AREA 7 EXCAVATION PLAN, PHASE I

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
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TABLE OF CONTENTS

1.0 Purpose 1
2.0 Project Boundary 1
3.0 Summary of Characterization Data 1
3.1 Above-WAC Material 2
3.2 Above-FRL Material 3
3.2.1 Remediation Facility Footprint (Area F Sampling) 3
3.2.2 High Nitrate Tank 3
3.2.3 Warehouse Footprint 3
3.2.4 Soil Surrounding K-65 Trench 3
3.2.5 Railroad Embankment/Impacted Material Haul Road 4
4.0 Excavation Methodology 4
4.1 Remediation Facility Footprint 4
4.2 High Nitrate Tank 5
4.3 K-65 Trench 6
4.4 Warehouse 8
4.5 Railroad Embankment 9
4.6 Impacted Material Haul Road 10
5.0 Surface Water Control 10
6.0 Dust Control 11
7.0 Excavation Sequencing 11
8.0 Restoration 11
9.0 References 12

Appendix A Characterization Data and Figures

LIST OF TABLES

Table A-1 K-65 Trench Silt Results
Table A-2 Area F Results
Table A-3 Area E Results
Table A-4 Area Surrounding K-65 Trench Results

LIST OF FIGURES

Figure 1 Area 7 Excavation Layout (Phase I)
Figure 2 Remediation Facility Excavation Grading Plan
Figure 3 High Nitrate Tank Plan View
Figure 4 High Nitrate Tank Profile
Figure 5 Warehouse Design
Figure A-1 Area E/F - Sample Points and Elevations
Figure A-2 Sample Points Surrounding K-65 Trench
Figure A-3 Sample Points and Elevations of Railroad Embankment and Impacted Material Haul Road

LIST OF ACRONYMS AND ABBREVIATIONS

AWWT	Advanced Waste Water Treatment (Facility)
BMP	Best Management Practices
D&D	Decontamination and Dismantlement
FEMP	Fernald Environmental Management Project
FRL	final remediation level
IMHR	Impacted Material Haul Road
MSL	mean sea level
ODNR	Ohio Department of Natural Resources
OSDF	On-Site Disposal Facility
OU4	Operable Unit 4
PSP	Project Specific Plan
RCRA	Resource Conservation and Recovery Act
SDFP	Soil and Disposal Facility Project
SP-7	Soil Stockpile 7
V/FCN	Variance/Field Change Notice
WAC	waste acceptance criteria
WPRAP	Waste Pits Remedial Action Project

AREA 7 EXCAVATION STRATEGY, PHASE I

1.0 PURPOSE

The purpose of this document is to describe the Soil and Disposal Facility Project's (SDFP) excavation and remediation strategy for a portion of Soil Remedial Area 7 (Silos). This effort is to prepare a remediated footprint for construction of the Silos Project Remediation Facility and support structures at the Fernald Environmental Management Project (FEMP). This activity involves general excavation and grading as well as removal of at- and below-grade structures and utilities following decontamination and dismantlement (D&D) of the area. This plan presents general methodology of SDFP-specific activities for at- and below-grade structure and soil excavation. The six key excavation/remediation elements are as follows:

- K-65 Trench
- Remediation Facility Footprint
- High Nitrate Tank (18M) Footprint
- Warehouse Footprint
- Railroad Embankment
- Impacted Material Haul Road (IMHR).

These elements will be completed in Fiscal Year 2002 and are described in following sections.

2.0 PROJECT BOUNDARY

The excavation zone (Figure 1) includes Area 7 and will be bounded as follows:

1. On the east by the Lime Sludge Ponds excavation area and the Building 30/45 parking lot
2. On the west by the Transfer Tank Area
3. On the south by the Operable Unit (OU4) Detention Basin
4. On the north by 2nd Street and just to the north of the K-65 Trench.

3.0 SUMMARY OF CHARACTERIZATION DATA

Extensive sampling was performed throughout the entire area under the Project Specific Plan (PSP) for Waste Acceptance Criteria (WAC) Attainment Sampling of Area 7 Soils and related Variance/Field Change Notices (V/FCNs; DOE 1998). Several sub-areas were defined within this PSP; this excavation plan covers only two of the sub-areas, Area E and Area F, as defined in the PSP. Of the six excavation/remediation elements listed in Section 1.0, only the Remediation Facility Footprint (Area F) and Warehouse Footprint (Area E) are entirely associated with the sub-area. The K-65 Trench stretches

between Area E and Area F. The High Nitrate Tank is south of the K-65 Trench, due south of Area E, and was considered an extension of Area E. Both the IMHR and the Railroad Embankment run parallel to the east side of Area E. All samples were taken at a depth from soil surface of 2.5 to 3 feet except for those collected from the K-65 Trench. If the soil at this elevation was not native or it was fill material, the boring was advanced to capture the first 6-inch interval of native soil. This was done to ensure that any fill material that met final remediation levels (FRLs) did not rest on top of contaminated native soil. The actual elevation above mean sea level (MSL) varied depending on the thickness of overlying material.

Grab samples were collected to characterize the material inside of the K-65 Trench. The borings that ran along side the trench both to the north and to the south were advanced to a prescribed depth of 10 feet, with an intermediate sample taken at the 5-foot interval of each boring. Process knowledge indicated that contamination was present at least 7 feet below surface on the south side of the trench. Therefore the 10-foot interval was sampled to conservatively bound suspected contamination.

A separate precertification PSP will be submitted following this plan that will address all areas that are to be excavated under this plan. The precertification will be performed prior any backfill of clean material.

3.1 Above-WAC Material

The silt/sludge on the inside of the trench had not been characterized prior to this investigation. Fifteen grab samples were collected from within the trench and initially analyzed for total uranium and technetium-99. The results of this analysis demonstrated that this material did not meet the WAC for technetium-99, with values ranging from <1.6 pCi/g to 590 pCi/g (Appendix A, Table A-1). Once this material was labeled above-WAC, subsequent analyses were requested to determine if the material met off-site WAC. Seven of the eight Resource Conservation and Recovery Act (RCRA) metals were analyzed at the on-site laboratory for the total conservation and then compared to the 20-times rule. The on-site lab recently deleted mercury from its list of offered analyses; therefore, mercury concentrations were not determined. Historical data indicates that mercury above the 20-times rule is not present in Area 7. The only analyte with a single result above the 20-times rule was lead; in this instance, the calculated average was well below the off-site WAC.

For health and safety reasons, the trench samples were also analyzed for radium and thorium isotopes although there are no WAC associated with these constituents.

3.2 Above-FRL Material

All samples collected for FRL determination were analyzed for total uranium, technetium-99, radium-226, radium-228, thorium-228, thorium-230, thorium-232, cesium-137, arsenic, beryllium, manganese, lead, boron, mercury, aroclor-1254, and aroclor-1260.

3.2.1 Remediation Facility Footprint (Area F Sampling)

The sample results within this area indicate above-FRL material only at four locations. Sample point A7-F9 has above-FRL levels of arsenic and radium at the 2.5 to 3-foot interval (572.75 MSL). Sample points A7-F13 and A7-F14 have above-FRL levels of arsenic at the 2.5 to 3-foot interval (571 MSL) and 3.5 to 4-foot interval (571.75 MSL), respectively. Sample point A7-F17 has above-FRL levels of arsenic at the 2.5 to 3-foot interval (572.44 MSL). All other points within Area F have below-FRL concentrations for all analytes. The lowest elevation within Area F is 570 feet above MSL (Appendix A, Table A-2 and Figure A-1).

3.2.2 High Nitrate Tank

Once the tank itself was removed, samples were collected beneath the remaining slab. These samples indicated no above-FRL results. The average elevation within the High Nitrate Tank area is 573 feet above MSL (Appendix A, Table A-3 and Figure A-1).

3.2.3 Warehouse Footprint

The sample results within this area indicate above-FRL arsenic at two locations. Sample point A7-E3 has arsenic at the 2.5 to 3-foot interval (573 MSL) and sample point A7-E6 has arsenic at the 2.5 to 3-foot interval (574.5 MSL). There are two utility lines that traverse the area from southeast to northwest. North of these utility lines, where sample point A7-E6 is located, the average elevation within the Warehouse Area (Area E) is 574.2 feet above MSL. South of these lines, the lowest elevation is 573 feet (Appendix A, Table A-3 and Figure A-1).

3.2.4 Soil Surrounding K-65 Trench

Samples were collected approximately ten feet to the north and south of the trench. These samples were collected at 5 and 10-foot intervals as described in Section 3.0. Sample points A7-K2, A7-K11, and A7-K17 has above-FRL arsenic at the 10-foot interval. Sample point A7-K6 has above-FRL radium-226 at the 5-foot interval. Sample points A7-K14 and A7-K16 have above-FRL arsenic at the 5-foot interval. Sample point A7-K15 has above-FRL arsenic and beryllium at the 5-foot interval. Sample points A7-K9, A7-K10, and A7-K12 were collected well after the rest of the points. With the required radium ingrowth time of twenty days, results are not yet available at this time for these points. However, based on results from surrounding sample locations, these points are considered above-FRL to the 10-foot interval. Sample point A7-K7 was eliminated due to accessibility and water conditions in the area (Appendix A, Table A-4 and Figure A-2).

3.2.5 Railroad Embankment/Impacted Material Haul Road

Samples were collected at the first interval below overlying material and at the first interval of native soil along the length of the Railroad Embankment (Appendix A, Figure A-3). Note that Figure A-3 displays additional sampling in an office trailer area, which is not included within the scope of this excavation plan.

The preliminary Railroad Embankment sample results indicate that no above-FRL conditions exist at the first interval beneath overlying material, which is at varying elevations along the railroad. The lowest elevation is at 574 feet above MSL. The IMHR is directly above the main utility corridor and, as a result, sample points could not be collected on the roadway itself. Samples were collected as closely as possible to the road. The data for all parameters are not yet available for the roadway due to the recent sample collection coupled with the required ingrowth period. The preliminary data indicate that above-FRL conditions do exist beneath the road, but the road will not be excavated at depth because of the utility corridor.

4.0 EXCAVATION METHODOLOGY

4.1 Remediation Facility Footprint

Excavation within the area identified as the Remediation Facility footprint on Figure 1 involves general excavation of soil and surface aggregate to a depth of approximately 5 to 6 feet to elevation 570. The preliminary design grade is based on characterization data and includes the majority of the excavation

required in accordance with the Remediation Facility excavation grading plan (Figure 2). Additional excavation in the area, as required for constructing the building foundation and backfilling in the area surrounding the building to match design grades, will be performed by the Silos Project. The debris and impacted soil within the remediation area will be excavated in lifts and disposed at the On-Site Disposal Facility (OSDF) based on the previous WAC attainment investigations. Side slopes along the perimeter will be no steeper than 2H:1V. The remaining surface will be both visually inspected for man-made materials and monitored using real-time scanning to determine if additional excavation is required. Excavation in 3 ± 1-foot lifts will be performed with the associated lift scan until all impacted material has been removed. Except for above-WAC material, debris and impacted soil will be disposed in the OSDF. Surface water collected during this excavation will be pumped or drained to the K-65 Trench following its excavation (see Section 5.0, Surface Water Control).

The utilities no longer required within the Remediation Facility footprint will be isolated and de-energized before excavation. De-energized utilities in the area include buried electrical feed to the former trailer area, gravity sanitary sewer lines, drinking water lines, and force-main sanitary sewer lines. Other utilities that are to remain active have been excluded from the deep excavation area or will have a maximum of 1 foot of impacted material excavated from the overburden. As shown on Figure 1, the northern edge and a portion of the eastern edge are identified as areas requiring excavation of 1 foot of soil/gravel or asphalt and road base, as applicable, in order to protect the drinking water and fire line utilities that will remain active. The storm sewer along the northern side and the northwest corner will also remain in service. Excavation will proceed with caution.

4.2 High Nitrate Tank

The High Nitrate Tank is illustrated in Figures 3 and 4. Following the removal of the High Nitrate Tank and containment wall by D&D, the concrete pad and sump were broken into manageable pieces that meet the WAC sizing requirements for placement into the OSDF using a hoe-ram. The concrete will be kept wet during breaking to control dust. The concrete and gravel were excavated and disposed at the OSDF. The underlying sand will be scanned with real time instruments to check for above-WAC conditions. If above-WAC material is found, the extent will be determined with real time instruments and sent to Soil Stockpile 7 (SP-7) or to the Waste Pits Remedial Action Project (WPRAP) directly. The preliminary excavation design grade is based on characterization data and involves general excavation of the sand and underlying fill to a depth of approximately 2 to 3 feet to elevation 573. Side slopes along the

perimeter and within the area will be no steeper than 2H:1V. The remaining surface will be both visually inspected for man-made materials and monitored using real-time scanning to determine if additional excavation is required. Excavation in 3 ± 1-foot lifts will be performed with the associated lift scan until all impacted material has been removed. Excavated debris and impacted soil will be disposed in the OSDF if it is below WAC. Surface water collected in this excavation will be pumped or drained to the K-65 Trench following its excavation (see Section 5.0, Surface Water Control).

Utilities within the area that are to remain active have been excluded from the deep excavation area or will have a maximum of 1 foot of impacted material excavated from the overburden. As shown on Figure 1, the western and eastern edges are identified as areas requiring 1-foot excavation of soil/gravel or asphalt and road base, as applicable, in order to protect the fire line and filtrate line utilities, which are remaining active.

Excavation will be limited to within 5 feet of existing power poles #543 and #544, located on the western side of the excavation area, which will remain in place. This dimension may increase or decrease slightly during construction since conditions are continually evaluated as the excavation progresses.

Pole WP114 is currently located along the southern edge of the K-65 Trench excavation area, just north of northeast corner of the High Nitrate Tank footprint. After excavation, this pole will be relocated south within the former High Nitrate Tank footprint in order to reroute the Silos communications line. This will be completed before K-65 Trench excavation.

4.3 K-65 Trench

The K-65 Trench will be removed from approximately 20-feet west of the East Silos Access Road to the east to just west of the Former Production Area near the southeast corner of the Lime Sludge Ponds, as shown on Figure 1. Prior to excavation, D&D will remove the piping within the trench and the metal decking on top of the trench. Based on recent sampling and characterization, the soil-like/sediment residues in the bottom of the trench are above-AC due to elevated levels of technetium-99. In general, this residue, along with the concrete and 1 foot of soil alongside and underlying the concrete, will be excavated for disposal at SP-7 or WPRAP directly. A backhoe using a smooth-edge bucket will remove the bulk of the sediment from the trench. The backhoe will transfer the residues into the bucket of a front end loader, which will in turn dump the excavated material into an articulated truck for hauling and

disposal at SP-7 or WPRAP. Geomembrane will be placed on the ground wherever excavated material is transferred from one vehicle to another to minimize the spread of technetium-99 contamination to adjacent areas. The remaining residues within the trench will be washed from east to west using a power washer. Waste water from this process will be pumped out of the trench at the "sump" location designated on Figure 1, near the Silos Transfer Tanks Building, and be discharged directly or indirectly into the Biodenitrification Surge Lagoon for Advanced Waste Water Treatment (AWWT) Facility Phase II treatment. A concrete plug has been installed in the western portion of the K-65 Trench by the Silos Project near the Transfer Tank Building. The residues in the bottom of the K-65 Trench will be removed from the section of trench extending from the eastern limit of excavation (near the southeast corner of the Lime Sludge Ponds) to the concrete plug near the Transfer Tank Building.

After the sediment is removed, two additional grout plugs will be installed within those portions of the trench that will not be excavated (the eastern portion located near the southeast corner of the Lime Sludge Ponds and the western portion located near the East Silos Access Road) because of its proximity to the Silos Project infrastructure. The concrete foundation and walls will be inspected for soundness before placing the grout plugs. The plugs will have a minimum 2-foot thickness where it is continuous from bottom to top of trench. The remaining portion of the trench will then be filled with gravel or stone. Water collected in this section of the trench will be removed through the existing sump system located near the Transfer Tank Building.

The trench concrete will be broken, excavated, and disposed at SP-7 or WPRAP. The concrete will be kept wet during the trench breaking to control dust and will be sized reduced to meet WAC for WPRAP at SP-7. Approximately 1 foot of underlying soil and along the sidewalls will be excavated and disposed at SP-7 or WPRAP. The sidewalls of the excavation will essentially be vertical until completion of real-time scanning. A safety barricade of construction fence or rope will bound the excavation due to the fall hazard.

The segment of the K-65 Trench which crosses over a main utility corridor located beneath and adjacent to the IMHR will be excavated with extreme caution. A hole will be excavated where the trench and utilities intersect. This hole will be adjacent to, but no deeper than the concrete bottom of, the trench. With the assistance of a spotter, the excavator will lower its bucket until the teeth can be inserted just below the concrete. The excavator will then pull the bucket up and towards the cab to avoid applying

downward pressure on, or contact with, the utilities. There will be no hoe ramming or breaking of the trench concrete by hammering with the excavator bucket. The 1 foot of soil beneath the trench will then be excavated by restricted and hand digging methods.

Soil underlying the approximate 1-foot scrape will be sampled at 50-foot intervals, tested for technetium-99 and scanned with real time instrumentation to check for OSDF above-WAC conditions. If above-WAC material is found, the extent will be determined with real-time instruments and/or physical samples and disposed similarly to the initial soil scrape. Once the above-WAC material has been removed, based on characterization data, excavation will continue to a depth of 10.5 feet from the surface to approximate elevation 566. This excavation will be performed in those portions of the trench between the western grout plug to the east to the first utility crossing, and then from the railroad tracks to the east to the east end of the K-65 Trench removal. The middle portion will not be excavated at this time. The material that meets OSDF WAC will be excavated in lifts and remain consistent with the excavation controls established in the Area 3A/4A Implementation Plan (DOE 2001). Excavation in 3 ± 1-foot lifts will be performed with the associated lift scan until all impacted material has been removed. The depth of excavation is approximated based on sample results from up to 10 feet north and south of the K-65 Trench. This sampling process is described in Section 3.0. Side slopes along the perimeter will be no steeper than 2H:1V. The remaining surface will be both visually inspected for man-made materials and monitored using real-time scanning to determine if additional excavation is required. Except for OSDF above-WAC material, debris and impacted soils will be disposed in the OSDF.

After the removal of the OSDF above-WAC material associated with the K-65 Trench, surface water collected in this excavation will be drained to the east end of the excavation (see Section 5.0, Surface Water Control). The K-65 Trench will generally be excavated to drain eastward towards the discharge location. Care will be taken to assure that the grout plugs installed in the trench will not be damaged.

4.4 Warehouse

The open area west of the IMHR, east of the East Silos Access Road, south of 2nd Street, and north of the K-65 Trench will be excavated to support the construction of the planned K-65 Stabilization Warehouse (Figure 5). This area is split into two separate general excavation areas that are separated by a 1-foot excavation due to shallow utilities (Figure 1). The soil in the northern portion of the area allegedly

contains significant loose fill in some locations that may have to be removed for structural reasons related to the construction of the warehouse. Excavation depths were selected based on characterization data. The northern portion of the footprint involves general excavation of soil and fill material to a depth of approximately 3 feet to elevation 574. The southern portion of the footprint involves general excavation of soil to a depth of approximately 4 feet to elevation 572. Side slopes along the perimeter and within the area will be no steeper than 2H:1V. The remaining surface will be both visually inspected for man-made materials and monitored using real-time scanning to determine if additional excavation is required. Excavation in 3 ± 1-foot lifts will be performed with the associated lift scan until all debris and impacted soil has been removed. Except for OSDF above-WAC material, debris and impacted soil will be disposed in the OSDF. Surface water collected in these excavations will be pumped or drained to the K-65 Trench following its excavation (see Section 5.0, Surface Water Control).

As shown on Figure 1, the eastern edge and a section separating the two general excavations are identified as areas requiring a 1-foot excavation of soil/gravel or asphalt and road base, as applicable, in order to protect utilities that may remain active. The lighting electric line and two overhead lights mounted on poles located along the west edge remain under consideration. If it is decided that they are to remain, the area including 5 feet on either side of the line will be limited to a 1-foot scrape.

4.5 Railroad Embankment

The Track No. 12 railroad embankment, located from 2nd Street southward to the end of the line just north of the Silos Access Road, will be excavated to a depth of approximately 2 to 3 feet below the railroad ballast to elevation 574. This will also bring the grade down near the design elevations for the new railroad spurs supporting Silos Remediation Facility. The easternmost track shown on Figure 1, which runs north south with a slight turn to the east at the south end, is to be removed before excavation work begins. Future tracks to be installed by the Silos Project are also shown on the figure. Side slopes along the perimeter and within the area will be no steeper than 2H:1V. The exposed surface will be both visually inspected for man-made materials and monitored using real-time scanning to determine if additional excavation is required. Excavation in 3 ± 1-foot lifts will be performed with the associated lift scan until all impacted material has been removed. Except for OSDF above-WAC material, debris and impacted soil will be disposed in the OSDF.

The portion of the K-65 Trench located underneath the embankment will be removed in accordance with the aforementioned methodology.

Surface water collected in this excavation will be pumped or drained to the K-65 Trench following its excavation (see Section 5.0, Surface Water Control).

4.6 Impacted Material Haul Road

The asphalt surface and gravel base of the IMHR will be removed from the north edge of the Silos crossing north to the south edge of the 2nd Street crossing, as shown on Figure 1. Excavation is limited to 1 foot in the areas along the shoulders of the road due to the close proximity of multiple utilities remaining in service. No additional excavation is currently planned due to this hazard.

The surface of this area will receive minimal grading in order to drain surface water to ultimately flow to the K-65 Trench following its excavation (see Section 5.0, Surface Water Control).

5.0 SURFACE WATER CONTROL

There is no storm sewer system that drains to the Storm Water Retention Basin in or near the immediate excavation area. As a result, the storm sewer system draining to the OU4 Detention Basin (and subsequently to Paddys Run) will be isolated from the excavation area by excavating in the catch basin areas. Silt fencing will be placed based on best management practices (BMP) and installed in accordance with Ohio Department of Natural Resources, Rainwater and Land Development (ODNR 1996). A dike will be excavated around the existing catch basins to prevent surface water from reaching the stormwater system. Surface water will therefore remain within the low points of the excavation as each excavation progresses towards completion. Although specific design grade elevations are discussed above, these elevations will reflect the minimum depth of excavation in each area. Excavations will be gradually graded to force surface water from all directions towards the excavated K-65 Trench. The K-65 Trench excavation will be sloped towards the east where the water will be pumped into a nearby hose connector located above the surface at the southeast corner of the Lime Sludge Ponds. This hose connector directs water underground to manhole MH168 through a 6-inch storm sewer line for subsequent AWWT Phase I treatment via the Storm Water Retention Basin.

The culvert located in the southeast of the Remediation Facility area will be blocked by placing a sheet of plywood over the opening and staking it firmly into place. The bottom of the plywood will be buried lower than the invert of the culvert. To the north, the Remediation Facility area is isolated from the K-65 Trench due to the planned excavation depth and the remaining utilities in the northeast corner. A small trench may be hand dug across the utilities to allow placement of a temporary culvert to direct flow from the area into the K-65 Trench and to minimize pumping. Sequencing requires the IMHR to remain active following the excavation of the K-65 Trench; therefore, a temporary culvert will be placed within the K-65 Trench and backfilled with gravel or stone. Because of the excavation depth on either side of the utilities within the K-65 Trench, water will pond on the western side of the utilities before reaching the height of the temporary culvert. If the area needs to be completely drained, pumping will be required. The remaining remediation areas can be graded towards the K-65 Trench without the need for overcoming these kinds of obstacles.

This surface water control strategy depends on excavating the K-65 Trench in a timely manner before significant excavation occurs. It will be necessary to hold surface water until completion of the K-65 Trench excavation.

6.0 DUST CONTROL

Dust will be controlled using standard methods deployed in other on-site remedial excavation projects (e.g., keeping concrete wet when breaking or size reducing, and using water trucks in excavation areas and along haul routes to keep ground surface damp).

7.0 EXCAVATION SEQUENCING

The current plan is to remediate Area 7 and the Lime Sludge Ponds simultaneously. Excavation will be performed by using multiple crews in multiple work areas. Excavation is planned to begin in the Warehouse area and proceed to the High Nitrate Tank area. The K-65 Trench will be excavated simultaneously with these areas since the trench contains the highest concentrations of contamination within the remediation area and is required to establish drainage eastward towards the hose connector discharge location. A culvert will be placed in the K-65 Trench at its intersection with the IMHR and backfilled with gravel or stone to maintain use of the IMHR. The Remediation Facility area will be excavated next. The Railroad will be excavated from south to north in order to utilize the IMHR. Finally, the IMHR will be removed from south to north to complete the remediation. This sequence may

be altered due to material needs at the OSDF or as required by the Construction Manager with approval from U.S. Environmental Protection Agency and Ohio Environmental Protection Agency for efficient utilization of craft personnel.

8.0 RESTORATION

No restoration seeding will take place within the work zone as this area will be turned over almost immediately to the Silos Project to begin the construction of the K-65 Remediation Facility, warehouse, rail spurs, and other associated support structures. This document does not address surface water, erosion, or dust controls associated with the construction of the K-65 Remediation Facility and associated support structures.

9.0 REFERENCES

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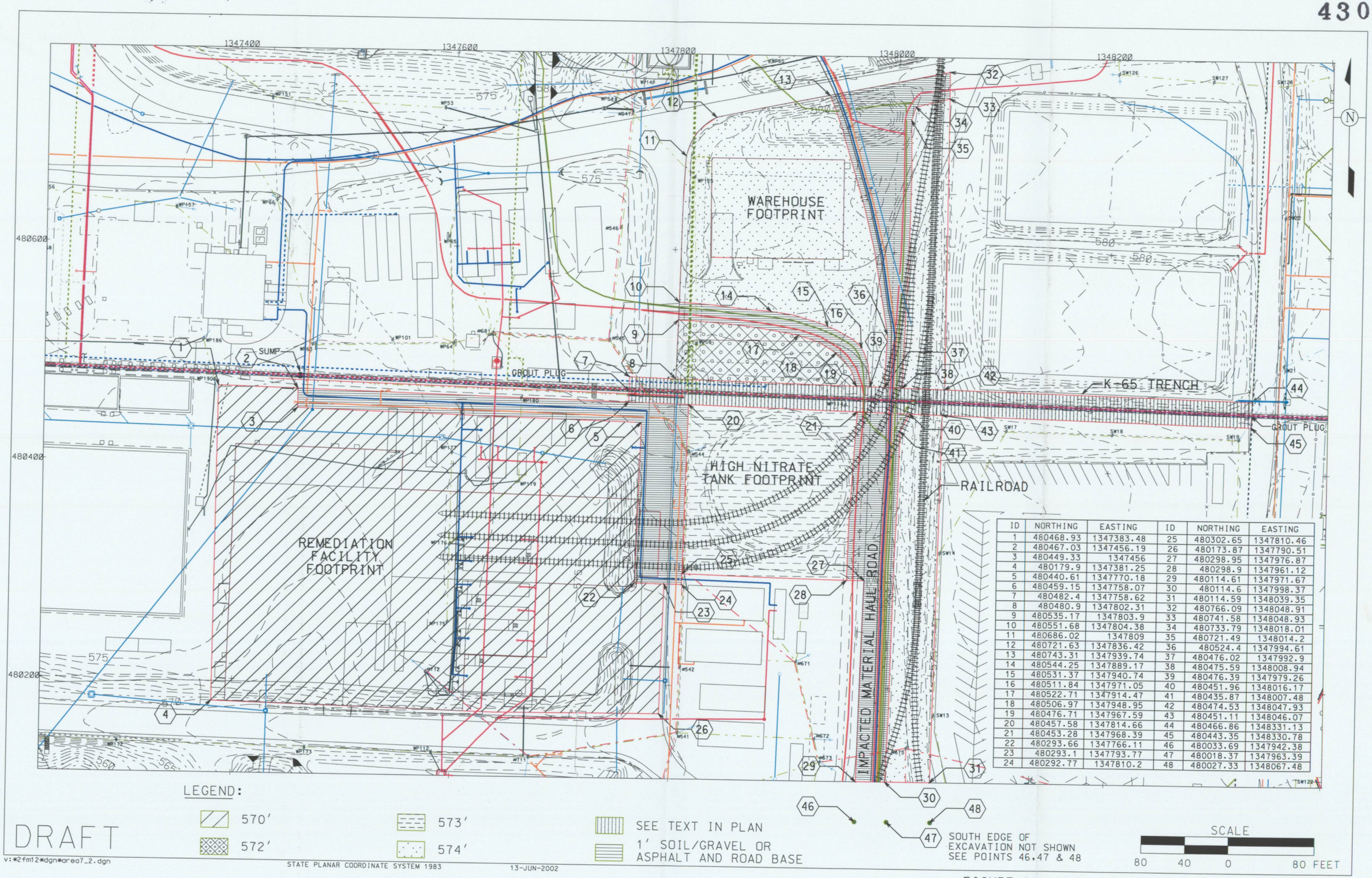
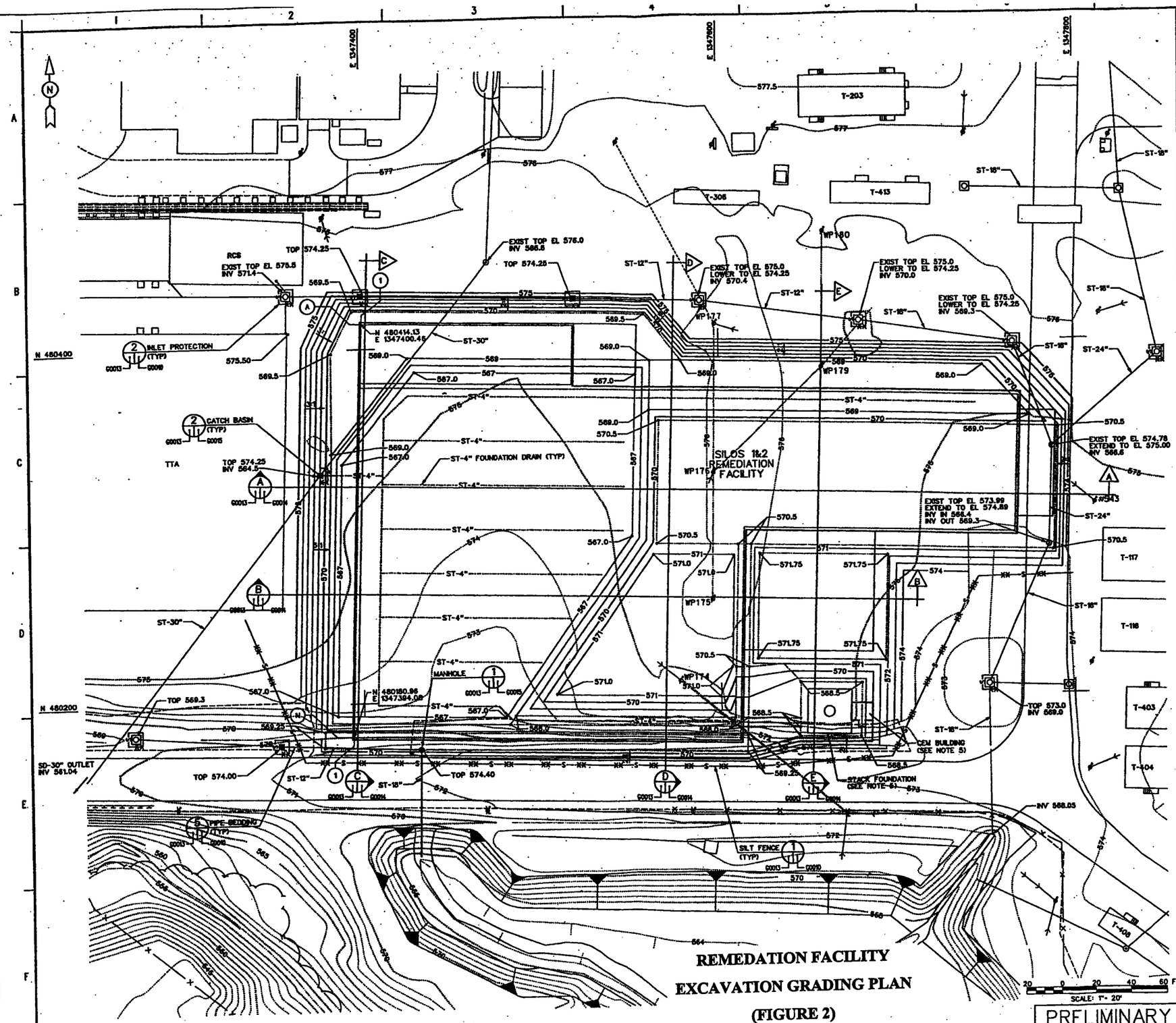


ID	NORTHING	EASTING	ID	NORTHING	EASTING
1	480468.93	1347383.48	25	480302.65	1347810.46
2	480467.03	1347456.19	26	480173.87	1347790.51
3	480449.33	1347456	27	480298.95	1347976.87
4	480179.9	1347381.25	28	480298.9	1347961.12
5	480440.61	1347770.18	29	480114.61	1347971.67
6	480459.15	1347758.07	30	480114.6	1347998.37
7	480482.4	1347758.62	31	480114.59	1348039.35
8	480480.9	1347802.31	32	480766.09	1348048.91
9	480535.17	1347803.9	33	480741.58	1348048.93
10	480551.68	1347804.38	34	480733.79	1348018.01
11	480686.02	1347809	35	480721.49	1348014.2
12	480721.63	1347836.42	36	480524.4	1347994.61
13	480743.31	1347939.74	37	480476.02	1347992.9
14	480544.25	1347889.17	38	480475.59	1348008.94
15	480531.37	1347940.74	39	480476.39	1347979.26
16	480511.84	1347971.05	40	480451.96	1348016.17
17	480522.71	1347914.47	41	480435.87	1348007.48
18	480506.97	1347948.95	42	480474.53	1348047.93
19	480476.71	1347967.59	43	480451.11	1348046.07
20	480457.58	1347814.66	44	480466.86	1348331.13
21	480453.28	1347968.39	45	480443.35	1348330.78
22	480293.66	1347766.11	46	480033.69	1347942.38
23	480293.1	1347793.77	47	480018.37	1347963.39
24	480292.77	1347810.2	48	480027.33	1348067.48

FIGURE 1. AREA 7 EXCAVATION LAYOUT (PHASE I)



REMEDATION FACILITY

EXCAVATION GRADING PLAN

(FIGURE 2)

PRELIMINARY
NOT FOR CONSTRUCTION

NOTES:

1. FOR GENERAL NOTES, LEGEND, UTILITY DESIGNATIONS AND EXCAVATION NOTES, SEE SHEET G0012.
2. SILT FENCE LOCATIONS SHOWN ARE APPROXIMATE. ADD ADDITIONAL SILT FENCE AND/OR ADJUST LOCATIONS AS NECESSARY TO MEET FIELD CONDITIONS.
3. PROTECT ALL EXISTING UTILITIES TO REMAIN FROM DAMAGE DURING EXCAVATION ACTIVITIES.
4. ALL SIDE SLOPES SHALL BE 4:1 UNLESS NOTED OTHERWISE.
5. STACK FOUNDATION AND CEM BUILDING LOCATION ARE ON HOLD.

4308

REF DWG NO.	DRAWING TITLE

REV. NO.	REVISION PURPOSE - DESCRIPTION	DATE	REV. BY	APPR.
A	ISSUED FOR REVIEW	04/15/02		

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
JACOBS

PROJECT NAME
SILOS 1 AND 2

DRAWING TITLE
CIVIL
REMEDIATION FACILITY FOUNDATION EXCAVATION
GRADING, DRAINAGE AND EROSION CONTROL PLAN

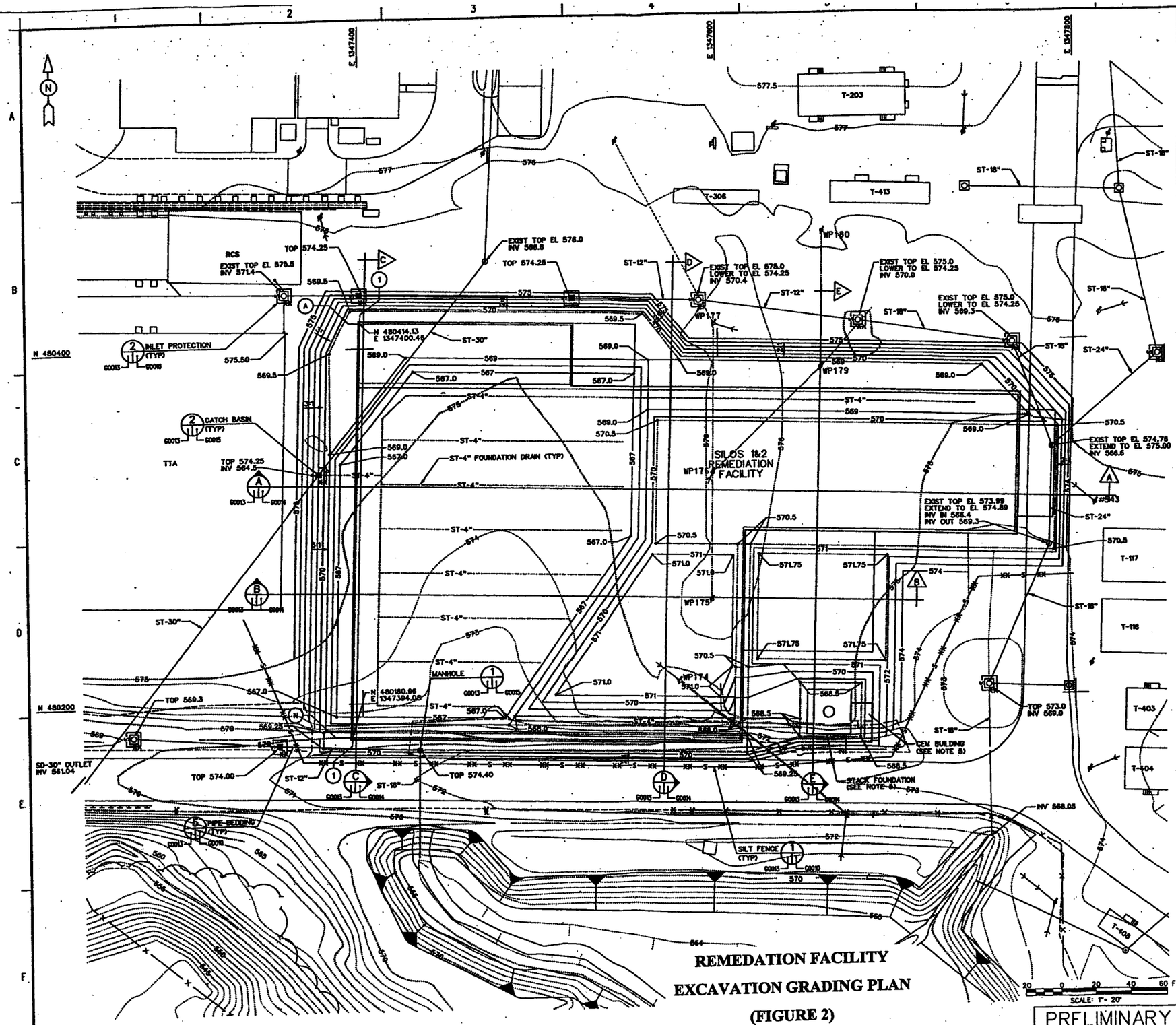
SCALE 1"=20'

T.A. NUMBER	PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
N/A	40750	94X-3900-G-01376	G0013	A

JOB INDEXT NO. 35H19603 FILENAME 94X01376.DGN

DATED 04/15/02
TIME: 03:36:41 PM
USER: KAKing
DESIGN FILE: k:\civil\drawings\94X01376.dgn

000017



REMEDATION FACILITY

EXCAVATION GRADING PLAN

(FIGURE 2)

PRELIMINARY
NOT FOR CONSTRUCTION

NOTES:

1. FOR GENERAL NOTES, LEGEND, UTILITY DESIGNATIONS AND EXCAVATION NOTES, SEE SHEET G0012.
2. SILT FENCE LOCATIONS SHOWN ARE APPROXIMATE. ADD ADDITIONAL SILT FENCE AND/OR ADJUST LOCATIONS AS NECESSARY TO MEET FIELD CONDITIONS.
3. PROTECT ALL EXISTING UTILITIES TO REMAIN FROM DAMAGE DURING EXCAVATION ACTIVITIES.
4. ALL SIDE SLOPES SHALL BE 4:1 UNLESS NOTED OTHERWISE.
5. STACK FOUNDATION AND CEM BUILDING LOCATION ARE ON HOLD.

4308

REF DWG NO.	DRAWING TITLE

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	DATE	REV. BY	APPR.
A	ISSUED FOR REVIEW	04/15/02		

UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
JACOBS

PROJECT NAME
SILOS 1 AND 2

DRAWING TITLE
CIVIL
REMEDIATION FACILITY FOUNDATION EXCAVATION
GRADING, DRAINAGE AND EROSION CONTROL PLAN

DRAWN BY: 4/10/02 | DESIGN LEAD: 4/10/02 | CHECKED BY: 4/10/02
PLANT/BLDG NO. | FLOOR | SCALE: 1"=20' | CLASS: U
SUBMITTED FOR 30% ISSUE | SUBMITTED FOR 60% ISSUE | SUBMITTED FOR 90% ISSUE
TECH LEAD | DATE

T.O. NUMBER: N/A | PROJECT NO.: 40750 | DRAWING INDEX CODE NO.: 94X-3900-G-01376 | SHEET NO.: G0013 | REV. NO.: A
JOB PROJECT NO.: 35H19603 | FILENAME: 94XG1376.DGN

DATE: 04/15/02 TIME: 03:34:47 PM | USER: EAKING | DESIGN FILE: I:\CIVIL\Drawings\94XG1376.dgn

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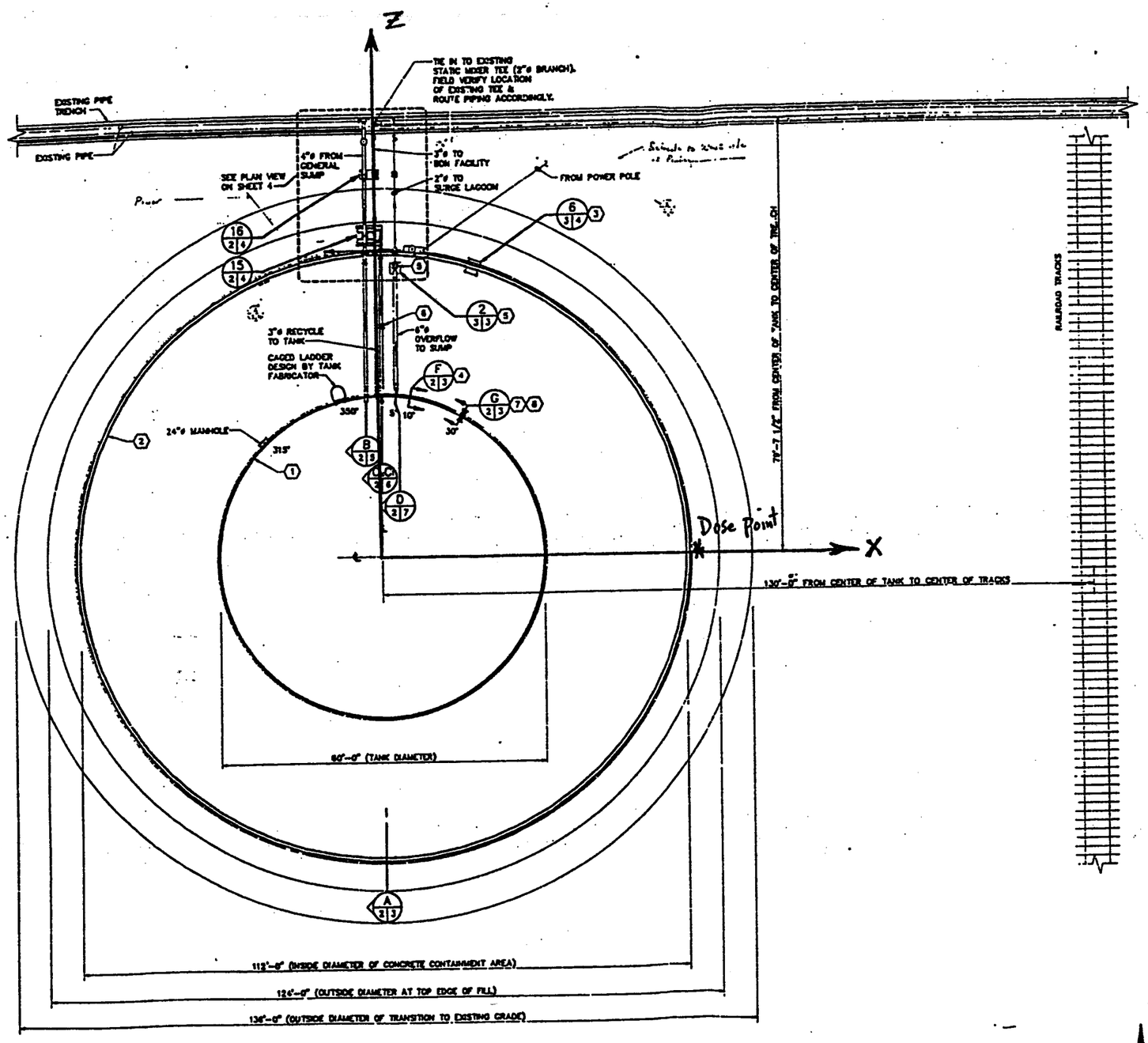
Caution 4146-56-01
Attachment 2
SKD 1 of 1

4308



PLAN (60'ø x 24' HIGH STEEL TANK AND CONCRETE CONTAINMENT AREA)
1/8"=1'-0"

DO NOT SCALE REDUCED DRAWING

DRAWING NOTES:

1. 60'-0" DIAMETER x 24'-0" HIGH ABOVE GROUND, OPEN-TOP, 666,000 GALLON STEEL TANK TO RECEIVE HIGH NITRA-S CONCENTRATION WASTEWATER FROM THE FMPC GENERAL SUMP.
2. 112'-0" I.D. x 8'-0" HIGH ABOVE GROUND REINFORCED LEAK-TIGHT CONCRETE CONTAINMENT STRUCTURE.
3. ACCESS LADDER INTO CONTAINMENT AREA. FOR DETAIL OF LADDER SEE SHEET 4, DETAIL 5.
4. 1" DIA. COUPLING WITH PLUG USED AS A DRAIN FOR EASE OF CLEANING TANK. SEE SHEET 3, DETAIL 10.
5. CONTAINMENT AREA SUMP PUMP. ZOELLER PUMP MODEL 184, 2 H.P.
6. 4" DIA. EXPANSION JOINT. GENERAL RUBBER CORP. STYLE 1015 MARJ-JOINT OR APPROVED EQUAL.
7. 10" DIA. OUTSIDE FLANGED NOZZLE.
8. 6" DIA. INSIDE AND OUTSIDE FLANGED NOZZLE.

HIGH NITRATE TANK
PLAN VIEW
(FIGURE 3)

NO.	REVISIONS	DATE
1 S	[illegible]	
C	CFG	5/6/89
B	FINAL APPROVAL	5/89
A	100% DESIGN REVIEW	4/89

SHEET TITLE: PARTIAL SITE PLAN

DANIS

QSOURCE ENGINEERING, INC.

HIGH NITRATE STORAGE TANK FOR BIODENITRIFICATION PROCESS

DWN: D.R.H. DATE: 3/89 NO. 2
DSGN: K.S.K. PROJ NO: 86316 OF 10
CKD: K.V.K. PROJ S/C NO: 350

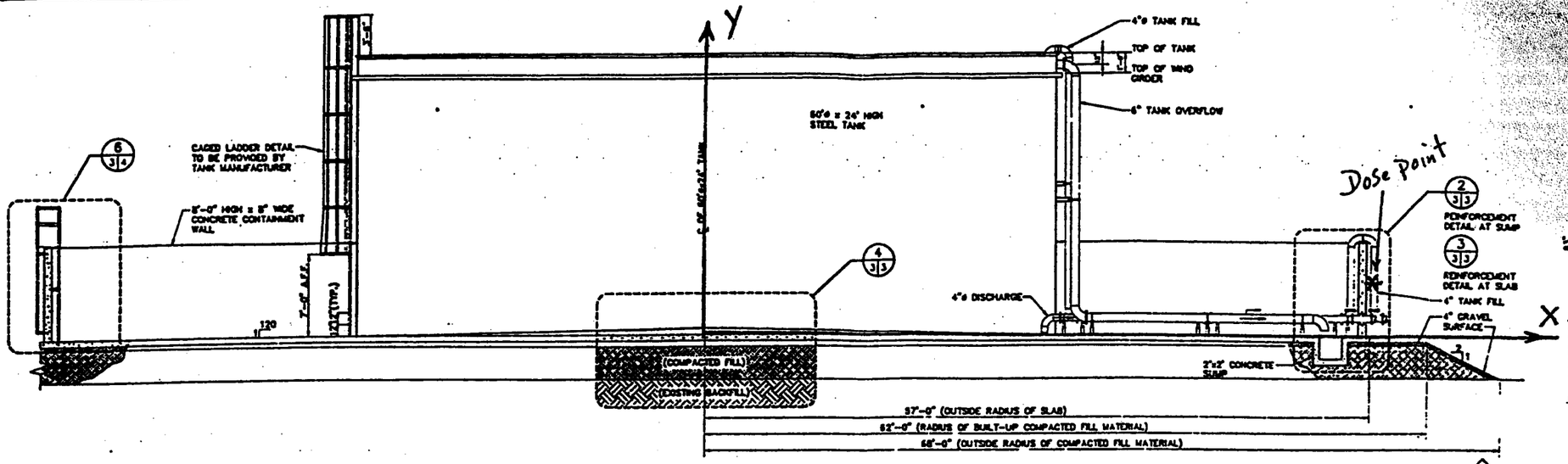
UNITED STATES DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER

SUBMITTED: [illegible] DATE
CHIEF APPROVAL: [illegible] DATE
ISSUED FOR CONSTRUCT: [illegible] DATE
PROJ PROJECT NO: 10 [illegible] 1 2 [illegible]
DWG NO: 18A-E600-00976

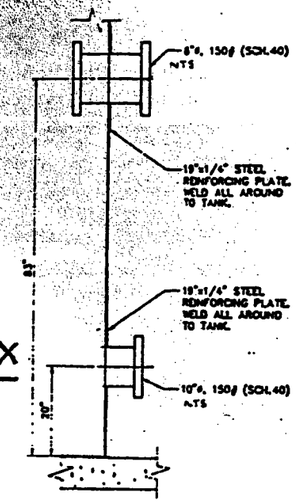
00018

ATTACHMENT 1
SHT 1 of 1
CALCULATION 4146-56-01

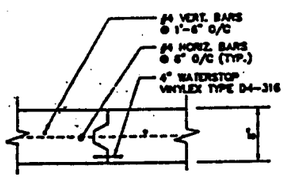
4308



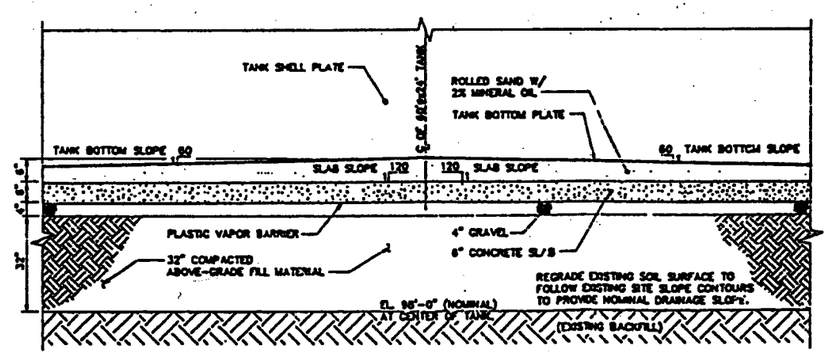
SECTION (TANK AND CONTAINMENT AREA) (LOOKING WEST)
1/4"=1'-0" A 2|3



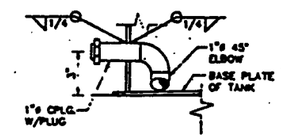
DETAIL (KEYWAY)
1 1/2"=1'-0" G 2|3



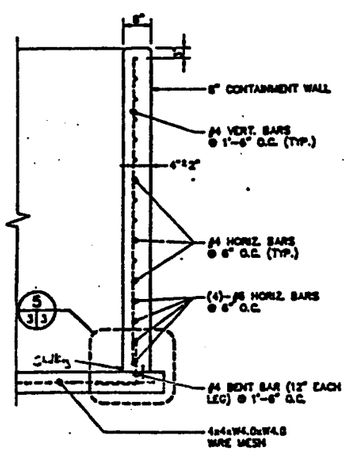
DETAIL (VERTICLE WALL JOINT)
1 1/2"=1'-0" E 3|3



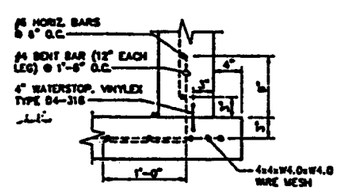
DETAIL (FOUNDATION SECTION VIEW AT CENTER OF TANK)
3/4"=1'-0" 4 3|3



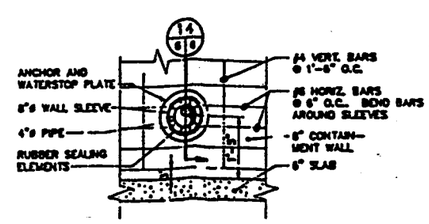
DETAIL
1 1/2"=1'-0" F 2|3



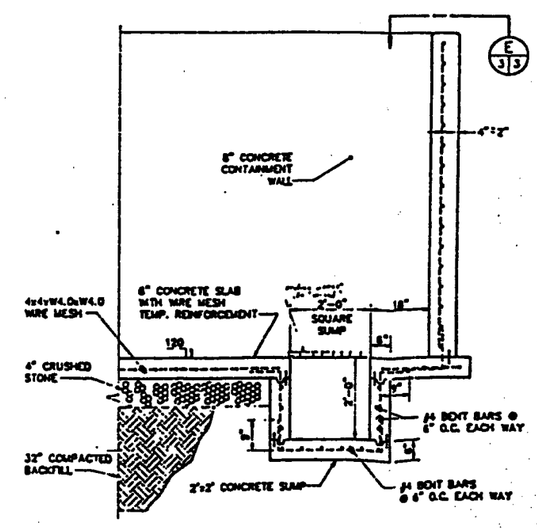
DETAIL (CONCRETE REINFORCEMENT DETAIL AT SLAB)
3/4"=1'-0" 3 3|3



DETAIL (WATERSTOP DETAIL)
1 1/2"=1'-0" 5 3|3



DETAIL (PIPE SLEEVE THRU WALL)
3/4"=1'-0" 8 3|3



DETAIL (CONCRETE REINFORCEMENT DETAIL AT SUMP)
3/4"=1'-0" 2 3|3

DO NOT SCALE REDUCED DRAWING

HIGH NITRATE TANK PROFILE (FIGURE 4)

2		
1	CPC	
B	IWM APPROVAL	
A	90% DESIGN REVIEW	
0	CPC-TANK FOUNDATION SUBGRADE CHG	
REV.	REVISIONS	DATE

SHEET TITLE: SECTION & DETAILS

DANIS

QSOURCE

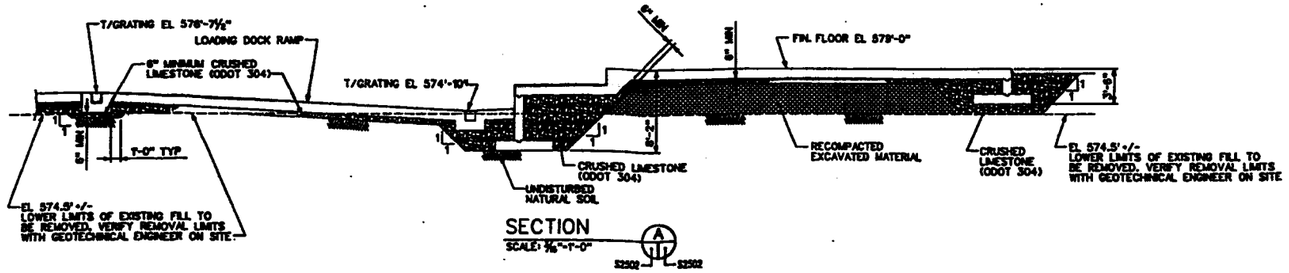
HIGH NITRATE STORAGE TANK FOR BIODENITRIFICATION PROCESS

DWG D.R.H. DATE 3/90 NO. 3
SCRN K.M.K. PROJ NO. 88318 OF 10
CHK K.M.K. PLOT S/E NO. 350

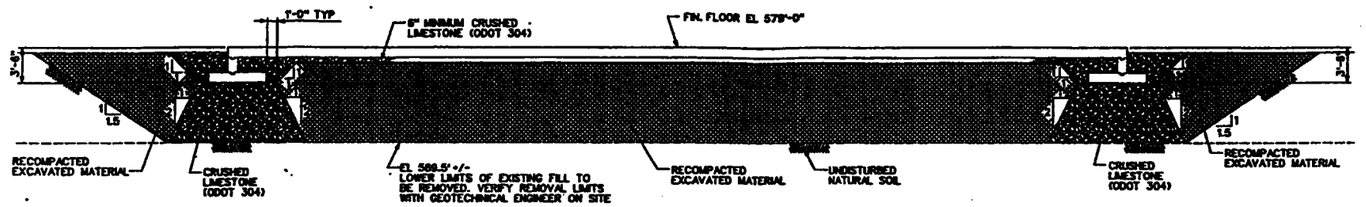
UNITED STATES DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER

IRA-5005-00977

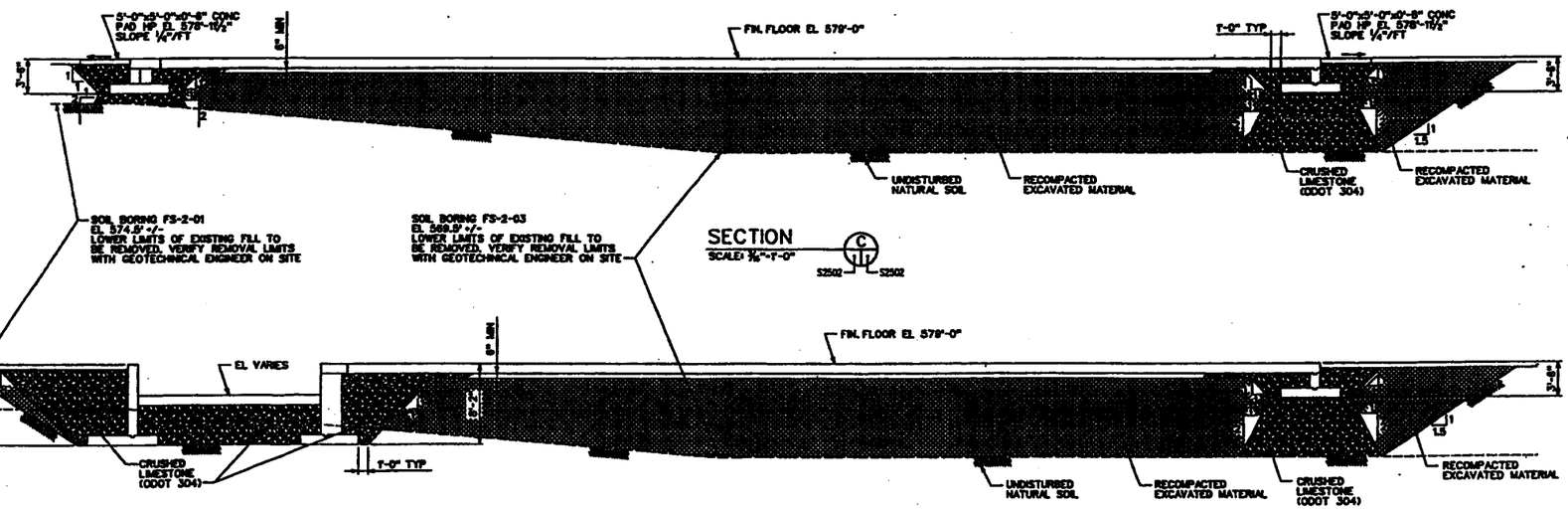
000019



SECTION A
SCALE: 3/16"=1'-0"
S2502 S2502

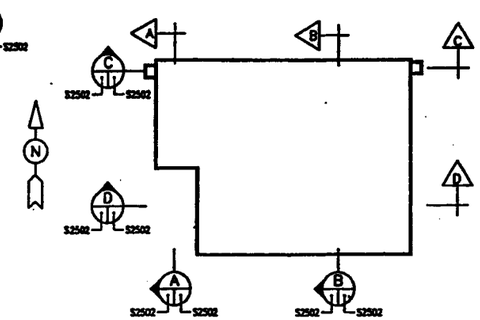


SECTION B
SCALE: 3/16"=1'-0"
S2502 S2502

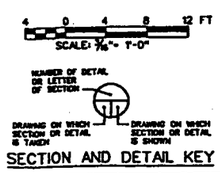


SECTION C
SCALE: 3/16"=1'-0"
S2502 S2502

SECTION D
SCALE: 3/16"=1'-0"
S2502 S2502



BUILDING PLAN (SECTION KEY)



SECTION AND DETAIL KEY

NOTES:

4308

1. SEE SHEET S2500 FOR FOUNDATION PLAN AND GENERAL NOTES.
2. EXCAVATION AND BACKFILL INFORMATION SHOWN ON THIS DRAWING IS INTENDED TO CLARIFY RECOMMENDATIONS IN THE FOLLOWING REPORT:

   GEOTECHNICAL ENGINEERING INVESTIGATION
   PROPOSED WAREHOUSE - SILOS 1 AND 2
   FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
   HAMILTON COUNTY, OHIO
   ATC PROJECT NO. 72.58679.0022 (SITE 2)

   NOTIFY GEOTECHNICAL ENGINEER IMMEDIATELY FOR ANY CLARIFICATIONS OR DISCREPANCIES BETWEEN INFORMATION ON THIS DRAWING AND THE GEOTECHNICAL ENGINEERING INVESTIGATION.
3. EXCAVATED MATERIAL APPROVED FOR REUSE AS RECOMPACTED EXCAVATED MATERIAL BENEATH THE FLOOR SLAB MUST BE STOCKPILED AT AN APPROVED LOCATION ON SITE. ONLY MATERIAL APPROVED BY THE GEOTECHNICAL ENGINEER ON SITE SHALL BE USED AS RECOMPACTED EXCAVATED MATERIAL. ALL PLACEMENT AND COMPACTION PROCEDURES SHALL BE IN CONFORMANCE WITH DIRECTION PROVIDED BY GEOTECHNICAL ENGINEER AND UNDER THE SUPERVISION OF THE GEOTECHNICAL ENGINEER.
4. ENGINEERED FILL CONSISTING OF ODOT 304 CRUSHED LIMESTONE MAY BE USED AS BACKFILL IN LIEU OF RECOMPACTED EXCAVATED MATERIAL.
5. RECOMPACTED EXCAVATED MATERIAL MAY BE USED IN LIEU OF ODOT 304 CRUSHED LIMESTONE WHEN APPROVED BY THE GEOTECHNICAL ENGINEER.

REF DWG NO.	DRAWING TITLE
S2500	FOUNDATION PLAN

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	DATE	REV. BY	APPR.
0	ISSUED FOR BID	02/15/02		

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
JACOBS

PROJECT NAME
SILOS 1 AND 2

WAREHOUSE DESIGN
FIGURE 5

SCALE: 3/16"=1'-0"
U

T.D. NUMBER	PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
N/A	40750	94X-3900-S-01475	S2502	0

JOB PROJECT NO. 35H19603 FILENAME 94X3H475.DGN

DATE: 02/20/02
TIME: 07:08:46 AM
USER: SSchorfe
DESIGN FILE: I:\STRU\Warehouse\94X3H475.dgn

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APPENDIX A

CHARACTERIZATION DATA AND FIGURES

TABLE A-1
K-65 TRENCH SILT RESULTS

ASCOC	A7-K65T-S-1	A7-K65T-S-2	A7-K65T-S-3	A7-K65T-S-4	A7-K65T-S-5	A7-K65T-S-6	A7-K65T-S-7	A7-K65T-S-8
ARSENIC (mg/kg)	**53.2**	**14.6**	**15.6**	11.1	**17.4**	8.12	10.2	8.61
BARIUM (mg/kg)	1720	302	236	178	772	81.6	147	302
CADMIUM (mg/kg)	3.34	1.41	1.27	1.32	3.02	1.04	1.19	1.37
CHROMIUM (mg/kg)	54.4	31.8	28.4	29.0	49.6	23.3	28.3	36.2
LEAD (mg/kg)	22.2	50.1	50.3	48.4	38.6	41.8	68.7	58.0
RADIUM 226 (pCi/g)	**22**	**9.6**	**7.8**	**6.9**	**13**	**3.9**	**6.4**	**6.1**
SELENIUM (mg/kg)	3.18	< 1.05	< 2.06	0.99	< 1.07	1.30	1.21	< 1.00
SILVER (mg/kg)	1.63	0.38	0.23	0.29	1.61	0.17	< 0.17	0.26
TECHNETIUM 99 (pCi/g)	**470**	**590**	**340**	**220**	**120**	**320**	**570**	**460**
THORIUM 228 (pCi/g)	**18**	**5.5**	**4.1**	**3.1**	**4.6**	1.7	**2.4**	**4.5**
THORIUM 230 (pCi/g)	18	39	35	32	24	20	33	53
THORIUM 232 (pCi/g)	1.4	**3.8**	**2.5**	**2.3**	**1.8**	1.3	1.5	**2.5**
URANIUM (ug/g)	**553**	**125**	**87.9**	**99.5**	**281**	58.9	73.5	**87.1**

ASCOC	A7-K65T-S-9	A7-K65T-S-10	A7-K65T-S-11	A7-K65T-S-12	A7-K65T-S-13	A7-K65T-S-14	A7-K65T-S-15
ARSENIC (mg/kg)	7.01	5.21	7.35	5.24	8.30	6.45	3.01
BARIUM (mg/kg)	101	110	397	88.0	101	51.8	39.8
CADMIUM (mg/kg)	0.78	0.59	3.25	1.02	2.16	1.13	0.46
CHROMIUM (mg/kg)	19.0	21.6	63.6	23.6	47.6	29.2	15.4
LEAD (mg/kg)	37.1	21.4	64.2	52.4	156	96.4	28.7
RADIUM 226 (pCi/g)	**3.6**	1.2	**7.5**	**4.3**	**5.6**	**3.3**	0.88
SELENIUM (mg/kg)	< 1.03	2.23	< 1.03	< 0.99	< 1.06	< 1.95	< 1.05
SILVER (mg/kg)	< 0.17	0.20	0.37	< 0.17	< 0.17	< 0.17	0.18
TECHNETIUM 99 (pCi/g)	**43**	**31**	**95**	22	**33**	3.1	< 1.6
THORIUM 228 (pCi/g)	**1.9**	0.52	**2.3**	1.4	1.6	0.90	0.62
THORIUM 230 (pCi/g)	26	2.2	25	14	26	9.7	2.9
THORIUM 232 (pCi/g)	**2.2**	0.40	1.0	1.2	1.5	0.66	0.58
URANIUM (ug/g)	30.8	16.7	73.3	42.4	**88.9**	32.8	17.8

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TABLE A-2
AREA F RESULTS

ASCOC	A7-F1	A7-F1 (4')	A7-F2	A7-F3	A7-F5	A7-F6	A7-F6 (4')	A7-F7	A7-F8	A7-F9
AROCLOR 1254 (ug/kg)	< 38	< 40	< 38	< 40	< 38	< 39	< 39	< 41	< 39	< 40
AROCLOR 1260 (ug/kg)	< 38	< 40	< 38	< 40	< 38	< 39	< 39	< 41	< 39	< 40
ARSENIC (mg/kg)	10.9	11.3	8.38	4.54	6.29	8.92	8.24	7.80	3.84	**17.6**
BERYLLIUM (mg/kg)	< 0.022	< 0.021	< 0.02	0.05	< 0.021	0.029	0.25	0.33	< 0.022	1.16
BORON (mg/kg)	< 1.10	< 1.06	< 1.02	< 1.04	< 1.07	< 1.10	2.23	8.64	< 1.10	< 1.12
CESIUM 137 (pCi/g)	< 0.063	< 0.059	< 0.060	0.100	< 0.039	< 0.040	< 0.049	< 0.044	< 0.048	< 0.064
LEAD (mg/kg)	15.0	19.6	24.4	19.1	7.93	21.2	20.8	19.3	18.7	46.5
MANGANESE (mg/kg)	459	857	1630	325	382	235	756	392	298	1470
MERCURY (mg/kg)	0.025	0.023	0.014	0.021	0.014	0.010	0.027	0.016	< 0.007	0.014
RADIUM 226 (pCi/g)	1.04	1.33	1.28	1.44	0.763	1.46	1.32	1.09	1.54	**1.73**
RADIUM 228 (pCi/g)	0.896	1.08	1.06	1.08	0.508	1.15	0.921	0.943	1.14	1.29
TECHNETIUM 99 (pCi/g)	< 1.5	< 1.9	< 1.7	< 1.9	< 1.7	< 1.9	< 1.6	< 1.8	< 1.7	< 2.0
THORIUM 228 (pCi/g)	0.889	1.06	1.05	1.04	0.479	1.12	0.891	0.938	1.11	1.27
THORIUM 230 (pCi/g)	< 18.9	< 22.2	< 21.1	< 22.6	< 19.8	< 23.0	< 20.6	< 21.9	< 23.8	< 25.5
THORIUM 232 (pCi/g)	0.896	1.05	1.06	1.08	0.508	1.15	0.921	0.943	1.14	1.29
URANIUM (ug/g)	4.20	4.23	4.03	11.6	3.81	4.72	3.52	< 2.60	5.45	4.87

4308

ASCOC	A7-F10	A7-F12	A7-F13	A7-F14	A7-F14 (4')	A7-F15	A7-F15 (4')	A7-F17	A7-F18	A7-F19	A7-F20
AROCLOR 1254 (ug/kg)	< 41	< 41	< 41	< 38	< 40	< 39	< 39	< 42	< 40	< 39	< 39
AROCLOR 1260 (ug/kg)	< 41	< 41	< 41	< 38	< 40	< 39	7	< 42	< 40	< 39	< 39
ARSENIC (mg/kg)	10.8	10.2	**18.4**	4.46	**12.8**	8.81	8.26	**13.0**	8.69	7.23	9.53
BERYLLIUM (mg/kg)	0.30	0.15	0.19	< 0.020	0.21	0.36	0.17	< 0.022	0.50	0.38	0.38
BORON (mg/kg)	3.29	< 1.15	< 1.11	< 1.01	< 1.16	2.76	1.73	< 1.12	< 1.14	< 1.13	4.43
CESIUM 137 (pCi/g)	< 0.033	< 0.063	< 0.040	< 0.033	< 0.041	< 0.059	< 0.053	< 0.046	< 0.058	< 0.037	< 0.045
LEAD (mg/kg)	19.3	23.3	24.2	6.51	17.4	17.8	14.0	27.1	24.6	24.9	20.9
MANGANESE (mg/kg)	540	465	696	209	321	531	306	1090	564	358	508
MERCURY (mg/kg)	0.020	0.024	0.061	< 0.006	0.032	0.019	0.024	0.037	0.035	0.022	0.025
RADIUM 226 (pCi/g)	1.02	1.52	1.43	0.818	1.24	1.11	1.07	1.42	1.51	1.32	1.04
RADIUM 228 (pCi/g)	0.802	1.16	1.18	0.461	1.01	0.891	0.794	1.10	1.14	1.10	0.889
TECHNETIUM 99 (pCi/g)	< 1.7	< 1.7	< 1.5	< 1.8	< 1.7	< 1.8	< 1.9	< 1.7	< 1.8	< 1.6	< 1.7
THORIUM 228 (pCi/g)	0.795	1.13	1.14	0.447	0.987	0.870	0.773	1.07	1.11	1.05	0.882
THORIUM 230 (pCi/g)	< 18.9	< 22.7	< 22.9	< 16.6	< 21.5	< 21.5	< 21.0	< 22.5	< 20.8	< 22.5	< 19.7
THORIUM 232 (pCi/g)	0.802	1.16	1.18	0.461	1.01	0.891	0.794	1.10	1.14	1.10	0.889
URANIUM (ug/g)	3.96	3.94	2.97	< 1.95	3.79	< 2.55	3.75	2.63	3.48	3.59	< 2.35

Note: Depths are at 3' unless otherwise noted

TABLE A-3
AREA E RESULTS

ASCOC	A7-E1	A7-E2	A7-E3	A7-E4	A7-E5	A7-E6	A7-E7	A7-E10	A7-E11
ARSENIC (mg/kg)	5.10	8.90	**15.4**	5.36	11.2	**13.2**	7.27	7.65	3.69
BERYLLIUM (mg/kg)	0.17	0.39	0.091	0.19	0.38	0.69	0.079	0.34	0.081
BORON (mg/kg)	< 1.11	< 1.15	< 1.19	< 1.12	< 1.01	< 1.17	< 1.01	< 1.06	< 1.11
CESIUM 137 (pCi/g)	< 0.040	< 0.057	< 0.062	< 0.023	< 0.050	< 0.058	< 0.037	< 0.050	< 0.052
LEAD (mg/kg)	19.2	19.8	22.4	19.2	31.0	31.1	17.2	20.2	21.5
MANGANESE (mg/kg)	354	273	277	265	684	990	647	813	250
MERCURY (mg/kg)	0.026	0.034	0.054	0.073	0.044	0.059	0.047	0.042	0.035
RADIUM 226 (pCi/g)	1.24	1.39	1.46	1.27	1.12	1.54	1.31	1.46	1.23
RADIUM 228 (pCi/g)	0.963	1.08	1.20	0.976	0.832	1.16	0.940	1.14	1.00
TECHNETIUM 99 (pCi/g)	7.1	20	2.3	4.8	< 1.8	< 1.9	< 1.7	< 1.9	< 1.8
THORIUM 228 (pCi/g)	0.918	1.08	1.18	0.937	0.821	1.16	0.903	1.12	1.03
THORIUM 230 (pCi/g)	< 20.9	< 21.8	< 22.8	< 21.2	< 20.1	< 23.5	< 20.3	< 22.8	< 21.1
THORIUM 232 (pCi/g)	0.963	1.08	1.20	0.976	0.832	1.16	0.940	1.14	1.00
URANIUM (ug/g)	3.48	3.07	5.22	2.54	7.05	4.50	6.79	4.19	< 2.54

ASCOC	A7-E13	A7-E14	A7-E16	A7-E16 (4.5')	A7-E18	A7-E20	A7-E21	A7-E22	A7-E22 (4.5')	A7-E23
ARSENIC (mg/kg)	8.07	4.62	7.46	8.76	10.1	10.6	5.80	2.86	2.83	6.20
BERYLLIUM (mg/kg)	0.25	0.099	0.17	< 0.020	0.35	< 0.021	0.29	0.13	0.24	0.13
BORON (mg/kg)	< 1.03	< 1.01	< 1.09	< 1.02	< 1.12	< 1.08	< 1.11	< 1.04	< 1.23	< 1.06
CESIUM 137 (pCi/g)	< 0.041	< 0.045	< 0.067	< 0.055	< 0.045	0.046	< 0.064	< 0.038	< 0.038	< 0.048
LEAD (mg/kg)	23.0	20.1	23.8	20.2	25.1	24.9	23.2	24.5	25.1	20.9
MANGANESE (mg/kg)	513	235	682	402	504	324	958	417	252	386
MERCURY (mg/kg)	0.037	0.036	0.046	0.054	0.044	0.044	0.048	0.042	0.058	0.041
RADIUM 226 (pCi/g)	1.55	1.15	1.69	1.20	1.55	1.48	1.37	1.22	1.47	1.25
RADIUM 228 (pCi/g)	1.07	0.936	1.02	0.843	1.10	1.06	1.07	1.06	1.16	0.874
TECHNETIUM 99 (pCi/g)	3.8	< 1.7	2.4	< 2.0	< 1.9	< 1.7	< 1.8	< 1.9	< 1.9	< 1.8
THORIUM 228 (pCi/g)	1.05	0.911	1.01	0.842	1.06	1.05	1.08	1.03	1.14	0.846
THORIUM 230 (pCi/g)	< 22.4	< 21.0	< 22.5	< 19.4	< 22.9	< 21.7	< 22.1	< 22.1	< 22.8	< 20.9
THORIUM 232 (pCi/g)	1.07	0.936	1.02	0.843	1.10	1.06	1.07	1.06	1.16	0.874
URANIUM (ug/g)	6.41	3.72	6.27	4.47	7.41	4.74	4.54	2.47	4.69	3.97

Note: Depths are at 3' unless otherwise noted

TABLE A-3
AREA E RESULTS

ASCOC	A7-E24	A7-E25	A7-E25 (4')	A7-E26	A7-E26 (3.5')	A7-E27	A7-E28	A7-E28 (3.5')
AROCLOR-1254 (ug/kg)	*	*	*	*	*	*	*	*
AROCLOR-1260 (ug/kg)	*	*	*	*	*	*	*	*
ARSENIC (mg/kg)	5.5	5.6	4	5	8.6	9	10.4	4.6
BERYLLIUM (mg/kg)	0.83	0.56	0.78	0.83	0.97	1.1	0.83	0.48
BORON (mg/kg)	2.4	3	2.7	6.1	2.6	2.2	4.4	1.8
CESIUM 137 (pCi/g)	*	*	*	*	*	*	*	*
LEAD (mg/kg)	14	13	13.4	14.9	17.9	18.3	13.2	11.8
MANGANESE (mg/kg)	607	536	325	670	919	420	373	470
MERCURY (mg/kg)	0.02	0.02	0.04	0.02	0.03	0.03	0.05	0.02
RADIUM 226 (pCi/g)	*	*	*	*	*	*	*	*
RADIUM 228 (pCi/g)	*	*	*	*	*	*	*	*
TECHNETIUM 99 (pCi/g)	0.95	0.24	1.3	0.97	1.1	0.42	1.1	1.6
THORIUM 228 (pCi/g)	*	*	*	*	*	*	*	*
THORIUM 230 (pCi/g)	*	*	*	*	*	*	*	*
THORIUM 232 (pCi/g)	*	*	*	*	*	*	*	*
URANIUM (ug/g)	*	*	*	*	*	*	*	*

Note: Depths are at 3' unless otherwise noted
* Data not available as of 6/10/02.

4308

FIGURE A-4
AREA SURROUNDING K-65 TRENCH RESULTS

ASCOC	A7-K1 (5')	A7-K1 (10')	A7-K2 (5')	A7-K2 (10')	A7-K3 (5')	A7-K3 (10')	A7-K4 (5')	A7-K4 (10')
AROCLOR-1254 (ug/kg)	41	41	42	37	40	41	38	43
AROCLOR-1260 (ug/kg)	41	`41	42	37	40	41	38	43
ARSENIC (mg/kg)	6.7	3.4	7.5	**50.4**	6.1	2.9	8.5	5.8
BERYLLIUM (mg/kg)	0.48	0.48	0.2	0.23	0.54	0.1	0.74	0.87
BORON (mg/kg)	5.4	6.5	5.6	6.2	4.2	3.8	22	27.8
CESIUM 137 (pCi/g)	0	0	0.017	0	0	0	0	0
LEAD (mg/kg)	8.9	8.9	6.2	6	11.3	3.6	12.1	11.3
MANGANESE (mg/kg)	261	317	366	758	347	209	731	394
MERCURY (mg/kg)	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
RADIUM 226 (pCi/g)	0.777	1.13	0.742	0.92	1.12	0.65	1.2	1.18
RADIUM 228 (pCi/g)	0.528	0.785	0.572	0.564	1.05	0.42	0.961	0.913
TECHNETIUM 99 (pCi/g)	1.1	0.81	7	-0.56	4.2	-0.38	0.67	0.25
THORIUM 228 (pCi/g)	0.495	0.777	0.559	0.547	1.03	0.418	0.937	0.921
THORIUM 230 (pCi/g)	0	0	0	0	0	0	0	0
THORIUM 232 (pCi/g)	0.524	0.785	0.572	0.564	1.05	0.42	0.961	0.913
URANIUM (ug/g)	1.7	3.03	5.12	0.706	3.59	3.07	4.81	4.55

ASCOC	A7-K5 (5')	A7-K5 (10')	A7-K6 (5')	A7-K6 (10')	A7-K8 (5')	A7-K8 (10')	A7-K9 (5')	A7-K9 (10')	A7-K10 (5')	A7-K10 (10')
AROCLOR-1254 (ug/kg)	40	41	42	41	38	42	*	*	*	*
AROCLOR-1260 (ug/kg)	40	41	42	41	38	42	*	*	*	*
ARSENIC (mg/kg)	7	4.7	**12.6**	3.4	2.5	6.9	**20.4**	6.8	7.8	5.3
BERYLLIUM (mg/kg)	0.64	0.43	1.2	0.24	0.31	0.54	1.1	0.19	0.75	0.27
BORON (mg/kg)	4.7	5.7	0.96	5.3	5.4	6.4	7.7	9.2	6.2	6
CESIUM 137 (pCi/g)	0	0	0	0	0	0	*	*	*	*
LEAD (mg/kg)	9.7	10.2	18.9	7	4.7	9.5	21.2	4.6	13.1	8
MANGANESE (mg/kg)	245	1040	641	392	229	350	1230	699	523	295
MERCURY (mg/kg)	0.03	0.02	0.06	0.02	0.02	0.02	0.03	0.02	0.02	0.02
RADIUM 226 (pCi/g)	1.12	1.16	**1.71**	0.818	1.09	1.12	*	*	*	*
RADIUM 228 (pCi/g)	0.997	0.954	1.22	0.669	0.939	0.925	*	*	*	*
TECHNETIUM 99 (pCi/g)	1.8	0.51	1.3	1.5	0.93	1.2	1.6	0.54	0.24	0.52
THORIUM 228 (pCi/g)	0.969	0.944	1.18	0.681	0.9	0.899	*	*	*	*
THORIUM 230 (pCi/g)	0	0	0	0	0	0	*	*	*	*
THORIUM 232 (pCi/g)	0.997	0.954	1.22	0.669	0.939	0.925	*	*	*	*
URANIUM (ug/g)	5.64	4.08	2.43	2.14	3.68	2.97	*	*	*	*

* Data not available as of 6/10/02

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FIGURE A-4
AREA SURROUNDING K-65 TRENCH RESULTS

ASCOC	A7-K11 (5')	A7-K11 (10')	A7-K12 (5')	A7-K12 (10')	A7-K13 (5')	A7-K13 (10')	A7-K14 (5')	A7-K14 (10')	A7-K15 (5')	A7-K15 (10')
AROCLOR-1254 (ug/kg)	42	43	*	*	41	41	41	40	42	40
AROCLOR-1260 (ug/kg)	42	43	*	*	41	41	41	40	42	40
ARSENIC (mg/kg)	7.9	**14**	*	*	8.9	10.4	**13.2**	5.5	**13.4**	8.4
BERYLLIUM (mg/kg)	0.62	0.49	*	*	0.9	0.5	0.47	0.41	**1.6**	0.54
BORON (mg/kg)	1.7	2.7	*	*	2.8	7.2	1.2	5.6	1.3	6.3
CESIUM 137 (pCi/g)	0	0	*	*	0	0	0	0	0	0
LEAD (mg/kg)	15.8	10.8	*	*	16.9	9.5	13.4	7.2	23	11.1
MANGANESE (mg/kg)	281	462	*	*	203	272	334	271	2780	634
MERCURY (mg/kg)	0.04	0.02	*	*	0.04	0.03	0.03	0.02	0.05	0.02
RADIUM 226 (pCi/g)	1.21	1.16	*	*	1.38	1.12	1.51	1.05	1.67	1.04
RADIUM 228 (pCi/g)	1.01	0.944	*	*	1.14	0.948	1.27	0.839	1.27	0.884
TECHNETIUM 99 (pCi/g)	1.2	0.88	*	*	-0.39	1	0.52	1.3	1.5	1.2
THORIUM 228 (pCi/g)	0.982	0.944	*	*	1.13	0.94	1.25	0.824	1.25	0.851
THORIUM 230 (pCi/g)	0	0	*	*	0	0	0	0	9.5	0
THORIUM 232 (pCi/g)	1.01	0.944	*	*	1.14	0.948	1.27	0.839	1.27	0.884
URANIUM (ug/g)	3.53	3.34	*	*	4.39	5.44	4.73	1.49	6.47	3.12

ASCOC	A7-K16 (5')	A7-K16 (10')	A7-K17 (5')	A7-K17 (10')	A7-K18 (5')	A7-K18 (10')
AROCLOR-1254 (ug/kg)	41	42	42	40	40	40
AROCLOR-1260 (ug/kg)	41	42	42	40	40	40
ARSENIC (mg/kg)	**53.6**	4.4	6	**14.1**	9.3	5.2
BERYLLIUM (mg/kg)	0.94	0.56	0.79	0.26	0.57	0.36
BORON (mg/kg)	3.3	6.9	2.5	5.6	5.6	6.8
CESIUM 137 (pCi/g)	0	0	0	0	0	0
LEAD (mg/kg)	16.9	9.9	13.7	8.8	12.3	8.9
MANGANESE (mg/kg)	481	449	280	656	242	403
MERCURY (mg/kg)	0.04	0.02	0.03	0.02	0.03	0.02
RADIUM 226 (pCi/g)	1.6	1.36	1.27	1.05	1.45	1.16
RADIUM 228 (pCi/g)	1.26	1.03	0.974	0.837	1.13	0.906
TECHNETIUM 99 (pCi/g)	0.06	-0.08	0.16	-0.23	-0.32	-0.3
THORIUM 228 (pCi/g)	1.22	1.04	0.946	0.821	1.1	0.903
THORIUM 230 (pCi/g)	0	0	0	0	0	0
THORIUM 232 (pCi/g)	1.26	1.03	0.974	0.837	1.13	0.906
URANIUM (ug/g)	5.66	2.8	1.65	3.77	4.58	1.6

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* Data not available as of 6/10/02

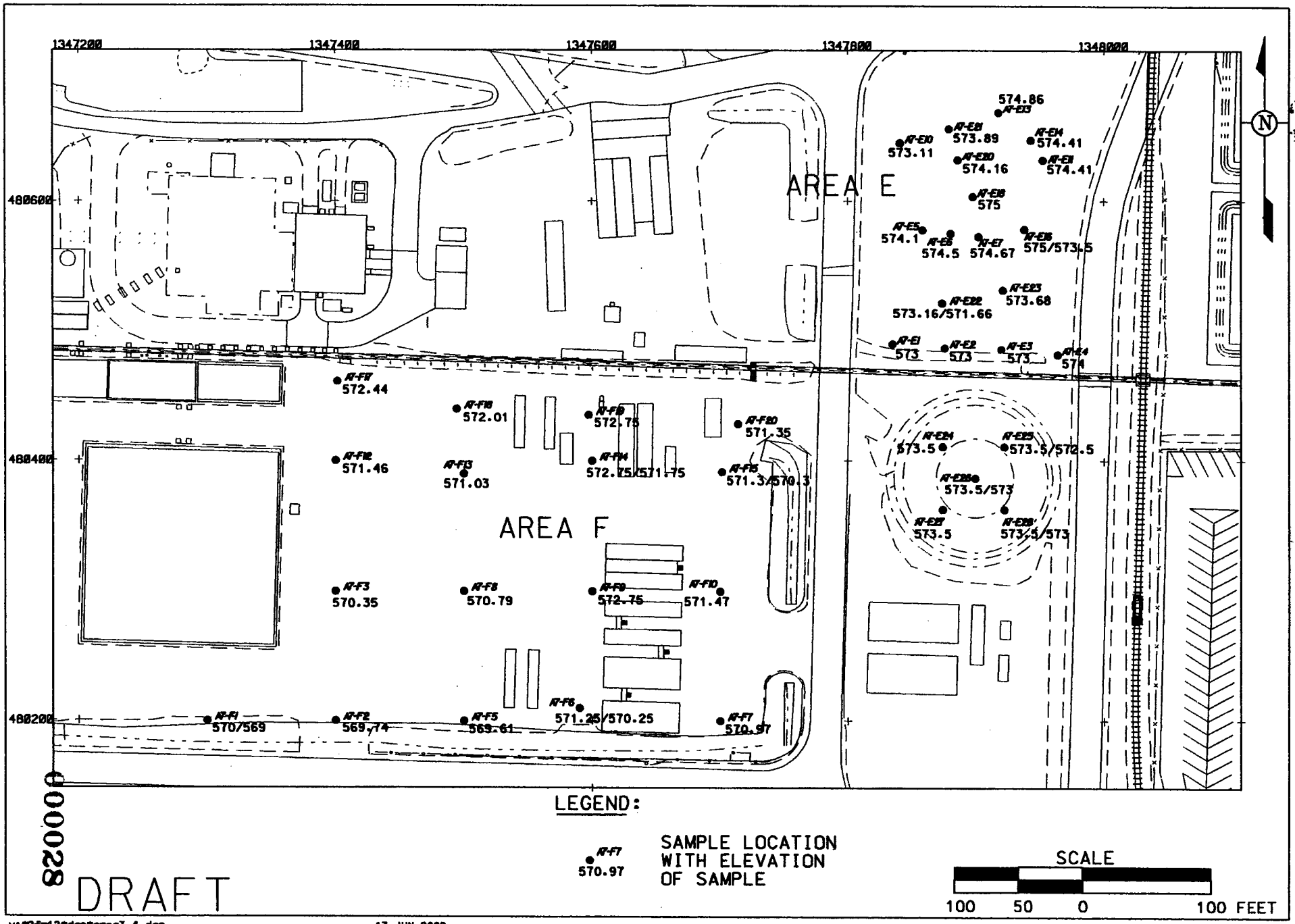

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FIGURE A-1. AREA E/F - SAMPLE POINTS AND ELEVATIONS

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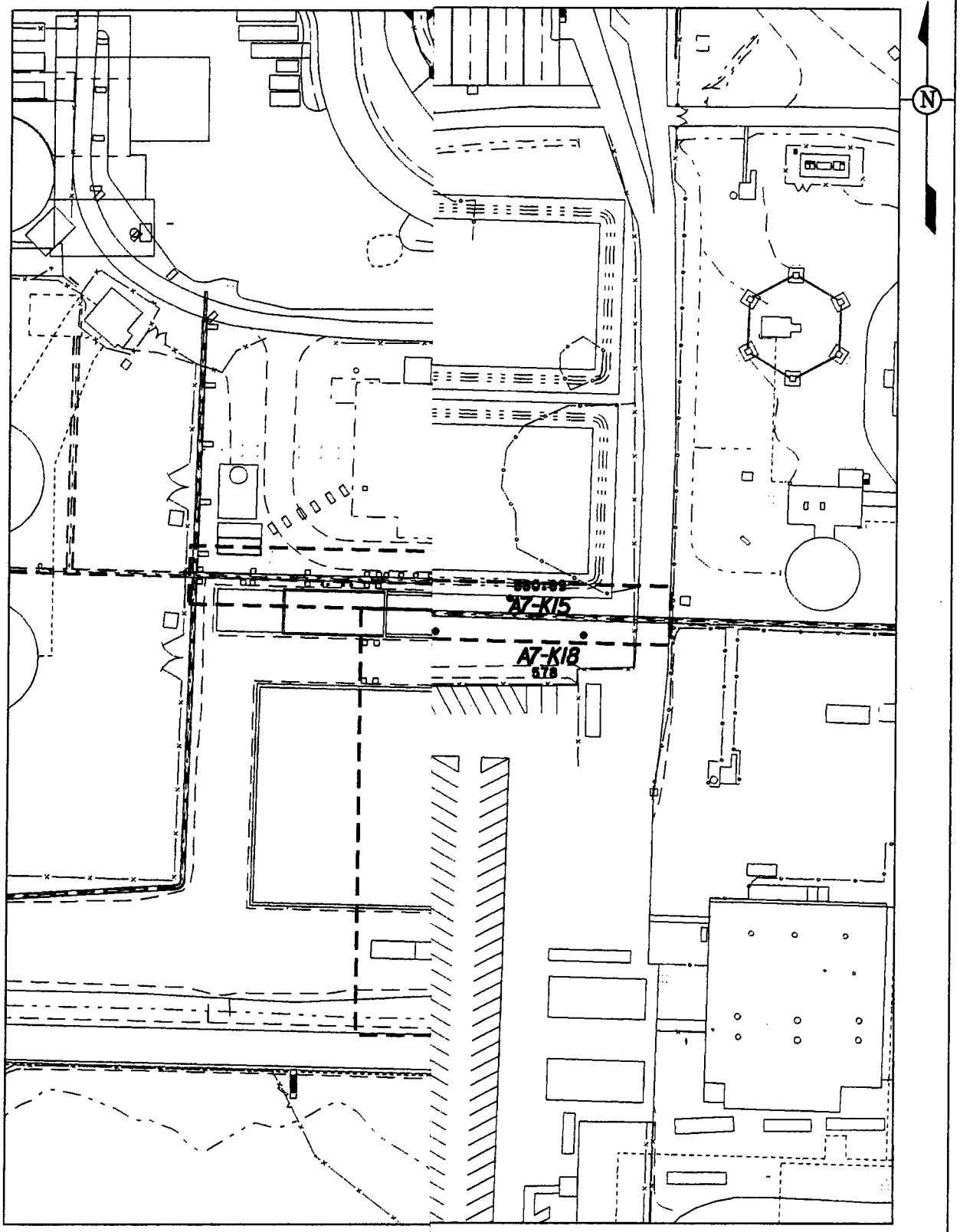

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SCALE

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MPLE POINTS SURROUNDING K-65 TRENCH

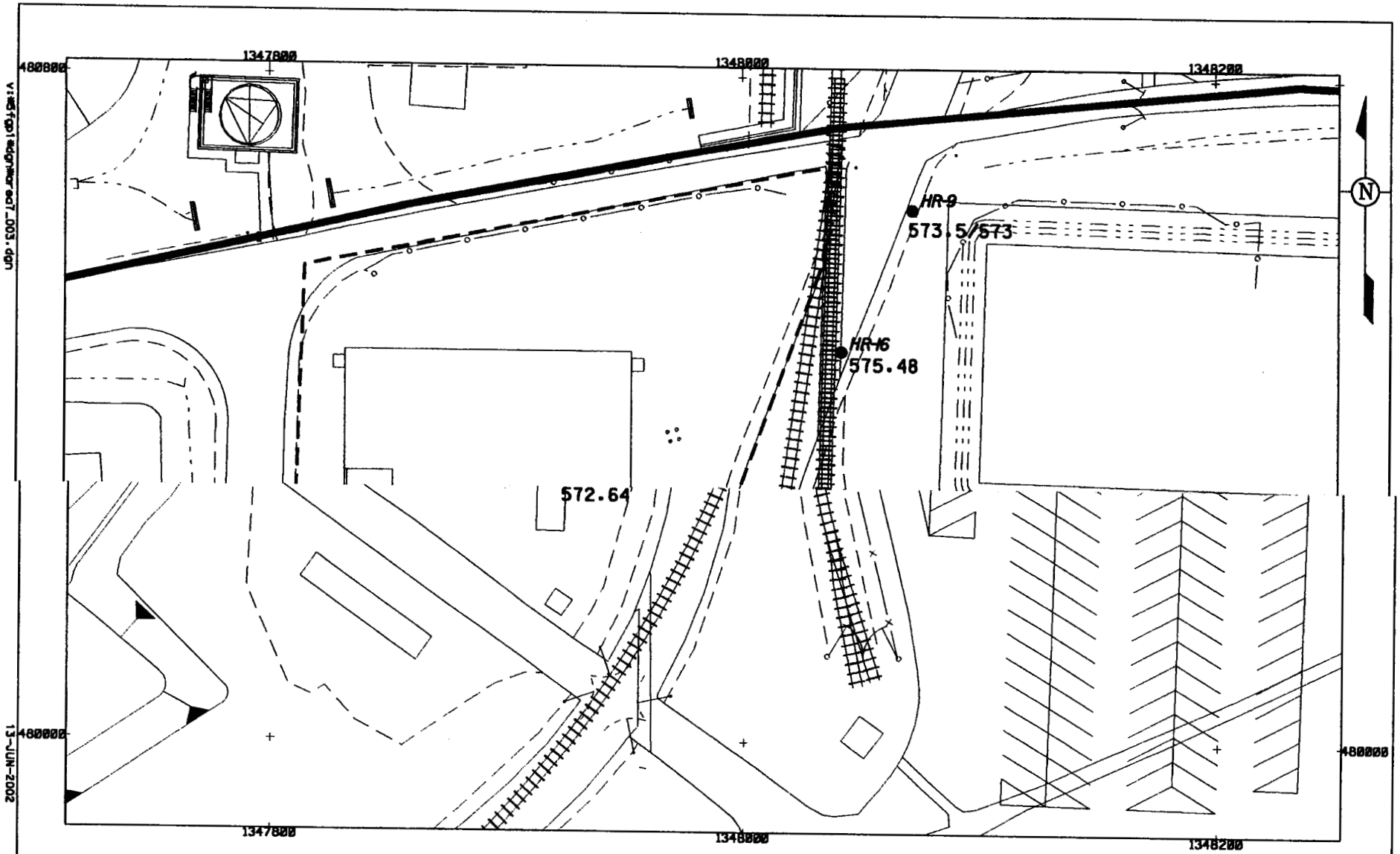

FIGURE A-3. SAMPLE POINTS AND ELEVATIONS OF RAILROAD EMBANKMENT AND IMPACTED MATERIAL HAUL ROAD

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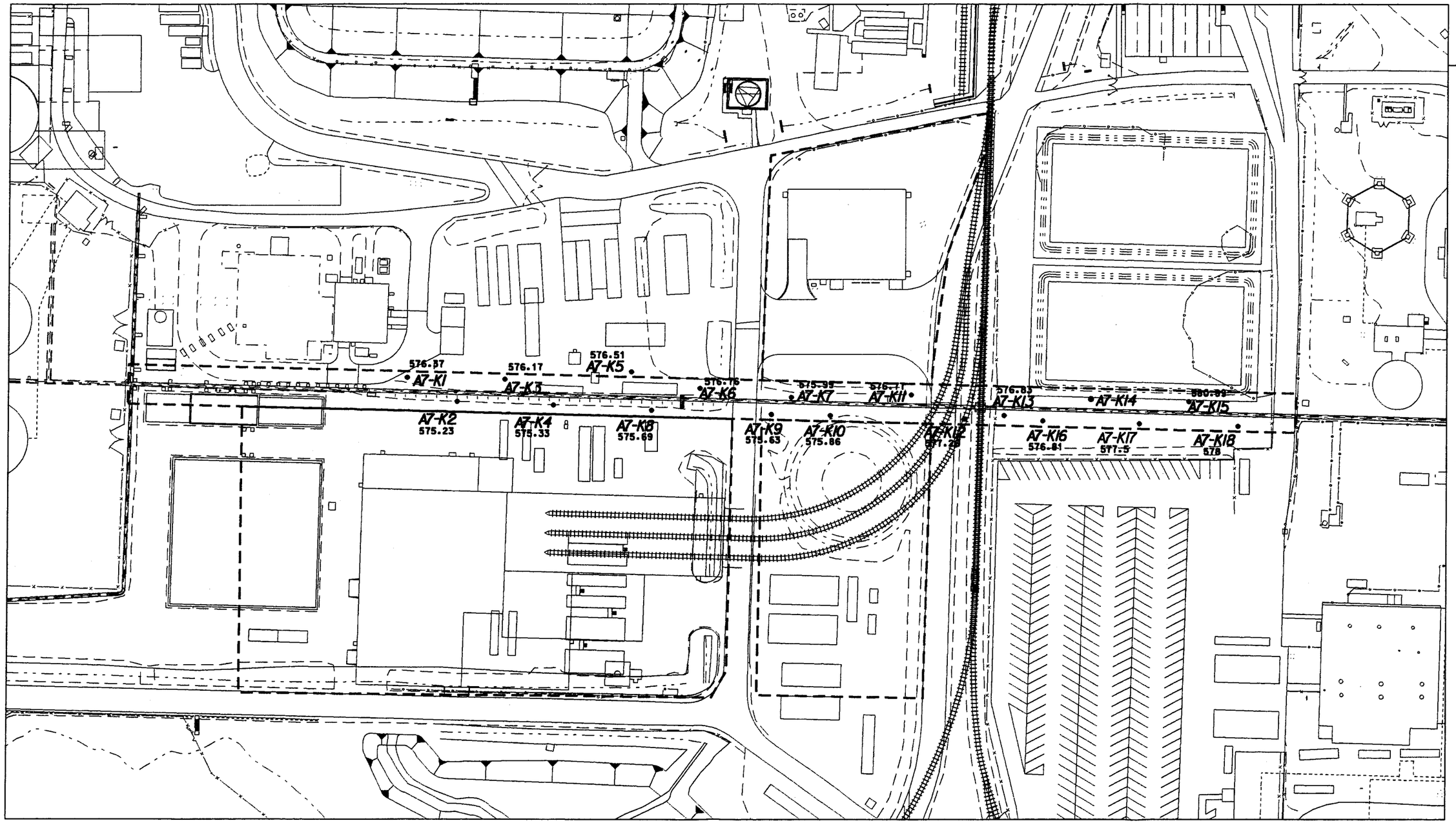

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• A7-K13 575 SAMPLE LOCATION WITH ELEVATION OF SAMPLE

SCALE

100 50 0 100 FEET

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FIGURE A-2. SAMPLE POINTS SURROUNDING K-65 TRENCH

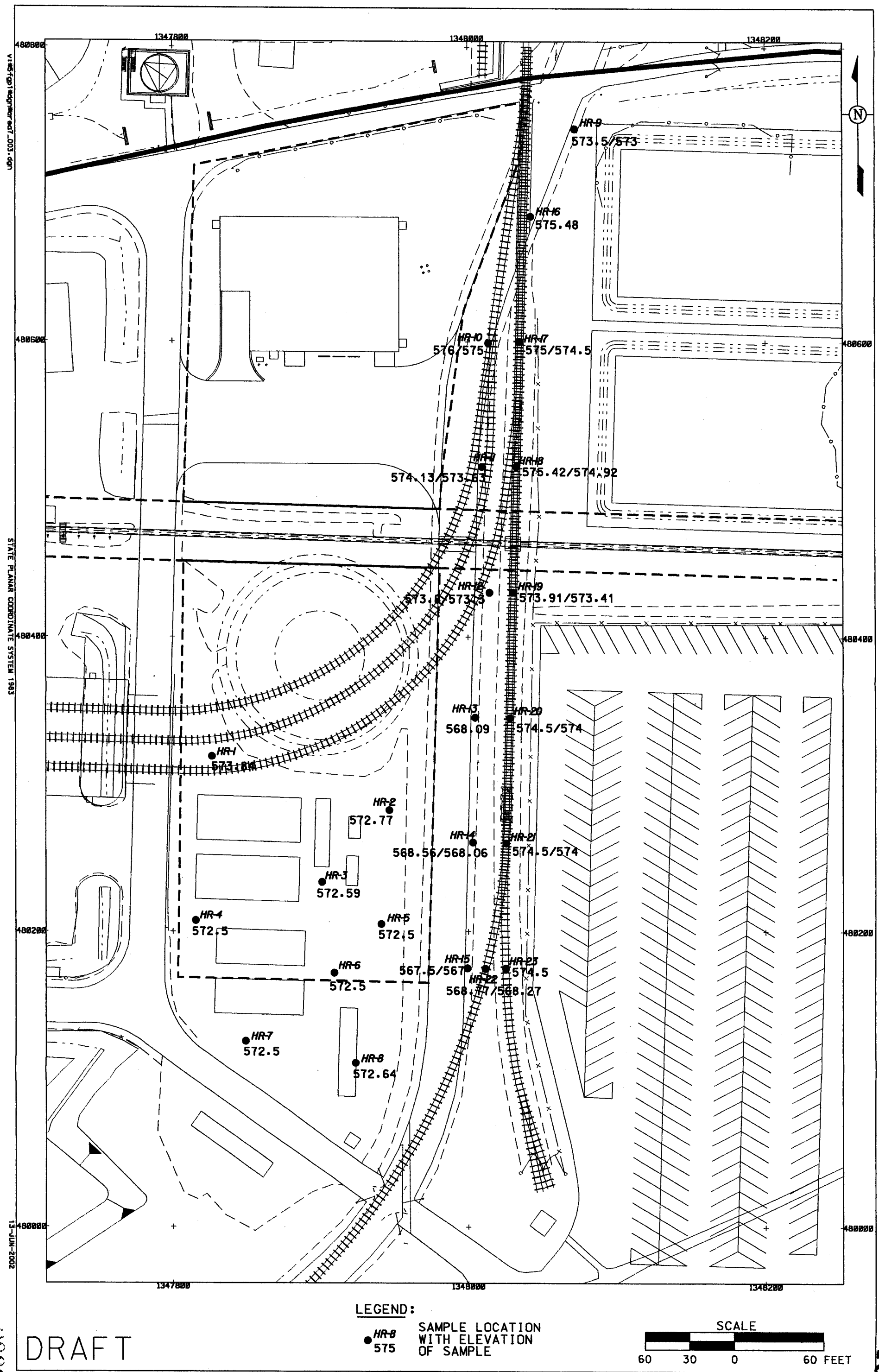

FIGURE A-3. SAMPLE POINTS AND ELEVATIONS OF RAILROAD EMBANKMENT AND IMPACTED MATERIAL HAUL ROAD

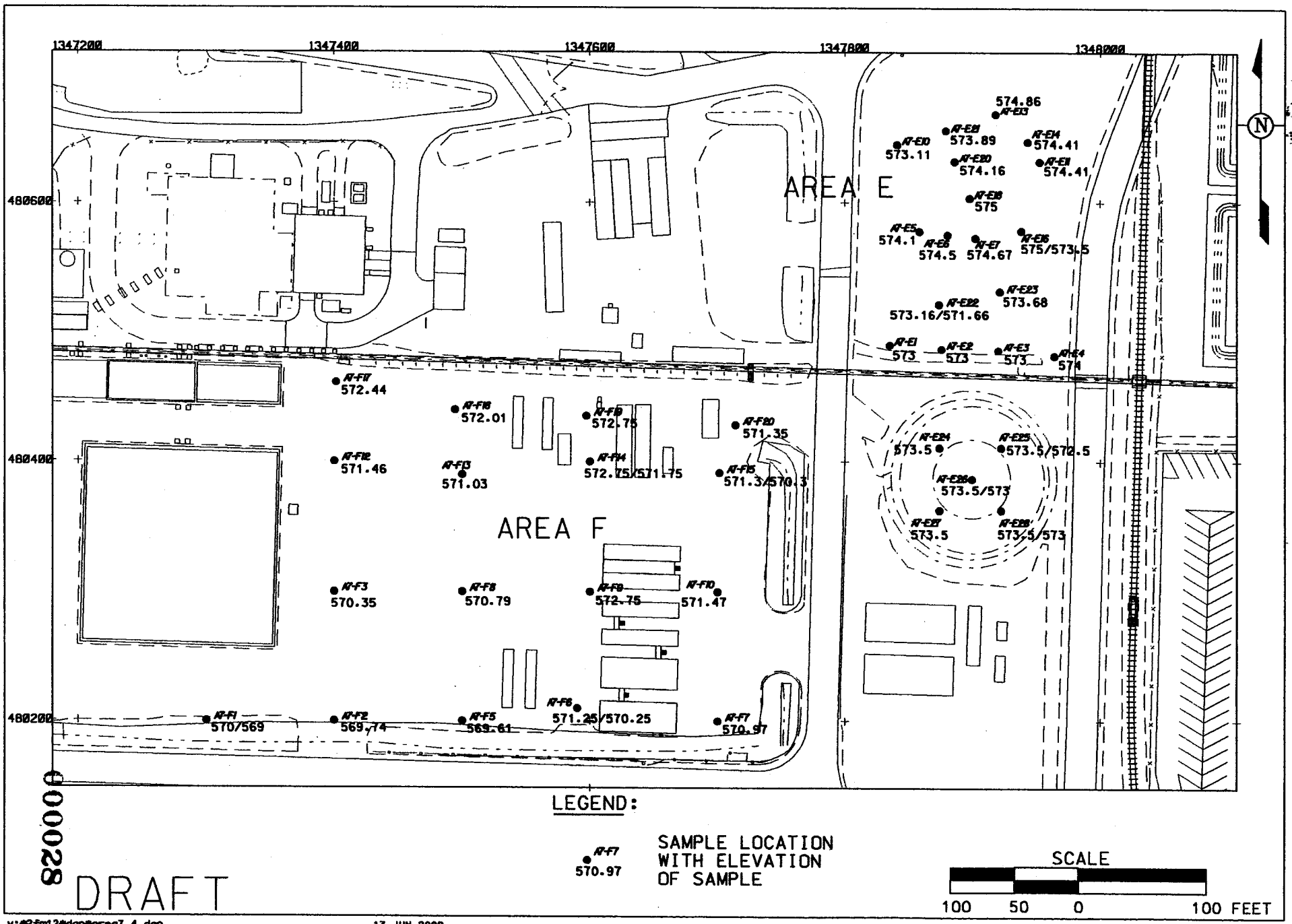

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FIGURE A-1. AREA E/F - SAMPLE POINTS AND ELEVATIONS

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