencing in the silo areas will be installed to support berm excavation and are therefore not part of the AWR site preparation activities and are not shown on drawing 66FCD002. The last paragraph will be revised as follows: "Stormwater drainage during and after AWR Project site preparation construction activities is illustrated on Drawing 66FCD001. Drainage from the Silos 1 and 2 domes and berms, and from the Silo 4 area, will continue to be collected by the existing trench system and discharged to the Waste Pit Area Runoff Control Sump (WPSRC). To ensure that the existing trench system does not become obstructed silt fencing will be installed and the trench will be included in the erosion and sediment control inspections. During the berm excavation and waste retrieval activities the existing trench system will be also utilized and to prevent silt buildup in the trench additional silt fencing and sediment traps will be installed. Details on the additional silt fencing and sediment traps will be included in the berm excavation plan in the remedial design package. For the purpose of designing ..."

(5) Commenting Organization: Ohio EPA Commentor: DSW
Section #: Attachment A, 2.2 Pg #: 4 Line #: NA
Original Comment #:
Comment: This states that details are in drawings 66FCD001 through 66FCD006. However drawings 66FCD001-66FCD004, 66FCD006, and 66FCD007 are in the package.

Response: The text in Section 2.2 Storm Water Control paragraph #1 will be revised to " These control measures are outlined in greater detail in drawings 66FCD001-66FCD004, 66FCD006, and 66FCD007 and in the Storm Water Drainage Plan provided in Appendix B of this document."

(6) Commenting Organization: Ohio EPA Commentor: DSW
Section #: Attachment A, 2.2 Pg #: 4 Line #: NA
Original Comment #:
Comment: This states that "...a few culverts cross the southern perimeter road..." Please state how many so that we can locate all of them on the drawings.

Response: Text in Section 2.2 Storm Water Control will be revised as follows: "Also, currently two culverts cross the southern perimeter road and discharge into an existing detention basin south and east of the PPDD."

(7) Commenting Organization: Ohio EPA Commentor: DSW
Section #: Attachment A, section 2.2.1 Pg #: 5 Line #: Code: C
Original Comment #:
Comment: Ohio EPA recommends employee training regarding BMPs for erosion and stormwater controls. Recommend use of video training course developed by Ohio Homebuilders Association and ODNR.

Response: Silos Project will obtain appropriate materials, such as the video mentioned in the comment, and make them available for review by AWR Project construction personnel responsible for installation and maintenance of stormwater and erosion controls.

(8) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Attachment A, section 2.2.2 Pg #: 6 Line #: Code: C
Original Comment #:
Comment: The section does not reference the concrete water diversion shown on drawing 66FCDOO2. Additional clarification is needed.

Response: Section 2.2.2 Spill Prevention Controls and Countermeasures will be revised as follows: "As illustrated on drawings 66FCD001 and 66FCD006 the area underneath the transfer line drains to the southeast stormwater basin utilizing a concrete water diversion northwest of the TTA building."

(9) Commenting Organization: Ohio EPA Commentor: DSW
Section #: Attachment A, 2.3 Pg #: 7 Line #: NA
Original Comment #:
Comment: This states that culvert entrances and exits are to be protected with rip rap or geofabric. Response to comment 7 (page 2 of response to written comments, Attachment D) indicates changes would be made to section 2.3 that coir matting and natural vegetation would be used for culvert entrances and exits. These changes have not been made in all the drawings either (see comment on drawings).

Response: Coir matting and natural vegetation will be specified in Attachment A, and on necessary drawings, for the culvert entrances and exits.

(10) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Attachment A, section 2.6 Pg #: 8 Line #: Code: C
Original Comment #:
Comment: Procedures provided in the Sitewide Excavation Plan and WAC Attainment Plan require WAO oversight during excavation to ensure WAC compliance. The text must be revised to define appropriate WAO oversight and monitoring during excavation activities.

Response: In response to a previous OEPA comment, Section 2.6 of the Pre-Operational Environmental Control plan was revised to provide additional detail regarding WAO oversight during excavation activities. Per a telephone conversation with Tom Schneider on May 10, 2000, the existing text is adequate as-is.

(11) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Attachment A, section 2.6 Pg #: 8 Line #: Code: C
Original Comment #:
Comment: The act of collecting WAC samples does not constitute WAC compliance. Until the data has been provided to Ohio EPA and USEPA for review and approval the area is not WAC compliant. All WAC sampling must be complete and data submitted to agencies prior to the initiation of excavation activities.

Response: Agreed. Results from the additional WAC attainment sampling in the proposed trailer area at the east end of the project area, and the staging area south of Silo 1, will be submitted for USEPA and OEPA review and approval before the areas are excavated.

(12) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Attachment A, section 2.6 Pg #: 9 Line #: Code: C
Original Comment #:
Comment: Under no previous circumstances has vegetation been free released from the site. Vegetation can be released for reuse through chipping, etc. on-site but no procedure is in place for free -release of vegetation.

Response: Agreed. There is currently no procedure for free-release of vegetation. The second sentence in the referenced paragraph will be revised to "Materials for which free release procedures exist will be surveyed for free-release by Radiological Control. There are currently no procedures in place for free release of vegetation."

(13) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Attachment A, section 3.1 Pg #: 6 Line #: Code: C
Original Comment #:
Comment: The second bullet should be changed to state, "*As a minimum*, in dry conditions, dust controls shall be initiated before each work shift and during lunch breaks, *or as necessary to ensure FEMP site-specific limits and OEPA standard for fugitive dust emissions are not exceeded.*

Response: Agreed. The text in the Fugitive Dust Control Plan will be revised as noted.

(14) Commenting Organization: Ohio EPA Commentor: DSW
Section #: Attachment A, Appendix B Pg #: 1 of 7 Line #: NA
Original Comment #:
Comment: Sheet 1 of 6 is shown in the upper right corner, whereas there are actually 7 pages.

Response: Agreed. The technical editing error will be corrected.

(15) Commenting Organization: Ohio EPA Commentor: DSW
Section #: Attachment A, Appendix B Pg #: 3 of 7 Line #: NA Code: C
Original Comment #:
Comment: Bullet 3 under assumptions mentions "potentially contaminated" areas but does not include roads on which "potentially contaminated" materials will be hauled. For the purposes of storm water control, these areas should also be considered "potentially contaminated".

Response: Measures will be implemented to prevent the spread of contamination to the perimeter road consistent with measures implemented for protection of the Haul Road. As specified in Attachment A, Section 2.6, trucks used to transport excess soil will be loaded within the controlled area and will be cleaned before exiting the area in order to prevent the spread of contamination to the perimeter road. Periodic monitoring of the perimeter road will be implemented to verify the effectiveness of these measures.

(16) Commenting Organization: Ohio EPA Commentor: DSW
Section #: Attachment A, Appendix B Pg #: 7 of 7 Line #: NA Code: C
Original Comment #:
Comment: This states that "...to the sedimentation basins in the southwest corner. These sediment basins have a storage capacity of approximately 50.0 cy to protect an area less than 1 acre..." The drawings do not show these basins. Additionally, the entire area that drains to a sediment basin must be considered in sizing it, not just the disturbed or construction area. Would this basin hold the equivalent of 67 cy per acre of drainage area (unable to tell from the information in this section.)

Response; The text is describing the sediment basins, which will be installed to support the Silo superstructure and berm removal activities. The detail information on the sediment basins, including verification that the capacity is adequate to contain the entire area draining to the basin, will be included in the Remedial Design Package. Note will be added to the Storm water calculations to note detail information on the sediment basins will be included in the Remedial Design Packages.

(17) Commenting Organization: Ohio EPA Commentor: DSW
Section #: Attachment A, Appendix B, Attachment A Pg #: A4 of A21 Line #: SWS-017 of Table 2-9 Code: C
Original Comment #:
Comment: Seeding should conform to the site requirements, which are different than those in Rainwater and Land Development. All else should conform to Rainwater and Land Development.

Response: Table 2-9 is a reference from the AWR contract defining the minimum contract requirements. The seeding specification included in the AWR Site Preparation Package will be used to direct field activities and conforms to current site requirements.

Drawings

(18) Commenting Organization: Ohio EPA Commentor: DSW
Section #: Attachment B, Drawings Pg #: 66FCD001 Code: C
Original Comment #:
Comment: Note 3, drainage area 6 outlet is listed as existing storm water basin north of the K-65 trench. The only existing storm water basin identified on the drawing is south of the K-65 trench. Please clearly identify the storm water basin to which you refer in this note.

Response: Agreed. The existing storm water basin north of the K-65 trench is not labeled. The drawing will be updated to label this storm water basin.

(19) Commenting Organization: Ohio EPA Commentor: DSW
Section #: Attachment B, Drawings Pg #: 66FCD001 Code: C
Original Comment #:
Comment: There is an existing catch basin in drainage area 3 connected to the 30" RCP line. It appears as though this catch basin could intercept flow from any accidental releases from the project and direct that flow to the Pilot Plant Drainage Ditch without first passing through the storm water basin. This catch basin should be blocked and if drainage is needed in that area, a catch basin tied in to the 12" ST could be added. This will direct all flow to the storm water basin before flowing to the Pilot Plant Drainage Ditch.

Response: The catch basin noted on the drawing in drainage area 3 is a raised manhole approximately 24 inches above grade. The above mentioned concern was evaluated during the development of the AWR stormwater drainage plan. The height of the manhole above grade, and the contour of the grading in area 3 meets, will prevent any material from an accidental release from entering the manhole, and thereby being directly discharged to the Pilot Plant Drainage Ditch.

(20) Commenting Organization: Ohio EPA Commentor: DSW
Section #: Attachment B, Drawings Pg #: 66FCD001 Code: C
Original Comment #:
Comment: The proposed 18" ST that allows storm water to pass under the entry point from the perimeter road to drainage area 3 should be removed. This will allow storm water to flow untreated into the Pilot Plant Drainage Ditch through the existing catch basins west of the entry. By not installing this culvert, storm water can be redirected to the existing storm water basin south of the perimeter road through existing catch basin CB-01.

Response: The proposed 18" ST will be deleted. The drawings will be amended to reflex this change.

(21) Commenting Organization: Ohio EPA Commentor: DSW
Section #: Attachment B, Drawings Pg #: 66FCD001 Code: C
Original Comment #:
Comment: The catch basins in the drainage swale on the south side of drainage area 5 should be protected with reinforced silt fence (e.g. see ODNR Rainwater and Land Development, page 125).

Response: A note will be added to drawings and text added to the Construction specification identifying the use of reinforced silt fencing, as specified on Page 125 of the ODNR Rainwater and land development Manual, around catch basins.

(22) Commenting Organization: Ohio EPA Commentor: DSW
Section #: Attachment B, Drawings Pg #: 66FCD002 Code: C
Original Comment #:
Comment: Note 3 should be revised to reflect the installation of matting and seeding in these areas (see also dwgs 003, 004 and note 4 in 006).

Response: Agreed. Note 3 on appropriate drawings will be revised to state the use of matting and vegetation for protection at the entrance and exits of culverts.

(23) Commenting Organization: Ohio EPA Commentor: DSW
Section #: Attachment B, Drawings Pg #: 66FCD002 Code: C
Original Comment #:
Comment: Silt fence installed as inlet protection as in the swale south of drainage area 5 should not be removed, they should be left in place (see also dwgs 003 and 004).

Response: Agreed. A note will be added to Drawing 66FCD002 to clarify that the inlet protection at catch basins in the swale south of Silos 1 and 2 will remain in place until berm excavation has been completed and the impacted area has been stabilized.

(24) Commenting Organization: Ohio EPA Commentor: DSW
Section #:Attachment B, Drawings Pg #: 66FCD002Code: C
Original Comment #:
Comment: The silt fence at the south end of drainage area 3 should be installed on the upper end of the contour and have the ends turned up. If there is a concern of the pool formed behind the silt fence encroaching on the construction area, removing the pooling function of the silt fence is not the direction to take for solving the problem. The concept is to hold the water for as long as practical to allow sediment to settle out. Redirecting flow to a catch basin increases sediment loads carried off the construction area by concentrating flow. It would be better to allow the pool to form behind the silt fence and let the water be removed from the area by flowing through the silt fence. Alternatively, inlet protection could be provided in the swale around catch basin 01. Preferably, the silt fence should be installed to intercept sheet flow prior to flow reaching the swale.

Response: The silt fencing will be installed at the upper end of the contour with the ends turned up. The drawing will be amended to reflect the change.

(25) Commenting Organization: Ohio EPA Commentor: DSW
Section #: Attachment B, Drawings Pg #: 66FCD002 Code: C
Original Comment #:
Comment: The silt fence at the south side of drainage area 5 should be installed as described in the previous comment Inlet protection should be provided as described above.

Response: The silt fencing will be installed with the ends turned up. The drawing will be amended to reflect the silt fencing turning up at the ends.

(26) Commenting Organization: Ohio EPA Commentor: DSW
Section #: Attachment B, Drawings Pg #: 66FCD002 Code: C
Original Comment #:
Comment: The silt fence to the west of drainage area 4, in acting as a diversion to flow, will concentrate flow along the base of the silt fence and at the ends. This frequently causes undercutting in these areas. Frequent inspections of this silt fence will need to be made and actions to correct any erosion taken immediately.

Response: As required by Notes 7 and 8 on this drawing, as well as by the Pre-operational Environmental Control Plan, this silt fence will be inspected weekly and within 24-hours of a rainfall exceeding 0.5 inches in a 24-hour period; any problems identified will be corrected within 24 hours.

(27) Commenting Organization: Ohio EPA Commentor: DSW
Section #: Attachment B, Drawings Pg #: 66FCD003 Code: C
Original Comment #:
Comment: The silt fence at the east side of drainage area 1 should be installed as described in the comment above. As there are no catch basins in this swale, the only alternative to installation along the contour at the edge of the parking area would be installing the silt fence in the swale in long inverted "v" configurations in a north-south direction. However, as described in the above comment, installation along the top of the swale is preferred.

Response: The silt fencing will be installed with the ends turned up. The drawing will be amended to reflect the silt fencing turning up at the ends.

(28) Commenting Organization: Ohio EPA Commentor: DSW
Section #: Attachment B, Drawings Pg #: 66FCD006 Code: C
Original Comment #:
Comment: Catch basin protection detail should show reinforcing and installation detail as described in ODNR Rainwater and Land Development page 125.

Response: A note will be added to drawings and text added to the Construction specification specifying the installation of reinforced silt fencing, as illustrated in the detail on page 125 of the ODNR Rainwater and Land Development Manual, around catch basins.

Technical Specifications

(29) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Spec 02302, 3.2.1 Pg #: Line #: Code: C
Original Comment #:
Comment: The document references several different piling activities. Considering the limited space within the AWR project area and OU4 in general. Piling should be kept to an absolute minimum and must be managed very aggressively. All piles must receive appropriate MTL designations and tracking.

Response: As specified in Section 2.6 of Appendix A, excavation activities will be planned to minimize the volume of excess soil and, to the extent practical, excess soil will be transported directly to the appropriate disposal; location rather than stockpiling. If interim storage is required, all piles will be tracked by WAO, including use of appropriate MTL designations, in accordance with WAO procedures.

(30) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Spec 02302, 3.2.1 Pg #: Line #: Code: C
Original Comment #:
Comment: Piles with side slopes of 2:1 will certainly present problems in terms of access and stability. Piles of this nature should receive extra scrutiny for proper erosion controls.

Response: Erosion control matting will be used to cover any pile with a 4:1 or greater slope. All piles will be inspected and maintained as necessary as part of erosion and sediment control inspections.

(31) Commenting Organization: Ohio EPA Commentor: DSW
Section #: Attachment C, 02302, 3.9.2 Pg #: 02302-11 Code: C
Original Comment #:
Comment: This refers to Section 07924, Seeding and should refer to 02924.

Response: This typographical error will be corrected.

(32) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 02370-4, 3.4 Pg #: Line #: Code: C
Original Comment #:
Comment: There is a conflict between paragraph A and C.2 of this section with regard to the % slope requiring the use of matting. Please correct.

Response: Paragraph C.2 is based on the site standard and will replace paragraph A.

(33) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 02370-4, 3.4 Pg #: Line #: Code: C
Original Comment #:
Comment: No requirements with regard to the type of erosion matting are provided. See previously approved specifications for other projects and include matting material requirements.

Response: The type of erosion matting is specified in section 2.1.B of this specification.

(34) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 02370-4, 3.5 Pg #: Line #: Code: C
Original Comment #:
Comment: It should be noted that erosion control matting is to be left in place following the establishment of vegetative cover and the completion of disturbance activities. Removal of the matting will negatively effect the vegetative cover. Erosion control matting should be made of biodegradable materials eliminating the need for removal.

Response: Section 3.5.C will be revised with an additional bullet indicating that the erosion control matting is to be left in place following the establishment of vegetative cover and the completion of disturbance activities. Removal of the matting will negatively effect the vegetative cover. Erosion control matting should be made of biodegradable materials eliminating the need for removal.

(35) Commenting Organization: Ohio EPA Commentor: DSW
Section #: Attachment C, 02530, 3.1.1.1Pg #: 02530-5 Code: C
Original Comment #:
Comment: Crossings should conform to Ohio EPA guidance, specifically, whenever a sanitary sewer and water main must cross, the sewer shall be at such an elevation that the crown of the sewer is at least 18 inches, measured between the outside pipe walls, below the water main. It appears from drawings 51CFD003 and 61CFD002 that this distance exists. This specification, however, should reflect practices deemed acceptable by Ohio EPA. The actual construction should also conform.

Response: The construction specification will be revised to include inspections to ensure that the sewer line is 18 inches below the water main where these lines cross in accordance with Ohio EPA guidance.

(36) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 02630-5, 2.5 Pg #: Line #: Code: C
Original Comment #:
Comment: Previously the document discussed the use of erosion control matting to replace riprap. It is unclear from this specification and the drawings where erosion control matting is being used rather than riprap.

Response: Agreed. Note 3 on appropriate drawings will be revised to specify the use of matting and vegetation for protection at the entrance and exist of culverts.

(37) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Spec 02924 Pg #: Line #: Code: C
Original Comment #:
Comment: Ohio EPA understands the site-wide seeding specification is being revised to change the species planted and the rates. The specification should be revised to incorporate the new seeding spec. Ohio EPA recommends contacting Fluor Fernald's Natural Resources group.

Response: Silos Project has discussed seeding requirements with the Fluor Fernald Inc. Natural Resources Group. Although the seeding specification is in the process of being revised as stated in Ohio EPA's comment, the new seed mixtures and other changes have not yet been finalized. The necessary changes will be incorporated into the Seeding Specification for the AWR project as soon as they are finalized.

(38) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Spec 02924 Pg #: Line #: Code: C
Original Comment #:
Comment: The specification as written appears to be an attempt to revise an existing spec to address some issues from previously approved specifications rather than the use of a previously approved spec. Ohio EPA recommends replacing this specification with one previously approved by the agencies. Modifications if required for project specific actions could then be incorporated with higher likelihood of acceptance.

Response: Revision 1 of Specification 02924 was prepared by replacing the necessary sections of the original draft (such as seed mixtures, fertilizer, mulch and binder requirements, application and maintenance methods) with the appropriate text incorporated verbatim seeding specifications previously approved by OEPA. As noted in the previous comment response, Specification 02924 will be revised as necessary upon finalization of the new FEMP site-wide seeding specification.

(39) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Spec 02924 Pg #: Line #: Code: C
Original Comment #:
Comment: Recent use of the product Regreen on-site have been very successful. OEPA recommends use of Regreen rather than perennial rye for temporary seeding.

Response: Based upon guidance from the Flour Fernald Inc. Natural Resources Group, perennial rye will be replaced with a mixture of Regreen (50 pounds/acre), Annual rye (20 pounds/acre), and Canada Wild Rye (20 Pounds/acre). Specification 02924 will be revised to incorporate this change.

(40) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Spec 02924-5, 2.5 Pg #: Line #: Code: C
Original Comment #:
Comment: Previous specs have not gone into nearly as much detail with regard to the properties required of topsoil. This appears to be overly restrictive considering the highly developed nature of the area. Additionally, any off-site topsoil proposed to be brought in for use will need to be evaluated for COCs, etc.

Response: Comment acknowledged. Any off-site topsoil would need to be sampled and analyzed for WAC attainment COC's to verify its acceptability for use in the AWR Project area. There is, however, currently no intent to import off-site topsoil for use in AWR Project Site Preparation activities. Sections 2.5.3 and 2.5.4 will be deleted from the specification.

(41) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Spec 02924-8, 2.9 Pg #: Line #: Code: C
Original Comment #:
Comment: See existing, recently approved specs for appropriate erosion control matting requirements. The use of plastic netting is not acceptable.

Response: Agreed. The reference to plastic netting will be deleted. Reference to the erosion matting requirements in Specification 02370 will be added.

Attachment D

(42) Commenting Organization: Ohio EPA Commentor: DSW
Section #: Attachment D Pg #: 3 Line #: Written comment 9 Code: C
Original Comment #:
Comment: There was an omission in our original comment. The original document submitted to us stated that no Indiana Bat had been observed along the Paddy's Run riparian corridor. In fact, during a recent survey conducted by the site, an Indiana Bat was observed in the Paddies Run riparian corridor.

Response: Comment acknowledged. In response to your original comment (regarding protection of the Sloan's Crayfish) text was added to Section 2.2.2 of Attachment A addressing measures taken during Site preparation activities to preserve natural resources in the Paddy's Run corridor. Protective measures to be implemented during AWR operation activities will be added to the ARAR compliance table which will be updated and resubmitted as part of the Accelerated Waste Retrieval Remedial Design Package.

USEPA Comments

(43) Commenting Organization: United States EPA Commentor: N/A
Drawing #: 51FCD003
Comment: The pipe bedding detail shown on this drawing indicates that power cables and fire alarm cables are to be installed in a trench containing a 2-inch diameter water line. It is not standard engineering practice to install electrical cables above a water line in a trench. The cables to be installed are to be directly buried and will not be protected by a conduit or concrete encasement. These cables could be damaged whenever the trench is excavated to repair the water line. Electrical cables should be installed in a trench separate from that of any water line. If electrical cables must cross a water line trench, they should be installed in a conduit encased in concrete. Such installation is necessary not only to protect the cables themselves but also to protect operators of excavation equipment. The drawing should be revised accordingly.

Response: The Accelerated Waste Retrieval (AWR) Project is installing these trailers for a short period of operation (two years). Given the temporary nature of these trailers, repairs to the water line are not expected to be necessary, and the electrical cables are installed in the same trench as the water line to minimize the amount of excavation. A note will be added to the drawings noting that the electrical cabling need to be de-energized prior to any work on the water line.

(44) Commenting Organization: United State EPA Commentor: N/A
Drawing #: 61FCD002
Comment: This drawing shows a precast concrete manhole detail which uses precast concrete sections, including a transition cone section, in the upper portion of the manhole. Typically such a cone section is 3 feet high, the monolithic base section is about 2 feet high, and the manhole frame and cover and any adjusting grade rings will have a total height of about 1 foot, making the manhole 6 feet deep. However, the profiles shown on the drawing indicate that two of the manholes are less than 4 feet deep and that the third manhole is less than 5 feet deep. The detail should be revised to clearly show a shallow manhole, or the sewer should be installed deeper if the precast concrete manhole shown is to be used. The drawing should be revised accordingly.

Response: Rather than using the standard precast manhole sections referenced in the comment, the Accelerated Waste Retrieval (AWR) design utilizes custom sections to more closely fit project requirements. The profile on the referenced drawing clearly indicates the correct depth.

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1.0 Introduction

The Silos 1 and 2 Accelerated Waste Retrieval (AWR) Project is one of the initial steps in the remediation of the K-65 silos location within the OU4 area. Fluor Fernald has a contract with Foster Wheeler Environmental Corporation (FWENC) to design, construct, start-up and operate a system for retrieving and staging the K-65 material for final remediation.

The site preparation design package provides the design documentation necessary to prepare the AWR Project site for the facilities and infrastructure required for this project.

2.0 Purpose

The purpose of the AWR Site Preparation Package is to convey the requirements for site development and preparation for facilities and infrastructure associated with the AWR Project. The concepts and ideas presented herein have been developed into final design drawing, specifications, and calculations and are ready for construction. The AWR Site Preparation information has been developed to support the AWR Final detail design activities which are currently being finalized by FWENC. The process detail design information will be presented to the agencies in the Remediation Design Package. See section 7.0 for further details.

3.0 Remedial Design Site Preparation Scope

The following activities constitute the site preparation phase for the AWR project. Along with the description of the activity is a reference to the drawing or other document giving further details relative to that activity.

- Set up office trailers and construction facilities.
  (Drawing 05FCD012 Misc. Facilities Civil Site Layout)

- Erect erosion controls and temporary fencing.
  (Work Areas 1 and 2 and 3 and 4 from Stormwater Drainage Calculations, Stormwater System Drawings)

- Building access roads and gravel parking areas.
  (Drawing 06FCD001 Support Facilities Grading Plan Trailer Layout)

- Run site utilities.
  (Drawings 61FCD001 and 61FCD002 Sanitary Sewer System Layout Plan, Drawings 51FCD002 Domestic Water System Underground Layout Plan, Drawing 05FCD013 Miscellaneous Facility Tie-In Locations)

- Install facilities for storm water management.
  (Drawing 12FCD001 Storm Water System Overall Drainage Plan, Drawing 66FCD006 Storm Waster System Miscellaneous Details Sheet 1)

- Perform site grading and prepare (level and apply gravel) laydown areas. Laydown areas consist of areas identified within the Silo Area and outside W-52 gate.
  (Drawing 05FCD014 Miscellaneous Facility Site Space Allocation)

- Perform excavations and prepare subgrade for foundations.
  (Drawing 12FCD002 Transfer Tank System Excavation Plan and Drawing 12FCD003 Transfer Tank System Site Layout Plan)

- Install gravel, vapor barriers, and mud slabs for foundations.
  (Drawings 12FCD005 thru 007 Transfer Tank System Cross Sections Sheet 1 thru 3)

- Install pre-cast sumps, reinforcing steel, embedded items, piping, and grounding related to the foundations.
  (Drawing 12FSD013 Transfer Tank System Sample Building FDN Embedded Plates)

- Place concrete mat foundation for the TTA/RCS/Sampling building.
  (Drawing 12FSD010 and 011 Transfer Tank System Concrete Slab, Sheets 1 and 2 and Drawing 12FSD016 Transfer Tank Area System Sample Building Foundations Sections and Details, Drawing 12FSD012 Transfer Tank System Sample Building Foundation Plan, Drawing 12FSD011 Transfer Tank System Sample Building Foundation Section, Drawing 20FSD005 Radon Control System Carbon Bed Building Foundation Plan, Drawing 20FSD014 Radon Control System Carbon Bed Building Foundation Section View, Plan Drawing 20FSD050 Radon Control System Air Handling Building Foundation, Drawing 20FSD065 Radon Control System Air Handling Building Foundation Section View)

4.0 Pre-Operational Environmental Control Plan

Attachment A of this document includes the Pre-Operational Environmental Control Plan. This plan provides the dust control, soil excavation, soil management, stormwater management and erosion control requirements for the AWR construction activities.

5.0 List of Drawings

Attachment B contains the following drawings, which depicts the site preparation design for the AWR Project.

- 12FSD005 - Transfer Tank System General Notes
- 12FSD010 - Transfer Tank System Concrete Slab - SH. 1
- 12FSD011 - Transfer Tank System Concrete Slab - SH. 2
- 12FSD012 - Transfer Tank System Concrete Tank Pads - SH. 1
- 12FSD013 - Transfer Tank System Concrete Tank Pads - SH. 2
- 12FSD016 - Transfer Tank System Base Slab & Foundations Sections & Details
- 12FSD017 - Transfer Tank System TTA Bldg. Tank Pad FDNS Sections
- 12FSD025 - Transfer Tank System SWRS Miscellaneous Foundations
- 20FSD005 - Radon Control System (RCS) Carbon Bed Building Foundation Plan
- 20FSD014 - RCS Carbon Bed Building Foundation Section View
- 20FSD050 - RCS Air Handling Building Foundation Plan
- 20FSD059 - RCS Air Handling Building Section View
- 20FSD065 - RCS Air Handling Building Foundation Section View
- 05FCD012 - Misc. Facilities Civil Layout
- 05FCD013 - Misc. Facilities Utility Tie-In Locations
- 05FCD014 - Misc. Facilities Site Space Allocation
- 06FCD001 - Support Facilities Grading Plan Trailer Layout
- 06FCD003 - Support Facilities Misc. Detail Trailer Layout
- 12FCD001 - Transfer Tank System Grading Plan
- 12FCD002 - Transfer Tank System Excavation Plan
- 12FCD003 - Transfer Tank Site System Site Layout Plan
- 12FCD005 - Transfer Tank System Cross Sections Sheet 1
- 12FCD006 - Transfer Tank System Cross Sections Sheet 2
- 12FCD007 - Transfer Tank System Cross Sections Sheet 3
- 51FCD002 - Domestic Water System Underground Layout Plan Sheet 2
- 51FCD003 - Domestic Water System Underground Piping Details
- 61FCD001 - Sanitary Sewer System Layout Plan
- 61FCD002 - Sanitary Sewer System Details
- 66FCD001 - Storm Water System Overall Drainage Plan
- 66FCD002 - Storm Water System SWRS-Drainage Plan Phase 1
- 66FCD003 - Storm Water System Trailer Area Drainage Plan
- 66FCD004 - Storm Water System FSMS Drainage Plan
- 66FCD006 - Storm Water System Misc. Details, Sheet 1
- 66FCD007 - Storm Water System Profiles

6.0 List of Specifications

Attachment C contains the following construction specifications that support the AWR Site Preparation activities.

- 02220 - Site Demolition
- 02300 - Earthwork
- 02302 - Excavation, Backfill, and Compaction for Utilities
- 02370 - Slope Protection and Erosion Control
- 02373 - Separation/Filtration Geotextiles
- 02510 - Water Distribution
- 02530 - Sanitary Sewer
- 02630 - Storm Drainage
- 02722 - Aggregate and/or Graded-Crushed Aggregate Base Course
- 02731 - Aggregate Surface Course
- 02924 - Seeding

7.0 Integration of Design Documentation

The design evolution utilized on the Accelerated Waste Retrieval (AWR) is as follows:

• Conceptual Design	issued	October 1999
• Preliminary Design	issued	December 1999
• 100% Site Prep Design	issued	April 2000
• Remedial Design Package	planned	May 2000
• Final Design Package	planned	May 2000

The Conceptual Design was reviewed by Fluor Fernald, Inc., Department of Energy (DOE), and the Silos Project Critical Analysis Team (CAT). The comment resolutions were woven into the AWR Preliminary Design Package. The Preliminary Design Package went through a formal review and comment period by Fluor Fernald, Inc., DOE, and the CAT. FWENC addressed these issues and finalized the Site Preparation information in April 2000. The Remedial Design Package information is currently being finalized and plans are to issue in May of 2000. The Remedial Design Package will consist of the following information developed during Preliminary Design.

- Process/System Description - high level summary of the systems and process controls.
- Finalized Process Flow Diagrams.
- Berm Excavation Plan - Layout the plan for excavating berm during construction and operation activities.
- Silo Penetration Plan - Define the process by which the Silo Dome will be breached to support camera installation and enlarging manways.
- Contingency Plan and Emergency Response.
- Sampling Plan.
- Silo Environmental Monitoring Plan

The Final Design is currently being completed. The Final Design Package is a compilation of detail design that supports the Remedial Design/Preliminary Design Packages.

8.0 Environmental Protection Agency (EPA) Involvement

After receiving the United States EPA and Ohio EPA approval of the Site Preparation and Remedial Design Packages for the AWR Project, a Final Design Report will be issued documenting the approved Certified for Construction Design. Any necessary changes to the design documented in the Final Design Report will be documented, reviewed, and approved through a formal change control process. Design Change Notices (DCNs) affecting the AWR Site Preparation Package will be provided to the USEPA and OEPA for review and approval in accordance with site practice. Any comments or concerns regarding proposed changes will be promptly addressed.

9.0 Response to comments

Attachment D includes the following Response to Comment documents:

- Response to Ohio EPA Written Comments on the Site Preparation Package received on March 14, 2000.
- Response to Ohio EPA Verbal Comments on the Site Preparation Package received March 14, 2000.
- Response to United States EPA Written Comments on the Site Preparation Package received February 7, 2000.

PRE-OPERATIONAL ENVIRONMENTAL CONTROL PLAN

FOR THE

SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL (AWR) PROJECT

May 2000

1.0 INTRODUCTION

This Pre-operational Environmental Control Plan (ECP) describes the methods and controls that are to be incorporated into the site preparation construction phase of the Accelerated Waste Retrieval (AWR) Project to minimize the impacts of these project activities on the environment. These methods and controls, as described in Section 2.0, are intended to minimize the environmental impacts of fugitive dust, storm water, erosion, and secondary waste resulting from AWR Project site preparation construction activities at the U.S. Department of Energy (DOE) Fernald Environmental Management Project (FEMP) site. The information presented in this plan is excerpted from the overall AWR Project Environmental Control Plan (Document No. 40710-624-P621-10, Rev. 0) to be submitted as part of the Remedial Design Package for the AWR Project.

The Site Preparation activities covered by this plan are:

- Set-up of office trailers and construction facilities
- Installation of erosion controls and fencing
- Construction of access roads and gravel parking areas
- Installation of utilities
- Installation of storm water and drainage controls
- Site grading and lay down area preparation which includes leveling and application of gravel (Laydown areas consist of areas identified within the Silos Project Area and outside the W-52 gate).
- Excavation and subgrade for foundations
- Installation of gravel, vapor barriers, and mud slabs for foundations
- Installation of pre-cast sumps, reinforcing steel, embedded items, piping and grounding related to the foundations
- Place concrete mat foundations for the TTA and RCS buildings

Berm excavation and construction of the foundations for the retrieval superstructure will not take place as part of the site preparation activities covered under this plan. These activities will be addressed in the Environmental Control Plan submitted as part of the AWR Project remedial Design Package.

AWR Project activities are to be performed in compliance with applicable environmental laws and regulations. These laws and regulations, at both the federal and state level, have been incorporated into Applicable or Relative and Appropriate Requirements (ARARs) for the AWR Project. Detailed discussion of compliance with ARARs and other applicable functional area requirements is provided in the AWR Project Environmental Control Plan (Document No. 40710-624-P621-10, Rev. 0) to be submitted as part of the Remedial Design Package for the AWR Project.

Overall FEMP site environmental monitoring is performed by Fluor Fernald. Data or information collected by Foster Wheeler in performance of the AWR Project environmental control activities, as described herein, are to be made available to Fluor Fernald for support of the FEMP site environmental monitoring efforts and for assessing compliance with the project ARARs and FEMP functional area requirements. Information is to be provided to Fluor Fernald from Foster Wheeler via the interfaces described in the Project Management Plan, Document No. 40710-624-P621-01, for the AWR Project.

2.0 METHODS AND CONTROLS

This section describes the various methods and controls to be incorporated into the site preparation construction identified in Section 1 to minimize impacts on the environment. These impacts are mitigated through the use of controls associated with fugitive dust, wastewater, storm water, erosion, and secondary waste generation.

2.1 Fugitive Dust Control

The spread of fugitive dust is controlled during the site preparation construction for the AWR Project in compliance with applicable regulations and Best Available Technology (BAT) requirements for control of fugitive dust emissions. Site-specific BAT control measures for fugitive dust control at the FEMP have been developed by DOE and approved by OEPA. These control measures are documented in RM-0047, "FEMP Fugitive Dust Control Requirements."

Implementation of fugitive dust control measures for the AWR Project, consistent with RM-0047, is described in detail in the "Fugitive Dust Control Plan for the AWR Project" (Document No. 40710624-P6455-01) which is provided as Appendix A to this document.

BAT dust control/work practice strategies to be implemented during AWR site preparation construction activities include:

- Apply water or other dust suppression or crusting agents in sufficient quantity to prevent dust generation but limited so that the application does not result in migration of the agent beyond work area boundaries, ponding, or disruption of other portions of work.
- As soon as fugitive dust emissions are visible, BAT dust controls and/or work practices must be implemented or increased.
- If the standard is exceeded, all mechanical dust-generating activities in the observed area must cease immediately. An increase of BAT dust controls and/or work practices needs to be implemented to bring the fugitive emissions to, at a minimum, below the standard during dust-generating activities (including wind erosion).

Specific BAT dust controls and/or work practices include:

- Application of dust suppression materials approved by appropriate Fluor Fernald personnel such as: water, resin, or equivalent combination of surfactant or crusting agents.
- Minimizing unnecessary traffic in and around field activities.
- Limiting speed of vehicles or equipment to 15 miles per hour or less during operation.
- Reduction in rate of excavation.
- Minimize the height of drop during loading and unloading.

- Changing the method of excavation/transport (e.g., from a front-end loader dumping into a truck to a self-propelled pan).

- Application of appropriate dust suppression agents such as water or surfactants, to the materials being transported by truck load beds to ensure the transported materials will not become airborne. Cover truckload beds, whether full or empty, as required by RM-0047 "FEMP Fugitive Dust Control Requirements".

- Application of dust suppression agents such as surfactants or crusting agents to storage piles.

- Wheel wash at the point of origin prior to entering any defined paved or unpaved roadways.

- Remove clods, clumps, tracks, or visible deposits of soils, mud or other materials that could readily become visible fugitive emissions from paved and treated unpaved roadways/parking areas. Apply appropriate dust control measures to suppress the generation of visible dust that may result from the removal process.

In addition, AWR Project field activities will be continuously observed by project personnel for visible emissions. The number of pieces or type of dust suppression equipment in operation controlling visible dust emission in a designated area will not preclude stopping project field activities in that area. During backshifts and off periods, the onsite Utility Engineer will be responsible for monitoring appropriate areas for fugitive dust generation and initiation of appropriate actions to mitigate fugitive dust generation that is observed. These actions can include calling in project personnel to implement corrective measures identified in the Fugitive Dust Control Plan.

Mechanical dust generating field activities in an observed area shall cease immediately if a fugitive dust standard or site-specific limit is exceeded for that observed area. An increase in BAT dust controls and/or work practices needs to be implemented to bring the fugitive dust emissions to, at a minimum, below the standard or limit during dust generating activities (including wind erosion).

2.2 Storm Water Control

The existing FEMP Storm Water Pollution Prevention Plan (PL-3083, Rev. 0) defines current requirements for management of storm water, consistent with the FEMP NPDES Permit (permit No. 1IO0004*FD) within the project site. The AWR Project area is contained within two drainage watersheds. The following paragraphs describe the existing and proposed storm water control measures at the AWR Project site to ensure the segregation and proper management of uncontaminated and contaminated storm water. These control measures are outlined in greater detail in drawings 66FCD001-66FCD004, 66FCD006, 66FCD007 and in the Storm Water Drainage Plan provided in Appendix B of this document.

Existing—An existing perimeter channel collects runoff from the Silo domes and the surrounding berms. The perimeter channel consists of a combination of small rectangular concrete channels, concrete curb, grates, and pipes. The perimeter channel drains to the Waste Pit Area Runoff Control Sump which was installed as part of CERCLA Removal Action 2 and is located 1,000 feet west-northwest of the silos. The sump has a capacity of 350,000 gallons. This sump also receives drainage from the waste pits to the north. A 12-in. main leads from the sump into the Bio-Surge Lagoon, which discharges to the Advanced Wastewater Treatment (AWWT) facility.

Areas not surrounded by the perimeter channel ultimately drain to the Pilot Plant Drainage Ditch (PPDD), which runs south of the project area and enters Paddy's Run at NPDES outfall STRM 4005, and drains a total of approximately 78 acres. As illustrated on Drawing No. 66FCD001, the majority of this area reaches the PPDD via an existing stormwater basin at the southeast quadrant of the project area. Also currently two culverts cross southern perimeter road and discharge into existing detention basin south and east of the PPDD.

Proposed—Control measures will be employed during implementation of AWR Project activities to assure that impacts to natural resources in the Paddy's Run corridor are minimized. As described in the subsequent sections of this Plan, excavation activities have been planned to minimize the area disturbed. No disturbance (excavation, removal of trees, etc) is planned in areas immediately adjacent to Paddy's Run. Erosion and sediment control measures will be employed during excavation to prevent impacts from stormwater runoff. Finally, as discussed in Section 2.2.2, drainage patterns will be maintained to prevent impacts to Paddy's Run due to spills or releases during the operational phase of the AWR Project.

AWR Project activities will not change or move existing drainage divides. Erosion and siltation in the concrete channels surrounding Silos 1 and 2 will be prevented through erosion and sediment control measures identified in Section 2.3. The perimeter road functions as the outer limit of operations. Rainfall will not directly contact the TTA process area since it is equipped with a roof and gutter system. Therefore, contaminated storm water from this area is not anticipated.

Stormwater drainage during and after AWR Project site preparation construction activities is illustrated on Drawing 66FCD001. Drainage from the Silo 1 and 2 domes and berms, and from the Silo 4 area, will continue to be collected by the existing trench system and discharged to the Waste Pit Area Runoff Control Sump (WPSRC). To ensure that the existing trench system does not become obstructed silt fencing will be installed and the trench will be included in the erosion and sediment control inspections. During the berm excavation and waste retrieval activities the

existing trench system will be also utilized and to prevent silt buildup in the trench additional silt fencing and sediment traps will be installed. Details on the additional silt fencing and sediment traps will be included in the Berm Excavation Plan in the Remedial Design Package. For the purpose of designing the drainage and stormwater controls for the AWR project, the Project area has been divided into eight drainage areas. These drainage areas are summarized below.

Drainage Area	Description	Outlet
1	Construction Trailer Area	Existing SE storm water basin at 18" outlet
2	Laydown Area	Existing SE storm water basin at CB-01
3	Assembly laydown/staging	Existing SE storm water basin at CB-01
4	TTA and RCS roof drains	Existing SE basin via 18" outlet
5	Area South of Silos 1 and 2	PPDD via CB-02
6	TTA control area	Basin at NE quadrant of project area
7	Silos 1 and 2 area	WPSRC sump via perimeter trench
8	Silo 4 area	WPSRC sump via existing drainage

These drainage areas, as well as the runoff coefficients and flows used to assure adequate capacity of the drainage system, are detailed on drawing 66FCD001. The calculations and rationale supporting the drainage plan are provided as Appendix B to this plan.

2.2.1 Employee Training

Construction personnel receive appropriate environmental erosion/stormwater control and safety training based on their job requirements. Environmental awareness is raised by issuing periodic bulletins concerning such topics as spill control. Supervisors are responsible for providing on-the-job training with respect to hazardous materials handling and company environmental policy. This training is documented and records are kept onsite.

Work being performed on the AWR Project is required to comply with the environmental policies of the FEMP site. In addition, site personnel are to perform the work as specified in the applicable certified for construction (CFC) drawings and construction specifications.

Earthwork operations and general construction personnel are subject to normal industrial hazards, and therefore, appropriate precautions are to be taken. Employees are to be trained to follow appropriate Occupational Safety and Health Administration (OSHA) standards with regard to fall protection and trench safety. In addition, hazards involved in working around heavy equipment will be addressed during daily safety briefings, safe workplans, and in the project-Specific Health and Safety Plan. Specific safety measures to be employed include high visibility PPE, lights, and back-up alarms.

2.2.2 Spill Prevention Control and Countermeasures

The potential impact of a release resulting from failure of various AWR systems was considered during development of the stormwater drainage plan. The following three potential sources of release were evaluated.

1) Silo failure during retrieval
2) Failure of one of the TTA tanks
3) Failure of the Slurry transfer Line during retrieval

The potential impact of a failure at Silo 1 or 2 during retrieval is minimized by the design of the retrieval operation and by maintenance of the existing drainage system. First, the water flows to and from the silos during retrieval will be closely controlled to minimize the inventory of water in the silo and to assure that the addition of water is stopped immediately upon a silo failure. Second, as will be outlined in the Berm Excavation plan to be submitted as part of the Remedial Design Package, excavation of the berms will be coordinated with the retrieval such that the level of material inside the silo will at all times be below the level of the berm outside the silo. Finally, as described in Section 2.3, drainage patterns and runoff controls will be maintained such that any release that was to escape the silo would be contained and directed to the WPSRC sump.

The release resulting from failure of one of the TTA tanks would be contained by the sealed concrete walls and floor of the TTA building. The floor drains to a sump which would be used to pump the contained material to an appropriate location, such as one of the other TTA tanks.

The transfer pipe used to transfer silo material from the Silo Waste Retrieval System to the TTA utilizes double-walled pipe to minimize the risk of pipe failure. As the transfer system will be designed to shut down in the event of a pipe failure, the amount of material potentially released in the event of a pipe failure would be limited to the inventory contained in the line – approximately 250 gallons, thus minimizing the likelihood that the release would drain beyond the project area. As illustrated on drawing 66FCD001 and 66FCD006, the area underneath the transfer line drains to the southeast stormwater basin utilizing a concrete water diversion northwest of the TTA building. A valve will be installed at the outlet of the basin to allow any material that were to reach the basin to be contained before reaching the Pilot Plant Drainage Ditch.

The design and construction of hazardous material storage tanks (e.g., fuel tanks and chemical tanks) and secondary containment will conform to the CFC drawings and specifications. Tanks are to be located away from heavy traffic and protected with bollards as necessary. Containers five gallons in size (minimum) are required to be labeled with the appropriate Hazardous Identification Label (diamond) as identified in the National Fire Protection Association (NFPA) Code, NFPA-704.

Heavy equipment and mechanical equipment are to be maintained in good repair so as to minimize the release of engine, transmission, or other oils, engine coolants, or hydraulic fluids. Idle equipment is to be parked as far away from drainage channels as practical. A drip pan can be used under equipment that is leaking, with immediate action taken to repair the equipment or remove it from the FEMP site.

Fueling operations are to be performed with care, with allowances made for fuel expansion to prevent inadvertent small releases. Fuel tanks are to be contained within temporary dikes and inspected regularly. Spilled material is to be cleaned up as soon as practical, placed in appropriate containers, and managed accordingly.

If a spill occurs at the AWR Project site, safe and practical methods available are to be used to prevent material from entering storm water drainage channels. Spills are to be reported immediately to Fluor Fernald. Spill response kits containing absorbent material are to be available during construction, operations, and systems closure for the AWR Project and are to be located for easy access. Absorbent pillows, temporary earth dikes, or other means are to be readily available on-site for use, as appropriate, without risking personnel safety.

2.2.3 Inspections and Recordkeeping

The Construction Manager, or designee, is to conduct site inspections of the site during construction activities to confirm compliance with BMPs on a weekly basis, or within 24 hours of a rainfall event exceeding 0.5 inches within a 24-hour period. Items to be inspected include, but are not limited to, the following:

- Conditions of erosion controls, such as:
  - Silt fences,
  - Drainage ways,
  - Gully formation,
  - Areas needing seeding or reseeding, and
  - Access roads.
- General housekeeping on-site;
- Evidence of silt build-up or obstruction of the Silos 1 and 2 perimeter trench
- Evidence of poor fueling practices or leaking fuel tanks;
- Evidence of leaks from other tanks or equipment; and
- Storm water channels inspected for oil sheen, debris, siltation, or other disturbance.

A written record of the inspection, including all notifications and deficiencies, is to be kept in the field office trailer and made available to FEMP personnel for review. Conditions noted during the inspections that require corrective action are to be repaired within 24 hours.

2.3 Erosion Control

Erosion controls are placed during the construction phase to minimize soil movement from excavated or disturbed areas. These controls are to be installed prior to the initiation of excavation in the affected areas. Erosion controls are detailed in Drawings 66FCD002, 66FCD003, 66FCD004, and 66FCD006 and Construction Specifications 02220, 02225, 02302, and 02370 for the AWR Project. These controls are based on standards specified in the FEMP Storm water Pollution Prevention Plan and the Ohio Department of Natural Resources (ODNR) Rainwater and Land Development Manual.

Several actions to lessen the environmental impact due to erosion are to be taken during AWR Project construction and operation:

- Every effort is to be made to keep disturbed areas to a minimum;
- Existing natural drainage is to be maintained where possible to avoid disturbing areas with vegetation;

- Silt fences are to be placed at the bottom of disturbed slopes and will be installed following the contours to the extent practical;

- Culvert entrances and exits are to be protected with coir matting and natural vegetation;

- Disturbed areas to be idle for more than 45 days will be stabilized within 7 days of final work;

- Overseeding or reseeding (including fertilizing when necessary) are to be performed as necessary until vegetation is established;

- Silt is to be removed from diversion ditches and silt fences, as required by the applicable construction specifications, and at the end of construction. The silt will be disposed as excess soil;

- Erosion control measures are to be inspected at least weekly or within 24 hours of a rainfall event exceeding 0.5-in. within a 24-hour period; and

- Remediation of problems identified in the site inspections are to be completed within 24 hours.

2.6 Secondary Waste Management

It is expected that secondary waste generated by the site preparation activities governed by this plan will consist primarily of excavated soil. Excavation activities during AWR Project Site Preparation Construction activities will be implemented to minimize the volume of excess soil requiring disposal. The grading and excavation plans have been developed to minimize the area of soil disturbed. Wherever possible, excavated soil is used for fill within the project area. Specific practices used to control excavation activities include measures to prevent the spread of contamination due to excavation activities. Vehicles used to transport excess soil will be loaded within the contamination area and will be cleaned before exiting the area. Temporary working piles of soil to be used as backfill, as well as interim storage piles if needed, will be managed to prevent the spread of contamination and to assure control and segregation of soil for proper disposition.

Excavation activities for AWR Project site preparation construction activities consist of excavation for trailers and utility installation, preparation of laydown areas and excavation for the TTA and RCS building foundations. This excavation is estimated to generate approximately 6000 cubic yards of excess soil. . Previous data (Proposed Phase II Soil Sampling and Analysis Within Soil Remediation Area 7, April 20, 1999) indicates that the Soil within the AWR project area will meet the Waste Acceptance Criteria (WAC) the FEMP Onsite disposal Facility (OSDF). Real-time monitoring will be used during excavation to demonstrate that the soil meets the OSDF WAC. As excess soil is generated it will be loaded into trucks within the project area and, if possible, transported directly to the OSDF. Any soil found not to meet the OSDF WAC will be segregated for transport to an alternate disposition location. If interim storage of excess soil is required, the soil will be stored in the area north of the High Nitrate tank at the eastern edge of the Silos Project Area. If interim storage is required, the pile will be constructed and managed in accordance with specification 02300.

No excavation of berm material is planned during site preparation construction activities. Excavation of berm material for construction of the Retrieval System Superstructure foundations, as well as excavation of the berm during retrieval, will be specified in detail in the Berm Excavation Plan submitted as part of the Remedial Design Package.

Construction Waste and Debris

Small quantities of other debris and waste, such as wood, vegetation and PPE, may also be generated during site preparation activities. Materials for which free-release procedures exist will be surveyed for free-release. There are currently no procedures for free-release of vegetation. All construction waste and debris will be containerized and appropriately disposed in accordance with waste management procedures.

Unknown Debris Management

If any previously buried debris (e.g. conduit, piping, concrete) is encountered during excavation, excavation activity will be halted and the debris will be managed in accordance with Fluor Fernald Safe Work Plan requirements as outlined in ACR-002. The debris will be characterized and appropriately disposed before resuming the excavation.

APPENDIX A

FUGITIVE DUST CONTROL PLAN

FOSTER WHEELER

FOSTER WHEELER ENVIRONMENTAL CORPORATION

FUGITIVE DUST CONTROL PLAN

DOCUMENT NO.
624-P6455-01, Rev. 0, PCN# 1

FOR THE

SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL (AWR) PROJECT

SUBMITTED TO:

FLUOR FERNALD, INC.

CONTRACT NO. FSC 624

May 12, 2000~~May 11, 2000~~

FOSTER WHEELER ENVIRONMENTAL CORPORATION

FUGITIVE DUST CONTROL PLAN

Revision 0, PCN# 1

Recommended by:

Foster Wheeler Engineering Manager **Date**

Approved by:

Foster Wheeler Project Manager **Date**

000035

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APPENDICES

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ACRONYMS

AWR	Accelerated Waste Retrieval
BAT	Best Available Technology
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
EC	Emergency Coordinator
FEMP	Fernald Environmental Management Project
OAC	Ohio Administrative Code
OEPA	Ohio Environmental Protection Agency
ORC	Ohio Revised Code
RM	Requirements Manual
S&H	Safety and Health
TBD	to be determined

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1.0 INTRODUCTION

As part of the Accelerated Waste Retrieval (AWR) Project at the U.S. Department of Energy (DOE) Fernald Environmental Management Project (FEMP) site, Foster Wheeler is required to perform fugitive dust control and emissions control in accordance with Exhibit 6.4, "Fugitive Dust Control Requirements", of the AWR Contract. The FEMP requirements also include the development of a Fugitive Dust Control Plan for the AWR Project, which is to be prepared in accordance with Exhibit 6.4 of the AWR Contract, and provided to Fluor Fernald, Inc. (Fluor Fernald) 30 days prior to construction for compliance review.

1.1 Purpose of Plan

This Fugitive Dust Control Plan is to be implemented at the AWR Project site for those activities with the potential of generating fugitive dust, as described in Sections 2 and 3 of this Plan. The mitigation of fugitive dust for specific portions of the AWR Project will also be addressed in Safe Work Plans and related procedures for those portions of work scope.

To meet the AWR Contract and FEMP site requirements, this Fugitive Dust Control Plan includes:

- A listing of specific types and quantities of equipment to be used for dust suppression;
- A listing of proposed methods and materials that will be used to proactively suppress dust;
- The frequency that routine dust suppression shall take place;
- A narrative description of how AWR Project field personnel will implement this Plan and how they will monitor for excessive or visible dust (including how records will be kept and where they will be maintained); and
- A description of the notification process that Foster Wheeler intends for Fluor Fernald to utilize during non-work periods to inform Foster Wheeler of a dust alert.

1.2 Background

Best Available Technology (BAT) dust controls or work practices to be implemented at the FEMP site must be approved by the Ohio Environmental Protection Agency (OEPA). Some BAT dust control/work practice strategies include:

- Apply water or other dust suppression or crusting agents in sufficient quantity to prevent dust generation but limited so that the application does not result in migration of the agent beyond work area boundaries, ponding, or disruption of other portions of work.
- As soon as fugitive dust emissions are visible, BAT dust controls and/or work practices must be implemented or increased.

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- If the standard is exceeded (see Section 1.5 of this Plan), all mechanical dust-generating activities in the observed area must cease immediately. An increase of BAT dust controls and/or work practices needs to be implemented to bring the fugitive emissions to, at a minimum, below the standard during dust-generating activities (including wind erosion).

For each project at FEMP, a Fugitive Dust Control Plan is prepared to address the reasonably available control measures, such as wetting with limited amounts of water or other suitable dust suppression chemicals, that are necessary to prevent loose soil particles from becoming airborne in moderate to heavy winds. The potential for fugitive dust is the highest during soil removal, staging, stockpiling, and transporting activities associated with construction projects. Demolition activities can also generate fugitive dust.

The spread of fugitive dust must be controlled during the execution of the AWR Project to maintain compliance with applicable State of Ohio regulations for restricting emissions of fugitive dust (i.e., Ohio Administrative Code [OAC] 3745-17-08) and the FEMP site fugitive dust control requirements. The FEMP site requirements are specified in the FEMP Requirements Manual RM-0047, *Fugitive Dust Control Requirements* (Fluor Fernald 1997), which stipulates that each project at FEMP develop a project-specific plan to describe:

- How field activities will be monitored for fugitive dust releases;
- What methods will be used to control fugitive dust releases;
- What records will be kept and maintained; and
- What notification process will be used after discovering fugitive dust release.

1.3 Organization of Plan

This Fugitive Dust Control Plan has been prepared in accordance with Exhibit 6.4 of the AWR Contract and to be consistent with FEMP RM-0047, *Fugitive Dust Control Requirements*. In order to address each of the plan elements specified in Exhibit 6.4 of the AWR Contract and to meet the intent of FEMP RM-0047, this Plan is organized as follows:

- Section 1 – Introduction;
- Section 2 – Types and Quantities of Dust Suppression Equipment;
- Section 3 – Dust Suppression Methods and Materials;
- Section 4 – Frequency of Routine Dust Suppression;
- Section 5 – Implementation, Monitoring, and Recordkeeping;
- Section 6 – Dust Alert Notification for Non-Work Periods; and
- Section 7 – References.

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1.4 Definitions

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The following are definitions of terms used in this Fugitive Dust Control Plan. These definitions have been taken from applicable guidance documents, FEMP site plans, and regulatory citations such as OAC 3745-17-01 and the Ohio Revised Code (ORC) 3704.01.

Best Available Technology (BAT) – Any combination of work practices, raw material specifications, throughput limitations, source design characteristics, an evaluation of the annualized cost per ton of pollutant removed, and air pollution control devices that have been previously demonstrated to the Director of Environmental Protection to operate satisfactorily in this state or other states with similar air quality on substantially similar air pollution sources.

Emit or emission – The release into the ambient air of an air contaminant.

Emission limitation or emission standard – A requirement that limits the quantity, rate, or concentration of emissions of air contaminants, including any requirement relating to the operation or maintenance of an air contaminant source.

Fugitive dust – Particulate matter that is emitted from any source by means other than a stack.

Fugitive dust source – Any source that emits fugitive dust or that emitted fugitive dust prior to the installation of any control equipment that was installed on or after February 15, 1972.

Material handling/vehicle traffic on storage piles – Includes activities such as loading in and loading out of materials, excavation, and vehicle traffic on storage piles. Fugitive emissions created by the above activities on storage piles shall be subjected to the standard defined in Section 2 of RM-0047. Fugitive emissions that cannot be distinguished between material handling activities and wind erosion will also be subjected to the standard defined in Section 2 of RM-0047.

Opacity – The degree to which emissions reduce the transmission of light and obscure the view of the background.

Particulate emissions – Particulate matter measurable by the applicable test methods in Appendix A of Title 40 of the Code of Federal Regulations (CFR), Part 60, "Standards of Performance for New Stationary Sources".

Particulate matter – Any material, except water in uncombined form, that is or has been airborne, and exists as a liquid or a solid at standard conditions.

Paved roadway or paved parking area – A predetermined area designed and improved specifically for vehicle traffic. Improvements to the predetermined area include the application of materials such as asphalt or concrete that forms a firm level surface for travel.

Unpaved roadway or unpaved parking area – A predetermined area designed and improved specifically for vehicle traffic. Improvements to the predetermined area include

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the application of gravel, shredded shingles, cinders, compaction, etc., to the delineated area.

Visible particulate (fugitive) emissions – Visible airborne particulates that are generated from the operation of heavy equipment, equipment wheels or tracks, any tools, or vehicle wheels. Visible particulate emissions are also those generated by wind erosion. Regulatory methods that will be used for visual determination of fugitive emissions are Method 9 of 40 CFR 60, Appendix A (to be used by Fluor Fernald) and Method 22 (to be used by Foster Wheeler).

Wind erosion of storage piles – Fugitive emissions from storage piles strictly created by the wind (and not the material handling equipment or vehicle traffic).

1.5 FEMP Site-Specific Limits and OEPA Standard

For the AWR Project, Foster Wheeler must comply with the following FEMP site-specific limits and OEPA standard for fugitive dust emissions:

- Visible particulate emissions from any paved roadway or paved parking area shall not exceed one minute during any sixty-minute observation period (FEMP RM-0047).
- Visible particulate emissions from any unpaved roadway, unpaved parking area, project field activities, or wind erosion from storage piles shall not exceed three minutes during any sixty-minute observation period (FEMP RM-0047).
- Visible particulate emissions from project field activities/areas shall not exceed twenty percent (20%) opacity as a three-minute average (OAC 3745-17-07[B][1]).

In accordance with Exhibit 6.4 of the AWR Contract, Foster Wheeler is required to verify compliance with the FEMP site-specific limits for visible particulate emissions using Method 22 of 40 CFR 60, Appendix A, "Visual Determination of Fugitive Emissions from Material Sources and Smoke Emissions from Flares". Fluor Fernald will provide opacity monitoring for the AWR Project to verify compliance with the OEPA standard for visible particulate emissions and forward the resulting information to Foster Wheeler (see Section 5.2 of this Plan).

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2.0 TYPES AND QUANTITIES OF DUST SUPPRESSION EQUIPMENT

In accordance with OAC 3745-17-08, *Restriction of Emission of Fugitive Dust*, the use of water or other suitable dust suppression chemicals is required for the control of fugitive dust from the demolition of existing buildings or structures, construction operations, grading of roads, or the clearing of land. As part of the AWR Project, activities associated with the potential generation of fugitive dust include:

- Soil excavation associated with the placement of foundations, roadway/parking area, culverts, and trailers;
- Berm excavation around Silos 1 and 2;
- Loading, transporting, and unloading of excavated soils;
- Demolition of pump house on Silo 4 bridge;
- Installation of doorways in Silo 4 concrete;
- Onsite mixing and placement of surrogate material in Silo 4; and
- Concrete penetrations of Silos 1 and 2.

In accordance with RM-0047, *Fugitive Dust Control Requirements*, the number of pieces or type of dust suppression equipment in operation controlling visible dust emission in a designated area will not prevent the stopping of project field activities in that area, if warranted, or impede equipment working in that area. Foster Wheeler plans to use potable water to the extent possible in controlling fugitive dust emissions associated with soil excavations and concrete demolition/penetration activities for the AWR Project. Water will be available at the site in either a water tanker truck (approximately 3,500-gallon capacity) with spray bar attachment or various water hoses and water spray cans, depending on the activity and respective potential for dust generation. If dust suppression materials other than water are to be used, then Foster Wheeler will seek Fluor Fernald approval of such materials prior to use.

Minimal amounts of water will be used in the cases of concrete penetrations and minor demolition work. Other dust control measures or BAT work practices include the use of trucks with covered beds for the loading, transporting, and unloading of excavated soil at the AWR Project site. Further discussion relating to dust suppression methods and materials is provided in Section 3 of this Plan. In addition, Safe Work Plans and related procedures that are developed for specific portions of the AWR Project will address mitigation measures associated with potential fugitive dust generation, and therefore, are not detailed in this Plan.

3.0 DUST SUPPRESSION METHODS AND MATERIALS

This section describes the BAT methods and materials to be used for dust suppression for respective field activities as part of the AWR Project. AWR Project personnel shall proactively suppress dust releases from field activities by applying BAT dust control (such as the application of water, dust suppression agents, or other appropriate methods approved by appropriate Fluor Fernald personnel) and/or implementing BAT work practices at the beginning and during field activities. Water is the proposed dust suppression material for the AWR Project.

3.1 Soil Excavation and Handling

As part of the AWR Project, field activities include the excavation, removal, and handling of soil associated with placement of facility foundations, silo berm removal, and the development of roadway/parking area and associated drainage improvements. The following BAT dust controls and/or work practices for these types of AWR Project activities are to be applied progressively as environmental conditions dictate:

- Work areas, stockpiles, working piles, etc., shall be appropriately controlled before the end of each shift.
- In dry conditions, dust control shall be initiated before each work shift and during lunch breaks, oor as necessary to ensure FEMP site specific limits and OEPA standard for ffugitive dust emissions are not exceeded. PCN#1
- Application of dust suppression materials approved by appropriate Fluor Fernald personnel such as water, resin, or equivalent combination of surfactant or crusting agents. Water is the proposed dust suppression material for the AWR Project.
- Minimize the amount of unnecessary traffic in and around field activities.
- Limit speed of vehicles or equipment to 15 miles per hour (mph) or less during operation. The speed limit shall be reduced, as required, to minimize dust generation.
- Reduce rate of excavation.
- Minimize the height of drop during loading and unloading.
- When feasible, change method of excavation/transport (e.g., from a front-end loader dumping into a truck to a self-propelled pan).
- Apply appropriate dust suppression agents such as water or surfactants (approved by Fluor Fernald) to the materials being transported by truckload beds to ensure the transported materials will not become airborne.
- Soil and like material shall not be visible above the vehicle's body. Change configuration of material being transported (i.e., place less in truck) as necessary.
- Cover truckload beds when transported materials are still likely to become airborne.

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- Apply dust suppression agents such as surfactants or crusting agents to interim storage piles.
- If practical, storage piles shall be covered with a tarpaulin, plastic, etc.
- Soils in work areas and placed in piles shall be rolled at the end of each workday.
- For areas of extended periods of inactivity, vegetate area if protective cover or periodic application of surfactant or crusting agents prove ineffective. This activity is considered as a last resort measure.

Mechanical dust-generating field activities in an observed area shall cease immediately if a fugitive dust standard or site-specific limit is exceeded for that observed area. An increase in BAT dust controls and/or work practices needs to be implemented to bring the fugitive dust emissions to, at a minimum, below the standard or limit during dust generating activities (including wind erosion). In accordance with OAC 3745-17-07(B)(1), the standard visible particulate emissions from AWR Project field activities shall not exceed twenty percent (20%) opacity as a three-minute average.

3.2 Materials/Equipment Hauling and Vehicle/Equipment Traffic

AWR Project activities will involve the hauling of materials and equipment at the FEMP site and the associated vehicle/equipment traffic. Whether these activities are performed on paved or unpaved surfaces (see Section 1.4, Definitions), the following BAT practices and measures are to be applied progressively as environmental conditions dictate to minimize fugitive dust:

- Wheel wash at the point of origin prior to entering any defined paved or unpaved roadways.
- Any clods, clumps, tracks, or visible deposits of soil or mud from *paved* roadways or parking areas shall be swept or otherwise removed, applying appropriate dust control measures to suppress the generation of visible dust that may result from the sweeping or removal process.
- Any clods, clumps, tracks, or visible deposits of soil or mud from *unpaved* roadways or parking areas shall be removed, as practical, applying appropriate dust control measures to suppress the generation of visible dust that may result from the removal process.
- Apply appropriate dust control mechanism such as water or surfactants to the materials being transported by truck load beds to ensure the transported materials will not become airborne. Cover truckload beds when transported materials are still likely to become airborne.
- Minimize the amount of unnecessary traffic on roadways, parking areas, and areas around field activities and limit speeds to 15 mph or less. Reduce speed limit, as required, to minimize dust generation.
- Roadway shoulders shall be maintained.

On *paved* roadways and parking areas (see Section 1.4, Definitions), no visible particulate emissions are allowed except for a period of time not to exceed one minute during any sixty-minute observation period. On *unpaved* roadways and parking areas (see Section 1.4, Definitions), no visible particulate emissions are allowed except for a period of time not to exceed three minutes during any sixty-minute observation period.

3.3 Other AWR Project Field Activities

The AWR Project includes some field activities that are not readily defined by the categories of work described in Sections 3.2 and 3.3. Safe Work Plans and procedures will be developed for specific portions of the AWR Project, including some with potential dust-generating work activities, that will include mitigation measures for fugitive dust generation.

For example, the onsite mixing and placement of surrogate material in Silo 4 will be performed in accordance with an approved Safe Work Plan that addresses specifically how the material is carefully mixed, controlled, and placed in the silo. Other field activities described in various AWR Project Safe Work Plans include the following:

- Demolition of pump house on Silo 4 bridge;
- Installation of doorways in Silo 4 concrete; and
- Concrete penetrations of Silos 1 and 2.

In all cases, BAT dust controls and/or work practices are to be applied progressively as environmental conditions dictate to minimize fugitive dust. AWR Project personnel shall proactively suppress dust releases from field activities by applying BAT dust control (such as the application of water, dust suppression agents, or other appropriate methods approved by appropriate Fluor Fernald personnel) and/or implementing BAT work practices at the beginning and during field activities. Water is the proposed dust suppression material for the field activities identified above.

As with other AWR Project field activities, any mechanical dust-generating field activities in an observed area shall cease immediately if a fugitive dust standard or site-specific limit is exceeded for that observed area. An increase in BAT dust controls and/or work practices needs to be implemented to bring the fugitive dust emissions to, at a minimum, below the standard or limit during dust generating activities (including wind erosion). In accordance with OAC 3745-17-07(B)(1), the standard visible particulate emissions from AWR Project field activities shall not exceed twenty percent (20%) opacity as a three-minute average.

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4.0 FREQUENCY OF ROUTINE DUST SUPPRESSION

In accordance with RM-0047, *Fugitive Dust Control Requirements*, AWR Project personnel should continuously observe field activities for visible emissions. At the start of each day and periodically throughout the day, AWR Project personnel (both Fluor Fernald and Foster Wheeler) are to tour paved/unpaved roads, parking areas, storage piles, and active AWR Project field activities to proactively apply BAT fugitive dust control and/or work practices to minimize dust generation. Before fugitive emissions are visible, BAT dust controls and/or work practices are to be implemented or increased.

If FEMP site limits are exceeded, then all mechanical dust-generating activities, including traffic on roadways in the observed area, shall be ceased immediately. An increase of BAT dust controls and/or work practices are to be implemented immediately to bring the fugitive emissions, as a minimum, below the limit during dust-generating activities (including wind erosion). BAT practices and measures are to be applied progressively as environmental conditions dictate to minimize fugitive dust. Fluor Fernald must concur that the method to suppress the fugitive dust has been appropriately executed by Foster Wheeler before work can restart.

5.0 IMPLEMENTATION, MONITORING, AND RECORDKEEPING

This section describes how AWR Project personnel will implement this Fugitive Dust Control Plan, including the monitoring for excessive or visible dust and how records will be kept and maintained. Safe Work Plans and related procedures will also be developed for specific portions of the AWR Project that include work activities such as the onsite mixing and placement of surrogate material, concrete penetrations of silos, etc., and will address mitigation measures associated with potential fugitive dust generation.

5.1 Plan Implementation

This Fugitive Dust Control Plan is to be implemented at the AWR Project site for those activities with the potential of generating fugitive dust, as described in Sections 2 and 3 of this Plan. The Project Manager for the AWR Project has the ultimate responsibility for the proper implementation of this Plan and the accuracy of its content over the course of the AWR Project.

A controlled copy of this Plan will be maintained at the AWR Project site and will be available for reference over the course of the AWR Project. During the construction phase of the AWR Project (including mobilization), the Construction Manager has the direct responsibility for the implementation of this Plan. During the operations/ maintenance/system closure phase, the Operations/Maintenance/System Closure Manager has this responsibility. The Foster Wheeler Site Safety and Health (S&H) Representative for the AWR Project is the primary person responsible for ensuring the proper fugitive dust observations are conducted at the site.

5.2 Monitoring

AWR Project personnel at the site are required to observe field activities for visible emissions. The Foster Wheeler Site S&H Representative is the primary person at the site responsible for ensuring this requirement is met for the AWR Project. Personnel involved in performing compliance surveillance (i.e., monitoring) to ensure that fugitive dust from AWR Project field activities are meeting fugitive dust standards or limits are required to have the following Fluor Fernald-provided training:

- 40 CFR 60 Appendix A, Method 22 "Visual Determination of Fugitive Emissions from Material Sources and Smoke Emission from Flares".

In accordance with RM-0047, *Fugitive Dust Control Requirements*, Fluor Fernald provides opacity monitoring for each project at FEMP and forwards respective information to the contractor performing work. Foster Wheeler is required to provide continuous monitoring of AWR Project field activities for visible fugitive dust, and keep records as described in the next section.

5.3 Recordkeeping

When performing visible emission monitoring for paved and unpaved roadways, paved and unpaved parking areas, and wind erosion from storage piles, Foster Wheeler will document and submit to Fluor Fernald daily the visual determination of fugitive emissions form (see Appendix

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B, "Method 22- Visual Determination of Duration Period for Fugitive Emissions"). AWR Project files including these daily records are maintained in accordance with the *Records Management Plan*, Document No. 624-P621-04, for the AWR Project.

The Foster Wheeler Site S&H Representative, or designee, will keep field records regarding fugitive dust emissions as part of his/her daily field logbook. Appendix A provides an example form that will be completed by the Foster Wheeler Site S&H Representative, or designee, as a daily record of fugitive dust control activities at the AWR Project site. Instructions for completing the form are also provided in Appendix A. This form is to be completed each time an application of dust suppression material is performed. The forms are submitted to Fluor Fernald on a weekly basis.

6.0 DUST ALERT NOTIFICATION FOR NON-WORK PERIODS

At least one AWR Project personnel, typically the Foster Wheeler Emergency Coordinator (EC), will be on-call during non-work periods seven days per week, including holidays, to respond to the generation of visible dust during off-hours. Table 6-1 provides a list of the primary and alternate contacts for the AWR Project personnel that will be on-call during non-work periods for the different phases of the AWR Project.

Table 6-1. On-Call Contacts for the AWR Project

Contact	AWR Project Phase	Phone Number	Cellular/Pager Number
Primary			
Construction Manager[1]	Construction[2]	TBD[3]	TBD
Alternate			
Project Manager	Construction	TBD	TBD
Site S&H Representative	Construction	TBD	TBD
Primary			
Senior Shift Supervisor[1]	Operations/Maintenance/ System Closure	TBD	TBD
Alternate			
Project Manager	Operations/Maintenance/ System Closure	TBD	TBD
Site S&H Representative	Operations/Maintenance/ System Closure	TBD	TBD

Notes:
[1] Denotes the Foster Wheeler EC for respective phase of the AWR Project.
[2] Construction includes mobilization activities.
[3] TBD = To be determined, upon relocation of AWR Project personnel to the FEMP site during mobilization of field activities for the AWR Project.

Dust suppression is to begin no more than two (2) hours after notification by Fluor Fernald during non-work periods. Foster Wheeler will apply enough BAT dust control material to bring the fugitive dust below the applicable standard or site-specific limit. In addition, the on-call personnel identified in Table 6-1 who responded to the dust alert will not leave the FEMP site without Fluor Fernald concurrence that sufficient controls are in place in accordance with this Fugitive Dust Control Plan.

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7.0 REFERENCES

The following references were consulted in the development of this Fugitive Dust Control Plan:

- Code of Federal Regulations (CFR), Titie 40, Part 60, Appendix A – Test Methods.
- (Fluor Fernald 1997), FEMP Requirements Manual RM-0047, "Fugitive Dust Control Requirements", Revision 0, August 22, 1997.
- Ohio Administrative Code (OAC), Chapter 3745-17, "Emissions of Particulate Matter", Approved Edition, Anderson Publishing Company, September 5, 1999.
- Ohio Revised Code (ORC), Chapter 3704, "Air Pollution Control", Anderson Publishing Company, October 15, 1999.

APPENDICES

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APPENDIX A

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CONTROL OF FUGITIVE DUST EMISSIONS
DAILY RECORD

Date: _____

Time	Area Treated (see sketch)	Treatment Method	Application Rate	Equipment Operator

Instructions:

Enter on form the following:

- Identification of area that was treated and/or cleaned. Record using sketch on back of form, or by attaching similar diagram at appropriate scale.
- The time and date the designated area was treated and/or cleaned.
- The manner the designated area was treated and/or cleaned.
- The application rate of dust suppression material (as a minimum, the tank truck load capacity and number of truckloads applied per unit of time per area, or segment, to which applied.
- The equipment operator (as a minimum, the name of the Contractor or subcontractor firm).

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APPENDIX B

METHOD 22 – VISUAL DETERMINATION OF DURATION PERIOD OF FUGITIVE EMISSIONS FORM

METHOD 22 – VISUAL DETERMINATION OF DURATION PERIOD OF FUGITIVE EMISSIONS

OUTDOOR LOCATION

Company	Observer
Location	Team
Co. Rep.	Date
Sky Condition	Wind Direction
Precipitation	Wind Speed
Project	Activity observed

Dust abatement operations _____
(i.e., water spray, tarping, or slow speeds)

Souce(s) of dust emissions _____
(i.e., earthmoving equipment, trucks, wind entrainment)

Other observations _____

Attach map of area being observed or draw sketch in space below (use FEMP site drawing from RM-0047) indicating area being observed. Indicate observer's position relative to source, emission points, and the sun.

OBSERVATIONS	Clock Time	Observation period duration (min:sec)	Accumulated emission time (min:sec)
Beginning			
End			

Notes:

Note: Method 22 is described in Appendix A of 40 CFR 60. Training is provided by Fluor Fernald.

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APPENDIX B

STORMWATER DRAINAGE CALCULATIONS

ATTACHMENT 1

FOSTER WHEELER ENVIRONMENTAL CORPORATION
CALCULATION COVER SHEET

Sheet 1 of 7

PROJECT FDF Silos 1&2 AWR SUBJECT Stormwater Drainage

CLIENT Fluor Daniel Fernald

CALCULATION NO CA-FSC624-RC-001 PROJECT NO. FSC 624

NO OF SHEETS 6 + 19 (ATTACH. A) DESIGN LEVEL

CALCULATION BY OTHERS ____ YES X NO PREPARER M. Hughes

REVIEWED BY ____ DATE ____

ASSUMPTIONS THAT REQUIRE CONFIRMATION ____ YES X NO

ASSUMPTIONS CONFIRMED BY ____ DATE ____

PRINT NAME, DATE AND INITIAL

Rev No	Affected Sheets	Prepared by Date	Checked by Date	Verified by Date
0	All	M. Hughes MSH 1/13/00	V. Bhatt 1/13/00	
0	ATTACH. A	M. Hughes MSH 1/13/00	V. Bhatt 1/18/00	
1	2, 5, 6, 7	M. Hughes 3/23/00	V. Bhatt 3/23/00	
1	1, 2, 3, 4, 7, 8, 9, 17, 18, 19	M. Hughes 3/23/00	V. Bhatt 3/23/00	

Applicable Codes, Standards and Regulations:

1. Location and Design Manual Volume 2 – Drainage Design, April 1992. Ohio Department of Transportation (ODOT).
2. Standard Specifications for Transportation Materials and Methods of Sampling and Testing, Seventeenth Edition, 1995. American Association of State Highway and Transportation Officials (AASHTO).
3. Construction and Material Specifications, January 1997. Ohio Department of Transportation (ODOT).
4. Rainwater and Land Development (Standards for Stormwater Management, Land Development and Urban Protection), Second Edition, January 1996. Dan Mecklenburg, Ohio Department of Natural Resources (ODNR).

Methodology:

The rational method, Q = CIA, will be used to determine storm water runoff for each drainage area. Then Manning's equation ($V = 1.49 \times R^{0.67} \times S^{0.5} / n$) will be used to determine the capacities for concrete drainage channel segment around Silos 1 and 2.. Manning's equation can be applied to ditches and culverts equally to determine velocity. The distance from the K-65 trench to the drainage culvert south of the drainage areas is approximately 280 feet. Time of travel is approximately 4 minutes for each drainage area at a general slope of .01 ft/ft, so a duration time of ten minutes is used to obtain rainfall intensities. Rainfall intensity for 10 minutes of a 10-year storm is approximately 5.4 inches per hour 6.6 inches per hour for the 25-year storm (Reference 4).

Assumptions:

1. The existing FEMP SWS in the AWR Project Area currently meets the technical requirements for the SWS as specified in the Technical Requirements Document (TRD) Reference 7.

2. Site Layout and Grading will be revised as necessary to facilitate existing Project Area drainage per Final Construction Drawings.

3. Activities related to the AWR Project are not anticipated to generate contaminated storm water. However, Areas 7 & 8 are located within "potentially contaminated" areas as designated by FEMP and therefore stormwater from these areas will continue to be collected by the existing concrete perimeter ditch system and conveyed to the Bio-Surge

References:

1. Hydraulic Design of Highway Culverts, FHWA Hydraulic Design Series No. 5, Federal Highway Administration, September 1985.
2. Soil Conservation Service Technical Release No. 55, Urban Hydrology for Small Watersheds, 1986.
3. Technical Paper No. 40, Rainfall Frequency Atlas of the US for Durations From 30 Minutes to 24 Hours & Return Periods From 1 to 100 Years, Weather Bureau, May 1961.
4. NOAA Technical Memorandum NWS Hydro-35, Five- to 60-Minute Precipitation Frequency for the Eastern and Central United States, National Oceanic and Atmospheric Administration, June 1977.
5. Construction Castings, Neenah Foundry Company, Catalog "R", 11th Edition, Neenah Wisconsin.
6. RFP No. F98P168407, Part 7, Technical Requirements Document (TRD), Revision 1, February 1999. Contract FSC 624, Silos 1 and 2 Accelerated Waste Retrieval Project, Fluor Daniel Fernald (FDF).
7. RFP No. F98P168407, Part 6, Statement of Work (SOW), Revision 1, February 1999. Contract FSC 624, Silos 1 and 2 Accelerated Waste Retrieval Project, Fluor Daniel Fernald (FDF).

Calculations: (see attached calculations sheets in Attachment A)

The AWR project is divided into 8 sub-areas consistent with the overall drainage plan and topography of the site (see Drawings 66FCD001 through 66FCD006).

Area #	Pre-development runoff	Post-development runoff	Outlet capacity
1	2.81 cfs (to the east)	4.09 cfs + 3.16 cfs = 7.25cfs	14.0 cfs
2	1.88 cfs	2.35 cfs	11.0 cfs
3	1.56 cfs	1.94 cfs	11.0 cfs
4	2.35 cfs	4.58cfs (3.16 to the east)	11.0 cfs
5	2.40 cfs	3.00 cfs	11.0 cfs
6	0.86 cfs	N/A	N/A
7	13.39 cfs (silo area)	13.05 cfs (silo area)	53.2 cfs
8	1.12 cfs	1.12 cfs	53.2 cfs

FOSTER WHEELER ENVIRONMENTAL CORPORATION									
PROJECT: Fernald Silos 1 and 2 AWR					SUBJECT: Stormwater Drainage				
Revision	/								Sheet 6 of 7
By / Date	MSH	3/23/00							Project No: 2122.0308
Ch / Date	HLT	3/23/00							Calc: CA-FSC624-FC-001

Stormwater from Area 7 is ultimately conveyed to the Bio-surge lagoon by an existing concrete perimeter ditch and a 21" dia. Culvert. The northeast quadrant of Area 7 drains to the concrete perimeter ditch and north to the lagoon. The southeast and southwest quadrants drain to the 21" dia. RCP via the concrete perimeter ditch and catch basin outlet at the road. The northwest quadrant drains to the 21" RCP via a trench drain crossing the perimeter road. The limiting flow of the concrete perimeter ditch surrounding the Silos occurs from the K-65 ditch north to the lagoon due to a 0.5% slope through this area. Increased slope translates to greater capacities. The capacity of this section of perimeter ditch is 41.7 cfs. The capacity of the 21" dia. culvert pipe, at 0.5% slope, draining the rest of the concrete perimeter ditch is 11.5 cfs (see attached nomograph, sheet A13 of A19). The total stormwater outlet capacity for Area 7 is 53.2 cfs and no other sub areas drain to Area 7. Area 8 is subject to minimal grading and construction activities which will not alter the existing SWS drainage for this area. Area 6 will be subjected to minimal grading and construction activities and the storm water drainage from this area flows along and away from the K-65 trench to the north and does not contribute runoff to either CB-01 or CB-02. Areas 1 through 5 are calculated using the Rational Method. From the K-65 trench to the south perimeter ditch is approximately 280', therefore overland sheet flow has not transformed into shallow trench flow. Time of travel (Tt) was calculated at 0.06 hours using the TR 55 Method which uses a 2 year, 24-hr. rainfall.

Conclusions:

The construction of the Silos 1 and 2 AWR Project will proceed in phases within 8 specific project drainage areas. The Stormwater Drainage Plan presented on Drawings 66FCD001 through 66FCD004 and Drawing 66FCD006 represents an overall plan to convey stormwater consistent with the TRD requirements and to prevent siltation and erosion for the entire project duration as well as the permanent stormwater drainage configuration. The calculations show the capacity of the existing SWS is adequate to handle the Post-development flows resulting from the Project activities for each of the 8 project areas. A total of nearly 8.0 acres will be disturbed during the construction of the project. Over half of this area will be minor grading with less than 1 foot of cut/fill in designated clean areas. Major earthwork will be required to construct foundations for the buildings, superstructure, and silo excavation. However, proper soil and erosion control, and other protective measures consistent with the specific requirements of the TRD will be employed. This should prevent contaminated stormwater from leaving the site. In addition, stormwater generated during each phase of excavation will be handled by the existing perimeter ditches. The two existing storm drainage culverts at the southern perimeter road provide sufficient capacity to handle the runoff from Areas 2 & 3, surface runoff from Area 4, and Area 5. The roof drainage from the TTA Building will be directed to the Eastern Perimeter drainage ditch by way of the existing, unused 12" storm pipe and then through the proposed 18" pipe into the detention

basin at the southeast portion of the Site. During construction of the TTA and RCS buildings, storm water will be removed from the excavation from a sump and pumped to the existing manhole in Area 4 and then to the east perimeter ditch. This will also be the method for removing stormwater when the slabs are being placed. The inlet and outlet protection at the ends of the pipes will remove the little amount of sediment involved in this procedure. The inlet and outlet protection will be maintenanced as noted on the drawings and in the Specifications. The post-development runoff is greater in each of the five areas, with diversion of the roof drainage through the existing storm drain to the perimeter ditch to the east the stormwater runoff into the perimeter ditch to the south increases only slightly from 8.19 cfs to 8.71 cfs. A 12" culvert pipe at two headwaters is capable of 5.5 cfs of flow, therefore the 2 12" dia. pipes in the south perimeter ditch have a combined capacity of 11.0 cfs. The 18" culvert pipe at the east perimeter at 2 headwaters is capable of 14.0 cfs of flow. The assumption is that this drainage system was originally designed to handle the flow from the area of the new TTA building. Since all the developed areas are to be treated with a gravel surface over a geotextile fabric, the chance of siltation and erosion in these areas is not considered to be significant. In the Silos 1 and 2 area, the configuration shown on the grading plan is the worst case scenario. The silt fence directs any narrow channel flow generated during a design storm from the southeast and southwest quadrants to the sedimentation basins at the southwest corner. These sediment basins have a storage capacity of approximately 50.0 cy to protect an area of less than 1 acre. Other areas around the silos are bounded by gravelled areas with silt fence protecting the concrete perimeter ditch from siltation. Further soil and erosion control measures will be deployed as noted on the Stormwater Drainage Plan Drawings and in the Construction Specifications. Proposed modifications to the existing SWS are also shown on the Drawings and are made to facilitate existing drainage paths on the site. R1

FOSTER WHEELER ENVIRONMENTAL CORPORATION									
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ATTACHMENT A

Written description (SWS) Section 2.3.2.1	Sheet A2
SWS Requirements 001 through 010	Sheet A3
SWS Requirements 011 through 020	Sheet A4
Calculations	Sheet A5 to A12
Figure 11.6 Flow in Pipes	Sheet A13
Chart 7 Pipe Culvert Chart	Sheet 14
Rainfall Intensity Zone Map	Sheet A15
Rainfall Intensity Duration Curves	Sheet A16
Drawing 66FCD001, Rev 0	Sheet A17 **
Drawing 66FCD002, Rev 1	Sheet A18 **
Drawing 66FCD003, Rev 1	Sheet A19 **
Drawing 66FCD004, Rev B	Sheet A20 **
Drawing 66FCD006, Rev 1	Sheet A21 **

R1

** - 11" x 17" sheets

2.3.2.1 Stormwater System

The Contractor shall provide facilities to prevent the introduction into any stream, lake, aquifer, or other body of water, of any substances or materials which may pollute or degrade the water or be deleterious to fish and wildlife.

The potential for generation of contaminated stormwater, including any run-on and run-off, shall be minimized by process design and operation. Contaminated run-off could come from areas that are in direct contact with residue or have a high potential of coming in contact with residue, such as storage pads and stockpile areas. The quantity of contaminated stormwater from the AWR Project area shall be minimized by segregating clean area run-off from potentially contaminated run-off. Clean run-off could include building roof drainage and run-off from areas of fixed contamination. "Clean" stormwater shall be routed to the stormwater collection basin south of the project area. Clean stormwater shall not be discharged to the AWWT Facility.

Areas used for management of materials that could contribute to contaminated stormwater shall be protected from precipitation and stormwater run-on and run-off, to the extent practicable, in the design. Contaminated stormwater shall not be discharged with "clean" stormwater. Contaminated stormwater shall be contained and sampled prior to discharge into the existing WWS. Contaminated stormwater shall meet the wastewater acceptance criteria and other requirements identified in Section 2.3.2.2 for wastewater, including the limit on flow, prior to discharge to the AWWT facility.

New SWS shall be designed in accordance with FEMP site policy and Ohio stormwater requirements. The site Stormwater Pollution Prevention Plan, RM-0039 (Part 7 - Section 3.0) is used to satisfy the requirements of the FEMP National Pollutant Discharge Elimination System (NPDES) Permit. Stormwater control design details, construction methods, and materials shall be in accordance with Ohio approved stormwater standards. As referenced in the SPPP, stormwater management, as well as erosion and sediment control during construction, shall comply with the latest version of ODNR Rainwater and Land Development Manual (Part 7 - Section 5.0); the U.S. Technical Paper 40 (Part 7 - Section 5.0) may be used for levels for storm events at the FEMP.

Storm drain systems not directly connected to the SWS (if any), with catchments less than 160 acres, may be designed by the Rational Method. Stormwater control systems designed by the Rational Method shall use rainfall frequencies found in Technical Paper No. 40 (Part 7 - Section 5.0) and NWS Hydro-35 (Part 7 - Section 5.0). Those storm drain systems directly connected to an existing SWS shall be designed by Soil Conservation Service methods (e.g., TR-55, TR-20).

Environmental releases shall be avoided to the extent possible. Any spills or other unplanned releases to the environment shall be immediately reported to FDF and cleaned up to minimize the release of contaminants to the environment.

Limited stormwater control facilities shall be provided to the Contractor for the collection of stormwater from the Contractor's process facility location . Existing stormwater control features and facilities are shown on the following: the topographic map illustrated in Figure C-4 (Appendix C - Section C.2), drawing 40A-4455-G-00056 (Part 7 - Section 1.4), and drawing 94X-5900-G-00898 (Part 7 - Section 1.4). The Contractor, using assigned FDF personnel, shall maintain this system until project completion. In particular, the Contractor shall maintain the drainage ditches and other stormwater appurtenances in the project area in a manner that ensures continued operation of the SWS pursuant to its design standards. For example, any sediment build-up that affects run-off flow below design capacities shall be removed and managed by the Contractor.

Table 2-9 provides system requirements for the SWS. Regulatory requirements for the control of stormwater are listed in the ARARs in Appendix B.

Table 2-9 Stormwater System Requirements

Requirement Number	Requirement
SWS-001	Provide controlled stormwater drainage, collection, and segregation of contaminated stormwater from uncontaminated liquids.
SWS-002	Ensure that drainage basins, curbs, and catch or retention basins have efficient and adequate drainage.
SWS-003	Ensure that the existing drainage pattern is maintained by providing culverts (or other controls) as needed for the SWRS, RCS, and the TTA, which are located in potentially contaminated area.
SWS-004	Ensure that AASHTO and ODOT standards for paving, surfacing methods, materials, and design are observed. Where conflict exists between the AASHTO or ODOT standards and the ODNR Rainwater and Land Development manual, the ODNR manual shall take precedence.
SWS-005	Ensure that appropriate design storm events for Hamilton County are used in designing new culverts, analyzing existing culverts and identifying drainage differences, maintenance problems, and other impacts caused by changes in the current system.
SWS-006	Stormwater management systems for secondary containment areas for K-65 material, wastewater, hazardous substance or hazardous material tanks, and contaminated stormwater shall be designed for the 25-year, 24-hour storm. Stormwater controls for all other uncontaminated stormwater shall be designed for the 10-year, 24-hour storm.
SWS-007	Install erosion matting, check dams, riprap lining, or other methods specified in the ODNR Rainwater and Land Development manual (Part 7 - Section 5.0) to limit erosion, as appropriate to control excessive stormwater velocities.
SWS-008	Through design, minimize the use of stone or other materials needed to control erosion in the ditches.
SWS-009	Ensure that the road side ditches do not overtop the roads for the design storm.
SWS-010	Include measures to minimize and mitigate erosion and sediment transport in the runoff controls from the distributed areas.

Table 2-9 Stormwater System Requirements

Requirement Number	Requirement
SWS-011	Design storm drainage in accordance with the ODNR Rainwater and Land Development manual.
SWS-012	Ensure that drainage is by open ditch systems, and make use of existing drainage structures such as culverts and catch basins when possible.
SWS-013	Minimize ditch size by flooding the road shoulder if necessary.
SWS-014	Perform side slope and ditch design in accordance with the ODNR Rainwater and Land Development manual. Ditch checks may be placed where required. Ditch design shall not impact nearby underground utilities.
SWS-015	Ensure that earthwork conforms to ODNR Rainwater and Land Development manual standards and complies with the FDF waste management standards, discussed in Section 5.0.
SWS-016	Ensure that design changes and temporary modifications prevent erosion and control sediment during and subsequent to construction.
SWS-017	Using seed or mulch, stabilize areas disturbed during construction that are not surfaced or covered with riprap. Ensure that revegetation, seeding, and soil supplements conform to ODNR Rainwater and Land Development manual standards.
SWS-018	Ensure that open course stormwater drainage channels have low velocities that are non-erosive and limit sediment accumulation.
SWS-019	Ensure that construction areas and exposed soil, unworked and left exposed for thirty days or more are seeded per ODNR Rainwater and Land Development manual standards and FDF waste management requirements.
SWS-020	Contaminated stormwater shall be contained and characterized prior to discharge tothe AWWT facility. Contaminated stormwater shall meet the wastewater acceptance criteria in Table 2-10a and other requirements identified in Section 2.3.2.2 for wastewater including the limit on flow prior to discharge to the AWWT facility.

ATTACHMENT M

FOSTER WHEELER ENVIRONMENTAL CORPORATION

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CHKD. BY _____ DATE _____ OFS NO. _____ DEPT. NO. _____

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PROJECT AWR CALC# CA-FSC&Z4-FC-001

SUBJECT STORM WATER RUNOFF, PRE-EXISTING CONDITIONS

$Q = CiA$ (RATIONAL METHOD)

ASSUME $t_c = 10$ MIN

10 YR, 24-HR STORM: $i = 5.4$ IN./HR
25 YR, 24-HR STORM: $i = 6.6$ IN./HR

AREA 1
$A = 1.30$ AC
$C = 0.40$ (TURF)
$i = 5.4$ (10 YR, 24 HR)
$Q = 0.40(5.4)(1.30) = 2.81$ CFS

AREA 2
$A = 0.87$ AC
$C = 0.40$
$i = 5.4$
$Q = 0.40(5.4)(0.87) = 1.88$ CFS

AREA 3
$A = 0.72$ AC
$C = 0.40$
$i = 5.4$
$Q = 0.40(5.4)0.72 = 1.56$ CFS

AREA 4
$A = 1.09$ AC
$C = 0.40$
$i = 5.40$
$Q = 0.40(5.4)(1.09) = 2.35$ CFS

AREA 5
$A = 1.11$ AC
$C = 0.40$
$i = 5.4$
$Q = 0.40(5.4)(1.11) = 2.40$ CFS

AREA 6
$A = 0.40$ AC
$C = 0.40$
$i = 5.4$
$Q = 0.40(5.4)(0.4) = 0.86$ CFS

FOSTER WHEELER ENVIRONMENTAL CORPORATION

BY MSA DATE 3/21/00 SHEET A6 OF 6

CHKD. BY _____ DATE _____ OFS NO. _____ DEPT. NO. _____

CLIENT _____

PROJECT AWSR CALC. #CA-FSC624-FC-001

SUBJECT STORM WATER RUNOFF, PRE-EXISTING CONDITIONS

AREA 7 $A = 2.83$ AC

COMPOSITE C: 2.59 (0.70) (STEEP, GRASSED)

0.12 (0.90)(2) (SILO ROOFS)

$\Rightarrow \frac{2.59(0.70) + 0.12(0.90)(2)}{2.83} = 0.72$

$i = 6.6$ (POTENTIALLY CONTAMINATED)

$Q = 0.72(6.6)(2.83) = 13.39$ CFS

AREA 8 $A = 0.37$ AC

COMPOSITE C: $\pi(41)^2 = 0.12(0.90)$ (SILO)

0.25 (0.40) (GRASS)

$C = \frac{0.12(0.90) + 0.25(0.40)}{0.37} = 0.56$

$Q = 0.56(6.6)(0.37) = 1.37$ CFS

SOUTH PERIMETER RD

$12' \times 355' = 0.10$ AC, $C = 0.90$

$Q = 0.90(5.4)0.10 = 0.48$ CFS

ATTACHMENT M

FOSTER WHEELER ENVIRONMENTAL CORPORATION

BY MSH DATE 3/21/00 3054 SHEET A7 OF 1

CHKD. BY _____ DATE _____ OFS NO. _____ DEPT. NO. _____

CLIENT _____

PROJECT AWR CALC # CA-FSC624-FC-001

SUBJECT STORM WATER RUNOFF, POST-DEVELOPMENT CONDITION

$Q = CiA$ (RATIONAL METHOD)

ASSUME $t_c = 10$ MIN

10 YR, 24-HR STORM: $i = 5.4$ IN/HR
25 YR, 24-HR STORM: $i = 6.6$ IN/HR

AREA 1 $A = 1.30$ AC (W/ROADWAY)

COMPOSITE C: $\frac{(60 \times 12)(1) + (60 \times 25)2 + 12(290)}{43,560} = 0.$ (ROAD) $C = 0.90$ (TRAILERS)

1.12 AC (GRAVEL) $C = 0.50$

$C = \frac{0.26(0.90) + 1.04(0.50)}{1.30} = 0.58$

$Q = 0.58(5.4)(1.30) = 4.09$ CFS

AREA 2 $A = 0.87$ AC
$C = 0.50$ (GRAVEL)
$i = 5.4$

$Q = 0.50(5.4)(0.87) = 2.35$ CFS

AREA 3

$A = 0.72$ AC
$C = 0.50$ (GRAVEL)
$i = 5.4$

$Q = 0.50(5.4)(0.72) = 1.94$ CFS

AREA 4 $A = 1.09$ AC

COMPOSITE C: $\frac{185 \times 180}{43,560} = 0.76$ AC (ROOFS) $C = 0.90$ (69% OF AREA)

0.33 AC (GRAVEL) $C = 0.50$

$C = \frac{0.76(0.90) + 0.33(0.50)}{1.09} = 0.78$

$Q = 0.78(5.4)(1.09) = 4.58$ CFS

(3.16 CFS, ROOF DRAIN, TO AREA 1)

000066

R

FOSTER WHEELER ENVIRONMENTAL CORPORATION

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PROJECT AWR CALC # CA-FSC624-FC-001

SUBJECT STORM WATER RUNOFF, POST DEVELOPMENT CONDITIONS

AREA 5

$A = 1.11$ AC
$C = 0.50$ (GRAVEL)
$i = 5.40$
$Q = 0.50(5.4)(1.11) = 3.00$ CFS

AREA 6

THIS AREA DOES NOT CONTRIBUTE RUNOFF TO THE STORM WATER SYSTEM (SW) SOUTH OF THE K-65 TRENCH. DEVELOPMENT IN THIS AREA IS MINIMAL AND STORM WATER RUNOFF INCREASE WILL BE INSIGNIFICANT.

AREA 7

$A = 2.83$ AC
$70' \times 220' = 0.35$ AC, $C = 0.50$ (GRAVEL)
$20' \times 200' = 0.09$ AC, $C = 0.90$ (CONC., RAIL)
$\pi(40)^2 = 0.12$ AC, $C = 0.90$ (SILOS)
$2.83 - 0.35 - 0.09 - 0.12 - 0.12 = 2.15$ AC, $C = 0.70$ (STEEP GRASSED)

$$C = \frac{0.35(0.50) + 0.09(0.9) + (0.24)(0.9) + 2.15(0.70)}{2.83}$$

$C = 0.70$
$Q = 0.70(6.6)(2.83) = 13.05$ CFS

AREA 8

DEVELOPMENT IN THIS AREA CONSISTS OF THE ADDITION OF A JOB TRAILER.
$A = 60 \times 12 = 0.02$ AC, $C = 0.90$
$Q = 0.90(6.6)0.02 = 0.10$ CFS
THE ADDITION OF 0.10 CFS TO THE SWS DOES NOT REPRESENT A SIGNIFICANT IMPACT.

ATTACHMENT A

FOSTER WHEELER ENVIRONMENTAL CORPORATION

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BY MSH DATE 3/21/00 SHEET A9 OF A

CHKD. BY _____ DATE _____ OFS NO. _____ DEPT. NO. _____

CLIENT _____

PROJECT AWR CALC # CA-FSC624-FC-001

SUBJECT STORM WATER RUNOFF, POST DEVELOPMENT

SOUTH PERIMETER RD
Q = 0.48 CFS | R1

9.19 CFS TOTAL TO SOUTH PERIMETER DITC
(2.35 + 1.94 + 1.42 + 3.00 + 0.48) | R1

ATTACHMENT H

FOSTER WHEELER ENVIRONMENTAL CORPORATION

BY MSH DATE 3/22/00 SHEET A10 OF 1

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PROJECT AWR CALC# CR-FSC624-FC-001

SUBJECT STORM WATER RUNOFF

TIME OF TRAVEL (FOR SHEET FLOW < 300')

FROM TR-55 $T_t = \dfrac{0.007(nL)^{0.8}}{(P_2)^{0.5}(S)^{0.4}}$

WHERE

T_t = TRAVEL TIME (HRS)
n = MANNING'S ROUGHNESS COEFFICIENT
L = FLOW LENGTH (FT)
P_2 = 2YR., 24-HR RAINFALL (IN)
S = SLOPE OF HYDRAULIC GRADE LINE (FT/FT)

R

$n = 0.011$
$L = 280'$
$P_2 = 3.8$ IN
$S = 577 - 575 = 2'$ FALL IN $280' = 0.0071$ FT/FT

$\therefore T_t = \dfrac{0.007[0.011(280)]^{0.8}}{(3.8)^{0.5}(0.0071)^{0.4}} = 0.064$ HR (3.8 MIN)

ATTACHMENT 1

FOSTER WHEELER ENVIRONMENTAL CORPORATION

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PROJECT AWR CALC# CA-FSC624-FC-001

SUBJECT PERIMETER TRENCH CAPACITIES

K-65 TRENCH → NORTH ("A")

1' BOT	9+97.30	7+68.80	228.50'
DEPTH VARIES	INV = 576.90	INV = 575.76	1.14' FALL
(1' MIN SIDES)			S = 0.50%

K-65 TRENCH → SOUTH ("B")

	10+02.70	11+58	155.30
	576.40	574.50	1.9'
1' BOTTOM	1.5' SIDES		S = 1.22%
	11+58	12+15.27	57.27'
	574.50	569.40	5.1
1' BOT	1.5' SIDES		S = 8.91%
	12+15.27	14+41.50	226.23'
	569.40	567.50	1.9'
			S = 0.84%
	14+41.50	15+30.10	88.60'
	567.50	565.50	2.0'
			S = 2.26'
	15+30.10	15+47.40	17.3'
	565.50	569.41	0.09'
			S = 0.52%

BEGIN 21"φ RCP : 146.0' @ 0.5%

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PROJECT AWR CALC # CA-FSC634-FC-001

SUBJECT PERIMETER TRENCH CAPACITIES

$$Q_{(CFS)} = \frac{1.486}{n} R_H^{2/3} \sqrt{S_o}\ A$$

$n = 0.012$ (UNFINISHED CONC. CHANNEL)

R_H (FLOWING FULL) $= A/P$ $A = 1\ FT^2$ $P = 3\ FT$ $R_H = 0.33$

$S_o = 0.50\%$ $A = 1$

∴ LIMITING FLOW, TRENCH "A"

$$Q = \frac{1.486}{0.012}(0.33)^{0.67}\sqrt{0.50}(1)$$

$Q = 41.67$ CFS

∴ LIMITING FLOW TRENCH "B" $S = 0.52\%$

$$Q = \frac{1.486}{0.012}(0.375)^{0.67}\sqrt{0.52}(1.5)$$

$Q = 69.43$ CFS

CAPACITY OF 21" ϕ RCP @ $S = 0.50\%$ (SEE ATTACHED CHART)

$Q = 11.5$ CFS

000071

FWENC 581D 10/96

ATTACHMENT 3054
A13 OF A21

3054

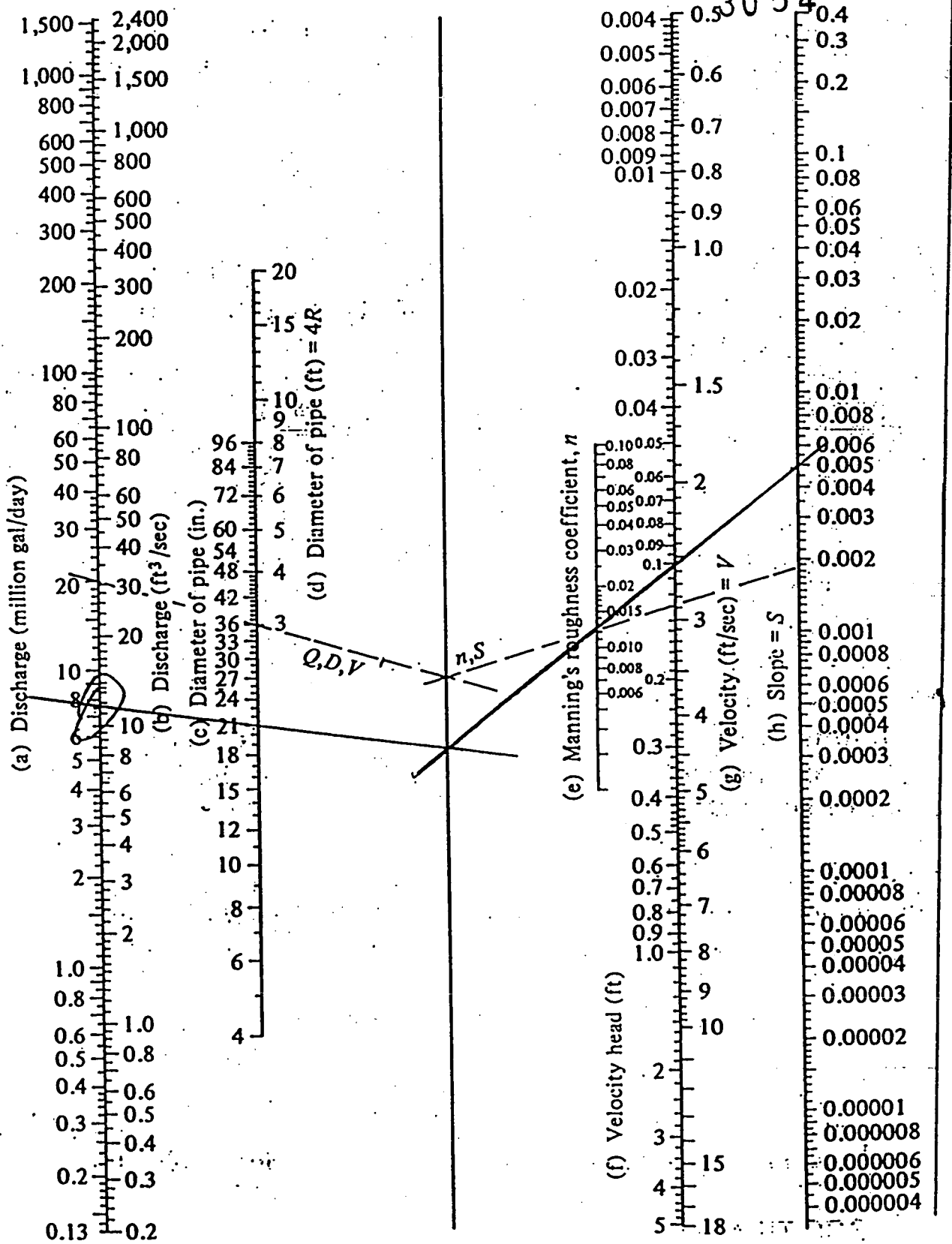
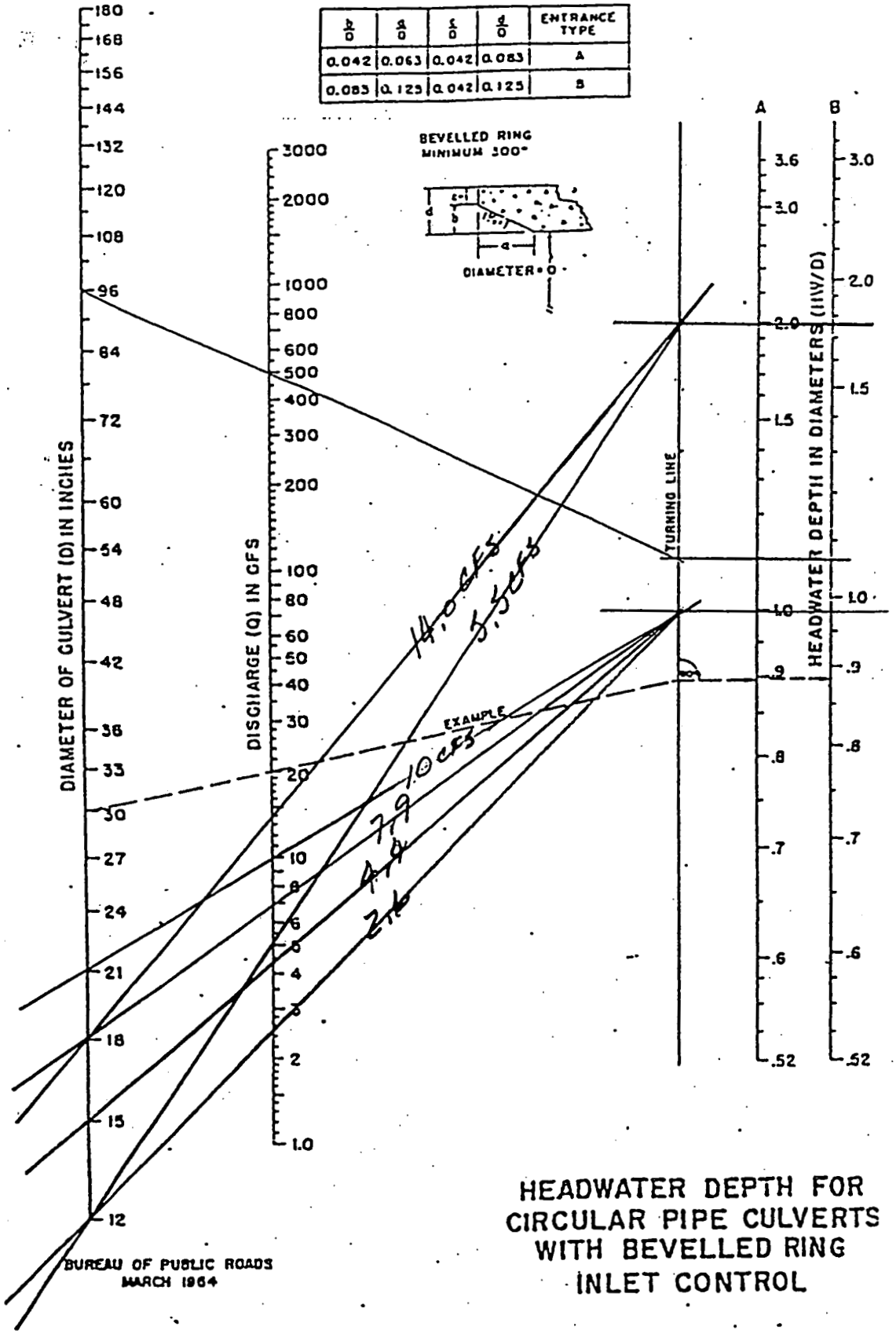


Fig. 11-6. *Flow in pipes (Manning's formula). (After "Design and Construction of Sanitary Storm Sewers," ASCE Manuals and Reports on Engineering Practice, No. 37, 1970.)*

CHART 7 ATTACHMENT A: A14 of A21



b/D	a/D	c/D	d/D	ENTRANCE TYPE
0.042	0.063	0.042	0.083	A
0.083	0.125	0.042	0.125	B

HEADWATER DEPTH FOR CIRCULAR PIPE CULVERTS WITH BEVELLED RING INLET CONTROL

FOSTER WHEELER ENVIRONMENTAL CORPORATION									
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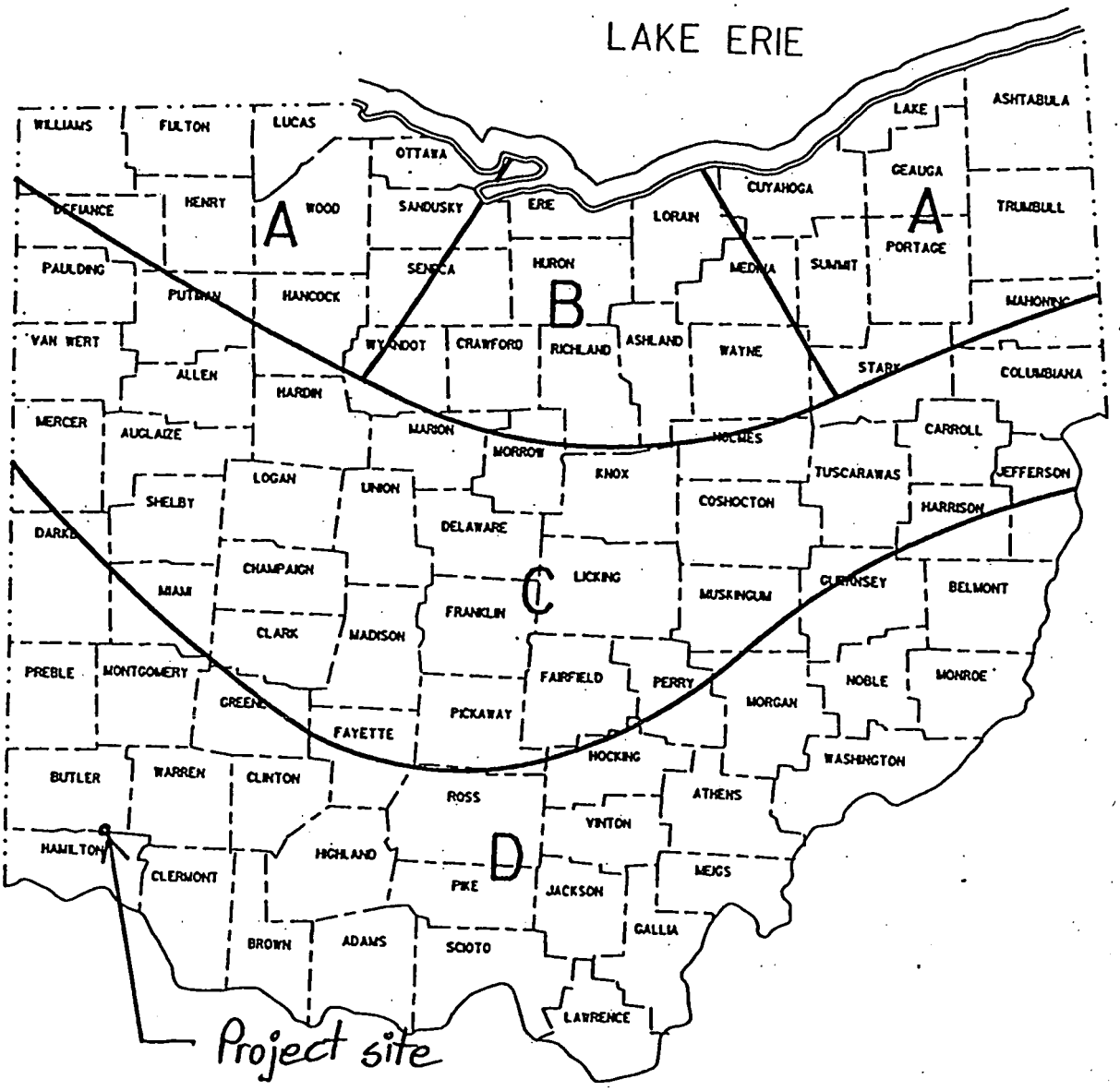
Ch / Date									Calc: CA-FSC624-FC-001

RAINFALL INTENSITY ZONE MAP	1101-3
	REFERENCE SECTION 1101.24



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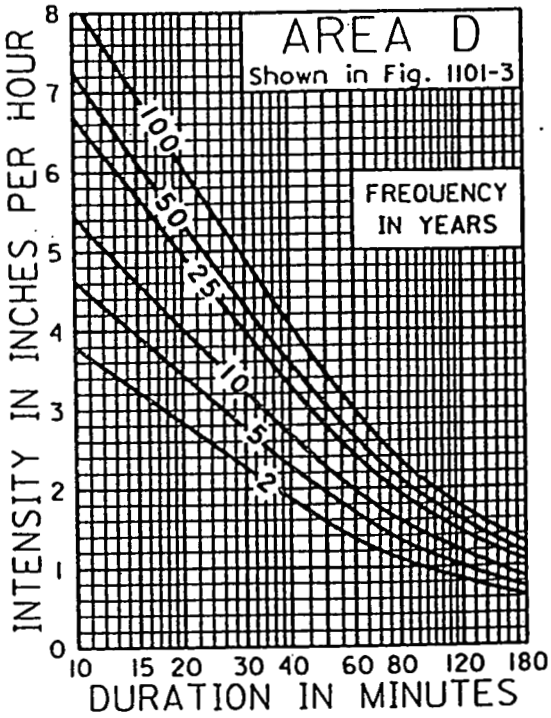
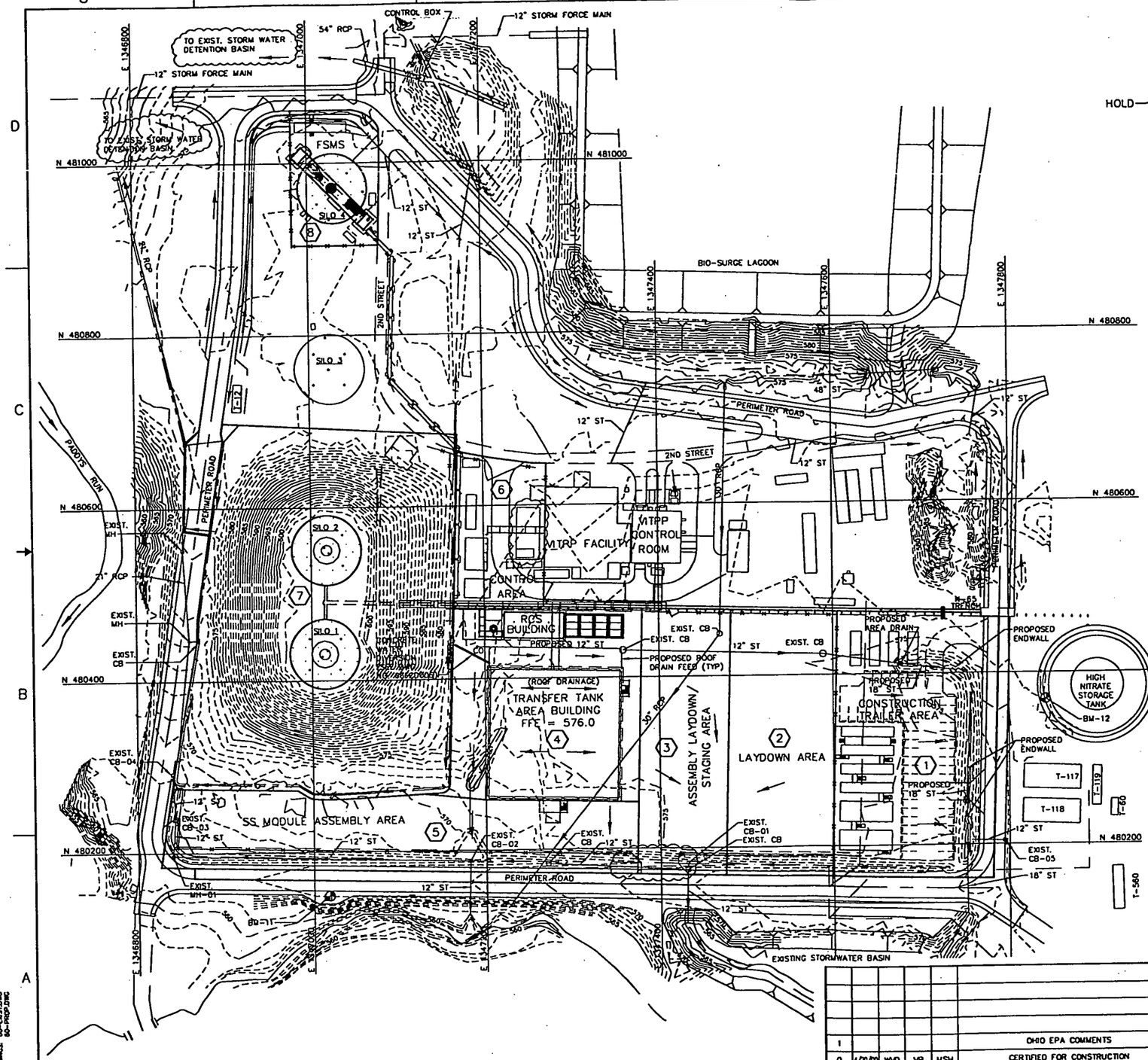


3054



NOTES:

HOLD — 1. SEE DRAWING 05FCD011 FOR GENERAL NOTES AND LEGEND.

2. DRAINAGE AREAS AT THE SILO'S AND NORTH AND WEST OF THE PERIMETER ROAD DRAIN TO THE WEST TO AN EXISTING CONCRETE SUMP. THE CONCRETE SUMP CONTAINS A 12" DIA FORCE MAIN TO THE BIO-SURGE LAGOON.

3.

DRAINAGE AREA	DESCRIPTION OF DRAINAGE AREA	OUTLET
1	GRAVEL LOT	EXISTING STORMWATER BASIN AT 18"ø OUTLET
2	GRAVEL LOT	EXISTING STORMWATER BASIN AT CB-01
3	LAYDOWN AREA	EXISTING STORMWATER BASIN AT CB-01
4	TTA AND RCS BUILDINGS - GUTTERS	PROPOSED ROOF DRAINAGE TO 18"ø OUTLET EAST OF AREA 1
5	SOUTH OF SILO 1	12 IN. OUTLET FROM CB-02
6	TTA CONTROL AREA	EXISTING STORMWATER BASIN NORTH OF K-65 TRENCH
7	SILOS 1 AND 2 - PERIMETER TRENCH	CONCRETE SUMP TO BIO-SURGE LAGOON
8	SILO 4 - PERIMETER TRENCH	CONCRETE SUMP TO BIO-SURGE LAGOON
9	ALL OTHER AREAS OUTSIDE PROJECT	EXISTING STORMWATER BASINS

4. DRAINAGE AREAS 7 & 8 RUNOFFS HAVE BEEN CALCULATED USING A 25 YEAR, 24 HOUR STORM.

5. ALL OTHER DRAINAGE AREA RUNOFFS HAVE BEEN CALCULATED USING A 10 YEAR, 24 HOUR STORM.

6. STORM WATER CONTROLS FOR ALL AREAS WILL BE BASED ON OHIO DEPT. OF NATURAL RESOURCES (ODNR) RAINWATER AND LAND DEV. PLAN.

7. THE AWR STORMWATER DRAINAGE PLAN ACCOUNTS FOR ANY CHANGES FROM PHASED CONSTRUCTION WITHIN THE INDIVIDUAL DRAINAGE AREAS AS FOLLOWS:

ZONE	ZONE AREA (SF)	RUNOFF COEFFICIENT OF DRAINAGE	ZONE MAXIMUM FLOW OF STORMWATER IN CFS	STORMWATER CONVEYANCE SYSTEM CAPACITY
1	56,535	0.58	7.25	14.0 CFS
2	37,978	0.40	2.35	11.0 CFS
3	31,405	0.50	1.94	11.0 CFS
4	47,539	0.78	1.42	11.0 CFS
5	48,287	0.50	3.00	11.0 CFS
6	17,616	0.57	N/A	N/A
7	123,437	0.69	13.05	53.2
8	16,287	0.56	N/A	53.2
ROAD	4,260	0.90	0.48	11.0

8. REFERENCE CALCULATION NO. CA-FSC624-FC-001.

STORMWATER LEGEND:

- (1) DRAINAGE AREA
- DRAINAGE AREA BOUNDARY
- FLOW DIRECTION
- CO PROPOSED CLEANOUT
- PROPOSED AREA DRAIN
- PROPOSED ENDWALL

STATE OF OHIO NORTH (NAD 83)

60 0 60 120
SCALE IN FEET

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
1					OHIO EPA COMMENTS
0	4/20/00	WVO	VB	MSH	CERTIFIED FOR CONSTRUCTION

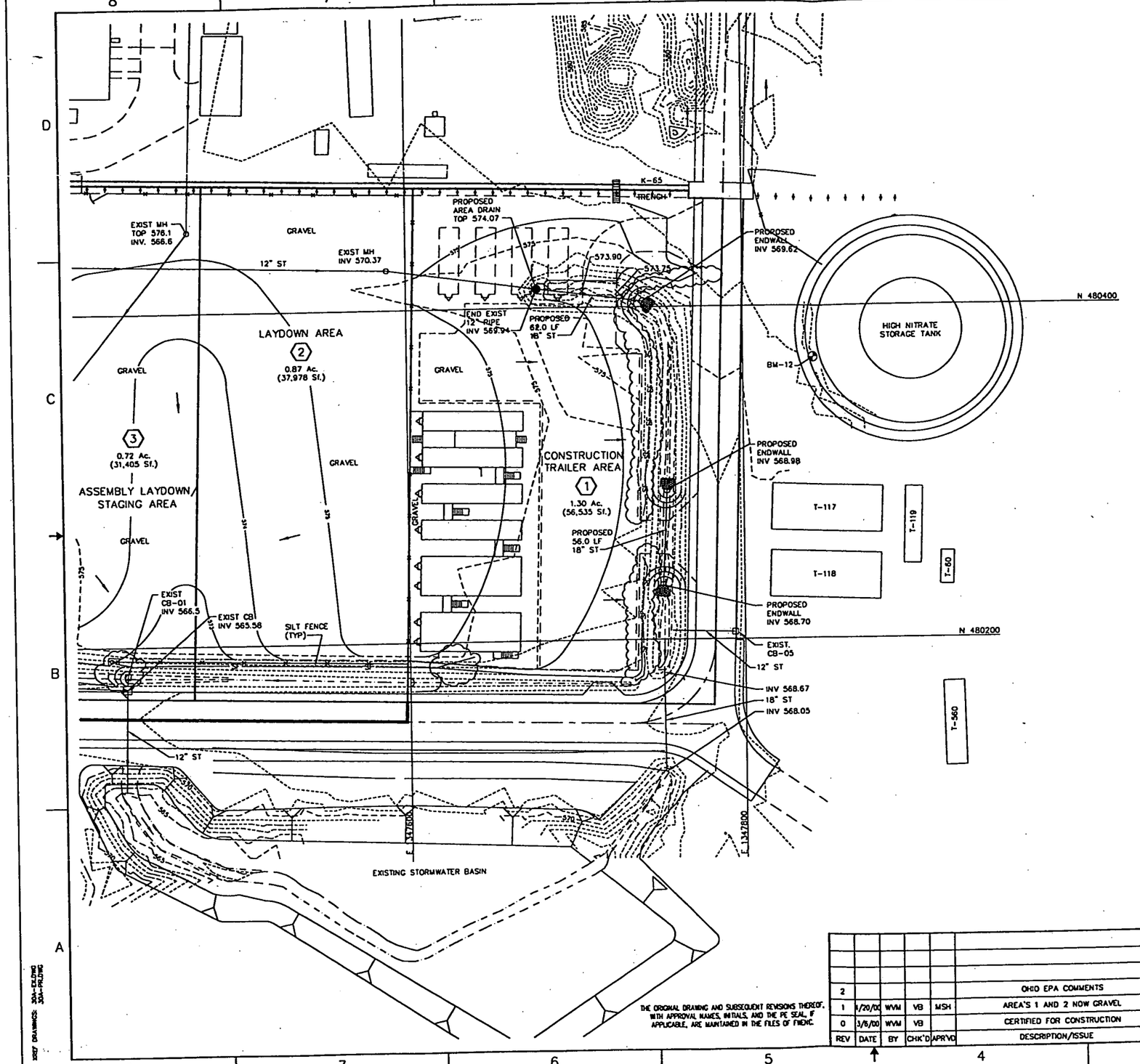
RPE

DRAWN BY W. MARVIN	DATE 4/20/00	DEPARTMENT OF ENERGY FERNALD ENVIRONMENTAL MANAGEMENT PROJECT SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT FERNALD, OHIO FDF CONTRACT NO. FSC 624
DESIGNED BY M. HUGHES	DATE 4/20/00	POSTER WHEELER FOSTER WHEELER ENVIRONMENTAL CORPORATION
CHECKED BY V. BHATT	DATE 4/20/00	TITLE STORM WATER SYSTEM OVERALL DRAINAGE PLAN
APPROVED BY M. HUGHES	DATE 4/20/00	
APPROVED BY JOHN LAWSON	DATE 4/20/00	SIZE D · SCALE 1"=60' · DWG. NO. 66FCD001 · REV 1

FILENAME: 66FCD001.DWG

3267 DRAWINGS: 50-EXIST.DWG 50-PROP.DWG

000076



NOTES:

HOLD 3054

1. SEE DRAWING 05FCD011 FOR GENERAL NOTES AND LEGEND.
2. SILT FENCE TO BE INSTALLED AT THE BOTTOM OF ALL DISTURBED SLOPES, AND FOLLOW CONTOUR.
3. CULVERT ENTRANCES AND EXITS TO BE PROTECTED BY COIR MATTING AND NATURAL VEGETATION.
4. AREAS DISTURBED BY EXCAVATION ACTIVITIES ARE TO BE SEEDED AND MULCHED WITHIN 7 DAYS, REFER TO SPEC SECTION 02924.
5. OVERSEEDING AND RESEEDING ARE TO BE PERFORMED AS NECESSARY UNTIL VEGETATION IS ESTABLISHED.
6. SILT IS TO BE REMOVED FROM DIVERSION DITCHES AND SILT FENCE INSTALLED AS REQUIRED BY THE SPECIFICATIONS AND AT THE END OF CONSTRUCTION.
7. REINFORCED SILT FENCING TO BE INSTALLED AROUND CATCH BASINS AS SPECIFIED ON PAGE 125 OF THE ODNR RAINWATER AND LAND DEVELOPMENT MANUAL
8. EROSION CONTROL MEASURES ARE TO BE INSPECTED WEEKLY AND WITHIN 24 HOURS OF A 0.5 INCH RAINFALL.
9. REMEDIATION OF PROBLEMS IDENTIFIED IN THE INSPECTION ARE TO BE COMPLETED WITHIN 24 HOURS.
10. AWR PROJECT ACTIVITIES DO NOT SIGNIFICANTLY ALTER EXISTING DRAINAGE PATTERNS.
11. SEE 66FCD007 FOR STORM DRAIN PROFILES.
12. ALL EROSION CONTROL MEASURES WILL BE BE INSTALLED AT THE BEGINNING OF EXCAVATION AND MAINTAINED FOR THE DURATION OF THE PROJECT.

STORMWATER LEGEND:

- (1) DRAINAGE AREA
- DRAINAGE AREA BOUNDARY
- FLOW DIRECTION
- PROPOSED AREA DRAIN
- PROPOSED ENDWALL
- —SF— SILT FENCE

STATE OF OHIO NORTH (NAD 83)

LETTER OR NUMBER OF SECTION OR DETAIL
DRAWING ON WHICH SECTION OR DETAIL IS TAKEN
DRAWING ON WHICH SECTION OR DETAIL IS SHOWN

SECTION & DETAIL KEY

30 0 30 60

SCALE IN FEET

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
2					OHIO EPA COMMENTS
1	1/20/00	WVM	VB	MSH	AREA'S 1 AND 2 NOW GRAVEL
0	3/6/00	WVM	VB		CERTIFIED FOR CONSTRUCTION

THE ORIGINAL DRAWING AND SUBSEQUENT REVISIONS THEREOF, WITH APPROVAL NAMES, INITIALS, AND THE PE SEAL, IF APPLICABLE, ARE MAINTAINED IN THE FILES OF FMENC.

PE

		DATE
DRAWN BY	W. MARVIN	3/6/00
DESIGNED BY	M. HUGHES	3/6/00
CHECKED BY	V. BHATT	3/6/00
APPROVED BY	M. HUGHES	3/6/00
APPROVED BY	JOHN LAWSON	3/6/00

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

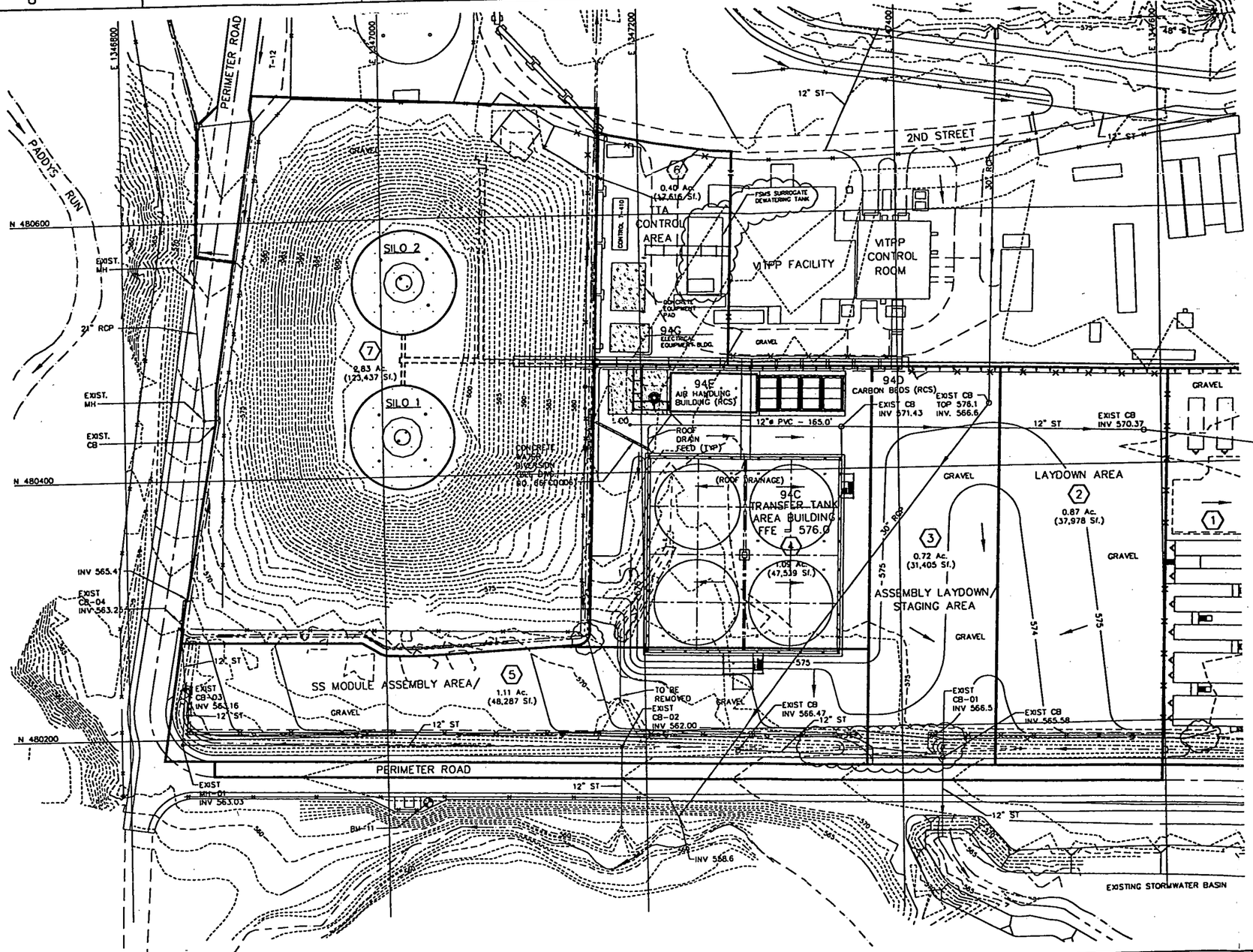
TITLE
STORM WATER SYSTEM
TRAILER AREA – DRAINAGE PLAN

SIZE	SCALE:	DWG. NO.	REV
D	1"=30'	66FCD003	2

FILENAME: 66FCD003.DWG

000078

3054



NOTES:

HOLD — 1. SEE DRAWING 05FCD011 FOR GENERAL NOTES AND LEGEND.

2. SILT FENCE TO BE INSTALLED AT THE BOTTOM OF ALL DISTURBED SLOPES, AND FOLLOW CONTOUR.

3. CULVERT ENTRANCES AND EXITS TO BE PROTECTED BY COIR MATTING AND NATURAL VEGETATION.

4. AREAS DISTURBED BY EXCAVATION ACTIVITIES ARE TO BE SEEDED AND MULCHED WITHIN 7 DAYS.

5. OVERSEEDING AND RESEEDING ARE TO BE PERFORMED AS NECESSARY UNTIL VEGETATION IS ESTABLISHED.

6. SILT IS TO BE REMOVED FROM DIVERSION DITCHES AND SILT FENCE INSTALLED AS REQUIRED BY THE SPECIFICATIONS AND AT THE END OF CONSTRUCTION.

7. REINFORCED SILT FENCING IS TO INSTALLED AROUND CATCH BASINS AS SPECIFIED ON PAGE 125 OF THE ODNR RAINWATER AND LAND DEVELOPMENT MANUAL.

8. EROSION CONTROL MEASURES ARE TO BE INSPECTED WEEKLY AND WITHIN 24 HOURS OF A 0.5 INCH RAINFALL.

9. REMEDIATION OF PROBLEMS IDENTIFIED IN THE INSPECTION ARE TO BE COMPLETED IWITHIN 24 HOURS.

10. AWR PROJECT ACTIVITIES DO NOT SIGNIFICANTLY ALTER EXISTING DRAINAGE PATTERNS.

11. THE TTA BUILDING AREA ROOF DRAINAGE WILL BE DIRECTED TO THE EXISTING 12" STORM DRAIN SYSTEM AT THE NORTHEAST SECTION OF THE BUILDING.

12. EROSION AND SILTATION INTO THE CONCRETE CHANNEL IS TO BE PREVENTED.

13. ALL EROSION CONTROL MEASURES WILL BE BE INSTALLED AT THE BEGINNING OF EXCAVATION AND MAINTAINED FOR THE DURATION OF THE PROJECT.

STORMWATER LEGEND:

(1)	DRAINAGE AREA
———	DRAINAGE AREA BOUNDARY
→	FLOW DIRECTION
CO	PROPOSED CLEANOUT
—SF—	PROPOSED SILT FENCE

STATE OF OHIO NORTH (NAD 83)

LETTER OR NUMBER OF SECTION OR DETAIL
DRAWING ON WHICH SECTION OR DETAIL IS TAKEN
DRAWING ON WHICH SECTION OR DETAIL IS SHOWN

SECTION & DETAIL KEY

40 0 40 80
SCALE IN FEET

THE ORIGINAL DRAWING AND SUBSEQUENT REVISIONS THEREOF, WITH APPROVAL NAMES, INITIALS, AND THE PE SEAL, IF APPLICABLE, ARE MAINTAINED IN THE FILES OF FWENC.

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
2					OHIO EPA COMMENTS
1	4/20/00	WVM	VB	MSH	AREA 2 GRAVELED, AREA 7 EXC & FNDN REMOVED
0	3/6/00	WVM	VB		CERTIFIED FOR CONSTRUCTION

PE

DRAWN BY W. MARVIN	DATE 3/6/00	
DESIGNED BY M. HUGHES	DATE 3/6/00	
CHECKED BY V. BHATT	DATE 3/6/00	
APPROVED BY M. HUGHES	DATE 3/6/00	
APPROVED BY JOHN LAWSON	DATE 3/6/00	

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
STORM WATER SYSTEM
SWRS – DRAINAGE PLAN
PHASE 1

SIZE	SCALE:	DWG. NO.	REV
D	1"=30'	66FCD002	2

FILENAME: 66FCD002.DWG

XREF DRAWINGS: 40-EXIST.DWG 40-PROP.DWG

000077

SECTION 02302

EXCAVATION, BACKFILLING, AND COMPACTING FOR UTILITIES

PART 1 GENERAL

1.1 RELATED SECTIONS

01330 Submittal Procedures

~~01575 Temporary Environmental Controls~~

02730 Slope Protection and Erosion Controls

~~02373 Separation/Filtration Geotextile~~

02924 Seeding

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 33	Standard Specification for Concrete Aggregates
ASTM C 76	(1997) Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM D 698	(1991) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft (600 kN-m/m))
ASTM D 1556	(1990;R 1996) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 2487	(1993) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2774	(1994) Standard Practice for Underground Installation of Thermoplastic Pressure Piping

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)

29 CFR 1926	Occupational Safety and Health Administration (OSHA Subpart P – Excavations

OHIO DEPARTMENT OF TRANSPORTATION (ODOT)

ODOT 304 (1997) Construction and Material Specifications, Aggregate Base

~~AMERICAN WATER WORKS ASSOCIATION (AWWA)~~

~~AWWA C600 (1993) Installation of Ductile-Iron Water Mains and Their Appurtenances~~

1.3 DEFINITIONS

1.3.1 Backfill

Material used in refilling a cut, trench or other excavation.

1.3.2 Cohesive Materials

Soils classified by ASTM D 2487 as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesive only when fines have a plasticity index greater than zero.

1.3.3 Cohesionless Materials

Soils classified by ASTM D 2487 as GW, GP, SW, and SP. Materials classified as GM and SM will be identified as cohesionless only when the fines have a plasticity index of zero.

1.3.4 Compaction

The process of mechanically stabilizing a material by increasing its density at a controlled moisture condition. "Degree of Compaction" is expressed as a percentage of the maximum density obtained by the test procedure described in ASTM D 698 for general soil types.

1.3.5 Granular Pipe Bedding

A dense, well-graded aggregate mixture of sand, gravel, or crushed stone (mixed individually, in combination with each other, or with suitable binder soil) placed on a subgrade to provide a suitable foundation for pipe. Granular bedding material may also consist of poorly graded sands or gravels where fast draining soil characteristics are desired.

1.3.6 In-Situ Soil

Existing in place soil.

1.3.7 Lift

A layer (or course) of soil placed on top of subgrade or a previously prepared or placed soil in a fill or backfill.

1.3.8 Porous Fill

A granular soil material having a large void ratio when placed and compacted, allowing a free flow of fluid to or from the surrounding soil, with no more than 10 percent of the material passing the 1/2 inch.

1.3.9 Refill

Material placed in excavation to correct overcut in depth.

1.3.10 Rock

Solid homogeneous interlocking crystalline material with firmly cemented, laminated, or foliated masses or conglomerate deposits, neither of which can be removed without systematic drilling and blasting, drilling and the use of expansion jacks or feather wedges, or the use of backhoe-mounted pneumatic hole punchers or rock breakers; also large boulders, buried masonry, or concrete other than pavement exceeding 1/2 cubic yard in volume.

1.3.11 Topsoil

In natural or undisturbed soil formations, the fine-grained, weathered material on the surface or directly below any loose or partially decomposed organic matter. Topsoil may be a dark-colored, fine, silty, or sandy material with a high content of well-decomposed organic matter, often containing traces of the parent rock material. Topsoil shall conform to specifications in Section 02924, "Seeding."

1.3.12 Unyielding Material

Rock rib, ridge, rock protrusion, or soil with cobbles in the trench bottom requiring a covering of finer grain material or special bedding to avoid bridging in the pipe or conduit.

1.3.13 Unsatisfactory Material

In-Situ soil or other material which can be identified as having insufficient strength characteristics or stability to carry intended loads in the trench without excessive consolidation or loss of stability. Also backfill material which contains refuse, frozen material, large rocks, debris, soluble particles, and other material which could damage the pipe or cause the backfill not to compact. Materials classified as PT, OH, or OL by ASTM D 2487 are unsatisfactory.

1.3.14 Unstable Material

Material in the trench bottom which lacks firmness to maintain alignment and prevent joints from separating in the pipe, conduit, or appurtenance structure during backfilling. This may be material otherwise identified as satisfactory which has been disturbed or saturated.

1.4 SUBMITTALS

Submit the following in accordance with Section 01330, "Submittal Procedures."

SD-06 Test Reports

Underdrainage backfill material tests

Concrete tests

Trench backfill material tests

Pipe bedding material tests

Topsoil tests

Test for moisture-density relation

Density and moisture tests

SD-07 Certificates

Shoring and sheeting plan

Dewatering plan

SD-11 Closeout Submittals

As-built drawings

1.5 REGULATORY REQUIREMENTS

Materials and workmanship specified shall be in accordance with the referenced articles, sections, and paragraphs of the standard except that contractual and payment provisions do not apply.

1.6 DELIVERY, STORAGE, AND HANDLING

Deliver and store materials in a manner to prevent contamination, segregation, freezing, and other damage. Store synthetic fiber filter fabric to prevent exposure to direct sunlight.

1.7 PROTECTION

1.7.1 Dewatering Plan

Base on site surface and subsurface conditions, available soil and hydrological data.

1.7.2 Utilities

Movement of construction machinery and equipment over pipes and utilities during construction shall be at the Subcontractor's risk. For work immediately adjacent to or for

excavations exposing a utility or other buried obstruction, excavate by hand. Start hand excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured. Support uncovered lines or other existing work affected by the contract excavation until approval for backfill is granted by FWENC. Report damage to utility lines or subsurface construction immediately to FWENC.

1.8 QUALITY ASSURANCE

~~1.8.1 Shoring and Sheeting Plan~~

~~Describe materials of shoring system to be used. Indicate whether or not components will remain after filling or backfilling. Provide plans, sketches, or details along with calculations by a professional engineer registered in any jurisdiction. Indicate sequence and method of installation and removal.~~

1.8.~~2~~1 Dewatering Plan

Describe methods for removing collected water from open trenches and diverting surface water or piped flow away from work area.

1.8.~~3~~2 Test for moisture-density relation

Submit 7 days prior to commencing utility excavation.

1.8.~~4~~3 Topsoil tests

Submit topsoil tests per Section 02924, "Seeding," verifying conformance to required parameters prior to commencing seeding operations.

1.8.~~5~~4 Density and moisture tests

Submit field test data not listed above sufficiently in advance of construction so as not to delay work. Submit within 14 days of test date.

PART 2 PRODUCTS

2.1 SOIL MATERIALS

Provide soil materials as specified below free of debris, roots, wood, scrap material, vegetable matter, refuse, soft unsound particles, ice, or other deleterious and objectionable materials.

2.1.1 Backfill

Bring trenches to grade indicated on the drawings using material excavated on the site of this project. This material will be considered unclassified and no testing other than for compaction will be required before use as backfill.

2.1.2 Sand

Clean, coarse-grained sand classified as SW or SP by ASTM D 2487 for bedding and backfill.

2.1.3 Gravel

Clean, coarsely graded natural gravel, crushed stone or a combination thereof having a classification ~~of GW~~ in accordance with ODOT ~~ASTM D 2487~~304 for bedding and backfill.

2.1.4 Backfill for Underdrainage Systems

Clean sand, crushed rock, or gravel meeting the following requirements:

a. Perforated or Slotted-Wall Pipe: Backfill meeting requirements of Type I material as specified in Table 1.

b. Any Type Drain Used With Filter Fabric: Clean gravel or crushed stone or gravel conforming to ASTM C 33 coarse aggregate grading size 57, 67, or 7.

TABLE 1

ASTM D 422 Sieve Size	Type I Gradation E 11 ASTM C 33 Percent Passing
~~1.5~~2 -inches	–100
1 inch	–70 – 100
3/~~8~~4 inch	~~100~~50 – 90
No. 4	~~95 – 100~~30 – 60
No. ~~50~~30	~~10~~ 9 – ~~30~~33
N0. ~~100~~200	0 – ~~10~~13

2.1.5 Pipe Bedding

TABLE 02302-1 UTILITY EARTHWORK REFERENCES

	PIPE MATERIALS	SOIL MATERIALS REFERENCE	INSTALLATION REF.
a.	Concrete Culvert Pipe	ASTM C 76 (Reinforced)	ACPA 01-103
b.	Polyvinyl Chloride (PVC)	ASTM D 2774, except bedding shall be SW or SP and all material surrounding pipe shall have maximum particle size of ½ inch	ASTM D 2774

Provide material for pipe bedding as indicated.

2.2 FILTER FABRIC

Provide a pervious sheet of polyester, nylon, or polypropylene filaments woven, spun bonded, fused, or otherwise manufactured into a nonraveling fabric with uniform thickness and strength. ~~Fabric shall have manufacturer certified minimum average roll properties as outlined in Specification Section 02373 "Separation/Filtration Geotextile."~~

2.3 BURIED WARNING AND IDENTIFICATION TAPE

Polyethylene plastic warning tape manufactured specifically for warning and identification of buried utility lines. Provide tape on rolls, 3 inch minimum width, color coded as specified below for the intended utility with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (intended service) LINE BELOW" or similar wording. Color and printing shall be permanent, unaffected by moisture or soil.

Warning Tape Color Codes

Red:	Buried Electric Line Below
Orange:	Buried Telephone or Other Voice/Data Communications Line Below
Blue:	Buried Water Line Below
Green:	Buried Sewer Line Below

PART 3 EXECUTION

3.1 PROTECTION

3.1.1 Shoring and Sheeting

Provide shoring and sheeting where indicated.

3.1.2. Drainage

Surface water shall be directed away from excavation and construction sites so as to prevent erosion and undermining of foundations. Diversion ditches, dikes and grading shall be provided and maintained as necessary during construction. Excavated slopes and backfill surfaces shall be protected to prevent erosion and sloughing. Excavation shall be performed so that the site and the area immediately surrounding the site and affecting operations at the site shall be continually and effectively drained.

3.1.3 Dewatering

Groundwater flowing toward or into excavations shall be controlled to prevent sloughing of excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction. French drains, sumps, ditches or trenches will not be permitted within 3 feet of the foundation of any structure, except with specific written approval, and after specific contractual provisions for restoration of the foundation area have been made. Control measures shall be taken by the time the

excavation reaches the water level in order to maintain the integrity of the in situ material.

Excavations shall be kept dry during subgrade preparation and continually thereafter until the structure to be built or the pipe to be installed therein is completed. The subcontractor shall be responsible for all damage incurred to the drainage facilities as a result of dewatering operations. All pipe or conduits shall be left clean and free of sediment.

Excavation shall be sloped to sumps and/or graded to drain. Excavations are to be kept free of standing water.

Surface water shall be diverted or otherwise prevented from entering excavated areas or trenches to the greatest extent practical. Any water accumulating in excavated areas shall be pumped to the nearest ditch or channel discharging to the sediment basin or sediment trap.

Operate the dewatering system continuously until construction work below existing water levels is complete. ~~Measure and record the performance of the dewatering system at the same time each day with observation wells and piezometers installed in conjunction with the dewatering system.~~

3.1.4 Underground Utilities

Location of the existing utilities indicated is approximate. The Subcontractor shall physically verify the location and elevation of the existing utilities indicated prior to starting construction. At the completion of construction, all drawings shall be red-lined "as-built" and forwarded to FWENC for approval.

3.1.5 Structures and Surfaces

Protect newly backfilled areas and adjacent structures, slopes, or grades from traffic, erosion settlement, or any other damage. Repair and reestablish damaged or eroded grades and slopes and restore surface construction prior to acceptance. Protect existing streams, ditches, and storm drain inlets from water-borne soil by means of filter fabric and rip-rap protection as indicated on the contract drawings. Perform work in accordance with requirements specified in Section 02370, "Slope Protection and Erosion Control."

3.1.5.1 Disposal of Excavated Material

Dispose of excavated material so that it will not obstruct the flow of runoff, streams, endanger a partly finished structure, impair the efficiency or appearance of any facilities, or be detrimental to the completed work.

3.1.6 Channels and Ditches

Construct (rip-rap) rock protection in areas indicated to the lines and thicknesses specified. Place rip-rap on a layer of filter fabric.

3.2 SURFACE PREPARATION

3.2.1 Stockpiling ~~Topsoil~~

Strip suitable soil from the site where excavation or grading is indicated and stockpile separately from other excavated material. Material unsuitable for use as topsoil shall be stockpiled and used for backfilling. Locate topsoil so that the material can be used readily for the finished grading. Where sufficient existing topsoil conforming to the material requirements is not available on site, provide borrow materials suitable for use as topsoil. Protect topsoil and keep in segregated piles until needed.

Stockpiles that are to be inactive for a period of 45 days or more shall be stabilized with a crusting agent within 7 calendar days of last activity. Slopes on stockpiles may not exceed 2:1 in steepness and shall be less than 15 feet in height. The pile shall be shaped with a drainage pitch of at least 2% on all areas. The perimeter of the pile shall have proper sediment controls (e.g. silt fence)

Differing materials shall be separated with dividers, or stockpiled separately to prevent mixing. Surface water shall be directed away from stockpile areas to prevent deterioration of materials.

The ground surface at stockpile locations shall be cleared and grubbed. Suitable and unsuitable materials shall be separately stockpiled. Stock [piles of suitable materials shall be protected from contamination.

3.3 GENERAL EXCAVATION AND TRENCHING

Keep excavations free from water while construction is in progress. Notify FWENC immediately in writing if it becomes necessary to remove rock or hard, unstable, or otherwise unsatisfactory material to a depth greater than indicated~~. Make trench sides as nearly vertical as practicable except where sloping of sides is allowed. Sides of trenches shall not be sloped from the bottom of the trench up to the elevation of the top of the pipe.~~ . Excavate ledge rock, boulders, and other unyielding material to an overdepth at least 6 inches below the bottom of the pipe unless otherwise indicated or specified. Blasting will not be permitted. Use bedding material placed in 6 inch maximum layers to refill overdepths to the proper grade. At the Subcontractor's option, the excavations may be cut to an overdepth of not less than 4 inches and refilled to required grade as specified. Grade bottom of trenches accurately to provide uniform bearing and support for each section of pipe on undisturbed soil, or bedding material as indicated or specified at every point along its entire length except for portions where it is necessary to excavate for bell holes and for making proper joints. Dig bell holes and depressions for joints after trench has been graded. Dimension of bell holes shall be as required for properly making the particular type of joint to ensure that the bell does not bear on the bottom of the excavation. Trench dimensions shall be as indicated.

3.3.1 Shoring and Sheeting

~~Shore and sheet excavations as described in the plan submitted with various member sizes arranged to prevent injury to persons and damage to structures. Arrange shoring and sheeting to preclude injurious caving during removal. Obtain approval from FWENC before removing shoring, sheeting, or bracing in excavations adjacent to on-grade slabs,~~

~~foundations, or other structural elements.~~Excavation protection shall be in accordance with OSHA 29 CFR 1926, Subpart P – Excavations.

3.4 BEDDING

Of materials and depths as indicated for utility lines and utility line structures. Place bedding in 6 inch maximum loose lifts. Provide uniform and continuous support for each section of structure except at bell holes or depressions necessary for making proper joints.

3.5 BURIED WARNING AND IDENTIFICATION TAPE

Install tape in accordance with FWENC design drawings except as modified herein. Bury tape at the depth indicated on FWENC design drawings.

3.6 BACKFILLING

Construct backfill in two operations (initial and final) as indicated and specified in this section. Place initial backfill in 12-inch maximum loose lifts to one foot above pipe unless otherwise specified. Ensure that initially placed material is tamped firmly under pipe haunches. Bring up evenly on each side and along the full length of the pipe structure. Ensure that no damage is done to the utility or its protective coating. Place the remainder of the backfill (final backfill) in 12-inch maximum loose lifts unless otherwise specified. Compact each loose lift as specified in the paragraph entitled "General Compaction" before placing the next lift. Do not backfill in freezing weather or where the material in the trench is already frozen or is muddy, except as authorized by FWENC. Provide a minimum cover from final grade as shown on FWENC design drawings for water piping and for sewer lines. Where settlements greater than the tolerance allowed herein for grading occur in trenches and pits due to improper compaction, excavate to the depth necessary to rectify the problem, then backfill and compact the excavation as specified herein and restore the surface to the required elevation. Coordinate backfilling with testing of utilities.

3.7 COMPACTION

Use hand-operated, plate-type, vibratory, or other suitable hand tampers in areas not accessible to larger rollers or compactors. Avoid damaging pipes and protective pipe coatings. Compact material in accordance with the following unless otherwise specified. If necessary, alter, change, or modify selected equipment or compaction methods to meet specified compaction requirements.

3.7.1 Compaction of Material in Subcuts or Overexcavations

In rock, compact to 95 percent of ASTM D 698 maximum density. In stable soils, compact to 95 percent of ASTM D 698 maximum density.

3.7.2 Compaction of Pipe and Conduit Bedding

In rock, compact to 95 percent and in soil, compact to 95 percent of ASTM D 698 maximum density.

3.7.3 Compaction of Backfill

Compact initial backfill material surrounding pipes, cables, conduits, or ducts, to 95 percent of ASTM D 698 maximum density except where bedding and backfill are the same material. Where bedding and backfill are the same material, compact initial backfill to the density of the bedding. Under areas to be seeded or sodded, compact succeeding layers of final backfill to 92 percent of ASTM D 698 maximum density.

3.8 RIP-RAP CONSTRUCTION

Construct rip-rap on filter fabric in the areas indicated.

3.8.1 Preparation

Trim and dress indicated areas to conform to cross sections, lines and grades shown within a tolerance of 0.1 foot.

3.8.2 Bedding Placement

Spread filter fabric on prepared subgrade as indicated.

3.8.3 Stone Placement

Place rock for rip-rap on prepared bedding material to produce a well graded mass with the minimum practicable percentage of voids in conformance with lines and grades indicated. Distribute larger rock fragments, with dimensions extending the full depth of the rip-rap throughout the entire mass and eliminate "pockets" of small rock fragments. Rearrange individual pieces by mechanical equipment or by hand as necessary to obtain the distribution of fragment sizes specified above.

3.9 FINISH OPERATIONS

3.9.1 Grading

Finish to grades indicated within one-tenth of a foot. Provide sod or topsoil in areas to be seeded or sodded as indicated. Grade areas to drain water away from structures. Grade existing grades that are to remain but have been disturbed by the Subcontractor's operations.

3.9.2 Spreading Topsoil

Clear areas to receive topsoil for the finished surface of materials that would interfere with planting and maintenance operations. Scarify subgrade as specified in Section 02924 ~~07924~~, "Seeding." Do not place topsoil when the subgrade is frozen, extremely wet or dry, or in other conditions detrimental to seeding, planting, or grading.

3.9.3 Disposition of Surplus Material

Surplus or other soil material not required or suitable for filling, backfilling, or grading shall be disposed of per FWENC directions.

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3.9.4 Protection of Surfaces

Protect newly graded areas from traffic, erosion, and settlements that may occur. Repair or reestablish damaged grades, elevations, or slopes.

3.10 FIELD QUALITY CONTROL

Test bedding and backfill for conformance to specified requirements. Test bedding and backfill for moisture-density relations in accordance with ASTM D 698 as specified herein. Provide additional tests as specified above for each change of source. Perform density and moisture tests in randomly selected locations and in accordance with ASTM D 1556 as follows:

a. Bedding and backfill in trenches: One test per 50 linear feet in each lift.

b. Appurtenance structures: One test per 100 square feet or fraction thereof in each lift.

END OF SECTION

SECTION 02370

SLOPE PROTECTION AND EROSION CONTROL

PART 1 GENERAL

1.1 SUMMARY

A. This section includes temporary control measures for slope protection and controls to reduce erosion and sedimentation through the use of erosion control devices.

B. Related Sections:

01330	Submittal Procedures
02300	Earthwork
02924	Seeding

1.2 REFERENCES

A. American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M 288 Geotextile Specification for Highway Applications.

B. Ohio Department of Transportation (ODOT)

ODOT Item 688 Construction and Material Specification (1997).

C. Ohio Department of Natural Resources (ODNR)

Rainwater and Land Development, Ohio's Standard for Stormwater Management (1996)

1.3 SUBMITTALS

The following shall be submitted in accordance with Section 01330, "Submittal Procedure."

SD-01 Data

Manufacturer's data on silt fence.

Manufacturer's data on erosion control matting.

SD-06 Instructions

Manufacturer's installation and maintenance instructions.

1.4 PROJECT CONDITIONS

A. Provide temporary pollution control features to ensure that effective and continuous erosion control is maintained throughout the construction period.

1.5 Quality Assurance

Subcontractor shall inspect and evaluate the effectiveness of, need for, maintenance of, the control measures. Repairs shall be made within 24 hours of problem discovery. Inspections shall occur weekly and within 24 hours of a 0.5-inch rainfall.

PART 2 PRODUCTS

2.1 MATERIALS

A. Silt Fence

1. Geotextile Filter Fabric: Shall be made of pervious sheets of strong rot-proof plastic fabric meeting the requirements of AASHTO M 288 for Sediment Control Fabrics.

2. Reinforcement Backing: Shall either be minimum 14-gauge steel wire and maximum mesh spacing of 6 inches or synthetic netting of equal strength. Use reinforcement backing as recommended by manufacturer of geotextile filter fabric. Reinforcement backing can be eliminated if post spacing is a maximum of 6 feet and the geotextile tensile strength is at least 200 pounds.

3. Posts: Shall be either wood or steel with minimum length of 4 feet. Wood posts shall be at least 2 inches by 2 inches of oak or similar hardwood. Steel posts shall be round or shaped as a "U", "T", or "C". Steel posts shall have a minimum weight of 1.33 pounds per linear foot and shall have projections for fastening reinforcement to silt fence.

4. Wire Staples: Shall be at least 9-gauge thickness with a minimum length of 1 inch.

5. A preassembled silt fence meeting the material requirements may be used instead of a field constructed silt fence.

B. Erosion Control Blankets (Matting): The matting shall be made from 100% commercial-grade Coir yard (spun from coconut fibers) containing approximately 45% Lignin, 55% cellulose. The erosion control blanket shall be 100% biodegradable within a maximum service life expectancy of 10 years for use on slopes of 1:1 or greater and where shown on the drawings. The blanket shall have the following physical properties.

1. Material Content

   a. Coir Yarn: 100 percent; containing 45% Lignin, 55% Cellulose (approximately).

2. Physical Specifications (Roll)

   a. Weight: 83.6 lbs; 22.7 oz/sq. yd (approximately)

   b. Average Mesh: 0.4" x 0.5"

   c. Open Area: 38% (approximately)

2.2 EQUIPMENT

The choice of equipment to perform erosion control operations shall be the responsibility of the Subcontractor. However, any equipment that results in waste, damage of material, or inaccurate work shall be promptly replaced.

PART 3 EXECUTION

3.1 PREPARATION

A. Coordinate use of erosion control measures with requirements of Section 02300, "Earthwork." Silt fences and rock check dams shall be installed as a first step in clearing and earthwork and maintained throughout the construction period.

B. Temporary measures may be removed at the beginning of the workday but must be replaced at the end of the workday. Erosion and sediment control measures shall be inspected at the end of each workday.

C. Prepare subgrade at locations to receive erosion and sediment control measures. Compact surface by use of hand or mechanical tamps. Replace pockets of soft soil as necessary. Do not install on frozen or spongy subgrades.

3.2 GENERAL REQUIREMENTS

A. Existing vegetative ground cover shall not be destroyed, removed, or disturbed more than 14 calendar days before grading operations.

B. Comply with local, state, and federal quality regulations for stormwater discharge. All pumped water shall be discharged through a siltation control device that removes all visible sediment. Pumped water shall not discolor the receiving stream.

C. All points of construction ingress and egress shall be protected to prevent tracking of mud or soil onto paved roads. Tracked mud or soil shall be removed by the Subcontractor at the end of each workday using shovels and brooms.

D. Seed and mulch in accordance with Section 02924, "Seeding."

3.3 SILT FENCE

A. Install silt fence on the downhill side of all work limits, along contours, and along natural drainage areas to reduce the quantity of sediment and flow velocities to downstream areas. Terminate silt fences on the uphill portion of work limits at a distance that prevents short-circuiting around the ends of silt fence. Silt fence shall be constructed before upland grading begins. Install in accordance with ODNR and manufacturer's recommendations.

B. Posts shall have a maximum spacing of 6 feet for silt fences constructed without reinforcement backing, or a maximum spacing of 10 feet for silt fences constructed with reinforcement backing. Install posts at least 1½ feet into ground. Seams between sections of fencing shall be overlapped with the end stakes wrapped together before driving into the ground.

C. Excavate trench approximately 6 inches wide and 6 inches deep upslope from the posts. Securely fasten wire reinforcement (if used) to upslope side of posts using wire staples, tie wires, or hog rings. Attach geotextile filter cloth directly to posts and wire reinforcement backing using wire, staples, or other means recommended by the silt fence manufacturer. Install filter fabric so that the fabric height above grade is at least 2 feet and the fabric length below grade is at least 12 inches. Do not use fabric with defects, rips, holes, deterioration or other types of damage. Backfill trench and compact soil.

D. Install reinforced silt fencing in accordance with the Ohio Department of Natural Resource (ODNR) around catch basin.

3.4 EROSION CONTROL BLANKETS (MATTING)

A. Erosion Control Blankets (Matting)

1. Install in accordance with ODNR and manufacturer's recommendations. All blankets shall be properly anchored with wire staples and wood stakes in patterns and sizes recommended by manufacturer. Bury edges in 6-inch deep trench, rake area smooth, and seed.

2. Erosion control blanket shall be used on all slopes steeper than 4H:1V and at all ditch inverts to a ditch depth of 1 foot.

B. Shape waterway, channel, and slope areas to require shape and grade. Prepare seedbed in accordance with Section 02924, "Seeding."

3.5 ADJUSTING

A. Remove accumulated sediment, debris, and obstructions as necessary from ditches and the channels as directed by the Construction Manager. In no case shall sediment reduce the available depth in the ditches and channels to less than one-third the depth shown on the Construction Drawings.

B. Remove accumulated sediment from the sediment trap before available depth is reduced to one-half its design depth.

C. Removal of Temporary Control Facilities

1. Erosion control facilities shall be removed after the disturbed areas are stabilized and established with grass or other measures approved by FWENC.

2. Erosion control matting is to be left in place following the establishment of vegetative cover and the completion of disturbance activities. Removal of the matting will negatively effect the vegetative cover. Erosion control matting should be made of biodegradable materials eliminating the need for removal.

3.6 MAINTENANCE

A. The Subcontractor shall maintain an erosion control checklist and an erosion control inspection log. Inspection records shall be maintained in proper order at the project site until after the construction is completed and accepted. Inspection records shall be given to FWENC.

B. Inspect erosion control devices immediately after each rainfall, at least daily during prolonged rainfall and weekly during dry periods. Remove sediment deposits after each storm event. Repair or replace damaged devices as necessary.

C. Silt is to be removed from diversion ditches and silt fence as needed and at the end of construction.

END OF SECTION

SECTION 02530

SANITARY SEWER

PART 1 GENERAL

1.1 RELATED SECTIONS

01330	Submittal Procedures
02302	Excavation, Backfilling, and Compaction for Utilities
03200	Concrete Reinforcement
03300	Cast-In-Place Concrete

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 443	(1998) Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
ASTM C 478	(1997) Precast Reinforced Concrete Manhole Sections
ASTM C 923	(1996) Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals
ASTM C 972	(1995) Standard Test Method for Compression-Recovery of Tape Sealant
ASTM C 990	(1996) Standard Specification for Joints for Concrete Pipe, Manholes,and Precast Box Sections Using Preformed Flexible Joint Sealants
ASTM D 412	(1998) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers
ASTM D 624	(1998) Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
ASTM D 1785	(1996; Rev. B) Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedule 80

ASTM D 2412	(1996; Rev. A) Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading
ASTM D 2467	(1999) Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings, Schedule 80
ASTM D 2564	(1999) Specification for Solvent Cement for Poly (Vinyl Chloride) (PVC) Plastic Piping

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910.27	Fixed Ladders

COMMERCIAL ITEM DESCRIPTIONS (CID)

CID A-A-60005	(1988) Frames, Covers, Gratings, Steps, Sump and Catch Basin, Manhole

UNI-BELL PVC PIPE ASSOCIATION (UBPPA)

UBPPA UNI-B-6	(1990) Low-Pressure Air Testing of Installed Sewer Pipe

1.3 SYSTEM DESCRIPTION

1.3.1 Sanitary Sewer Gravity Pipeline

Provide mains and laterals 4 inch lines of polyvinyl chloride (PVC) plastic pipe. Provide building connections 4 inch lines of polyvinyl chloride (PVC) plastic pipe.

The exterior sanitary gravity sewer system includes equipment, materials, installation, and workmanship as specified herein.

1.4 SUBMITTALS

Submit the following in accordance with Section 01330, "Submittal Procedures."

SD-02 Shop Drawings

Metal items

Frames, covers, and gratings

SD-03 Product Data

Pipeline materials including joints, fittings, and couplings

Submit manufacturer's standard drawings or catalog cuts.

1.5 DELIVERY, STORAGE, AND HANDLING

1.5.1 Delivery and Storage

1.5.1.1 Piping

Inspect materials delivered to site for damage; store with minimum of handling. Store materials on site in enclosures or under protective coverings. Store plastic piping and jointing materials and rubber gaskets under cover out of direct sunlight. Do not store materials directly on the ground. Keep inside of pipes and fittings free of dirt and debris.

1.5.1.2 Cement, Aggregate, and Reinforcement

As specified in Section 03300, "Cast-In-Place Concrete" and 03200, "Concrete Reinforcement."

1.5.2 Handling

Handle pipe, fittings, and other accessories in such manner as to ensure delivery to the trench in sound undamaged condition. Carry, do not drag, pipe to trench.

PART 2 PRODUCTS

2.1 PIPELINE MATERIALS

2.1.1 PVC Plastic Gravity Sewer Piping

ASTM D 1785, Poly (Vinyl Chloride) (PVC) plastic pipe shall be Schedule 80.

2.1.1.1 PVC Plastic Gravity Joints and Jointing Material

Joints shall conform to ASTM D 2467. Solvent Cements shall conform to ASTM D 2564.

2.2 CONCRETE MATERIALS

Concrete materials shall be as specified in Section 03300, "Cast-In-Place Concrete."

2.3 MISCELLANEOUS MATERIALS

2.3.1 Precast Concrete and Associated Materials

2.3.1.1 Precast Concrete Manhole Sections

Precast concrete manhole risers, base sections, and tops shall conform to ASTM C 478. Base and first riser shall be monolithic.

2.3.1.2 Gaskets and Connectors

Gaskets for joints between manhole sections shall conform to ASTM C 443. Resilient connectors for making joints between manhole and pipes entering manhole shall conform to ASTM C 923 or ASTM C 990.

2.3.1.3 External Preformed Rubber Joint Seals

An external preformed rubber joint seal shall be an accepted method of sealing cast iron covers to precast concrete sections to prevent ground water infiltration into sewer systems. All finished and sealed manholes constructed in accordance with paragraph entitled "Manhole Construction" shall be tested for leakage in the same manner as pipelines as described in paragraph entitled "Leakage Tests." The seal shall be multi-section with a neoprene rubber top section and all lower sections made of Ethylene Proplene Di Monomer (EPDM) rubber with a minimum thickness of 60 mils. Each unit shall consist of a top and bottom section and shall have mastic on the bottom of the bottom section and mastic on the top and bottom of the top section. The mastic shall be a non-hardening butyl rubber sealant and shall seal to the cone/top slab of the manhole/catch basin and over the lip of the casting. Extension sections shall cover up to two more adjusting rings. Properties and valves are listed in the following tables:

Properties, Test Methods and Minimum Values for Rubber used in Preformed Joint Seals

Physical Properties	Test Methods	EPDM	Neoprene	Butyl mastic
Tensile, psi	ASTM D 412	1849	2195	–
Elogation percent	ASTM D 412	553	295	350
Tear Resistance, ppi	ASTM D 624 (Die B)	280	160	–
Rebound, percent				
5 minutes	ASTM C 972	–	–	11
2 hours	ASTM C 972	–	–	12

2.3.2 Metal Items

2.3.2.1 Frames, Covers, and Gratings for Manholes

CID A-A-60005, cast iron; figure numbers shall be as follows:

a. Non-traffic manhole:

Frame: Figure 4, Size 22
Cover: Figure 12, Size 22
Steps: Figure 19

2.3.2.2 Manhole Steps

Zinc-coated steel conforming to 29 CFR 1910.27. Steps are not required in manholes less than 4 feet deep.

PART 3 EXECUTION

3.1 INSTALLATION OF PIPELINES AND APPURTENANT CONSTRUCTION

3.1.1 General Requirements for Installation of Pipelines

Apply except where specific exception is made in the following paragraphs entitled "Special Requirements."

3.1.1.1 Location

The work covered by this section shall include all system installations. Where the location of the sewer is not clearly defined by dimensions on the drawings, do not lay sewer line closer horizontally than 10 feet to a water main or service line. Where sanitary sewer lines pass above water lines, encase sewer in concrete for a distance of 10 feet on each side of the crossing, or substitute rubber-gasketed pressure pipe for the pipe being used for the same distance. Where sanitary sewer lines pass below water lines, lay pipe so that no joint in the sewer line will be closer than 3 feet, horizontal distance, to the water line. Whenever a sanitary sewer and water main must cross, the sewer shall be at such an elevation that the crown of the sewer is at least 18 inches, measured between the outside pipe walls, below the water main.

3.1.1.2 Earthwork

Perform excavation, backfilling and compacting operations in accordance with Section 02302, "Excavation, Backfilling, and Compaction for Utilities."

3.1.1.3 Connections to Existing Lines

Obtain approval from FWENC before making connections to existing lines or manholes. Conduct work so that there is minimum interruption of service.

3.1.2 Concrete Work

Cast-in-place concrete is included in Section 03300, "Cast-In-Place Concrete."

3.1.3 Manhole Construction

Construct base slab of cast-in-place concrete or use precast concrete base sections. Make inverts in cast-in-place concrete and precast concrete bases with a smooth-surfaced semi-circular bottom conforming to the inside contour of the adjacent sewer sections. For changes in direction of the sewer and entering branches into the manhole, make a circular curve in the manhole invert of as large a radius as manhole size will permit. For cast-in-place concrete construction, either pour bottom slabs and walls integrally or key and bond walls to bottom slab. No parging will be permitted on interior manhole walls. For precast concrete construction, make joints between manhole sections with the gaskets specified for this purpose; install in the manner specified for installing joints in concrete piping. Parging will not be required for precast concrete manholes. Cast-in-place concrete work shall be in accordance with the requirements specified under paragraph entitled "Concrete Work" of this section. Make joints between concrete manholes and pipes entering manholes with the resilient connectors specified

for this purpose; install in accordance with the recommendations of the connector manufacturer. Where a new manhole is constructed on an existing line, remove existing pipe as necessary to construct the manhole. Cut existing pipe so that pipe ends are approximately flush with the interior face of manhole wall, but not protruding into the manhole. Use resilient connectors as previously specified for pipe connectors to concrete manholes.

3.2 FIELD QUALITY CONTROL

3.2.1 Field Tests and Inspections

FWENC will conduct field inspections and witness field tests specified in this section. The Subcontractor shall perform field tests and provide labor, equipment, and incidentals required for testing. Be able to produce evidence, when required, that each item of work has been constructed in accordance with the drawings and specifications.

3.2.2 Tests for Nonpressure Lines

Check each straight run of pipeline for gross deficiencies by holding a light in a manhole; it shall show a practically full circle of light through the pipeline when viewed from the adjoining end of line. When pressure piping is used in a nonpressure line for nonpressure use, test this piping as specified for nonpressure pipe.

3.2.2.1 Leakage Tests

A. Low-pressure air tests: Perform tests as follows:

(1) PVC plastic pipelines: Test in accordance with UBPPA UNI-B-6. Allowable pressure drop shall be as given in UBPPA UNI-B-6. Make calculations in accordance with the Appendix to UBPPA UNI-B-6.

3.2.3 Field Tests for Concrete

Field testing requirements are covered in Section 03200, "Concrete Reinforcement."

END OF SECTION

SECTION 02630

STORM DRAINAGE

PART 1 GENERAL

1.1 RELATED SECTIONS

01330 Submittal Procedures

03200 Concrete Reinforcement

03300. Cast in Place Concrete

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN CONCRETE PIPE ASSOCIATION (ACPA)

ACPA 01-102	(1988) Concrete Pipe Handbook
ACPA 01-103	(1990) Concrete Pipe Installation Manual

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 32	(1993) Sewer and Manhole Brick (Made from Clay or Shale)
ASTM C 62	(1997) Building Brick (Solid Masonry Units Made from Clay or Shale)
ASTM C 76	(1995; Rev. A) Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C 139	(1997) Concrete Masonry Units for Construction of Catch Basins and Manholes
ASTM C 270	(1997) Mortar for Unit Masonry
ASTM C 443	(1994) Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
ASTM C 476	(1995) Grout for Masonry
ASTM C 478	(1996) Precast Reinforced Concrete Manhole Sections

ASTM C 923	(1998) Standard Specification for Resilient Connectors between Reinforced Concrete Manhole Structures, Pipes, and Laterals
ASTM D 1785	(1996; Rev. B) Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedule 40, 80, and 120
ASTM D 2774	(1994) Underground Installation of Thermoplastic Pressure Piping
ASTM D 2467	(1999) Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings, Schedule 80
ASTM D 2564	(1999) Specification for Solvent Cement for Poly (Vinyl Chloride) (PVC) Plastic Piping

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1	(1998) Structural Welding Code - Steel

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910.27	Fixed Ladders

COMMERCIAL ITEM DESCRIPTIONS (CID)

CID A-A-60005	(1998) Frames, Covers, Gratings, Steps, Sump and Catch Basin, Manhole

1.3 SUBMITTALS

Submit the following in accordance with Section 01330, "Submittal Procedures."

SD-02 Shop Drawings

Precast concrete structures

Metal items

SD-03 Product Data

Concrete piping including fittings and jointing materials

Subsurface drainage piping including fittings and jointing materials

SD-07 Certificates

Pipeline and fittings, including factory-applied linings and joint materials

Cast-iron frames, covers, and gratings

Precast concrete structures

Submit certificates attesting that tests set forth in each applicable referenced publication have been performed, whether specified in that publication to be mandatory or otherwise and that production control tests have been performed at the frequency or intervals specified in the publication. Other tests shall have been performed within 3 years of the date of submittal of certificates on the same type, class, grade, and size of material as is being provided for the project.

1.4 DELIVERY, STORAGE, AND HANDLING

1.4.1 Delivery and Storage

1.4.1.1 Piping

Inspect materials delivered to site for damage; store with minimum of handling. Store plastic piping, jointing materials, and rubber gaskets under cover out of direct sunlight. Do not store materials directly on the ground. Keep inside of pipes and fittings free of dirt and debris.

1.4.1.2 Metal Items

Check upon arrival; identify and segregate as to types, functions, and sizes. Store off the ground in a manner affording easy accessibility and not causing excessive rusting or coating with grease or other objectionable materials.

1.4.1.3 Cement, Aggregates, and Reinforcement

Store as specified in Section 03200, "Concrete Reinforcement."

1.4.2 Handling

Handle pipe, fittings, and other accessories in a manner to ensure delivery to the trench in sound undamaged condition. Carry, do not drag pipe to trench.

PART 2 PRODUCTS

2.1 PIPELINE AND CULVERT MATERIALS

2.1.1 Concrete Piping

2.1.1.1 Concrete Pipe and Fittings

Storm drainage pipe shall be reinforced concrete pipe conforming to ASTM C 76, Class III.

2.1.1.2 Jointing Materials for Concrete Piping

Gaskets and pipe ends for rubber gasket joint shall conform to ASTM C 443. Gaskets shall be suitable for use with sewage.

2.1.2 PVC Pipe

2.1.2.1 Storm drainage pipe carrying building roof drainage shall be 12-inch PVC Schedule 40, conforming to ASTM D 1785.

2.1.2.2 PVC plastic gravity joints and jointing materials joints shall conform to ASTM D 2467. Solvent cements shall conform to ASTM D 2564.

2.2 CONCRETE MATERIALS

Provide as specified in Section 03200, "Concrete Reinforcement."

2.3 MISCELLANEOUS MATERIALS

2.3.1 Drainage Structures

Precast structures shall be provided in lieu of cast-in-place concrete. Pipe-to-wall connections shall be mortared to produce smooth transitions and watertight joints or provided with ASTM C 923 resilient connectors. Bases shall have smooth inverts accurately shaped to a semicircular bottom conforming to the inside contour of the adjacent sewer sections. Changes in direction of the sewer and entering branches into the manhole shall have a circular curve in the manhole invert of as large a radius as the size of the manhole will permit.

2.3.1.1 Precast Concrete Structures

ASTM C 478, except as specified herein.

2.3.2 Masonry Materials

Shall conform to the following specifications and other requirements specified hereunder.

2.3.2.1 Brick

ASTM C 32, Grade MS, or ASTM C 62, Grade SW, except that the absorption test will be waived.

2.3.2.2 Concrete Masonry Units

ASTM C 139.

2.3.2.3 Mortar

ASTM C 270, Type M.

2.3.2.4 Water

Water for masonry mortar shall be fresh, clean, potable.

2.3.2.5 Grout

ASTM C 476.

2.3.3 Metal Items

2.3.3.1 Frames, Covers, and Gratings

Shall be cast iron conforming to CID A-A-60005, figure numbers as indicated. Fabricate frames, covers, and gratings of standard commercial grade steel or ductile iron, welded by qualified welders in accordance with AWS D1.1. Covers shall be of rolled steel floor plate or ductile iron having an approved anti-slip surface. Steel gratings shall be of commercial grade steel or ductile iron and be of welded construction.

a. Non-traffic manhole:

Frame: Figure 4, Size 22
Cover: Figure 12, Size 22
Steps: Figure 19

2.3.3.2 Drainage Structure Steps

Zinc-coated steel conforming to 29 CFR 1910.27. Steps are not required in manholes or catch basins less than 4 feet deep.

2.4 FLARED ENDS

Flared end sections shall be same material as pipe material except that only reinforced concrete flared ends shall be provided for concrete pipe

2.5 EROSION CONTROL RIPRAP

Provide sound and durable limestone rock conforming to O.D.O. T. Type D. Provide a dense mass with a minimum thickness of 8 inches.

Erosion control matting shall be installed at existing and proposed endwalls, catchbasins, and area drains unless otherwise directed.

PART 3 EXECUTION

3.1 INSTALLATION OF PIPELINES AND APPURTENANT CONSTRUCTION

3.1.1 General Requirements for Installation of Pipelines

These requirements shall apply to pipeline installation except where specific exception is made under paragraph entitled "Special Requirements."

3.1.1.1 Location

The work covered by this section shall include all storm drainage construction as shown on the plans.

3.1.1.2 Earthwork

Perform earthwork operations in accordance with Section 02300.

3.1.1.3 Pipe Laying and Jointing

Inspect each pipe and fitting before and after installation; remove those found defective from site and replace with new. Provide proper facilities for lowering sections of pipe into trenches. Lay pipe with the bell ends in the upgrade direction. Adjust spigots in bells to produce a uniform space. Blocking or wedging between bells and spigots will not be permitted. Replace by one of the proper dimensions any pipe or fitting that does not allow sufficient space for proper calking or installation of joint material. At the end of each work day, close open ends of pipe temporarily with wood blocks or bulkheads. Provide batterboards not more than 25 feet apart in trenches for checking and ensuring that pipe invert elevations are as indicated. Laser beam method may be used in lieu of batterboards for the same purpose.

3.1.1.4 Connections to Existing Lines

Notify FWENC in writing at least 10 days prior to date that connections are to be made. Obtain approval of FWENC before interrupting service. Conduct work so that there is minimum interruption of service on existing line.

3.1.2 Special Requirements

3.1.2.1 Installation of Concrete Piping

Install pipe and fittings in accordance with paragraph entitled "General Requirements for Installation of Pipelines" of this section and with the provisions for rubber gasket jointing and jointing procedures of ACPA 01-103 or of ACPA 01-102, Chapter 9. Make joints with the gaskets previously specified for joints with this piping. Clean and dry surfaces receiving lubricants, cements, or adhesives. Affix gaskets to pipe not more than 24 hours prior to the installation of the pipe. Protect gaskets from sun, blowing dust, and other deleterious agents at all times. Before installation of the pipe, inspect gaskets and remove and replace loose or improperly affixed gaskets. Align each pipe section with the previously installed pipe section, and pull the joint together. If, while pulling the joint, the gasket becomes loose and can be seen through the exterior joint recess when the pipe is pulled up to within one inch of closure, remove the pipe and remake the joint.

3.1.2.2 Installation of PVC Piping

Installation of PVC storm drainage pipe will be in accordance with ASTM D 2774.

3.1.3 Concrete Work

Perform cast-in-place concrete work in accordance with Section 03200.

3.1.4 Manhole and Catch Basin Construction

Use precast concrete base sections. Make inverts in cast-in-place concrete and precast concrete bases with a smooth-surfaced semi-circular bottom conforming to the inside contour of the adjacent drainage sections. For changes in direction of drains and entering branches into the manhole, make a circular curve in the manhole invert of as large a radius as manhole size will permit. For cast-in-place concrete construction, either pour bottom slabs and walls integrally or key and bond walls to bottom slab. For precast concrete construction, make joints between sections with the gaskets specified for this purpose; install in the manner specified for installing joints in concrete piping. Give a smooth finish to inside joints of precast concrete manholes and catch basins. Parging will not be required for precast concrete manholes. Cast-in-place concrete work shall be in accordance with the Paragraph 3.1.3, "Concrete Work." Make joints between concrete manholes and pipes entering manholes with the resilient connectors specified for this purpose or mortared to produce a watertight joint; install in accordance with the recommendations of the connector manufacturer. Where a new manhole is constructed on an existing line, remove existing pipe as required to construct the manhole. Cut existing pipe so that pipe ends are approximately flush with the interior face of manhole wall, but not protruding beyond into the manhole.

3.2 FIELD QUALITY CONTROL

3.2.1 Field Tests and Inspections

FWENC will monitor Subcontractor's quality activities (e.g., surveillance of inspection and testing activities and special processes performance) and provide required oversight for verification of activity performance in accordance with assigned witness/hold points designated in the inspection and test documentation.

The Subcontractor shall perform field tests and provide labor, equipment, and incidentals required for testing. Be able to produce evidence, when required, that each item of work has been constructed properly in accordance with the drawings and specifications.

3.2.2 Pipeline Testing

Check each straight run of pipeline for gross deficiencies by holding a light in a manhole; it shall show a practically full circle of light through the pipeline when viewed from the adjoining end of line.

3.2.3 Field Tests for Concrete

Field testing requirements are covered in Section 03300, "Cast-In-Place Concrete."

END OF SECTION

SECTION 02924

SEEDING

ART 1 GENERAL

RELATED SECTIONS

01330 Submittal Procedures

2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 4427	(1992; R 1996) Peat Samples by Laboratory Testing

COMMERCIAL ITEM DESCRIPTIONS (CID)

CID A-A-1909	Fertilizer

DEPARTMENT OF AGRICULTURE (DOA)

DOA FSA	(January 1985) Federal Seed Act Rules and Regulations of the Secretary of Agriculture
DOA SSIR	(April 1984) Soil Survey Investigation Report No. 1, Soil Survey Laboratory Methods and Procedures for Collecting Soil Samples, Soil Conservation Service

STATE OF OHIO DEPARTMENT OF NATURAL RESOURCES (ODNR)

(1996) Rainwater and Land Development, Ohio's Standard for Storm Water Management, Land Development, and Urban Stream Protection

3 DEFINITIONS

3.1 Stand of Turf

95 percent ground cover of the established species.

.4 SUBMITTALS

Submit the following in accordance with Section 01330, "Submittal Procedures."

SD-03 Product Data

1.5.2 Storage

1.5.2.1 Seed, Fertilizer and Lime Storage

Store in cool, dry locations away from contaminants.

1.6 TIME RESTRICTIONS AND PLANTING CONDITIONS

1.6.1 Restrictions

Do not plant when the ground is frozen, snow covered, muddy, or when air temperature exceeds 90 degrees Fahrenheit.

1.7 TIME RESTRICTIONS AND PLANTING CONDITIONS

1.7.1 Seed

All disturbed areas must be seeded within seven days of knowing that the area will be idle for 45 days or more.

Seeding shall be from March 1 through October 31.

PART 2 PRODUCTS

2.1 SEED

2.1.1 Classification

Provide FWENC- and/or Fluor Fernald, Inc.-approved seed of the latest season's crop delivered in original sealed packages, bearing producer's guaranteed analysis for percentages of mixtures, purity, germination, weed seed content, and inert material and date of expiration. Label in conformance with DOA FSA and applicable state seed laws. Wet, moldy, or otherwise damaged seed will be rejected.

Each variety of seed shall: have a purity of not less than 90 percent, have a percentage of germination not less than 80 percent, have a weed to seed content of not more than 0.75 percent and contain no noxious weeds. These percentages are by weight.

2.1.2 Seed Mixture Composition

For interim seeding, the seed mixture shall be a mixture of Regreen (50 pound/acre) annual rye (20 pounds/acre) and Canada wild rye (20 pounds/acre).

For permanent seeding, the seed mixture shall be at least (all measures are in pounds pls/acre):

	April 15-May 31	October 1-April 14
1. Canada Wild Rye	2	3
2. Little Bluestem	2	3

3. Big Bluestem	3	4
4. Indian Grass	2	3
5. Switch Grass	½	1
6. Side Oats Gramma	½	1
7. Live Oats	20	25

For summer (June-September) seeding, the seed mixture shall be Buckwheat, 60 pounds pls/acre. The planting of buckwheat during the summer season will be followed by either interim or permanent seeding during the next seeding window.

Seed mixtures should be prepared by a seed vender for the above mixture compositions. Field mixes will be acceptable when field mix is performed on site in the presence of FWENC.

2.2 FERTILIZER

1. Use fertilizer that is dry or liquid commercial grade fertilizer. Uniform in composition that meets the requirements of all state and federal regulations and standards of the Association of Agricultural Chemists.

2. Fertilizer for interim seeding shall be VCOTE 34-4-14 as manufactured by George W. Hill or equal.

2.3 MULCH

Furnish mulch meeting the following requirements:

1. Mulch shall be straw or wood cellulose fiber, free of clay, stone, foreign substances, and reasonable free of weeds.

2. Furnish straw that does not contain sticks larger than ¼ inch in diameter or other materials that may prevent matting down during application. Use straw that is free from mold and other objectionable material and in an air-dry condition suitable for placing with mulch blower equipment or other equipment as approved by the Contractor. Straw shall be generally 6 inches or more in length.

3. Mulch applied by hydrospraying shall be a wood cellulose processed into a uniform fibrous physical state. Use wood cellulose fiber containing a green dye that will provide for easy visual inspection for uniformity of slurry spread. The wood cellulose fiber, including dye, shall contain no growth or germination inhibiting properties. The fiber shall be manufactured in a manner that, after addition and agitation in slurry tanks with water, the fibers become uniformly suspended to form a homogenous material. When sprayed on the ground, the material shall allow absorption and percolation of moisture. The wood cellulose fiber shall have a maximum particle length of 0.375 inches and a maximum particle thickness of o.o47 inches.

2.4 MULCH BINDER

Mulch Binder agent shall be as approved by the Contractor and shall meet the following requirements:

1. The binder shall be a pine sap emulsion comprised of a 100% organic emulsion produced from naturally occurring resins and be nontoxic to plants. The mulch binder shall be compatible with application via a hydroseeder, and must not require intense cleaning of equipment.

2. The mulch binder shall not have hazardous characteristics of as defined in 40 CFR 261 Subpart C either in its pre-applied or cured states.

2.5 TOPSOIL

2.51 Existing Soil

Modify existing soil to conform to the requirements specified in paragraph entitled "Composition."

2.5.2 On-Site Topsoil

Reusable surface soil stripped and stockpiled on site if requirements specified for topsoil in paragraph entitled "Composition" are met.

2.6 PH ADJUSTERS

2.6.1 Lime

Commercial grade limestone containing not less than 50 percent of total oxides, gradation, as follows: Minimum 75 percent passing 100 mesh sieve and 100 percent passing 20 mesh sieve.

2.6.2 Aluminum Sulfate

Commercial grade.

2.7 SOIL CONDITIONERS

Provide singly or in combination as required to meet specified requirements for topsoil. Soil conditioners shall be nontoxic to plants.

2.7.1 Peat

Peat humus derived from a freshwater site and conforming to ASTM D 4427 as modified herein. Shred and granulate peat to pass ½-inch mesh screen and condition in storage pile for minimum 6 months after excavation.

2.7.2 Sand

Clean and free of materials harmful to plants.

2.7.3 Perlite

Horticultural grade.

2.7.4 Vermiculite

Horticultural grade.

2.7.5 Rotted Manure

Composted, horse or cattle manure containing maximum 25 percent by volume of straw, or other bedding materials. Manure shall be free of stones, sticks, and soil, viable weed seed, and other materials harmful to plants.

2.7.6 Composted Wood Derivatives

Ground bark, nitrolized sawdust, humus, or other wood green waste material free of stones, sticks, and soil stabilized with nitrogen and having the following properties:

2.7.6.1 Particle Size

Minimum percent by weight passing:

No. 4 mesh screen	95
No. 8 mesh screen	80

2.7.6.2 Nitrogen Content

Minimum percent based on dry weight:

Fir Sawdust	0.7
Fir or Pine Bark	1.0

2.7.7 Calcined Clay

Granular particles produced from montmorillonite clay calcined to minimum temperature of 1200 degrees F to the following gradation: minimum 90 percent passing 8 mesh screen, 99 percent retained on 60 mesh screen and, maximum 2 percent passing 100 mesh screen. Bulk density: 40 pounds maximum per cubic foot.

2.8 WATER

Suitable quality for irrigation.

2.9 EROSION CONTROL MATERIALS

2.9.1 Net

Heavy twisted jute mesh, biodegradable paper fabric with knitted yarns, or standard weave burlap.

2.9.2 Blanket

Fiber

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Soil Preparation

Remove existing topsoil to a minimum depth of 2 inches and stockpile. After areas have been brought to finish subgrade elevation, thoroughly till to minimum depth of 6 inches by scarifying, disking, harrowing, or other methods approved by FWENC until a smooth seedbed is provided. A smooth seedbed shall be defined as soils containing no clods greater than 1.5 inches in diameter within 1.5 inches of the surface of the soil The Contractor shall conduct periodic inspections of finished seedbed preparation. Remove debris and stones larger than one inch in any dimension remaining on surface after tillage.

3.1.2 Topsoiling

Spread stockpiled topsoil evenly to provide positive drainage. Provide off-site topsoil to meet indicated finish grade if required. Do not spread topsoil when frozen or excessively wet or dry. Thoroughly mix subgrade and topsoil and off-site topsoil to a depth of 6 inches by disking, harrowing, tilling or other method approved by FWENC. Correct irregularities in finished surfaces to eliminate depressions. Protect finished prepared soil areas from damage by vehicular or pedestrian traffic.

3.1.3 Fertilizer, Lime, pH Adjuster, and Soil Conditioners

Apply at rates as determined by laboratory soil analysis of the soils at the job site or at the standardization rates of:

Agriculture Lime at two tons per acre and Fertilizer (12-12-12) at 500 pounds per acre.

3.2 SEEDING

3.2.1 Seed Application Seasons and Conditions

Immediately before seeding, restore soil to proper grade and thoroughly moisten soil to a depth of 6 inches. Do not seed when ground is muddy frozen, snow covered or in an unsatisfactory condition for seeding. If special conditions exist that may warrant a variance in the above seeding dates or conditions, submit a written request to FWENC stating the special conditions and proposed variance. Apply seed within twenty-four hours after seedbed preparation. Sow seed by approved sowing equipment.

3.2.2 Seed Application Method

Do not seed in excess of what can be mulched within 24 hours. Apply mulch within 24 hours of seeding

3.2.2.1 Broadcast and Drop Seeding

Use broadcast or drop seeders. Cover seed uniformly to a maximum depth of 1/2 inch by means of spike-tooth harrow, cultipacker, raking or other approved devices.

3.2.2.2 Hydroseeding

First, mix water and fiber. Fiber shall be added at 1,000 pounds, dry weight, per acre. Then add and mix seed and fertilizer to produce homogeneous slurry. When hydraulically sprayed on the ground, material shall form a blotter like cover impregnated uniformly with grass seed. Spread with one application with no second application of mulch.

3.2.3 Top Dressing (Mulch)

Spread straw, hay, humus in a uniformly thick layer over seed bed area to an even depth of 1/2 inch at a rate of 2 air-dried tons per acre. Take precautionary measures to prevent topdressing materials from spilling onto pavements or utilities structures. During June through September, increase straw or mulch application to 3 air-dried tons per acre.

Apply sprayed wood cellulose fiber at a net dry rate of 2000 pounds per acre. Mix the wood cellulose fiber with water at a ratio of 50 pounds of wood cellulose fiber per 100 gallons of water.

Maintain mulching material in place with a pine sap emulsion binder. Apply binder according to manufacturer's directions at a rate of 2500 gallons of diluted emulsion per acre.

3.2.4 Rolling

Immediately after seeding, firm entire area except for slopes in excess of 3 to 1 with a roller not exceeding 90 pounds for each foot of roller width. If seeding is performed with cultipacker-type seeder or by hydroseeding, rolling may be eliminated.

3.3 PROTECTION OF TURF AREAS

Immediately after turfing, protect area against traffic and other use.

3.4 MAINTENANCE

3.4.1 Start watering areas seeded as required by temperature and wind conditions. Apply water at a rate sufficient to insure thorough wetting of soil to a depth of 2 inches without runoff. During the germination process, seed is to be kept actively growing and not allowed to dry out.

3.4.2 Mow turfed area to an average height of 1-½ inches when average height of grass becomes greater than 4 inches.

3.4.3 Maintain the seeded areas in satisfactory condition until acceptance of the seeding by the Contractor. Maintenance of seeded areas includes repairing eroded areas revegetating when necessary, watering, and mowing (if applicable). A satisfactory condition of the vegetated area is defined as follows:

1. An area shall have a predominant stand of the seeded vegetation.

2. Within 3 weeks, germination must occur over 95 percent of the area with no single bare area greater than 3 square feet.

3. Within 3 months, 95 percent of the area must be covered with mature vegetation.

Areas failing to meet these requirements shall be repaired or reseeded ad necessary to produce an acceptable stand of vegetation as specified in this Section. Areas that become bare during June through September shall be reseeded with the summer seeding mix.

Seeded areas shall be maintained with applied crusting agent to ensure proper erosion control.

3.5 WARRANTY

Seeded areas shall be subject to a warranty period of not less than 12 months from initial establishment of vegetation over 100 percent of the seeded areas.

At the end of the warranty period, the Contractor shall perform an inspection upon written request of the Subcontractor. Seeded areas not demonstrating satisfactory condition of vegetation as specified herein shall be repaired, reseeded, and maintained to meet all requirements as specified herein at the Subcontractor's expense.

The seeded areas shall be accepted at the end of the warranty period if a satisfactory condition exists as defined in this Section. After all disturbed areas are stabilized and all necessary corrective work has been completed, the Contractor shall certify in writing the final acceptance of seeded areas.

3.6 FIELD QUALITY CONTROL

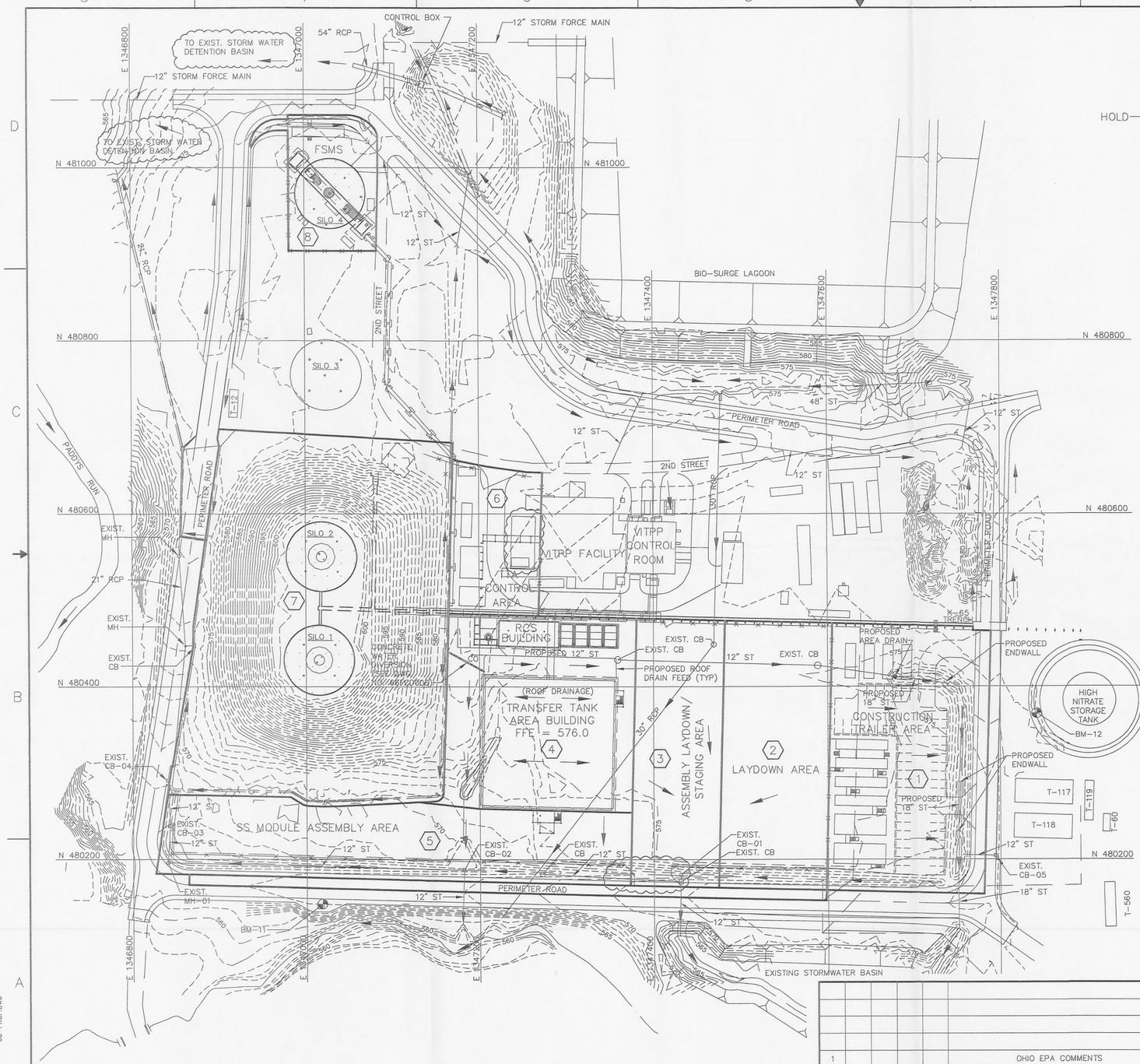
3.6.1 Final Inspection and Acceptance

Final acceptance will be based upon a satisfactory stand of turf.

Within 3 weeks, germination must occur over 95 percent of the area with no single bare area greater than 3 square feet.

Within 3 months, 95 percent of the area must be covered with mature perennial grass. Replant within specified planting dates areas which do not have a satisfactory stand or turf.

END OF SECTION



NOTES:

HOLD — 1. SEE DRAWING 05FCD011 FOR GENERAL NOTES AND LEGEND.

2. DRAINAGE AREAS AT THE SILO'S AND NORTH AND WEST OF THE PERIMETER ROAD DRAIN TO THE WEST TO AN EXISTING CONCRETE SUMP. THE CONCRETE SUMP CONTAINS A 12" DIA FORCE MAIN TO THE BIO-SURGE LAGOON.

3.

DRAINAGE AREA	DESCRIPTION OF DRAINAGE AREA	OUTLET
1	GRAVEL LOT	EXISTING STORMWATER BASIN AT 18"ø OUTLET
2	GRAVEL LOT	EXISTING STORMWATER BASIN AT CB-01
3	LAYDOWN AREA	EXISTING STORMWATER BASIN AT CB-01
4	TTA AND RCS BUILDINGS – GUTTERS	PROPOSED ROOF DRAINAGE TO 18"ø OUTLET EAST OF AREA 1
5	SOUTH OF SILO 1	12 IN. OUTLET FROM CB-02
6	TTA CONTROL AREA	EXISTING STORMWATER BASIN NORTH OF K-65 TRENCH
7	SILOS 1 AND 2 – PERIMETER TRENCH	CONCRETE SUMP TO BIO-SURGE LAGOON
8	SILO 4 – PERIMETER TRENCH	CONCRETE SUMP TO BIO-SURGE LAGOON
9	ALL OTHER AREAS OUTSIDE PROJECT	EXISTING STORMWATER BASINS

4. DRAINAGE AREAS 7 & 8 RUNOFFS HAVE BEEN CALCULATED USING A 25 YEAR, 24 HOUR STORM.

5. ALL OTHER DRAINAGE AREA RUNOFFS HAVE BEEN CALCULATED USING A 10 YEAR, 24 HOUR STORM.

6. STORM WATER CONTROLS FOR ALL AREAS WILL BE BASED ON OHIO DEPT. OF NATURAL RESOURCES (ODNR) RAINWATER AND LAND DEV. PLAN.

7. THE AWR STORMWATER DRAINAGE PLAN ACCOUNTS FOR ANY CHANGES FROM PHASED CONSTRUCTION WITHIN THE INDIVIDUAL DRAINAGE AREAS AS FOLLOWS:

ZONE	ZONE AREA (Sf)	RUNOFF COEFFICIENT OF DRAINAGE	ZONE MAXIMUM FLOW OF STORMWATER IN CFS	STORMWATER CONVEYANCE SYSTEM CAPACITY
1	56,535	0.58	7.25	14.0 CFS
2	37,978	0.40	2.35	11.0 CFS
3	31,405	0.50	1.94	11.0 CFS
4	47,539	0.78	1.42	11.0 CFS
5	48,287	0.50	3.00	11.0 CFS
6	17,616	0.57	N/A	N/A
7	123,437	0.69	13.05	53.2
8	16,287	0.56	N/A	53.2
ROAD	4,260	0.90	0.48	11.0

8. REFERENCE CALCULATION NO. CA-FSC624-FC-001.

3054

STORMWATER LEGEND:

- DRAINAGE AREA
- DRAINAGE AREA BOUNDARY
- FLOW DIRECTION
- PROPOSED CLEANOUT
- PROPOSED AREA DRAIN
- PROPOSED ENDWALL

STATE OF OHIO NORTH (NAD 83)

60 0 60 120
SCALE IN FEET

000117

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
1					OHIO EPA COMMENTS
0	4/20/00	WVD	VB	MSH	CERTIFIED FOR CONSTRUCTION

RPE

DRAWN BY W. MARVIN	DATE 4/20/00	
DESIGNED BY M. HUGHES	DATE 4/20/00	
CHECKED BY V. BHATT	DATE 4/20/00	
APPROVED BY M. HUGHES	DATE 4/20/00	
APPROVED BY JOHN LAWSON	DATE 4/20/00	

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

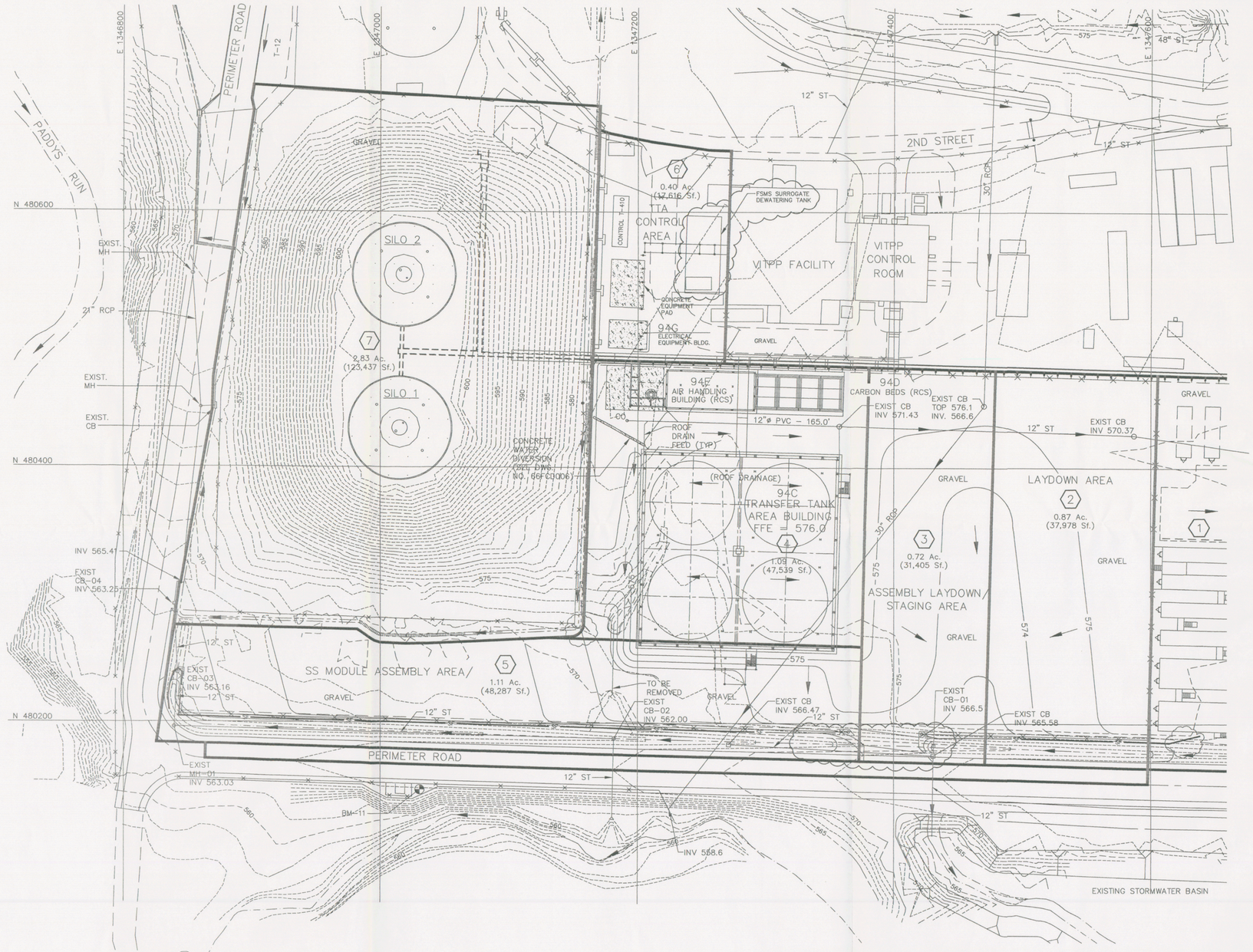
FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
STORM WATER SYSTEM
OVERALL DRAINAGE PLAN

SIZE	SCALE:	DWG. NO.	REV
D	1"=60'	66FCD001	1

FILENAME: 66FCD001.DWG

XREF DRAWINGS: 60-EXIST.DWG 60-PROP.DWG



NOTES:

HOLD

1. SEE DRAWING 05FCD011 FOR GENERAL NOTES AND LEGEND.
2. SILT FENCE TO BE INSTALLED AT THE BOTTOM OF ALL DISTURBED SLOPES, AND FOLLOW CONTOUR.
3. CULVERT ENTRANCES AND EXITS TO BE PROTECTED BY COIR MATTING AND NATURAL VEGETATION.
4. AREAS DISTURBED BY EXCAVATION ACTIVITIES ARE TO BE SEEDED AND MULCHED WITHIN 7 DAYS.
5. OVERSEEDING AND RESEEDING ARE TO BE PERFORMED AS NECESSARY UNTIL VEGETATION IS ESTABLISHED.
6. SILT IS TO BE REMOVED FROM DIVERSION DITCHES AND SILT FENCE INSTALLED AS REQUIRED BY THE SPECIFICATIONS AND AT THE END OF CONSTRUCTION.
7. REINFORCED SILT FENCING IS TO INSTALLED AROUND CATCH BASINS AS SPECIFIED ON PAGE 125 OF THE ODNR RAINWATER AND LAND DEVELOPMENT MANUAL.
8. EROSION CONTROL MEASURES ARE TO BE INSPECTED WEEKLY AND WITHIN 24 HOURS OF A 0.5 INCH RAINFALL.
9. REMEDIATION OF PROBLEMS IDENTIFIED IN THE INSPECTION ARE TO BE COMPLETED IWITHIN 24 HOURS.
10. AWR PROJECT ACTIVITIES DO NOT SIGNIFICANTLY ALTER EXISTING DRAINAGE PATTERNS.
11. THE TTA BUILDING AREA ROOF DRAINAGE WILL BE DIRECTED TO THE EXISTING 12" STORM DRAIN SYSTEM AT THE NORTHEAST SECTION OF THE BUILDING.
12. EROSION AND SILTATION INTO THE CONCRETE CHANNEL IS TO BE PREVENTED.
13. ALL EROSION CONTROL MEASURES WILL BE BE INSTALLED AT THE BEGINNING OF EXCAVATION AND MAINTAINED FOR THE DURATION OF THE PROJECT.

STORMWATER LEGEND:

- DRAINAGE AREA
- DRAINAGE AREA BOUNDARY
- FLOW DIRECTION
- PROPOSED CLEANOUT
- PROPOSED SILT FENCE

3054

STATE OF OHIO NORTH (NAD 83)

LETTER OR NUMBER OF SECTION OR DETAIL
DRAWING ON WHICH SECTION OR DETAIL IS TAKEN
DRAWING ON WHICH SECTION OR DETAIL IS SHOWN

SECTION & DETAIL KEY

40 0 40 80

SCALE IN FEET

000118

THE ORIGINAL DRAWING AND SUBSEQUENT REVISIONS THEREOF, WITH APPROVAL NAMES, INITIALS, AND THE PE SEAL, IF APPLICABLE, ARE MAINTAINED IN THE FILES OF FWENC.

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
2					OHIO EPA COMMENTS
1	4/20/00	WVM	VB	MSH	AREA 2 GRAVELED, AREA 7 EXC & FNDN REMOVED
0	3/6/00	WVM	VB		CERTIFIED FOR CONSTRUCTION

RPE

DRAWN BY W. MARVIN	DATE 3/6/00
DESIGNED BY M. HUGHES	DATE 3/6/00
CHECKED BY V. BHATT	DATE 3/6/00
APPROVED BY M. HUGHES	DATE 3/6/00
APPROVED BY JOHN LAWSON	DATE 3/6/00

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

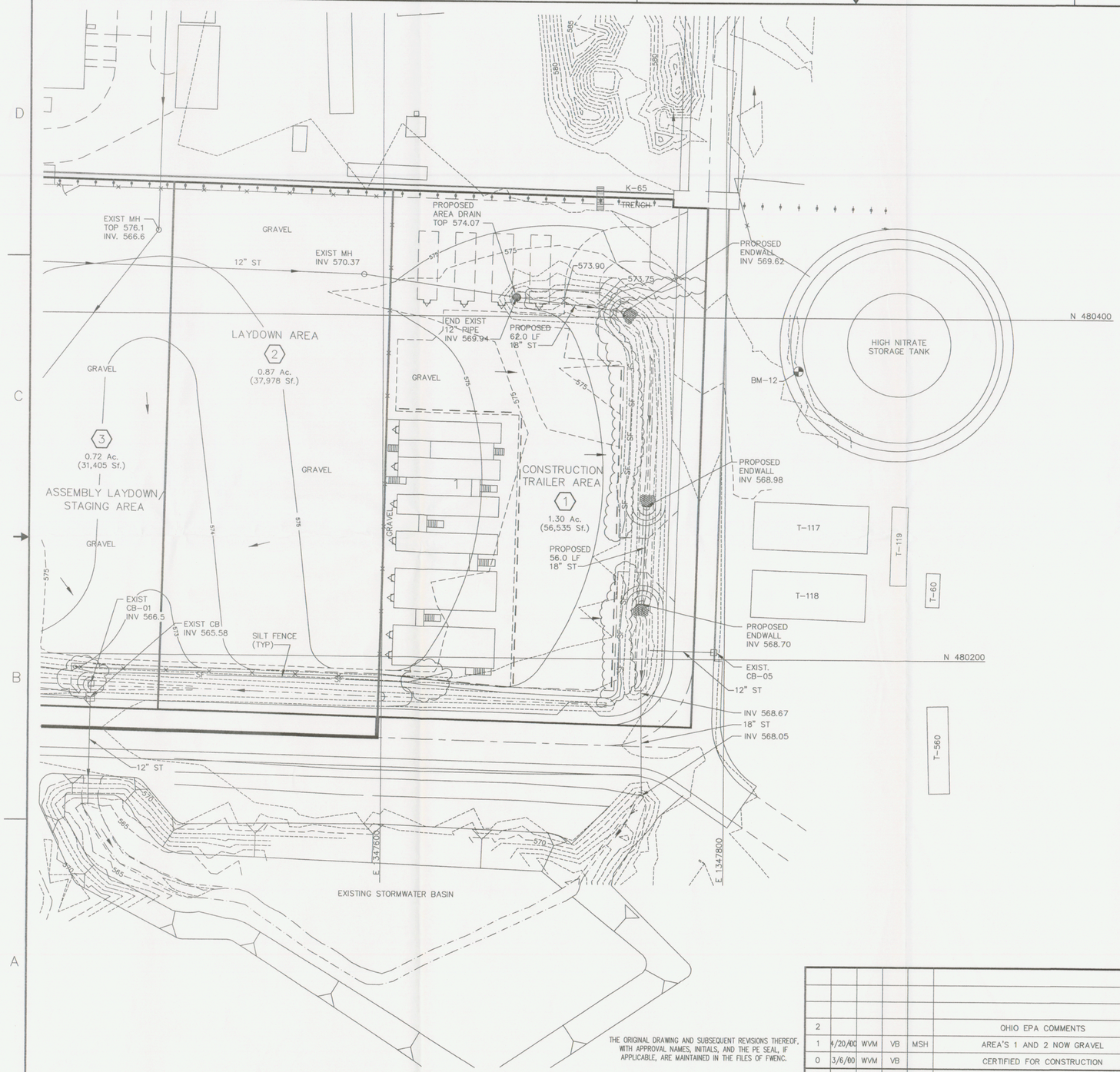
FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
STORM WATER SYSTEM
SWRS – DRAINAGE PLAN
PHASE 1

SIZE	SCALE:	DWG. NO.	REV
D	1"=30'	66FCD002	2

XREF DRAWINGS: 40-EXIST.DWG 40-PROP.DWG

FILENAME: 66FCD002.DWG



NOTES:

HOLD

1. SEE DRAWING 05FCD011 FOR GENERAL NOTES AND LEGEND.
2. SILT FENCE TO BE INSTALLED AT THE BOTTOM OF ALL DISTURBED SLOPES, AND FOLLOW CONTOUR.
3. CULVERT ENTRANCES AND EXITS TO BE PROTECTED BY COIR MATTING AND NATURAL VEGETATION.
4. AREAS DISTURBED BY EXCAVATION ACTIVITIES ARE TO BE SEEDED AND MULCHED WITHIN 7 DAYS, REFER TO SPEC SECTION 02924.
5. OVERSEEDING AND RESEEDING ARE TO BE PERFORMED AS NECESSARY UNTIL VEGETATION IS ESTABLISHED.
6. SILT IS TO BE REMOVED FROM DIVERSION DITCHES AND SILT FENCE INSTALLED AS REQUIRED BY THE SPECIFICATIONS AND AT THE END OF CONSTRUCTION.
7. REINFORCED SILT FENCING TO BE INSTALLED AROUND CATCH BASINS AS SPECIFIED ON PAGE 125 OF THE ODNR RAINWATER AND LAND DEVELOPMENT MANUAL
8. EROSION CONTROL MEASURES ARE TO BE INSPECTED WEEKLY AND WITHIN 24 HOURS OF A 0.5 INCH RAINFALL.
9. REMEDIATION OF PROBLEMS IDENTIFIED IN THE INSPECTION ARE TO BE COMPLETED WITHIN 24 HOURS.
10. AWR PROJECT ACTIVITIES DO NOT SIGNIFICANTLY ALTER EXISTING DRAINAGE PATTERNS.
11. SEE 66FCD007 FOR STORM DRAIN PROFILES.
12. ALL EROSION CONTROL MEASURES WILL BE BE INSTALLED AT THE BEGINNING OF EXCAVATION AND MAINTAINED FOR THE DURATION OF THE PROJECT.

STORMWATER LEGEND:

(1)	DRAINAGE AREA
	DRAINAGE AREA BOUNDARY
	FLOW DIRECTION
	PROPOSED AREA DRAIN
	PROPOSED ENDWALL
—SF—	SILT FENCE

3054

STATE OF OHIO NORTH (NAD 83)

LETTER OR NUMBER OF SECTION OR DETAIL

DRAWING ON WHICH SECTION OR DETAIL IS TAKEN

DRAWING ON WHICH SECTION OR DETAIL IS SHOWN

SECTION & DETAIL KEY

30 0 30 60

SCALE IN FEET

000119

THE ORIGINAL DRAWING AND SUBSEQUENT REVISIONS THEREOF, WITH APPROVAL NAMES, INITIALS, AND THE PE SEAL, IF APPLICABLE, ARE MAINTAINED IN THE FILES OF FWENC.

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
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1	4/20/00	WVM	VB	MSH	AREA'S 1 AND 2 NOW GRAVEL
0	3/6/00	WVM	VB		CERTIFIED FOR CONSTRUCTION

RPE

DRAWN BY W. MARVIN	DATE 3/6/00
DESIGNED BY M. HUGHES	DATE 3/6/00
CHECKED BY V. BHATT	DATE 3/6/00
APPROVED BY M. HUGHES	DATE 3/6/00
APPROVED BY JOHN LAWSON	DATE 3/6/00

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
STORM WATER SYSTEM
TRAILER AREA – DRAINAGE PLAN

SIZE	SCALE:	DWG. NO.	REV
D	1"=30'	66FCD003	2

FILENAME: 66FCD003.DWG

XREF DRAWINGS: 30A-EX.DWG
30A-PR.DWG