SEP 30 1996 Sta. 37 20

ENGINEERING DATA TRANSMITTAL

1. EDT 618849

2. To: (Receiving Organization)	3. From: (Originating Organization)	4. Related EDT No.:
Distribution	WHC TWRS Disposal Engineering A. L. Shord	606377
5. Proj./Prog./Dept./Div.:	**6. Cognizant Engr.:**	**7. Purchase Order No.:**
WHC TWRS Disposal Engineering	A. L. Shord	N/A
8. Originator Remarks: The attached engineering study is transmitted for approval and release.		**9. Equip./Component No.:** N/A **10. System/Bldg./Facility:** N/A
11. Receiver Remarks: **11A. Design Baseline Document?** [ ] Yes [X] No		**12. Major Assm. Dwg. No.:** N/A **13. Permit/Permit Application No.:** N/A **14. Required Response Date:** Sept 30, 1996

15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Designator	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	TWR ~~TRW~~ WHC-SD-TRW-ES-003		0	TWRS Privatization Phase 1, Site Development Engineering Study	N/A	1,3		

16. KEY

Approval Designator (F)	Reason for Transmittal (G)	Disposition (H) & (I)
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)	1. Approval 4. Review 2. Release 5. Post-Review 3. Information 6. Dist. (Receipt Acknow. Required)	1. Approved 4. Reviewed no/comment 2. Approved w/comment 5. Reviewed w/comment 3. Disapproved w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION
(See Approval Designator for required signatures)

(G) Reason	(H) Disp.	(J) Name (K) Signature (L) Date (M) MSIN	(G) Reason	(H) Disp.	(J) Name (K) Signature (L) Date (M) MSIN
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			1	1	RL Site Infrastrucuture Division W. F. Edwards Approved 9/30/96 A2-45

18.	19.	20.	21. DOE APPROVAL (if required) Ctrl. No.
A L Shord 9/30/96 A. L. Shord Date Signature of EDT Originator	P. Felise 9/30/96 Authorized Representative for Receiving Organization Date	J. S. Garfield 9/30/96 Cognizant Manager Date	[] Approved [] Approved w/comments [] Disapproved w/comments

S

TWRS PRIVATIZATION PHASE 1 SITE DEVELOPMENT ENGINEERING STUDY

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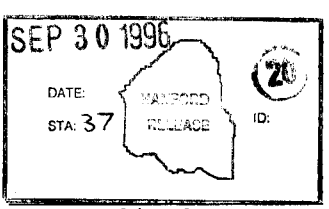
Westinghouse Hanford Com,pany, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-87RL10930

EDT/ECN: 618849 UC: 721
Org Code: 73520 Charge Code: D727D
B&R Code: EW3130000 Total Pages: 66

Key Words: TWRS Privatization, Phase 1, site development, grout site, privatization utilities

Abstract: The DOE-RL is pursuing a new business strategy of hiring private contractors for treatment of Hanford Site tank wastes. This strategy is called 'privatization' and includes design, permitting, construction, operation and deactivation of facilities for tank waste treatment. The TWRS Privatization Infrastructure Project consists of several sub-projects which will provide key services needed to support the privatization mission. One sub-project is to develop the selected site for the privatization facilities. This study addresses the pertinent issues related to the development of the site and specific parcels to be assigned to each of two private contractors. It also summarizes other studies that address provisions for utilities and other site services.



Release Approval 9-30-96 Date

Release Stamp

Approved for Public Release

WHC-SD-TWR-ES-003
Revision 0

ENGINEERING STUDY

TWRS PRIVATIZATION PHASE I

SITE DEVELOPMENT ENGINEERING STUDY

WORK ORDER E23382

Prepared for

Westinghouse Hanford Company

September 1996

Subcontract WHC 380393

Prepared by

ICF Kaiser Hanford Company
Richland, Washington

E23382ES

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ENGINEERING STUDY

TWRS PRIVATIZATION PHASE I

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ICF Kaiser Hanford Company
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for

Westinghouse Hanford Company

September 1996

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Concurrence: J.T. Koberg 9/27/96
J.T. Koberg, ICF KH/TFRSO Project Manager — Date

TABLE OF CONTENTS

ABBREVIATIONS

CWA	Clean Water Act
DOE	U.S. Department of Energy
DOE-RL	U.S. Department of Energy, Richland Operations Office
EA	Environmental Assessment
ECOLOGY	Washington State Department of Ecology
ETF	Effluent Treatment Facility
gpm	gallons per minute
HDPE	High Density Polyethylene
LERF	Liquid Effluent Retention Facility
lpm	liters per minute
mm	millimeters
M&I	Hanford Site Maintenance and Integration Contractor
MSP	Master Site Plan
MW	megawatt
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
psi	pounds per square inch
PC	Privatization Contractor
PVC	Poly Vinyl Chloride
RCRA	Resource Conservation and Recovery Act
RFP	Request for Proposal
SPIF	Systematic Planning of Industrial Facilities
TEDF	Treated Effluent Disposal Facility
TPPI	TWRS Privatization Phase I
TWRS	Tank Waste Remediation System
WAC	Washington Administrative Code

ENGINEERING STUDY

TWRS PRIVATIZATION PHASE I

SITE DEVELOPMENT ENGINEERING STUDY

WORK ORDER E23382

I. INTRODUCTION

In collaboration with numerous parties, the U.S. Department of Energy (DOE) has decided to privatize the treatment and disposal of most of the radioactive hazardous waste contained in the underground storage tanks on the Hanford Site. Privatization is defined as vendors, under contract with DOE, using private funding to design, permit, construct, operate, and deactivate their own equipment and facilities to treat radioactive hazardous waste, or mixed waste [as defined in Washington Administrative Code (WAC) 173-303]. Payment for these services takes the form of fixed price per unit of product meeting DOE specifications. Vendors are selected through a fixed-price competitive process.

Privatization activities have been divided into two phases. Phase I, a "proof of concept" phase, is to demonstrate the capabilities of privatization through the treatment of up to 13 percent of the waste. Once demonstrated, privatization will be expanded into Phase II to include the treatment and disposal of the remainder of the waste.

In concert with the preparation of the Tank Waste Remediation System (TWRS) Request for Proposals (RFP) (DOE-RL, 1996) for the solicitation of privatization contractors [PC(s)], a location was selected for the Phase I facilities (Shord, 1996 a). The location (the former Grout Disposal Site) was selected for numerous reasons: it already has been characterized and, to a degree, developed; it adjoins the planned feed tanks in the 200-East Area; and it is of sufficient size for two competing PC(s) to carry out the demonstration of pretreating, immobilizing, and vitrifying mixed waste. The selected area will be parcelled, and each PC will be assigned a site for development.

To prepare for the PC's development of their assigned sites, utilities must be extended from the 200-East Area infrastructure. This study addresses pertinent issues related to the development of the parcels of land to be assigned to each PC (Shord, 1996 b) and summarizes other studies that address the provision of utilities to each parcel.

II. SUMMARY AND CONCLUSIONS

The 6 hectare (15 acre) PC sites should be developed around the large soil mound remaining from excavation operations for the Grout Disposal Vaults by locating one site to the north and the other site to the south of the soil mound, (see Figure 1 in Appendix A). Roads and utilities should be extended from the 200-East Area infrastructure to the PC sites as shown in sketch ES-E23382-C-009 (all sketches are provided in Appendix C) and further described in this study as part of Alternative 1. The aforementioned sketch will be incorporated into the TWRS Privatization Phase I (TPPI) Master Site Plan (MSP) (Trost, 1996 a) as Figure 16.

The TPPI MSP is a stand-alone document that was developed as part of this study to provide a single source planning document for the TPPI Site. The MSP will coordinate temporary and permanent land use, utilities, and traffic flow for the overall program. It will identify needs, requirements and conflicts. As such, it is not a static, one-time effort. Rather, it is a flexible plan which will be constantly maintained to reflect changes as additional project data or program revisions become known.

There is a total of 36 hectare (89 acre) of usable land if Alternative 1 is implemented, of which about 4 hectare (10 acre) would be located under the soil mound. The total cost for site development is estimated to be $18,625,000, assuming replacement of the 299-E25-32 groundwater monitoring well is not required. The recommended schedule by which to implement Alternative 1 is in Appendix B.

III. DESCRIPTION OF ALTERNATIVES

A. CRITERIA

1. Introduction

The criteria presented in this section is based on detailed project input, existing conditions, Systematic Planning of Industrial Facilities (SPIF) planning principles (Muther, 1987), and various Hanford planning criteria. By summarizing the elements of the criteria presented in this section into distinct "objective" statements, and through the use of a modified Kepner-Trego decision analysis methodology (see Section IV.A.1.), alternatives for the development of the TPPI site can be systematically evaluated.

2. Project Input

As TWRS Privatization Phase I (TPPI) consists of two competing PC(s), two separate sites or parcels of 6 hectares (15 acres) each are to be

developed inside the fenced compound previously known as the Grout Disposal Site (DOE-RL, 1996). Each PC will be assigned a parcel for the construction of the process and support facilities necessary to demonstrate their method for the treating of mixed waste. Features of each parcel are to be as equal as is feasible. Neither parcel shall provide one PC a major advantage over the other.

Each parcel is to be provided with the following services or utilities:

- Access roads
- Rail service
- Raw and potable water
- Liquid effluent pipelines
- Electrical Power

The method in providing each of these services or utilities to the PC parcels is addressed in separate studies. The preferred alternative derived by each of these studies is to be employed by each site development alternative.

Mixed waste tanks 241-AP-106 and 241-AP-108 will be used to stage low-level waste for treatment by the PC(s). A high-level waste transfer line will be routed to a new valve pit, within the AP tank complex. Each PC will be responsible for the extension of transfer lines from the 241-AP tank farm to their respective parcel. To keep mixed waste transfer system components to a minimum, the parcels are to be located as near the 241-AP Tank Farm as is feasible.

3. Basic Site Planning Criteria

Summarized below are the basic planning criteria for the development of a site for a mixed waste treatment facility (Jacobs, 1995).

- Health & Safety
  - Locate personnel areas upwind from treatment areas.
  - Facilities must not be located over contaminated areas.

- Minimize the transportation of radioactive and hazardous waste and material through populated areas. (Railroad and/or roads from treatment plants to storage).

- Minimize distance to emergency, fire, and security facilities.

- Provide buffer zones around potentially hazardous facilities.

• Environment

- Minimize use of undisturbed areas to protect endemic plant & animal species.

- Use natural topographic and geologic conditions to minimize and simplify excavations.

• Utilities/Infrastructure

- Maximize use of existing utilities/infrastructure.

- Facilities must not be located over utility corridors.

- Piping, electrical, and transportation infrastructure improvements shall be provided in corridors to permit ready connection to individual building/projects.

- Separation between utility lines in corridors should be "to code" and consider constructibility needs.

• Site access must consider the number, frequency, safety, and effects of the following:

- The movement of plant personnel and vehicles

- Transportation of end products and solid waste from Treatment facilities to storage.

- Additional construction personnel, vehicles, parking, office areas, materials, and work flow.

- Vehicle access to storage area.

- Rail access to site

- Constructibility
  - Buildings should be located to provide adequate room for construction including laydown, excavation, material handling and permit construction under different contractors and schedules.
  - The utility corridor width will be adequate to meet the minimum setback requirement of 15 meter (50 feet) from all support facilities as per setback standards of DOE/RL-92-29.
  - Infrastructure corridors are assumed to be installed first to assist in the development of the rest of the complex.
- Adjacency Relationships
  - Operating facilities are orientated in close proximity to inter-related support facilities minimizing the need for additional transfer facilities or equipment.
  - The impact to existing site activities and operating facilities during construction and operation should be kept to a minimum.
  - Centralize support facilities to minimize duplication.
  - Provide easy access between like or inter-related support facilities.
  - Parking facilities should be placed as close as practicable to personnel areas.

4. Hanford 200 Areas Development Plan Criteria

   The Hanford 200 Areas Development Plan (Rinne, 1993) proposes the following criteria:

   - Site Development Standards
     - Buffer zones for hazardous facilities
     - Cluster similar activities and provide parking on the perimeter.
     - Provide pedestrian and bicycle paths between complexes.
     - Emphasize ease of access

- Utility corridors along roadways should be reserved from main truck line extensions.

- Building Setbacks
  - From Route 3 and Route 4S - 90 meter (300 feet)
  - From centerline of any other roads - 15 meter (50 feet)
- Landscape Standards
  - Landscaping should be used near facilities and clusters.
  - Trees, shrubs, hedges, and landform should be used to reduce wind impacts to structures

5. Site Planning Criteria Through SPIF

   Site planning principles "Systematic Planning of Industrial Facilities (S.P.I.F.)" (Muther, 1987), as presented by Richard Muther in his September, 1994 DOE/RL sponsored seminar was used to develop the Site Development Engineering Study.

   a. SPIF Methodology - The SPIF planning process is a proven approach. The process sets forth five sequential steps that progress from inputs and influences to a specific plan, with a check-and-coordinate at each step. The process has flexibility in its application, serving as a guide rather that a specific set of instructions. The process involves interaction, integration and modification of each component. The process incorporates the need for analysis, coordination, or control by other parties outside the planning project but related to it.

      The following five sequential steps were used in developing the precepts used in the SPIF planning process; Investigate, Interact, Integrate, Modify and Evaluate.

      - Step 1 - Investigate
        - Divide or redefine the facilities conceptually (qualitative needs) by activity-areas and/or class-of-space grouping.
        - Establish or clarify the plan-for demand and capacity requirements (quantitative needs).

- Identify the dominant internal (on-site) considerations, physical and non-physical.
- Select the lead components and/or major elements.

• Step 2 - Interact

- Determine basic long-range relationships based on flow, other, cross-orientation.
- Establish space by activity areas.
- Adjust or arrange the spaces into conceptual layouts, considering the typical site-plan arrangements.
- For handling--materials, moves, methods.
- For utilities--substance, distribution, conductors.
- Establish conceptual plan(s) considering the typical site-plan arrangements.

• Step 3 - Integrate

- Tie to existing facilities and utilities, with any long-range facilities planned for the future.
- Input from all related parties has been integrated into a conceptual MSP which should be flexible enough to allow for unanticipated future changes.

  In addition to integrating all five physical components, the many physical and non-physical influences outside the direct planning must be considered.

  As a result of the integrating of each component with the lead component, preliminary plans are roughed out for each of the four components based on a conceptual layout. In addition, all the comments, suggestions and advice from others are to be integrated into the plan.

- Step 4 - Modify

  This modification and refinement is essentially the pulling together of preliminary plans developed in Step 3 - Integrate - and improving them. Specific alternative layouts are developed, from which one will be selected.

- Step 5 - Evaluate

  Evaluate the plans by rough cost comparisons, by rating degree to which each honors the dominant considerations, or by other factors. Select the best.

b. SPIF Planning Principles - Consist of the following elements:

- Group similar activities or functions together.
- Provide for safety and convenience of employees.
- Develop a basic plan of growth for the site.
- Establish a basic pattern of material flow and/or product-process (or other primary) relationships.
- Orient or align the proposed facilities with the property lines or existing dominant features.
- Take advantage of natural features of the site.
- Develop a basic infrastructure for the site.
- Establish a pattern of internal transport and/or circulation.
- Establish dedicated corridors for primary distribution of utilities.
- Keep the layout flexible.
- Plan layout for ease of expansion.
- Stay in compliance with all regulations.
- Conserve energy through orientation, alignment and short distances.
- Aid security considerations - fire, theft, espionage.

- Avoid overcrowding the site. Keep some uncommitted space.

B. ALTERNATIVES CONSIDERED

Three development scenarios have been defined as alternatives. Each provide differing solutions to the issue of what to do with the soil mound or spoil pile that remains near the center of the former Grout Disposal Site from the excavation for the construction of the grout vaults. Each alternative provides two 6 hectare (15 acre) parcels for privatization facility development, one to be assigned to each PC. All of the alternatives incorporate the preferred alternatives identified in various related engineering studies that evaluated the methods by which to provide services and utilities to the PC(s).

- Alternative 1 is to develop two parcels by locating one PC parcel north of the soil mound and a second, slightly different shaped parcel, south of the soil mound. The existing soil mound is left in place as shown in Figure 1 (all figures are in Appendix A) and Sketch ES-E23382-C-001 (all sketches are in Appendix C).

- Alternative 2 is to develop two nearly identical parcels by removing or relocating the soil mound and locating the two PC sites as close as possible to each other, separated by a 60 meter (200 feet) wide utility corridor (see Figure 2 and Sketch ES-E23382-C-002).

- Alternative 3 is to develop two parcels around the existing soil mound, similar to that proposed in Alternative 1, but forwards the concept of removing or relocating a portion of the soil mound to locate the northern PC's parcel far enough south to avoid encompassing an existing groundwater monitoring well identified as 299-E25-32 (see Figure 3 and Sketch ES-E23382-C-003).

1. Alternative 1

   Alternative 1 proposes to develop the former Grout Disposal Site by the extension of roads and utilities from the 200-East Area to two 6 hectare (15 acre) parcels located on either side of the existing soil mound (see Figure 1 and Sketch ES-E23382-C-001). Other than the filling of a portion of the excavated ramp leading to the grout vaults, the parcels themselves will not be improved. Each PC will be responsible for the clearing, grubbing and finite grading of their respective parcel. The amount of disturbed area within the parcel boundaries is to be minimized in order to facilitate the environmental investigations

necessary before turning property responsibilities over to each privatization contractor (PC).

a. Usable Land Area - There is a total of 36 hectare (89 acre) of usable land (having less than a 5 percent grade) available within the Phase I Privatization site, of which about 4 hectare (10 acre) is currently located under a soil mound.

   If it becomes necessary, the 6 hectare (15 acre) sites could be readily expanded into the area covered by the soil mound by relocating a portion of, or all of the mound. This would provide up to an additional 7 hectares (18 acres) of usable land to be divided between the parcels. The northern parcel, Parcel "A", could be expanded to the south and Parcel "B" could be expanded to the north to provide a total of 9.5 hectares (24 acres) each. However, groundwater monitoring well 299-E25-1000 would then be impacted similar to well 299-E25-32 and may require replacement. (See discussion below under subparagraph 1.h. Monitoring Wells.)

   In addition to the two - 6 hectare (15 acre) sites, there is a potential 10.6 hectare (26 acre) site east of the PC sites, across the intra-area road, that could be employed for construction laydown areas or additional administrative and support facilities.

   To provide the southern parcel with a uniform shape, up to 9 000 cubic meters (12,000 cubic yards) of soil will be required in order to fill a portion of the excavated ramp leading to the existing vaults. Soil will be retrieved from the soil mound and compacted to structural fill requirements. Enough area will be filled to provide for a north/south service road outside of the parcel. The cost of grading and filling to prepare the parcels for turnover to the PC(s) is estimated at $36,000.

   About two thirds of the 36 hectares (89 acres) of usable land is of undisturbed or minorly disturbed late successional sage-steppe. In the process of developing the TPPI site, large portions of this natural habitat will be destroyed. Several threatened species are known to occasionally reside within this mature sagebrush habitat. Recently, construction projects at the Hanford site have set precedents in what may be required to mitigate the loss of the mature sagebrush habitat that would be destroyed by Phase I activities. For Project W-058, Replacement of the Cross-site Transfer System, it was required that for each hectare (2.5 acres) of mature sagebrush habitat destroyed by construction activities three hectares (7.4 acres) of sagebrush

habitat had to be recovered. For destroying 9.3 hectares (23 acres) of undisturbed sage-steppe, Project W-058 was to transplant of 500 mature plants and plant 18,400 sagebrush seedlings into a previously disturbed area of 28 hectares (69 acres). This was at a cost of $30,000 per hectare of disturbed sage-steppe, or $280,000.

It is anticipated that approximately 4 hectares (10 acres) of sagebrush habitat will be destroyed by the development and construction of the access and intra-area roads and utility easements. The northern parcel is almost entirely covered by undisturbed sage-steppe whereas less than half of the southern parcel is undisturbed. If both parcels are fully developed, approximately 9 hectares (22 acres) of additional sagebrush habitat would be destroyed for a total of 13 hectares (32 acres) of habitat. Sagebrush habitat mitigation costs for Alternative 1 would be expected to be approximately $390,000.

b. Access Roads - Roads are extended from Canton Avenue in the 200-East Area to the PC sites through the improvement of an existing road entering the south side of the Phase I Privatization site and the construction of a new road on entering the north side of the site as shown in Figure 4. The intersection of Canton Avenue and Route 4S will be upgraded to state highway standards by the addition of a 457 meter (1500 feet) acceleration lane for egress from Canton Avenue to the east onto Route 4S, a 183 meter (600 feet) acceleration lane from Canton Avenue to the west onto Route 4S, and a 183 meter (600 feet) left turn lane from Route 4S to the north onto Canton Avenue. A deceleration and right turn lane is already in-place at this location (Ackerman, 1996).

   The northern access road will cross over a subsurface contamination zone identified as the 216-A-29 Ditch and nicknamed "Snows Canyon". The 216-A-29 Ditch is an inactive hazardous waste disposal unit identified for closure under RCRA interim status. In 1980-81, soil samples were taken near the upper end of the of the ditch. Analysis of the samples indicated a radioactive contaminant level in the range of 10 to 1000 picocuries per gram of Strontium 90 and Cesium 137[1]. Contamination was found to remain fairly close to the surface, generally remaining within the confines of the ditch and within the top two feet of soil. Since that time the ditch has been

[1] Information on the level of contamination found in the 216-A-29 Ditch was obtained during a meeting held on June 20, 1996. Minutes are in the project file. The test data mentioned was archived in the early 1980's. It is currently planned that the file will be retrieved and evaluated during FY 1997.

removed from service, cleared of all vegetation, and filled with a minimum of 600 mm (2 feet) of clean soil. A large embankment covering approximately 1860 square meters (20,000 square feet) will be constructed at a point where the ditch is centered in a 4 to 5 meter (13 to 16 feet) deep swale. The embankment will provide clean soil for the installation of piped utilities and a foundation for the northern access road.

Only a portion of the planned road improvements are to be completed prior to the time the PC(s) are to initiate construction activities (FY 2000). The upgrading of the Canton Avenue and Route 4S intersection and the rough grading of the northern access and interior roads will be completed by the end of FY 1999 for the purpose of construction access. Final grading and paving activities for the widening of Canton Avenue, the widening of the southern access road, and the northern and interior roads will be completed near the end of privatization facility construction, anticipated to be in 2002. The cost for road improvements is estimated at $1,310,000.

c. Rail Service - An existing siding or rail spur (no longer needed for the unloading of grout materials) is to be employed for the rail delivery of equipment and materials (Ackerman, 1996). A car puller is available at the former grout dry blend facility for the staging of rail cars. Road access is satisfactory, though to avoid the congested area around the 241-AP Tank Farm, shipments being transferred from the rail siding to the PC's site may have to employ a less than direct route (see Sketch ES-E23382-C-004).

   At the drafting of this study it had not been established whether or not rail service would be required into the TPPI site. If a rail spur extension is deemed necessary only one route was found to be feasible (see Sketch ES-E23382-C-004). The cost for the design and construction of this spur is estimated at $2,073,000. The cost for the extension of rail service into the TPPI site is not included in the estimates of any of the alternatives evaluated in this study.

d. Water Supply - Raw, fire suppression, and potable water services are extended to the PC sites by the extension of the existing 200-East Area water distribution system. The existing infrastructure has the reserve capacity to provide the quantities of water required by the two PC(s), namely a 24-hour averaged demand of 1 090 lpm (290 gpm) of raw water, a 24-hour averaged demand of 245 lpm (65 gpm) sanitary water, and a peak demand of up to 9 450 lpm

(2500 gpm) of fire suppression water[2]. The means by which the existing distribution system should be extended is by the installation of a raw water loop extension and a sanitary water pipeline extension as shown in Sketch ES-E23382-C-005. Water line construction should be completed by the end of FY 1999 so that water for PC construction activities would be available at the PC parcel boundaries by early FY 2000 (Fort, 1996). The cost for extending the 200-East Area water system is estimated at $1,286,000.

Prior to the completion of the raw water extension loop, construction water used in the construction of roads and various utilities will be obtained from an existing riser approximately 75 meters (250 feet) east of Canton Avenue and 240 meters (800 feet) south of 241-AP Tank Farm (see Sketch ES-E23382-C-005).

e. Liquid Process Effluents - The liquid effluent lines from the PC(s) to existing treatment and disposal facilities will be routed to the north as shown in Figures 5 and 6 (Palet, 1996).

   The non-radioactive, non-dangerous liquid effluents will be discharged into the Treated Effluent Disposal Facility (TEDF) which does not have any treatment or retention capacity. Strict control at the generating facility interface is therefore essential to operate the TEDF in compliance with the requirements.

   The radioactive, dangerous liquid effluent will be discharged into Liquid Effluent Retention Facility (LERF). The LERF is a passive facility which will receive the effluent for temporary storage and subsequent treatment at the Effluent Treatment Facility (ETF).

   To eliminate the potential for interference with PC construction activities, the effluent lines should be constructed prior to FY 2000. The cost for the installation of the liquid effluent pipelines is estimated at $1,273,000.

f. Electrical Power - A new substation will be required to provide electrical power to TPPI (Singh, 1996). A site that was previously

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[2] The anticipated quantity or average flow requirements for raw (or untreated process) water, fire suppression water, and potable (or sanitary) water, were forecasted in August, 1996, by the TWRS Privatization Source Evaluation Board and are repeated here accordingly (by informal direction). The criteria differs from that stated in the RFP which is that each PC is to be provided 760 lpm (200 gpm) of raw water, and 95 lpm (25 gpm) of potable water, both averaged over 24 hours. Fire suppression water criteria remains the same at 9 450 lpm (2500 gpm).

disturbed and has not been reserved for any other project or use has been tentatively selected for the new substation. A study investigating 230 kV routing options and substation siting is ongoing (Akerson, 1996) and is expected to be finalized in the same time frame as this study. The substation location and 230 kV transmission line route will be finalized after the facility configuration and load requirements are available from the PC(s). The location tentatively proposed for the substation and the tentative preferred route for two new 230 kV transmission lines which will connect to the existing 230 kV line located north of Route 11A is shown in Figure 7. This tentatively preferred route starts at a point in the existing 230 kV transmission line northeast of the 200-East Area and approximately 200 meters (650 feet) north of Route 11A. The new 230 kV transmission line proceeds south for 3 660 meters (12,000 feet) then turns 90 degrees to the right to run west for 2 430 meters (8,000 feet) to the new substation. The new 230 kV transmission line then returns, paralleling the previous path, to near the starting point to tie back into the existing 230 kV transmission line completing a loop.

Corridors for the lower-voltage (13.8 kV) feed lines for each PC site are shown on Sketch ES-E23382-C-001. Since the substation site is located between TWRS Phase I and Phase II facilities it will be possible to expand the substation to meet a portion of the TWRS Phase II requirements. The cost of constructing a new 230 kV substation, for extending the 230 kV transmission lines to the substation, and installing new 13.8 kV distribution lines from the substation to each PC parcel, is preliminarily estimated at $13,990,000.

Construction power of up to 4 MW per PC of 13.8 kV will be provided from the 251-W substation by the extension of distribution lines C8L5 and C8L6 (Adhikari, 1996). It is anticipated that existing power line routes, and poles where sufficient, will be employed in extending the power into the TPPI site. The cost estimate for extending construction power to the sites is $340,000.

g. Telecommunications - The extension of telecommunications into the TPPI site was not addressed in the TPPI RFP, and as such the parties responsible for installation are not yet identified. It is anticipated that the utility corridors identified in this study for the extension of utilities from the 200-East Area infrastructure will be utilized in extending telecommunications to each PC.

h. Monitoring Wells - An existing groundwater monitoring well resides within the parcel situated on the north side of the soil mound (see Sketch ES-E23382-C-006). This well, 299-E25-32, is one of only a handful of wells at Hanford which provide information about the vertical gradients and radiochemical distribution across two intervals. Based on the Priority 1 Category 4 classification (Williams, 1996), this well will require replacement if it must be decommissioned due to PC activities. Easements can be placed around the wells that reside within the parcel boundaries to maintain access for sampling and provide protection from future land-use activities. However, should the well location create adverse restrictions on the PC assigned to the parcel, the well may have to be relocated. Besides losing the continuity of data from an historical baseline, the cost for the replacement of a Category 4 groundwater monitoring well is estimated to be over $75,000. Three other Category 4 wells and a Category 3 well are located outside of the PC construction zones proposed by Alternative 1 and currently pose no problem. Some abandoned wells, or wells that will be abandoned in the near future, reside within the boundaries of the southern parcel and will be clearly marked at grade and should pose few problems for the PC.

i. Transfer/Feed Lines - The PC(s) will be responsible for selecting the route and installing the transfer/feed lines from the AP Tank Farm. A utility corridor has been established with the north boundary being the existing feed line to the former grout processing plant and the south boundary is the south fence line (see Sketch ES-E23382-C-007). There are a number of mobile offices and other utilities located in the area. Some of these items may have to be relocated to make sufficient room for the new transfer/feed lines that will originate at the AP Tank Farm.

2. Alternative 2

Alternative 2 is to develop two nearly identical parcels by removing or relocating the soil mound and locating the two PC sites as close as possible to each other, separated by a utility corridor (see Figure 2 and Sketch ES-E23382-C-002). A safety representative from the TPPI site evaluation team indicated that a 61 meter (200 feet) buffer zone, or corridor, between sites should be sufficient for safety purposes (Trost, 1996 b). Each PC will be responsible for the clearing, grubbing and finite grading of their respective parcel, however the south parcel, having been cleared of the soil mound will be almost entirely cleared and leveled prior to the transfer to the respective PC. The amount of disturbed area within the northern parcel boundary should be minimized

in order to facilitate the environmental investigations necessary before turning property responsibilities over to the PC.

a. Usable Land Area - After the removal of the soil mound, there is a total of 36 hectare (89 acre) of usable land (having less than a 5 percent grade) available within the Phase I Privatization site. By the placement of the two parcels to the northern side of the usable area the capability to equally expand the two parcels beyond 6 hectares (15 acres) in size is limited unless the southern parcel is relocated to the south or the north/south intra-area road is moved to the east. It may be difficult to facilitate expansion of the parcels after the transfer of management responsibilities to the PC(s).

   Similar to Alternative 1, in addition to the two - 6 hectare (15 acre) sites, there is a potential 10.6 hectare (26 acre) site east of the PC sites, across the intra-area road, that could be employed for construction laydown areas, or additional administrative and support facilities. Also an additional parcel of approximately 6 hectares (15 acres) could be identified south of the southern parcel for development.

   Approximately 170 000 cubic meters (220,000 cubic yards) of soil will be relocated to a sloping site northeast of the northern parcel. The cost of excavating, grading, and filling to prepare the parcels for turnover to the PC(s) is estimated at $264,000.

   It is anticipated that approximately 4 hectares (10 acres) of sagebrush habitat will be destroyed by the development and construction of the access and intra-area roads and utility easements. The northern parcel is almost entirely covered by undisturbed sage-strep whereas only a small portion, about one half hectare (1.2 acres) of the southern parcel is undisturbed. If both parcels are fully developed, approximately 6.5 hectares (16 acres) of additional sagebrush habitat would be destroyed for a total of 10.5 hectares (26 acres) of habitat. Sagebrush habitat mitigation costs for Alternative 2 would be expected to be approximately $315,000.

b. Access Roads - Roads are extended identical to that described for Alternative 1.

c. Rail Service - Access to the site by rail is identical to that provided by Alternative 1.

d. Water Supply - Raw, fire suppression, and potable water services are extended identical to that described for Alternative 1.

e. Liquid Process Effluents - The liquid effluent lines from the PC(s) to existing treatment and disposal facilities will be routed nearly identical to that described for Alternative 1.

f. Electrical Power - Identical to that described for Alternative 1, electrical power will be extended to a new substation and routed within the privatization site within defined corridors.

g. Telecommunications - Identical to that provided for Alternative 1.

h. Monitoring Wells - Each parcel will have an existing Category 4 groundwater monitoring well residing within its boundaries. The northern parcel, being located identical to that proposed in Alternative 1, will contain well 299-E25-32, which is one of only a handful of wells at Hanford which provide information about the vertical gradients and radiochemical distribution across two intervals. With a Priority 1 Category 4 classification (Williams, 1996), this well will require replacement if it must be decommissioned due to PC activities. A Priority 2 Category 4 well, 299-E25-1000 resides just within the boundary of the southern parcel. Easements can be placed around these wells to maintain access for sampling and provide protection from future land-use activities, but their presence within the parcel boundaries may create an encumbrance for the PC(s). Should the well location create adverse restrictions on the PC assigned to the parcel, the wells may have to be relocated. Besides losing the continuity of data from an historical baseline, the cost for the replacement of a groundwater monitoring well is over $75,000. Two other Category 4 wells are located outside of the PC construction zones proposed by Alternative 1 and currently pose no problem. An abandoned well resides within the boundaries of the southern parcel and will be clearly marked at grade and should pose few problems for the PC.

i. Transfer/Feed Lines - PC(s) will be responsible for selecting the route and installing the transfer/feed lines from the AP Tank Farm. A utility corridor similar to that described for Alternative 1 is shown in Figure 2.

3. Alternative 3

Alternative 3 is to develop two parcels around the existing soil mound, similar to that proposed in Alternative 1, but forwards the concept of removing or relocating a portion of the soil mound to locate the northern PC's parcel far enough south to avoid encompassing an existing groundwater monitoring well (see Figure 3 and Sketch ES-E23382-C-003).

a. Usable Land Area - There is a total of 36 hectare (89 acre) of usable land (having less than a 5 percent grade) available within the Phase I Privatization site, of which about 4 hectare (10 acre) is currently located under a soil mound. By locating the northern parcel south of the existing groundwater monitoring well 299-E25-32, and moving approximately 72,000 cubic meters (94,000 cubic yards) of the soil mound to the northeast corner of the privatization site, the encumbrance or replacement of the existing well can be avoided. If it becomes necessary, the 6 hectare (15 acre) sites could be readily expanded into the area covered by the balance of the soil mound by removing a larger portion, or all of the mound. This would produce up to an additional 4.5 hectares (12 acres) of usable land to be divided between the parcels to provide a total of 8.3 hectares (20 acres) each. Groundwater monitoring well 299-E25-1000 would then be impacted and may require replacement. The northern parcel could be simultaneously expanded to the north to provide a total of 9.5 hectares (24 acres) per parcel, identical to the expansion capabilities of Alternative 1.

Similar to Alternative 1, in addition to the two - 6 hectare (15 acre) sites, there is a potential 10.6 hectare (26 acre) site east of the PC sites, across the intra-area road, that could be employed for construction laydown areas, or additional administrative and support facilities.

To provide the southern parcel with a uniform shape, up to 9 000 cubic meters (12,000 cubic yards) of soil will be required in order to fill a portion of the excavated ramp leading to the existing vaults. Soil will be retrieved from the soil mound and compacted to structural fill requirements. Enough area will be filled to provide for a north/south service road outside of the parcel. With the addition of the 72,000 cubic meters (94,000 cubic yards) being relocated to locate the northern parcel south of the existing groundwater monitoring well, the cost of grading and filling to prepare the parcels for turnover to the PC(s) is estimated at $150,000.

It is anticipated that approximately 4 hectares (10 acres) of sagebrush habitat will be destroyed by the development and construction of the access and intra-area roads and utility easements. Seventy five percent of the northern parcel is covered by undisturbed sage-strep whereas less than half of the southern parcel is undisturbed. If both parcels are fully developed, approximately 7.5 hectares (18.5 acres) of additional sagebrush habitat would be destroyed for a total of 11.5 hectares (28.5 acres) of habitat. Sagebrush habitat mitigation costs for Alternative 3 would be expected to be approximately $345,000.

b. Access Roads - Roads are extended identical to that described for Alternative 1.

c. Rail Service - Access to the site by rail is identical to that provided by Alternative 1.

d. Water Supply - Raw, fire suppression, and potable water services are extended identical to that described for Alternative 1.

e. Liquid Process Effluents - The liquid effluent lines from the PC(s) to existing treatment and disposal facilities will be routed identical to that described for Alternative 1.

f. Electrical Power - Identical to that described for Alternative 1, electrical power will be extended to a new substation and routed within the privatization site within defined corridors.

g. Telecommunications - Identical to that provided for Alternative 1.

h. Monitoring Wells - Neither 6 hectare (15 acre) parcel will have a Category 4 groundwater monitoring well residing within its boundaries. Some abandoned wells, or wells that will be abandoned in the near future, reside within the boundaries of the southern parcel proposed by Alternative 3 and will be clearly marked at grade and should pose few problems for the PC.

i. Transfer/Feed Lines - PC(s) will be responsible for selecting the route and installing the transfer/feed lines from the AP Tank Farm. A utility corridor identical to that described for Alternative 1 is shown in Figure 3.

IV. IDENTIFICATION OF PREFERRED ALTERNATIVE

A. EVALUATION OF ALTERNATIVES

1. Evaluation Methodology

The means employed in evaluating alternatives for the development of the TPPI site will be in accordance with a modified Kepner-Trego decision analysis methodology. The subject is first clarified by a "decision statement" from which objectives can be established. The objectives will then be classified between limiting criteria and elements or features that are desirable rather than limiting. At this point, various alternatives are generated. First, each alternative is evaluated to the limiting criteria on a go/no-go basis with those not meeting the criteria being summarily eliminated from further evaluation. The alternatives that pass the limiting criteria are then comparatively ranked to the desirable objectives that have been numerically valued. The products of the ranking and the value of each of the desirable objectives are then summed for each alternative, with the highest scoring alternative tentatively selected as the preferred alternative. The highest scoring alternatives are then evaluated for the consequences of possible failures. The product of the probability of a given failure occurring and the costs associated with that failure gives the "financial risk" in applying a given alternative. A final selection of the preferred alternative is then made based on the benefits provided verses the amount of risk being taken.

The Decision Statement can be phrased as follows:

"Identify the land improvements necessary to develop two parcels for the competitive demonstration of pretreating, immobilizing, and vitrifying mixed waste."

2. Limiting Objectives

The limiting objectives, or criteria each alternative must meet to qualify for further evaluation, were derived from the elements described in section III.A., Criteria, and are listed in Table 1.

Table 1

LIMITING OBJECTIVES		
Objective	Alternative Meets Objective	
	Yes	No
Alternative develops two parcels of 6 hectares (15 acres) each within the compound previously known as the Grout Disposal Site (RL, 1996).	X	
Neither parcel is located within or over a contaminated area.	X	

All three alternatives were developed to be in conformance with the limiting criteria. Each contain 6 hectares and are entirely within the existing Grout Disposal Site. With the exception of the northernmost grout vault, there is no known contamination within the Grout Disposal Site.

3. Desirable Objectives

The desirable objectives, were also derived from the elements described in section III.A., Criteria, with particular interest to the basic planning criteria and the SPIF principles. The desirable objectives, their rated value, and the comparative rank and score of each alternative is listed in Table 2.

Table 2

DESIRABLE OBJECTIVES							
Objective	Rated Value	Alternative 1		Alternative 2		Alternative 3	
		Rank	Score	Rank	Score	Rank	Score
Provides Optimum Health and Safety Aspects	25	3	75	1	25	2	50
Minimizes Impacts to the Environment	20	2	40	1	20	3	60
Minimizes Cost of Site Development	15	2	30	2	30	2	30
Optimum use of Utilities/Infrastructure	10	3	30	1	10	2	20
Augments Constructibility of Facilities	5	3	15	1	5	2	10
Provides for Adjacency Relationships	5	3	15	1	5	2	10
Optimizes Site Access While Allowing Control of Process Areas	5	3	15	1	5	2	10
Provides for Growth and Future Facility Expansion.	5	3	15	1	5	2	10
Meets 200 Area Site Development Standards	5	2	10	2	10	2	10
Takes Advantage of Natural and Adjoining Features	5	3	15	1	5	2	10
Total Score	100		260		120		220

Each of the desirable objectives and the logic used in the ranking of alternatives is described below.

a. Provides optimum health and safety aspects - Among the reasons Alternative 1 is ranked the best on this objective is that, of the three alternatives, the parcel orientation that is proposed provides the largest separation distance between the PC(s). Besides minimizing the potential for interference during construction, this allows for increased dispersement of the emissions from the neighboring facility. As the predominant winds come from the northwest while the high intensity winds commonly come from the southwest (Hoitink, 1993) it is not possible to develop two 6 hectare parcels within the confines of the former Grout Disposal Site without one parcel being downwind of the other. The increased separation will minimize adverse downwind

affects. Alternative 3 is ranked second over Alternative 2 for similar reasons.

All three alternatives provide for the separation of the radioactive waste transport and process areas from the more populated areas such as employee parking and office areas. The western portion of the parcels is best suited for process facilities due to the location of the AP-Tank Farm and the existing grout vaults. Waste transfer/feed lines must be sloped to drain to the PC process facilities. As there is little grade change between the 241-AP Tank Farm to either PC parcel, to minimize the depth required for the draining of the transfer/feed lines the process facilities must be located on the western side of the parcels. Also, it has been proposed that the existing empty grout vaults be used as the immobilized low-level waste interim storage facility (Calmus, 1996, and Burbank, 1996). Access to and from the existing grout vaults can occur without cask transport vehicles having to cross or traverse the more public access roads that encompass the parcels.

It is anticipated that the PC(s) will develop their respective parcels such that employee parking and administrative areas will be situated on the eastern portion of the parcels and be separated from the process areas by a buffer zone. This will locate the personnel areas somewhat downwind of the process areas in difference to the basic site criteria identified in Section III.A.3. Though not ideal, the expansion of the site in an easterly direction due to the constraints of existing facilities creates little choice in the matter. To mitigate the situation, a larger buffer zone between personnel and process areas and increased exhaust stack heights should be employed.

b. Minimizes impacts to the environment - Alternative 3 is ranked the highest on this objective as it disturbs a smaller amount of undisturbed real estate and makes best use of the natural topographic conditions by employing the balance of the existing spoil pile as a buffer between PC parcels. The parcel orientation proposed by all alternatives will provide both parcels with mostly level conditions minimizing the need for preparatory earthwork by the PC(s). Alternative 1 is ranked above Alternative 2 as the relocation of approximately 170,000 cubic meters (220,000 cubic yards) of earth, required in order to implement Alternative 2, to the sloping terrain northeast of the northern parcel effectively negates the benefit of using a previously disturbed area. An nearly equal amount of undisturbed area will be required in order to relocate the spoil pile.

c. Minimizes cost of site development - As each alternative employs the same recommended means by which to extend utilities to the PC parcels, the cost for the extension of utilities to the PC(s) is identical for all alternatives. Therefore, the effort required to prepare the parcels for turnover to the PC(s) provide the difference in cost estimates. Rough order of magnitude costs for the construction of various utility extensions and site improvements proposed by the various alternatives are summarized and listed in Table 3. As the difference in total estimated cost for each alternative is less than 1 percent, the alternatives are considered equal in cost and are ranked the same.

Table 3

COST COMPARISON OF ALTERNATIVES*			
Utility or Improvement	Alternative		
	1	2	3
Parcel Filling/Excavation	**$36,000**	**$264,000**	**$150,000**
Sagebrush Mitigation	**$390,000**	**$315,000**	**$345,000**
Access Road Improvements/Const.	**$1,310,000**	**$1,310,000**	**$1,310,000**
Rail Service	**0**	**0**	**0**
Water Distribution System Extension	**$1,286,000**	**$1,286,000**	**$1,286,000**
Liquid Effluent Pipelines	**$1,273,000**	**$1,273,000**	**$1,273,000**
230 kV Substation & 13.8 kV Power	**$13,990,000**	**$13,990,000**	**$13,990,000**
Construction Power	**$340,000**	**$340,000**	**$340,000**
Telecommunication System Ext.	**TBD**	**TBD**	**TBD**
Monitoring Well Replacement	**0**	**0**	**0**
TOTAL ESTIMATED COST	**$18,625,000**	**$18,778,000**	**$18,693,000**

* The above Rough Order of Magnitude estimates were obtained from the various studies that are referred to in the study text or were derived within the study text from unit prices.

d. Optimum use of utilities/infrastructure - All three alternatives utilize the preferred alternatives that were identified in engineering studies that evaluated means of providing specific utility services to the PC sites. As such there is little difference in any one alternative's ability to employ elements of the infrastructure. The only area where the alternatives could be ranked against one another would be in the utilization of existing features such as the soil mound. As Alternative 1 employs the

soil mound as a buffer, and Alternative 3 similarly employs a portion of the mound, they are ranked first and second accordingly.

e. Augments constructibility of facilities - All three alternatives will provide reasonably level, 6 hectare sites, of very similar geometry. With the provisions of both a north and south access to the site, the movement of material shipments and construction equipment for each PC can be separated. The PC assigned to the northern parcel can have the shipments enter from the north, off of Route 1. The PC assigned to the southern parcel have material shipments enter from Route 4S. On all these points the alternatives are reasonably equal. However, Alternative 1 is ranked the highest on this objective as the increased separation between parcels minimizes the potential for one PC to interfere with the construction activities of another. Alternative 3 is similarly ranked second. Additionally, as part of the studies proposing to utilize the existing Grout Vaults for the interim storage of immobilized low-level waste, it was proposed that a larger vault be constructed adjacent to the existing vaults (Calmus, 1996, and Burbank, 1996). Alternative 1 provides adequate space for the construction of such a vault (see Sketch ES-E23382-C-008).

f. Provides for adjacency relationships - All three alternatives have the same western boundary and are as close to the 241-AP Tank Farm as is feasible. The proposed temporary repository for the treated waste, the existing grout vaults, lies in between, providing easy access to the inter-related facility. On these points all three alternatives are reasonably equal. However, Alternative 1 is ranked the highest on this objective as each PC's waste feed lines can be routed in separate corridors minimizing interferences during PC design and construction activities. The PC assigned to the southern parcel could be relegated to a route to the south side of the grout complex while the PC assigned to the northern parcel would be relegated to a waste feed line route to the north. The northern route would run from the AP Tank Farm in a corridor just south of the existing waste feed transfer line, then north and east to the north side of the existing vaults. Alternative 3 provides the same features, but the slightly larger parcel separation provided by Alternative 1 gives that alternative a preference. As both PC(s) would most likely employ the northern waste transfer route if Alternative 2 were employed, that alternative is ranked the least on this objective.

g. Optimizes site access while allowing control of process areas - All three alternatives provide identical means for site access. The main access roads circumscribe the parcels and the interim storage area providing an inherent separation of public traffic from waste transfer and

process areas. The increased separation between PC parcels provided by Alternative 1 allow for the development of a larger staging and maneuvering area for the transfer of casks from the PC sites to the interim storage area (vaults). This larger area will allow for optimum control of access to the process and material handling areas. Alternative 3 is ranked second on this objective as the amount of staging area available between parcels is larger than that provided by Alternative 2.

h. Provides for growth and future facility expansion - There is a total of 36 hectare (89 acre) of usable land (having less than a 5 percent grade) available within the Phase I Privatization site. Alternative 1 is the most flexible if it becomes necessary to expand the 6 hectare (15 acre) sites. Alternative 1 could be readily expanded into the area covered by the soil mound by relocating a portion of, or all of the mound. Up to a total of 9.5 hectares (24 acres) each could be provided to each PC by the extension of one boundary line of each parcel. Alternative 3 is ranked second as it can be expanded similarly to provide the same 9.5 hectare parcels, however, by expanding to that degree Alternative 1 is created. Alternative 2 is ranked third as the complete relocation of the southern parcel would be required for the northern parcel to be expanded.

i. Meets 200 Area Site Development Standards - All three alternatives meet the standards listed in Section II.A.3. and therefore are ranked equally on this objective.

j. Takes advantage of natural and adjoining features - Alternative 1 is ranked the highest of all the alternatives as it takes advantage of the existing soil mound to provide a large buffer between PC activities. Alternative 3 is ranked second as it proposes the removal of a portion of the soil mound.

4. Risk Analysis

Alternatives 1 and 3 scored within approximately fifteen percent of one another on the desirable objectives (see Table 2) with Alternative 1 scoring the highest and being tentatively selected as the preferred alternative. The risks of implementing either of the two alternatives will be analyzed and compared by an examination of the probability of any given failure or loss, and the cost impacts of that failure or loss, should the alternative be implemented.

a. Well Relocation - In implementing Alternative 1, there is a risk that well 299-E25-32 will have to be relocated. This well is one of only a handful

of wells at Hanford which provide information about the vertical gradients and radiochemical distribution across two intervals. With a Priority 1 Category 4 classification, this well will require replacement if it must be decommissioned due to PC activities. Besides losing the continuity of data from an historical baseline, the cost for the replacement of a Category 4 groundwater monitoring well is estimated to be over $75,000. It is impossible to place a cost value on the loss of the ability to continue the collection of data for comparison with the historical base developed from past sampling of this well. The data cannot be duplicated or replaced, and has little intrinsic value. The environmental impacts created when moving 72,000 cubic meters (94,000 cubic yards) of earth, as proposed by Alternative 3, may balance the potential for loss of the historical base for groundwater monitoring should well 299-E25-32 require relocating to be able to fully implement Alternative 1. However, assuming there is a 50/50 probability of having to replace the well, the 'financial risk' being taken by implementing Alternative 1 is approximately $38,000. As this amount of 'financial risk' is negligible when compared to the total cost of implementing any one of the alternatives, Alternative 1 remains the preferred alternative.

b. Expansion of Vault Facility - It has been recently proposed that, in addition to utilizing the existing Grout Vaults for the interim storage of immobilized low-level waste, a larger vault be constructed adjacent to the existing vaults (Calmus, 1996, and Burbank, 1996). Alternative 1 provides adequate space for the construction of such a vault (see Sketch ES-E23382-C-008). As the buffer zone between the PC parcels is smaller in Alternative 3, there is a risk that should the construction of the additional vault be required, the smaller area provided by Alternative 3 would create additional constraints in the construction of the vault. These constraints may cause cost impacts to either the PC(s) or the vault project. The amount of 'financial risk' that would be taken in implementing Alternative 3 is not estimable at this time. However, as Alternative 1 provides less potential for 'financial risk' in this area it remains the preferred alternative.

B. PREFERRED ALTERNATIVE

Alternative 1 is the preferred alternative for development of the TPPI Site. Proposed improvements are shown in Sketch ES-E23382-C-008. Alternative 1 meets all limiting objectives or criteria identified in Section IV.A.2. and scored the highest, of the three alternatives evaluated, on the desirable objectives identified in Section IV.A.3. A risk analysis of the highest scoring alternatives

indicated that implementing Alternative 1 carries no more risk than implementing Alternative 3 except for the potential to require the replacement of the 299-E25-32 groundwater monitoring well. As the additional cost of replacing the well under Alternative 1 basically offsets the additional cost of relocating a portion of the soil mound to avoid the well, as proposed by Alternative 3, the additional 'financial risk' in implementing Alternative 1 is acceptable.

The implementation of Alternative 1 will have minimal impact in the day to day operations of the existing 200-East Area infrastructure. Demands on existing infrastructure systems will remain below maximum capacity. Various maintenance activities would be expanded, but it is anticipated they would have minimal impact on the current operations.

A schedule has been developed (see Appendix B) that presents the course by which design and construction activities should proceed. It should be noted that the schedule takes into account the integration of the construction of various utilities and services. As an example, road services are also to be provided to each parcel by 2000. To avoid excavating into or through previously completed roadways, the construction of the water lines should be completed prior to the need for finish grading of the roads. Also, it would be anticipated that the initial clearing and grubbing of water line alignments would occur during the winter of 1998/1999 as part of the site preparation/road construction activities in order to avoid impacting threatened species.

C. UNCERTAINTIES

1. Parcel Size and Orientation

   It is uncertain as to what will be the final layout of the PC parcels. Land requirements of each PC will be established after contract placement, and final size and orientation may differ from the basis or assumptions used. The alternatives were developed based on the TPPI RFP PC parcel size and orientations given in previous studies (Trost, 1996 b). Variations and combinations of several of the alternatives evaluated may need to be investigated further based on the PC's needs.

2. Site Constraints

   a. Existing Past Practice Disposal Areas - The TPPI Site is surrounded by various waste sites such as waste trenches, ditches, ponds, and burial grounds. The nearby utility infrastructure serves and weaves through numerous process and waste storage facilities. The areas and

corridors remaining in between may contain surface and/or subsurface contamination. This places constraints on the extension of roads and utilities into the site. The degree by which contamination is encountered and the impacts it creates on the cost and schedule is uncertain.

Design and construction of all future projects must be coordinated closely with the appropriate operable unit manager(s) to ensure compliance with RCRA and CERCLA requirements and to minimize construction, remediation, and operating costs. The TPPI site is encircled by and within certain operable units, therefore, development must be closely integrated with cleanup and restoration plans for those operable units. The impacts to schedule and cost of the Phase I site development in order to perform these integration activities is uncertain.

b. Crossings of Contaminated Pipelines - The raw water pipeline route proposed for extending a fire suppression distribution loop into the TPPI site must cross a couple of abandoned cooling water and steam condensate drain lines that fed into the various cribs and trenches southwest of the TPPI site (Fort, 1996). It is possible for these single wall pipelines to have had leaks, that went undetected, which has contaminated the soil in their immediate vicinity. It is currently being planned that during FY 1997 a sampling and characterization program will be initiated at these and other locations to better identify the risks involved when constructing the pipelines in the areas having the potential for subsurface contamination.

   It is reasonable to expect that the large diameter drainlines at the head of 216-A-42 Basin to have leaked contaminated water into the surrounding soil. The southern corridor, proposed by Alternatives 1 and 3 for the PC(s) to install waste transfer pipelines, crosses through this area. It may not be possible for the PC(s) to install waste transfer pipelines without the Hanford Site Maintenance and Integration Contractor (M&I) first performing some degree of remediation. The same can be said for the northern waste transfer line corridor that crosses over the clay chemical sewer pipelines that drained into the 216-A-29 Ditch east-northeast of the 241-AP tank farm. The magnitude of contamination that exists and the impacts that would be had on construction activities cannot be estimated without comprehensive sampling and characterization. With the cost for analysis of soil samples estimated at between $4,000 and $6,000 each, the cost for characterization of these two locations is estimated to be around $100,000. It is currently being planned that during FY 1997 a sampling and characterization program will be initiated at these locations to better identify the risks involved in constructing pipelines in the areas having

the potential for subsurface contamination. Costs for performing any sampling or remediation effort is not provided for in any of the construction estimates generated while developing this study.

c. Crossing of the 216-A-29 Ditch - All three alternatives propose crossing Snows Canyon (216-A-29 Ditch) for road, water mains and liquid effluent pipelines. The crossing of the ditch requires the construction of a new embankment in an area where the ditch is situated below the invert of a 3 to 4 meter deep swale.

As the canyon is an inactive hazardous waste disposal unit under RCRA Part A permit (DOE-RL, 1994), any activity within the waste units boundary must be approved by the regulators. Recent discussions with the Washington State Department of Ecology on the subject of a 216-A-29 Ditch crossing indicate that the state may request some level of characterization be performed in the vicinity of the crossing as part of the effort to install the new pipelines. It is uncertain as to what actions will be required, or what improvements will be allowed in the ditch, once the characterization has been performed and more is known about the level and types of contamination that exist. Should contaminant levels exceed expectations, it is also uncertain as to the response the regulators may require to continue to propose the use of the crossing. It is possible that, in order to construct a road and pipeline crossing, the affected area (approximately 1860 square meters) of the ditch may be required to be remediated first. The ditch is not scheduled for characterization, remediation, and closure by the Hanford environmental restoration and management contractor until some time after the year 2000. To employ a ditch crossing there is the risk of having the increased cost of full remediation of up to a 30 meter (100 feet) section of the 216-A-29 Ditch added to the effort. The cost estimates noted in this study do not account for the cost of any remediation.

One of the risks involved in running pressure mains for water distribution systems across the ditch is that the long-term undetected leakage of small amounts of water into the canyon could re-suspend any contamination present in the soil and carry it deeper, potentially to the groundwater. The use of nestable pipe encasements to direct any minor leakage beyond the boundaries of the ditch are proposed as mitigating features to minimize the potential for the spreading of contamination.

Due to the size of the raw water pressure main (300 mm) there is the potential to cause erosion damage to the canyon invert with the catastrophic failure of the pipeline. The only features that exist to

mitigate such an occurrence are the erosion control dams within the canyon. The volume of water deposited into the canyon before response by operations personnel to close isolation valves could easily cause the failure of these dams, eroding the canyon floor and spreading contamination. Remediation could cost millions of dollars.

Other mitigating features could be employed to reduce the potential for a catastrophic accident, such as structural concrete encasement, pressure sensors tied to automatic shutoff valves, etc. The evaluation of such safety features would be the subject of a future study.

3. Assumptions

   a. Land Requirements - It is assumed the land requirements identified in the *Request for Proposals* (DOE-RL RFP No. DE-RP06-96RL13308, 1996) be sufficient to allow for future support facility expansion by each PC.

   b. NEPA Documentation and Environmental Assessments - The amount of NEPA documentation existent or necessary to perform the recommended site improvements will be addressed in a separate report (TWRS Privatization Phase I Site Characterization Environmental Baseline Report) to be performed in FY 1997. It is assumed that NEPA documentation previously developed for work within the former Grout Disposal Site will provide the basis for the NEPA documentation for the project and portions of the utility corridors which lie outside the former Grout Disposal Site. It is also assumed that the necessary documentation for required for the TPPI site can be provided by incorporating the Grout project NEPA either directly or by reference without creating additional project impacts. It is anticipated that an Environmental Assessment (EA) will be required for the 230 kV Substation and related transmission line as well as an EA for the road improvement work outside the former Grout Disposal compound.

   c. Habitat Mitigation Responsibilities - With each PC responsible for the clearing, grubbing and finite grading of their respective parcel, it remains uncertain as to who will be responsible for the cost of mitigating the habitat that is lost in the process. It is therefore assumed that DOE-RL will be responsible for the costs of mitigating the losses in habitat. The rough order of magnitude estimates for sagebrush habitat mitigation that were derived in this study have been included in the total estimate for each alternative.

d. Storm Water - It is assumed each PC will be responsible for the management of storm water within the boundaries of their respective site through localized channeling and evaporation/percolation depressions.

e. Decontamination and Decommissioning - It is anticipated that all of the existing facilities in the 200-East Area will be involved in extensive decontamination and decommissioning activities in the immediate future, and possibly much longer. It is assumed that integration with such activities will not cause adverse cost and schedule problems for the development of the site.

f. Steam and Sanitary Wastes - It is assumed that, in accordance with the *Request for Proposals* (DOE-RL RFP No. DE-RP06-96RL13308, 1996), the PC(s) will provide facilities to meet their steam and sanitary wastewater requirements within their respective parcels.

V. IMPLEMENTATION RECOMMENDATIONS

It is recommended that the TWRS Phase I privatization site be developed through the implementation of Alternative 1 as outlined in this study, subject to favorable results from the recommended activities noted below.

As part of this study an overall long-range Master Site Plan (MSP) (Trost, 1996 a) has been developed to establish a "baseline" for the TPPI PC sites. The results of this and other recently completed TPPI engineering studies have been integrated into this MSP. The MSP depicts the recommended layout for the PC sites along with various interfaces between the sites and other Hanford utilities and functions. The complete integration of the TPPI MSP with the overall Hanford Site planning process will assist in establishing the PC sites and the necessary priorities to meet the Hanford cleanup mission. It is recommended that the MSP be formalized into a living document. As the TPPI program's technical details become established, project definitions are changed, and new data becomes available, the MSP should be updated accordingly and used as a point of reference for the development of the site.

It is recommended that the following evaluations continue in development and be completed in early FY 1997 to identify any potential impacting elements that would inhibit the implementation of the preferred alternative:

- Contaminant levels at the base of the earth embankment proposed to be employed in the crossing of the 216-A-29 Ditch. (The Hanford Site Environmental Restoration Contractor has been commissioned to organize a

Data Quality Objectives session with the regulators to establish the required sampling and any mitigation responses in order to employ a crossing.)

- Confirmation sampling and analysis of surface and subsurface soils in areas of reasonable potential for contamination. In addition to the 216-A-29 Ditch (noted above), the area southeast of the 216-A-30 and 216-A-37-2 cribs and the locations where existing waste cooling water drain lines are crossed should be sampled and analyzed.

Cultural and ecological resources reviews are required prior to the initiation of any construction activities. A preliminary ecological evaluation is planned during FY 1997 to identify any major impacts or issues to site development. A response to any issue could then be planned for, evaluated, and mitigating elements implemented before any major impacts occur to the schedule. A cultural and ecological resources review is also planned for the spring of 1998.

Each corner of the parcels identified in Alternative 1 should be marked through the installation of permanent survey markers or monuments. The legal description of the TPPI, for the purposes of RCRA permitting, should be changed slightly from that provided for the former Grout Disposal Site. The site boundary should be modified to extend the fence line on the south side of the Grout complex paralleling the 216-A-37-1 and 2 cribs to the fence south of Grout Drive. This will provide for a more direct routing of the waste transfer lines to the PC assigned to the southern parcel.

The two PC(s) should join together to construct a single septic system or sanitary disposal field. A single system could be located in the northern sloping portion of the site, an area outside of the usable land area identified for PC site development, but within the former Grout Disposal Site compound. The natural grade, averaging 6 to 7 percent, could be employed to design a gravity induced pressure distribution system simplifying system controls. A single, larger system can be installed and operated at less cost than would two separate, smaller systems. A single 14,500 gallon system (maximum allowed under Washington State Department of Health guidelines) will be sufficient to provide service for more than 600 employees.

It is recommended that a study be commissioned to investigate the necessary system upgrades in order to provide telecommunications to the TPPI site. The extension of telecommunications into the TPPI site was not addressed in the TPPI RFP, and as such the parties responsible for existing system upgrades and cable installation have not been identified. It is anticipated that the utility corridors identified in this study for the extension of utilities from the 200-East Area infrastructure will be utilized in extending telecommunications to each PC, and existing and new pole lines for the distributing of electrical power will be employed.

VI. REFERENCES

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Appendix A

Figures

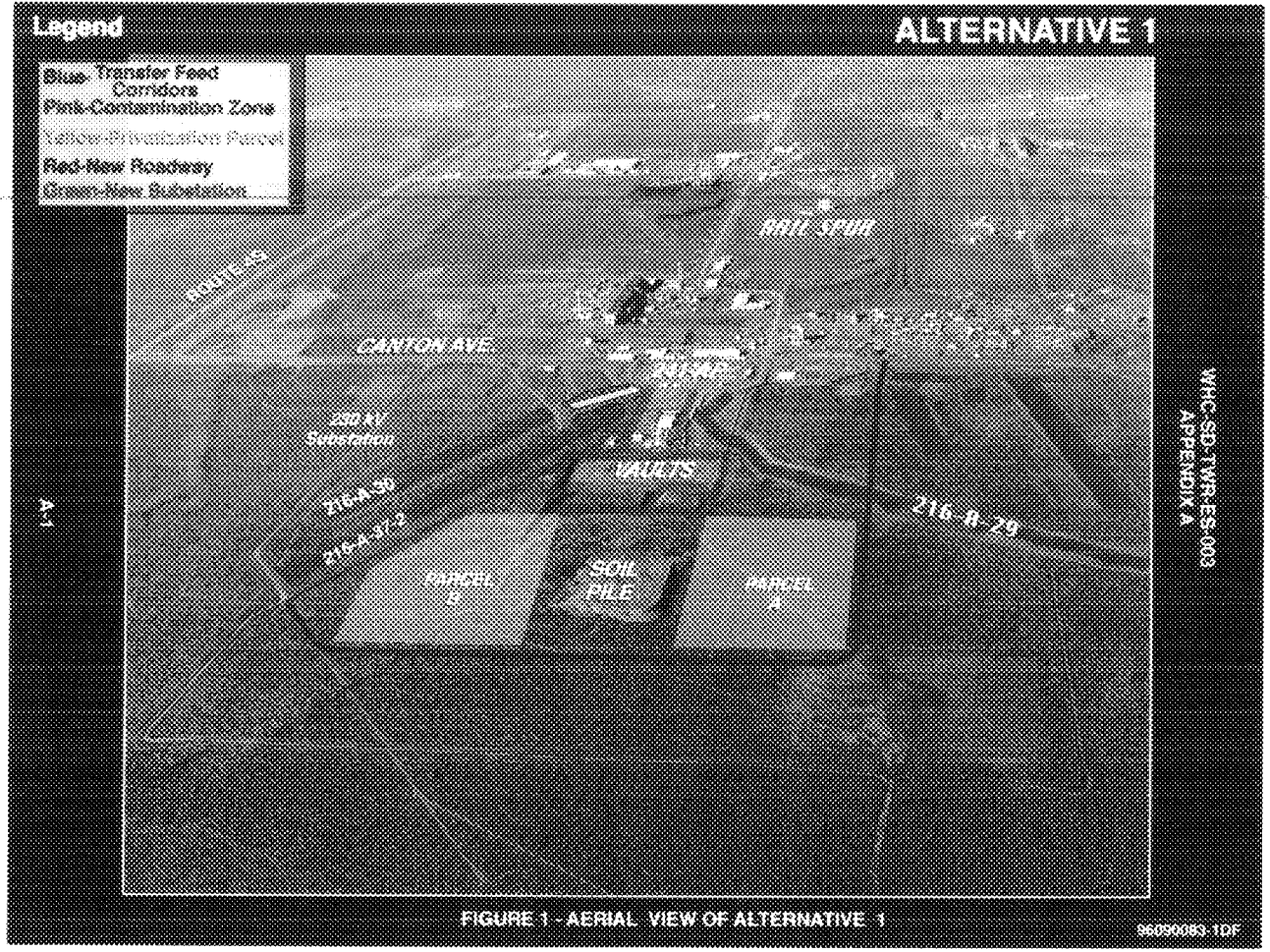


FIGURE 1 - AERIAL VIEW OF ALTERNATIVE 1

96090083-1DF

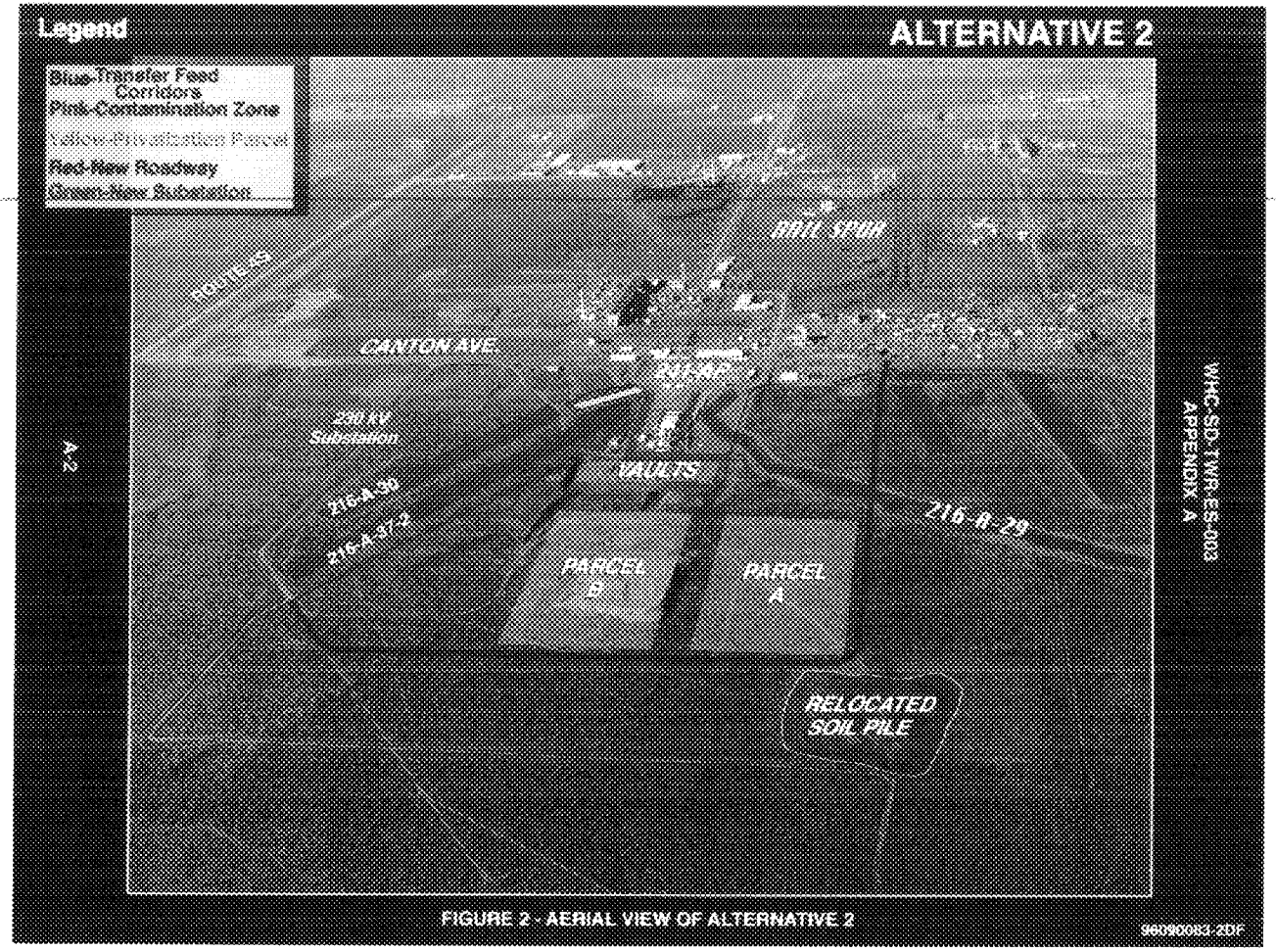


FIGURE 2 - AERIAL VIEW OF ALTERNATIVE 2

96090083.2DF

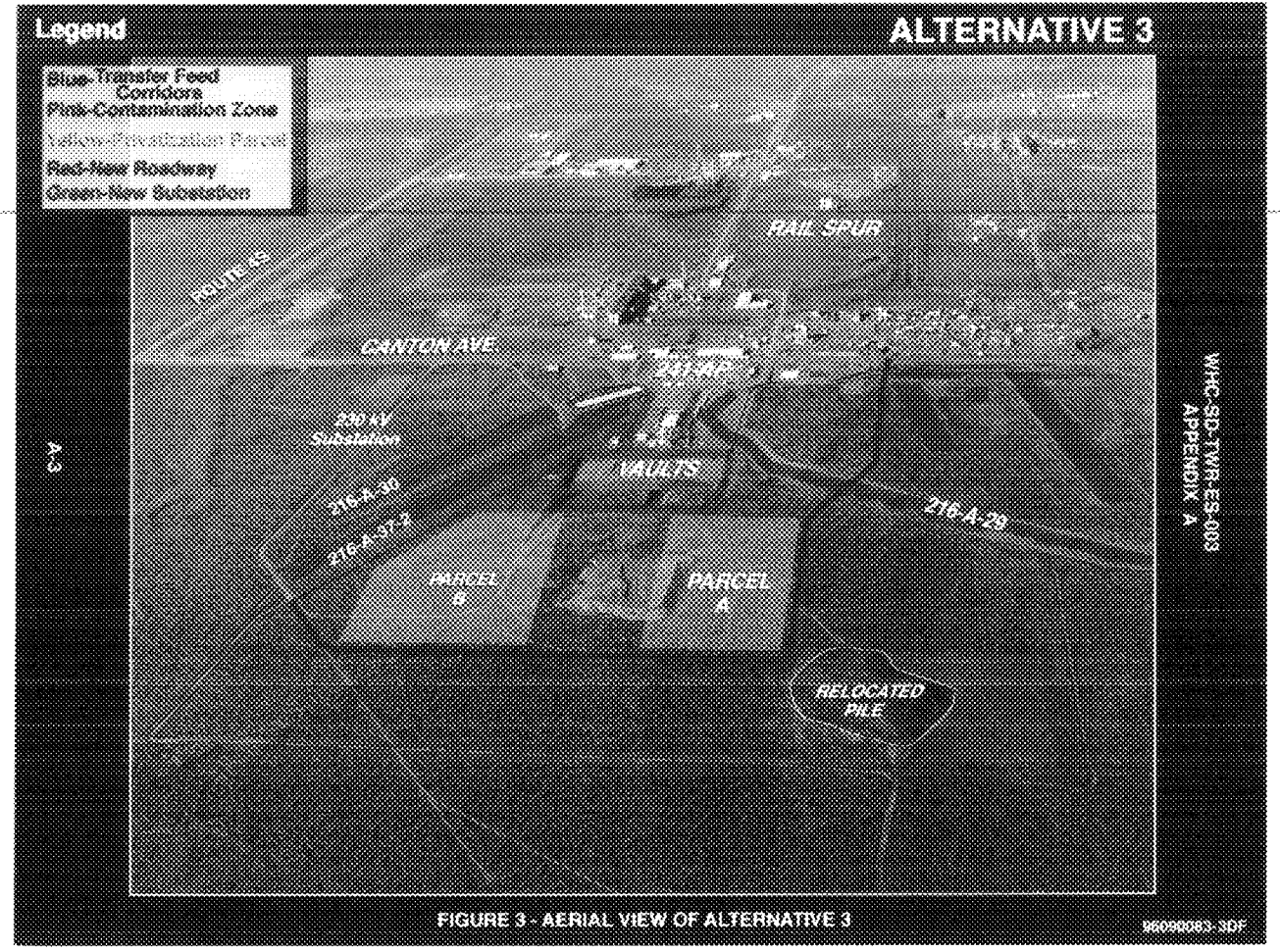
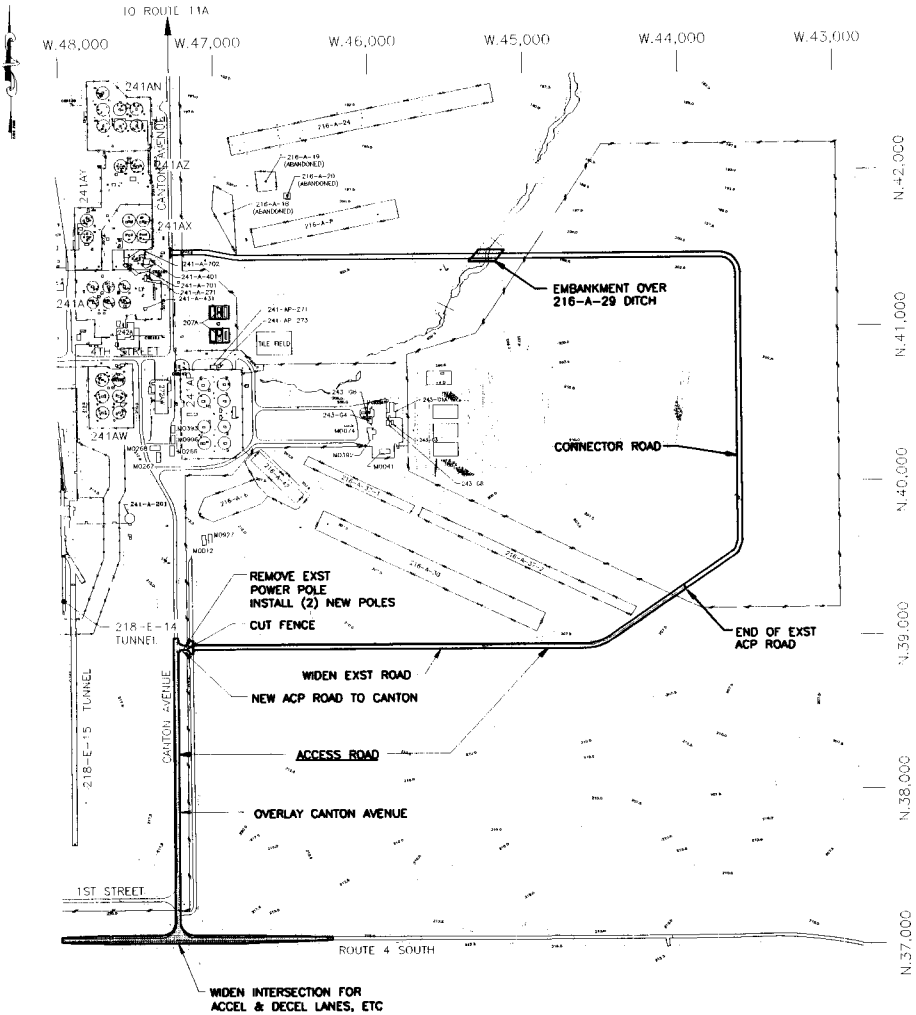


FIGURE 3 - AERIAL VIEW OF ALTERNATIVE 3

96090083-3DF



SITE PLAN
SCALE: 1:4500
0 45 90 180 270 360
1 cm = 45 meters

FIGURE 4
PREFERRED ACCESS ROAD LOCATIONS

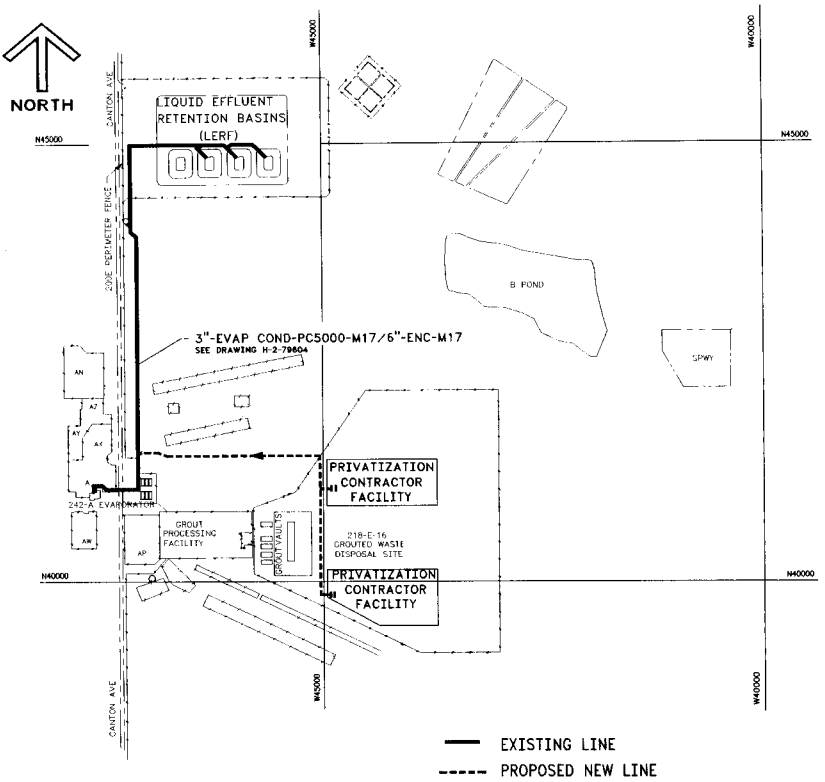


FIGURE 5
RADIOACTIVE, DANGEROUS
LIQUID EFFLUENT TRANSFER SYSTEM

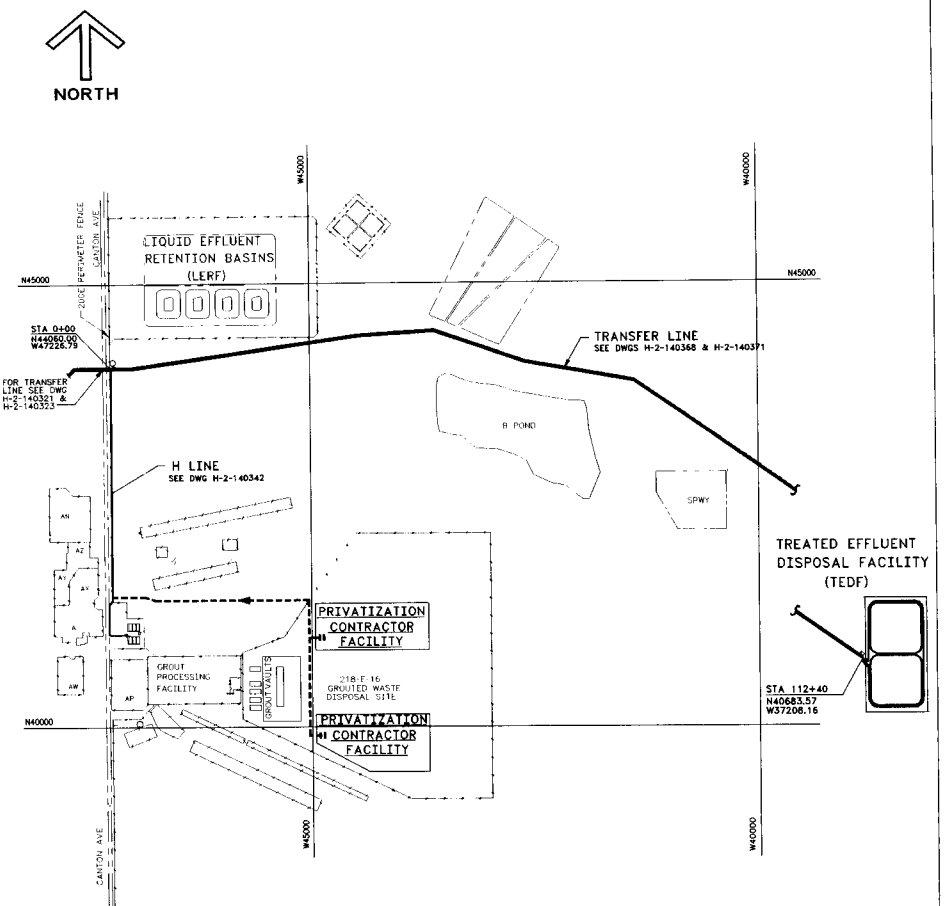


FIGURE 6
NON-RADIOACTIVE, NON-DANGEROUS
LIQUID EFFLUENT TRANSFER SYSTEM

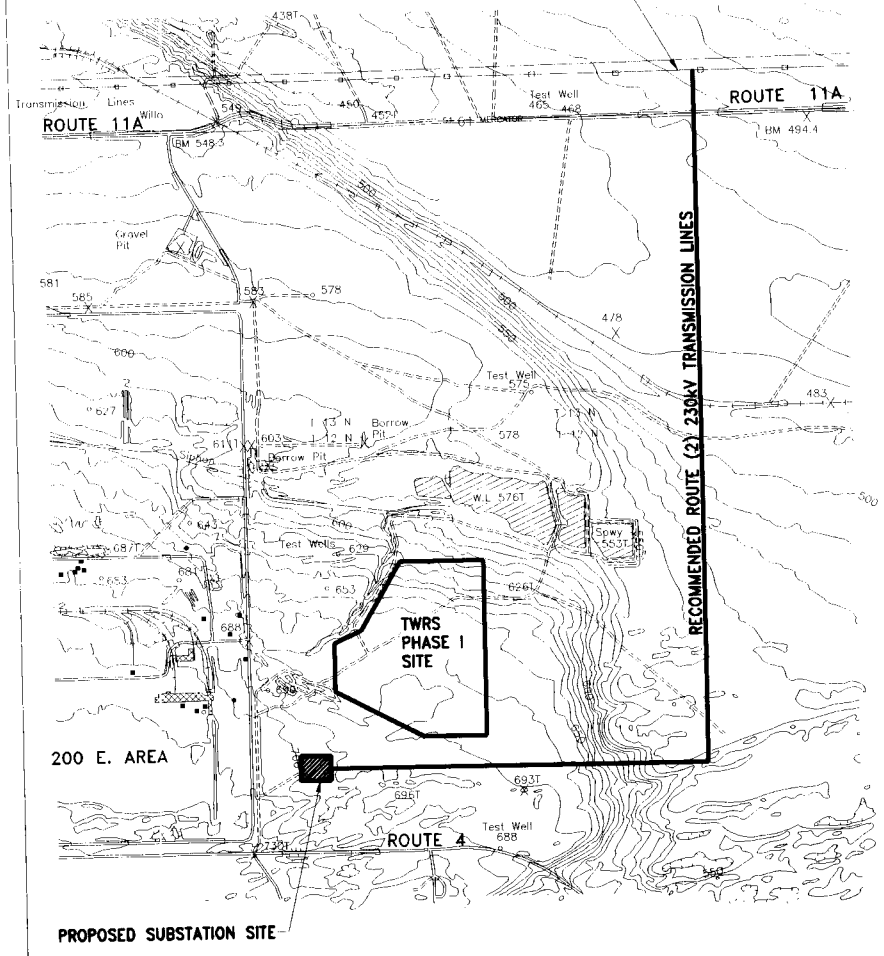


FIGURE 7.

ELECTRICAL POWER TRANSMISSION ROUTE

Appendix B

Schedule

WBS	Activity ID	Activity Description	Early Start	Early Finish
1				
1.1				
1.1.1				
1.1.1.3				
1.1.1.3.02				
1.1.1.3.02.03				
1.1.1.3.02.03.01				
1.1.1.3.02.03.01.01				
1.1.1.3.02.03.01.01.01				
1.1.1.3.02.03.01.01.01.	L3W11105	Project Management FY97	01OCT96*	30SEP97
1.1.1.3.02.03.01.01.01.	L3W11105A	Key Decision "0" Provided by RL Phase I	06JAN97*	
1.1.1.3.02.03.01.01.01.	L3W11210	Project Management FY98	01OCT97	30SEP98
1.1.1.3.02.03.01.01.01.	L3W11315	Project Management FY99	01OCT98	30SEP99
1.1.1.3.02.03.01.01.01.	L3W11420	Project Management FY2000 to FY2001	01OCT99	28SEP01
1.1.1.3.02.03.01.01.01.	L3W11525	Project Management FY2002 to FY2016	01OCT01	30SEP16
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1.1.1.3.02.03.02.01				
1.1.1.3.02.03.02.01.02				
1.1.1.3.02.03.02.01.02.01				
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1.1.1.3.02.03.02.01.02.	L3W212110	Electrical Systems Integration FY98	01OCT97	30SEP98
1.1.1.3.02.03.02.01.02.	L3W212115	Electrical Systems Integration FY99	01OCT98	30SEP99
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1.1.1.3.02.03.02.01.02.	L3W2123	Electrical Interface Control Document Rev	01OCT96*	28FEB97
1.1.1.3.02.03.02.01.02.	L3W2123A	Issue Rev 1 of ICDs for Elec Phse I		28FEB97*
1.1.1.3.02.03.02.01.02.04				
1.1.1.3.02.03.02.01.02.	L3W212405	Electrical Interface Control Drawing	14NOV96*	21APR97
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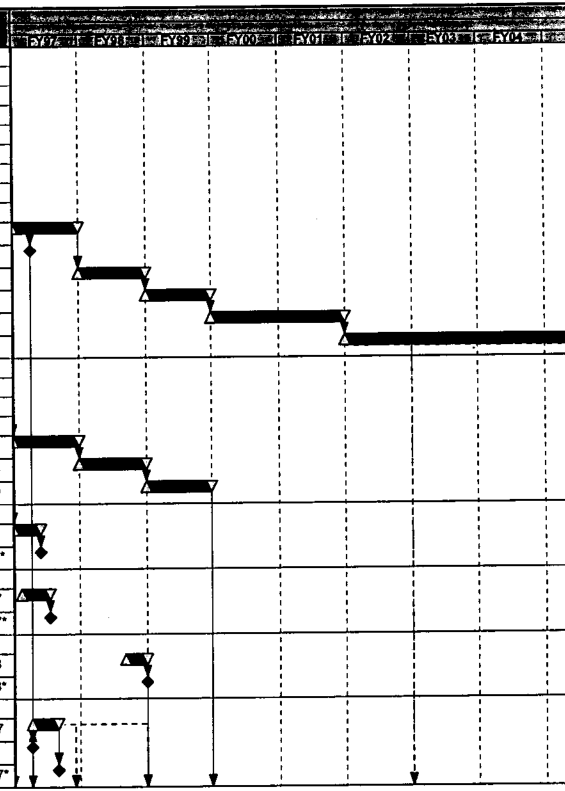

Project Start	01OCT96
Project Finish	29SEP34
Data Date	01OCT96
Plot Date	20SEP96

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Early Bar
Progress Bar
Critical Activity

SB02

LOW LEVEL WASTE PROJECT
SUPPORT SYSTEMS ACQUISITION
PAUL FELISE - MYPP

Sheet 1A of 7C

AS OF 20 SEPT96 Marian R. Strong			
Date	Revision	Checked	Approved

WBS	Activity ID	Activity Description	Early Start	Early Finish
1.1.1.3.02.03.02.01.03.	L3W213110	Conceptual Design Contingency	02SEP97*	30SEP97
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1.1.1.3.02.03.02.01.04.	L3W214110	Electrical Project E&I FY2000	01OCT99*	01JUN00
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1.1.1.3.02.03.02.01.05.	L3W215105	Electrical Project	01OCT98	30SEP99
1.1.1.3.02.03.02.01.05.	L3W215105A	Award Procurement Contract for Phs I	01OCT98*	
1.1.1.3.02.03.02.01.05.	L3W215110	Electrical Project Dsn/Construct/Startup	01OCT99*	14MAR00
1.1.1.3.02.03.02.01.05.	L3W215110A	Compt Constructn/Startup Electrical Sys		14MAR00*
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1.1.1.3.02.03.02.01.06.	L3W216105	Electrical Project Engineering FY99	01OCT98*	30SEP99
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1.1.1.3.02.03.02.01.06.	L3W216215	Electrical Project Technical Support FY99	01OCT98	30SEP99
1.1.1.3.02.03.02.01.06.	L3W216220	Electrical Project Technical Support	01OCT99	29SEP00
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1.1.1.3.02.03.02.02.02.	L3W222130	Raw and Potable Water Systems	01OCT98	30SEP99
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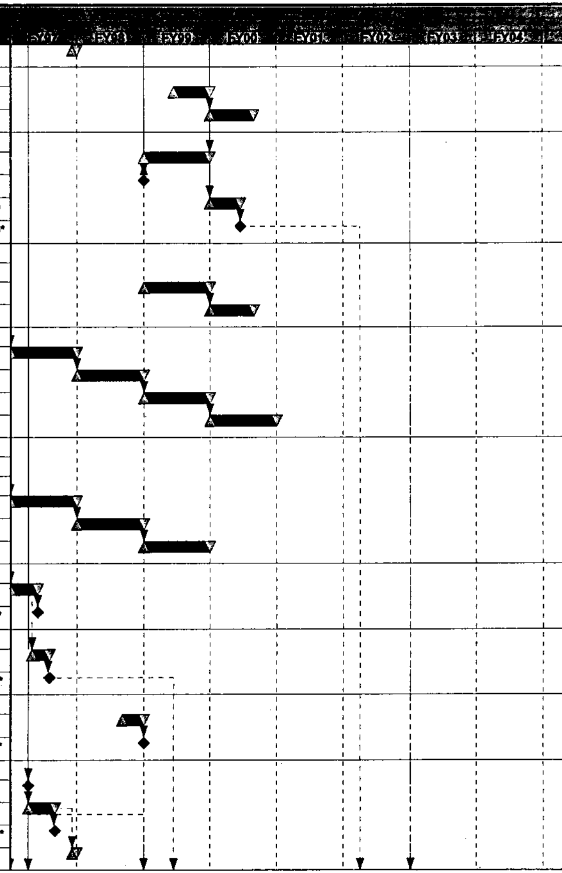

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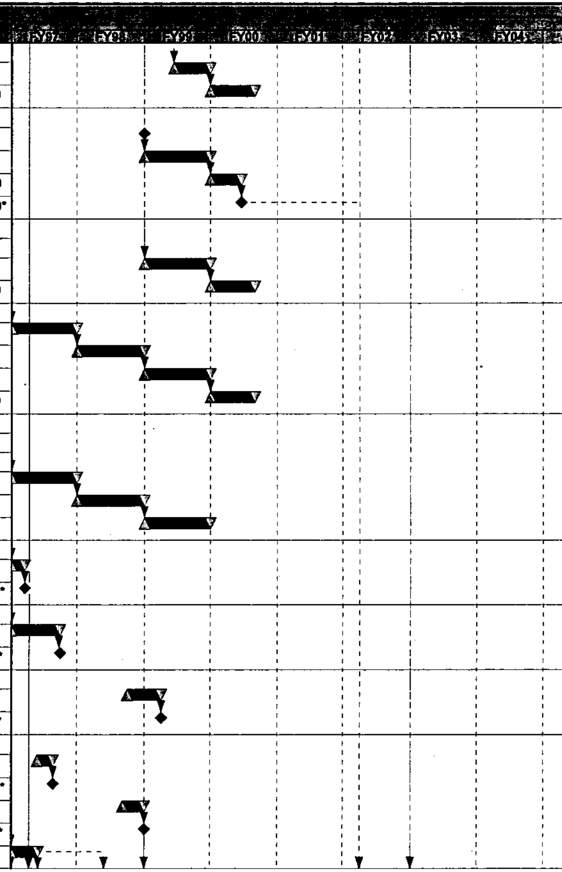

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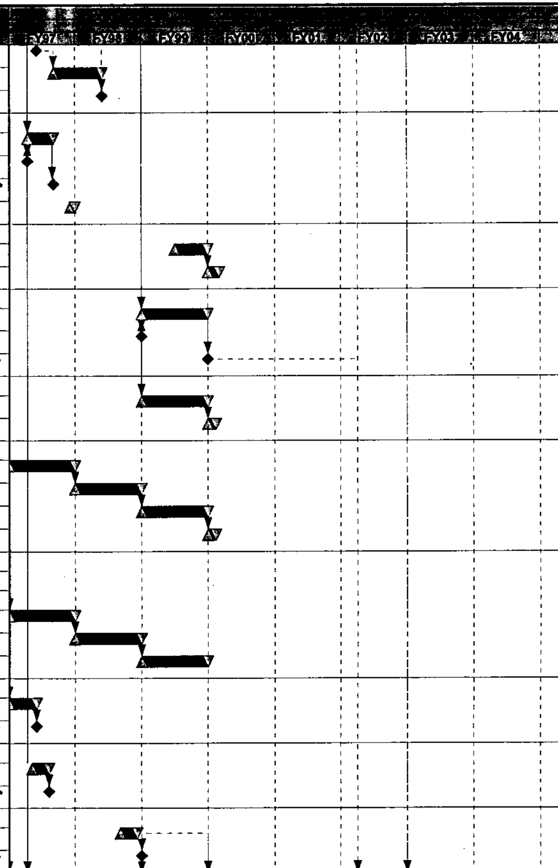
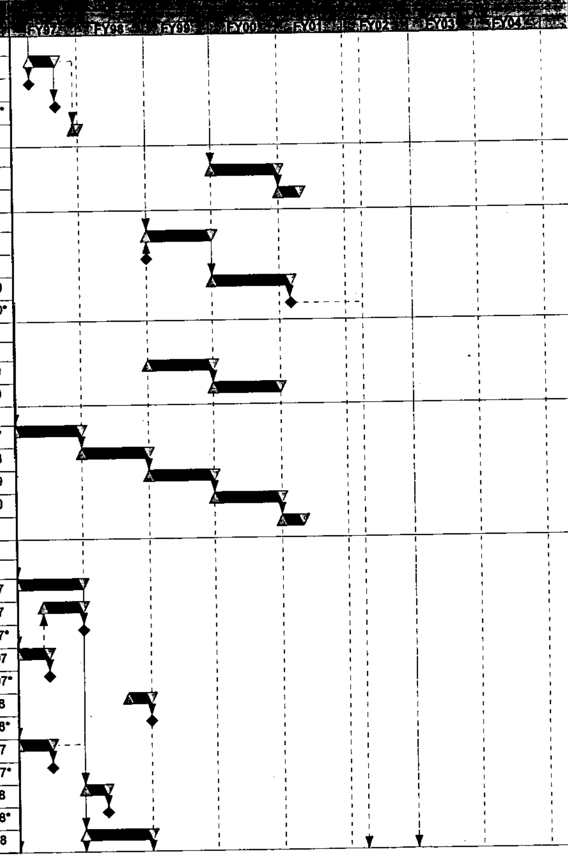
1.1.1.3.02.03.02.03.02.	L3W232710	Site Characterization Data Collection and	02JUN97*	27FEB98
1.1.1.3.02.03.02.03.02.	L3W232710A	Complete Data Collection and Report		27FEB98*
1.1.1.3.02.03.02.03.03				
1.1.1.3.02.03.02.03.03.	L3W23305	Site Work and Roads Conceptual Design	06JAN97*	29MAY97
1.1.1.3.02.03.02.03.03.	L3W23305A	Initiate Conceptual Design Site/Roads	06JAN97*	
1.1.1.3.02.03.02.03.03.	L3W23305B	Cmplt Concept Dsn Site/Roads Proj Phse		29MAY97*
1.1.1.3.02.03.02.03.03.	L3W23310	Conceptual Design Contingency	02SEP97*	30SEP97
1.1.1.3.02.03.02.03.04				
1.1.1.3.02.03.02.03.04.	L3W23405	Engineering & Inspection FY99 -Site	01APR99*	30SEP99
1.1.1.3.02.03.02.03.04.	L3W23410	Engineering & Inspection FY00 -Site	01OCT99*	30NOV99
1.1.1.3.02.03.02.03.05				
1.1.1.3.02.03.02.03.05.	L3W23505	Design/Construction/Startup - Site &	01OCT98*	30SEP99
1.1.1.3.02.03.02.03.05.	L3W23505A	Award Procurement Contract Site/Roads	01OCT98*	
1.1.1.3.02.03.02.03.05.	L3W23505B	Compt Constructn/Startup Site		30SEP99*
1.1.1.3.02.03.02.03.06				
1.1.1.3.02.03.02.03.06.	L3W236105	Project Engineering FY99 - Site	01OCT98*	30SEP99
1.1.1.3.02.03.02.03.06.	L3W236110	Project Engineering FY00 - Site	01OCT99*	10NOV99
1.1.1.3.02.03.02.03.06.02				
1.1.1.3.02.03.02.03.06.	L3W236205	Project Technical Support FY97 - Site	01OCT96*	30SEP97
1.1.1.3.02.03.02.03.06.	L3W236210	Project Technical Support FY98 - Site	01OCT97*	30SEP98
1.1.1.3.02.03.02.03.06.	L3W236215	Project Technical Support FY99 - Site	01OCT98*	30SEP99
1.1.1.3.02.03.02.03.06.	L3W236220	Project Technical Support FY00 - Site	01OCT99*	10NOV99
1.1.1.3.02.03.02.04				
1.1.1.3.02.03.02.04.02				
1.1.1.3.02.03.02.04.02.01				
1.1.1.3.02.03.02.04.02.	L3W242105	Liquid Effluents Systems Integration FY97	01OCT96*	30SEP97
1.1.1.3.02.03.02.04.02.	L3W242110	Liquid Effluents Systems Integration FY98	01OCT97*	30SEP98
1.1.1.3.02.03.02.04.02.	L3W242115	Liquid Effluents Systems Integration FY99	01OCT98*	30SEP99
1.1.1.3.02.03.02.04.02.03				
1.1.1.3.02.03.02.04.02.	L3W242305	Liquid Effluents Interface Control	01OCT96	28FEB97
1.1.1.3.02.03.02.04.02.	L3W242305A	Issue Rev 1 ICDs Liquid Effluent Phase I		28FEB97*
1.1.1.3.02.03.02.04.02.04				
1.1.1.3.02.03.02.04.02.	L3W242405	Liquid Effluents Interface Control Drawing	04FEB97*	05MAY97
1.1.1.3.02.03.02.04.02.	L3W242405A	Issue Rev 0 Intrfce Cntrl Dwgs Liq Eff		05MAY97*
1.1.1.3.02.03.02.04.02.05				
1.1.1.3.02.03.02.04.02.	L3W242505	Liquid Effluents Interface Control Drawing	08JUN98*	08SEP98
1.1.1.3.02.03.02.04.02.	L3W242505A	Issue Rev 1 Intrfce Cntrl Dwg Liq Eff		30SEP98*



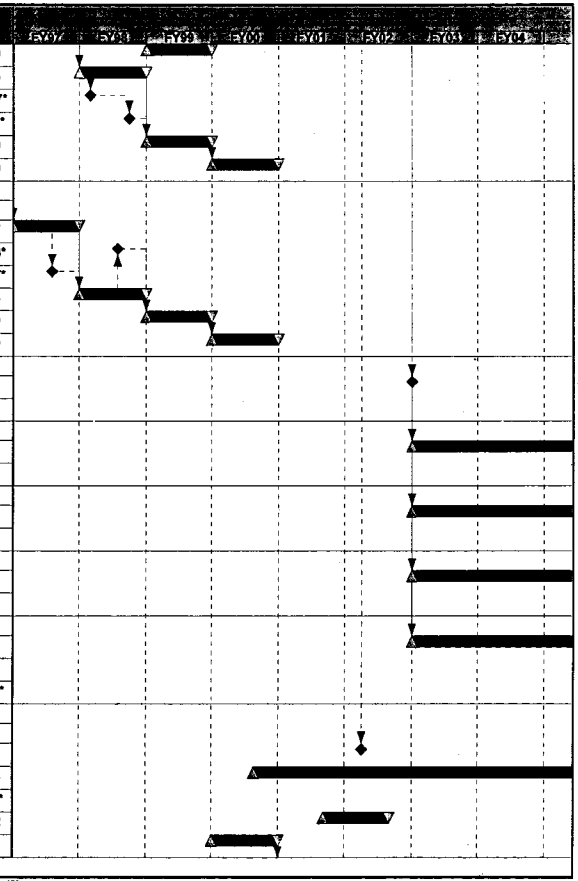
Sheet 4A of 7C

WBS	Activity ID	Activity Description	Early Start	Early Finish
1.1.1.3.02.03.02.04.03				
1.1.1.3.02.03.02.04.03.	L3W24305	Liquid Effluent Conceptual Design	06JAN97*	29MAY97
1.1.1.3.02.03.02.04.03.	L3W24305A	Initiate Conceptual Design Liquid Effluent	06JAN97*	
1.1.1.3.02.03.02.04.03.	L3W24305B	Compt Concept Dsn Liquid Efflt Sys Proj		29MAY97*
1.1.1.3.02.03.02.04.03.	L3W24310	Conceptual Design Contingency	02SEP97*	30SEP97
1.1.1.3.02.03.02.04.04				
1.1.1.3.02.03.02.04.04.	L3W24405	Liquid Effluent Engineering & Inspection	01OCT99*	29SEP00
1.1.1.3.02.03.02.04.04.	L3W24410	Liquid Effluent Engineering & Inspection	02OCT00*	31JAN01
1.1.1.3.02.03.02.04.05				
1.1.1.3.02.03.02.04.05.	L3W24505	Liquid Effluent Design/Construct/Startup	01OCT98*	30SEP99
1.1.1.3.02.03.02.04.05.	L3W24505A	Award Procurement Contract for Liq Eff	01OCT98*	
1.1.1.3.02.03.02.04.05.	L3W24510	Liquid Effluent Design/Construct/Startup	01OCT99*	30NOV00
1.1.1.3.02.03.02.04.05.	L3W24510A	Compt Constructn/Startup Liquid Effluent		30NOV00*
1.1.1.3.02.03.02.04.06				
1.1.1.3.02.03.02.04.06.01				
1.1.1.3.02.03.02.04.06.	L3W246105	Liquid Effluent Project Engineering FY99	01OCT98*	30SEP99
1.1.1.3.02.03.02.04.06.	L3W246110	Liquid Effluent Project Engineering FY00	01OCT99	29SEP00
1.1.1.3.02.03.02.04.06.02				
1.1.1.3.02.03.02.04.06.	L3W246205	Liquid Effluent Project Technical Support	01OCT96	30SEP97
1.1.1.3.02.03.02.04.06.	L3W246210	Liquid Effluent Project Technical Support	01OCT97	30SEP98
1.1.1.3.02.03.02.04.06.	L3W246215	Liquid Effluent Project Technical Support	01OCT98	30SEP99
1.1.1.3.02.03.02.04.06.	L3W246220	Liquid Effluent Project Technical Support	01OCT99	29SEP00
1.1.1.3.02.03.02.04.06.	L3W246225	Liquid Effluent Project Technical Support	02OCT00	31JAN01
1.1.1.3.02.03.02.05				
1.1.1.3.02.03.02.05.02				
1.1.1.3.02.03.02.05.02.	L3W252105	106/108 AP Feed Tank Custody Transfer	01OCT96	30SEP97
1.1.1.3.02.03.02.05.02.	L3W252110	106&108 AP Feed TK Custdy Xfer Intrfce	20FEB97*	30SEP97
1.1.1.3.02.03.02.05.02.	L3W252110A	Issue Rev 0 Intrfc Cntl Drawings Feed		30SEP97*
1.1.1.3.02.03.02.05.02.	L3W252205	106/108 AP Feed Tank Interface Control	01OCT96	26MAR97
1.1.1.3.02.03.02.05.02.	L3W252205A	Issue Rev 1 of ICDs Feed Tanks Phase I		26MAR97*
1.1.1.3.02.03.02.05.02.	L3W252210	106 & 108 AP Feed Tnk Intrfce Cntrl	01JUN98*	30SEP98
1.1.1.3.02.03.02.05.02.	L3W252210A	Iss Rev 1 Intrfc Cntrl Drawings Feed Tank		30SEP98*
1.1.1.3.02.03.02.05.02.	L3W252305	106&108 AP Feed TK Custdy Xfer	01OCT96	07APR97
1.1.1.3.02.03.02.05.02.	L3W252305A	Issue Rev1 Tech Spec Supptg Doc Feed		07APR97*
1.1.1.3.02.03.02.05.02.	L3W252405	106&108 AP Feed TK Custdy Xfer	01OCT97*	02FEB98
1.1.1.3.02.03.02.05.02.	L3W252405A	Issue Rev2 Tech Spec Supptg Doc Feed		02FEB98*
1.1.1.3.02.03.02.05.02.	L3W252505	106/108 AP Feed Tank Custody Transfer	01OCT97	30SEP98



Sheet 5A of 70

WBS	Activity ID	Activity Description	Early Start	Early Finish
1.1.1.3.02.03.02.05.02.	L3W252605	106/108 AP Feed Tank Custody Transfer	01OCT98	30SEP99
1.1.1.3.02.03.02.05.02.	L3W252705	106/108 AP Feed Tank Technical Support	01OCT97	30SEP98
1.1.1.3.02.03.02.05.02.	L3W252705A	Issue Readiness Eval. Plan for		26NOV97*
1.1.1.3.02.03.02.05.02.	L3W252705C	Iss Readiness Eval Report for 106/108AP		30JUN98*
1.1.1.3.02.03.02.05.02.	L3W252710	106/108 AP Feed Tank Technical Support	01OCT98	30SEP99
1.1.1.3.02.03.02.05.02.	L3W252715	106/108 AP Feed Tank Technical Support	01OCT99	29SEP00
1.1.1.3.02.03.02.06				
1.1.1.3.02.03.02.06.02				
1.1.1.3.02.03.02.06.02.	L3W26205	Radioactive Solid Waste systems	01OCT96	30SEP97
1.1.1.3.02.03.02.06.02.	L3W26205A	Issue Eng. Study/Assmnt Solid Waste		30APR98*
1.1.1.3.02.03.02.06.02.	L3W26205B	Issue Rev 1 Solid Waste ICD Phs I		30APR97*
1.1.1.3.02.03.02.06.02.	L3W26210	Radioactive Solid Waste systems	01OCT97	30SEP98
1.1.1.3.02.03.02.06.02.	L3W26215	Radioactive Solid Waste systems	01OCT98	30SEP99
1.1.1.3.02.03.02.06.02.	L3W26220	Radioactive Solid Waste systms Definition	01OCT99	29SEP00
1.1.1.3.02.03.03				
1.1.1.3.02.03.03. . . .	L3W31105A	Start Phase II Support Systems Projects	01OCT02*	
1.1.1.3.02.03.03. . . .	L3W31105B	Key Decision 0 for Supp Sys Proj. Phase	03OCT05*	
1.1.1.3.02.03.03.01				
1.1.1.3.02.03.03.01. . .	L3W31105	Phase II Support Sys Acquisit Elec Proj	01OCT02*	30SEP09
1.1.1.3.02.03.03.01. . .	L3W31110	Phase II Support Sys Acquisit Elec Proj	02OCT06*	30SEP09
1.1.1.3.02.03.03.02				
1.1.1.3.02.03.03.02. . .	L3W32105	Phase II Support/Sys Acquisit/Site Roads	01OCT02*	30SEP09
1.1.1.3.02.03.03.02. . .	L3W32110	Phase II Support/Sys Acquisit/Site Roads	02OCT06*	30SEP09
1.1.1.3.02.03.03.03				
1.1.1.3.02.03.03.03. . .	L3W33105	Phase II Support/Sys Acquisit/Liq Effit	01OCT02*	30SEP09
1.1.1.3.02.03.03.03. . .	L3W33110	Phase II Support/Sys Acquisit/Liq Effit	02OCT06*	30SEP09
1.1.1.3.02.03.03.04				
1.1.1.3.02.03.03.04. . .	L3W34105	Phase II Support/Sys Acquisit/Sew-Treat	01OCT02*	30SEP09
1.1.1.3.02.03.03.04. . .	L3W34110	Phase II Support/Sys Acquisit/Sew-Treat	02OCT06*	30SEP09
1.1.1.3.02.03.03.04. . .	L3W34110A	Comp. Cons/Startup Supp Sys Proj.		30SEP09*
1.1.1.3.02.03.04				
1.1.1.3.02.03.04.01				
1.1.1.3.02.03.04.01. . .	L3W41105A	Commence Full Ops Suppt Sys Phse 1	02JAN02*	
1.1.1.3.02.03.04.01. . .	L3W41110	Phase 1 Production - Support Systems	16MAY00*	31DEC14
1.1.1.3.02.03.04.01. . .	L3W41110A	Complt Ops Sup Sys Phse 1 Processing		01JUN15*
1.1.1.3.02.03.04.01. . .	L3W41205	Phase 1 Vendor Staff Training Costs	01JUN01*	31MAY02
1.1.1.3.02.03.04.01. . .	L3W41305	Support Systems Ops Phase 1 Sys	01OCT99*	29SEP00



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1.1.1.3.02.03.04.01. . .	L3W41315	Support Systems Ops Phase 1 Sys	01OCT01	30SEP02
1.1.1.3.02.03.04.02				
1.1.1.3.02.03.04.02. . .	L3W42105	Phase 2 Production Support Systems	01OCT08*	28SEP33
1.1.1.3.02.03.04.02	L3W42105A	Commence Full Ops Sup Sys Phse II	01OCT09*	
1.1.1.3.02.03.04.02. . .	L3W42105B	Cmplt Ops Supprt Systems Phase 2		30SEP33*
1.1.1.3.02.03.04.03				
1.1.1.3.02.03.04.03. . .	L3W43105	Phase 1 Utility (Elec and Watr) Costs	04JAN00*	31DEC01
1.1.1.3.02.03.04.03. . .	L3W43110	Phase 1 Utility (Elec and Watr) Costs	02JAN02	31MAY11
1.1.1.3.02.03.04.03. . .	L3W43115	Phase 1 Utility (Elec and Watr) Costs	01JUN11	31MAY12
1.1.1.3.02.03.04.04				
1.1.1.3.02.03.04.04. . .	L3W44105	Phase 2 Utility (Elec and Watr) Costs	01OCT08*	30SEP33
1.1.1.3.02.03.04.04. . .	L3W44110	Phase 2 Utility (Elec and Watr) Costs	01OCT08*	30SEP33
1.1.1.3.02.03.04.05				
1.1.1.3.02.03.04.05. . .	L3W45105	Phase 1 Solid Waste/Liquid Effl Disposal	02JAN02*	31MAY12
1.1.1.3.02.03.04.06				
1.1.1.3.02.03.04.06. . .	L3W46105	Phse 2 Solid Wste/Liquid Efflnt Displ A	03MAY10*	29DEC28
1.1.1.3.02.03.04.06. . .	L3W46107	Phse 2 Solid Wste/Liquid Efflnt Displ B	03MAY10*	29DEC28
1.1.1.3.02.03.04.06. . .	L3W46108	Phse 2 Solid Wste/Liquid Efflnt Displ C	03MAY10*	29DEC28
1.1.1.3.02.03.04.06. . .	L3W46110	Phse 2 Solid Wste/Liquid Efflnt Disposl	02JAN25*	30SEP33
1.1.1.3.02.03.05				
1.1.1.3.02.03.05.01				
1.1.1.3.02.03.05.01. . .	L3W51105	D & D / Closure - Phase 1	01OCT14*	29SEP15
1.1.1.3.02.03.05.01. . .	L3W51105A	Award D & D / Closure Subcontract Phs I	30SEP14*	
1.1.1.3.02.03.05.02				
1.1.1.3.02.03.05.02. . .	L3W52105	D & D / Closure - Phase 2	03OCT33*	29SEP34
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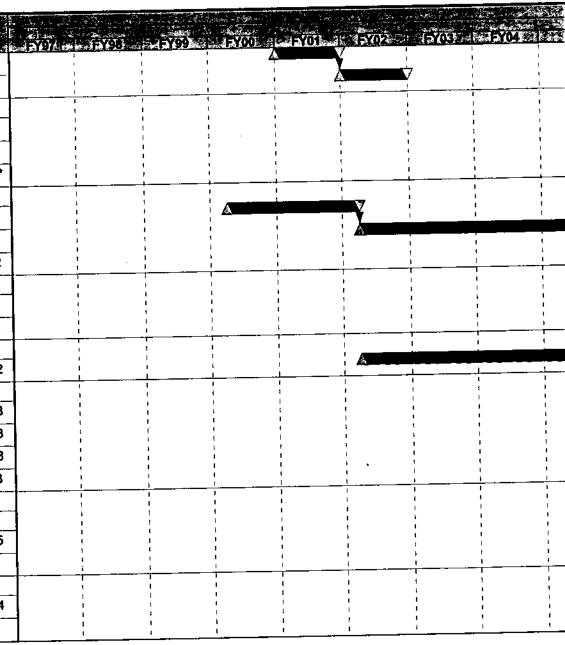

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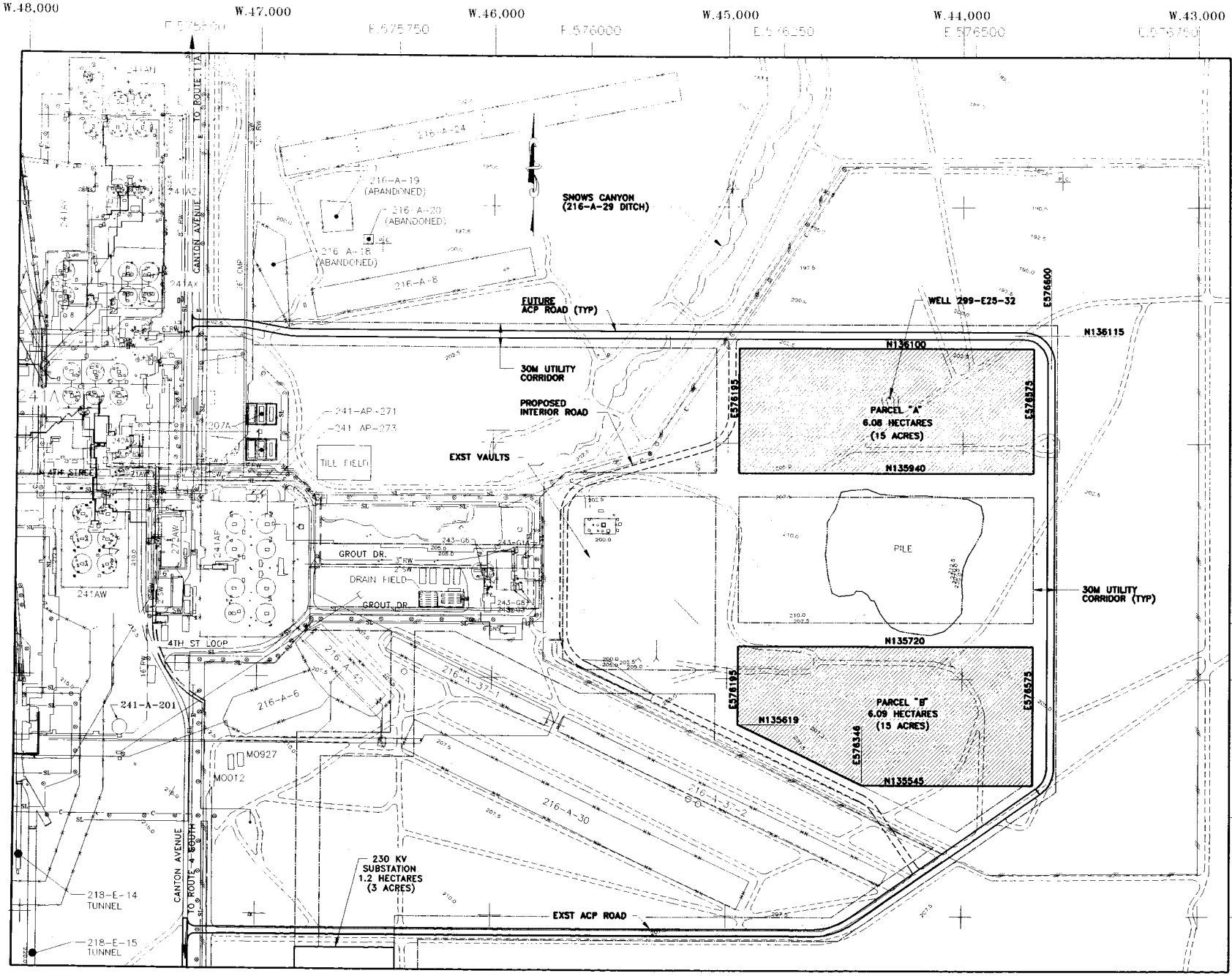
Appendix C

Sketches



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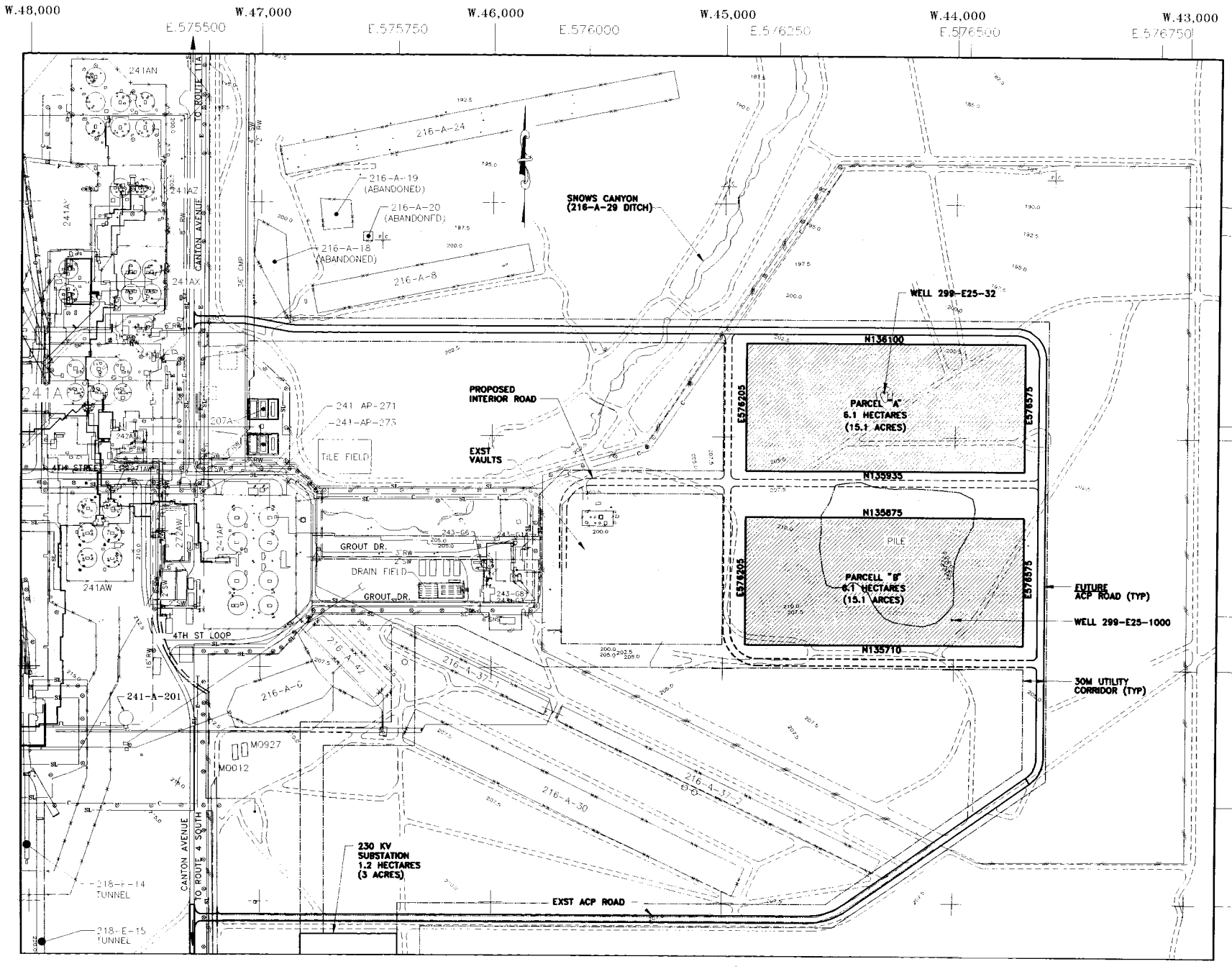


LEGEND

W.46,000 N.40,000	HANFORD PLANT COORDINATES (FEET)
E.576,000 N.135,750	WASHINGTON STATE COORDINATES (METERS)

SITE PLAN

SCALE: 1:4500

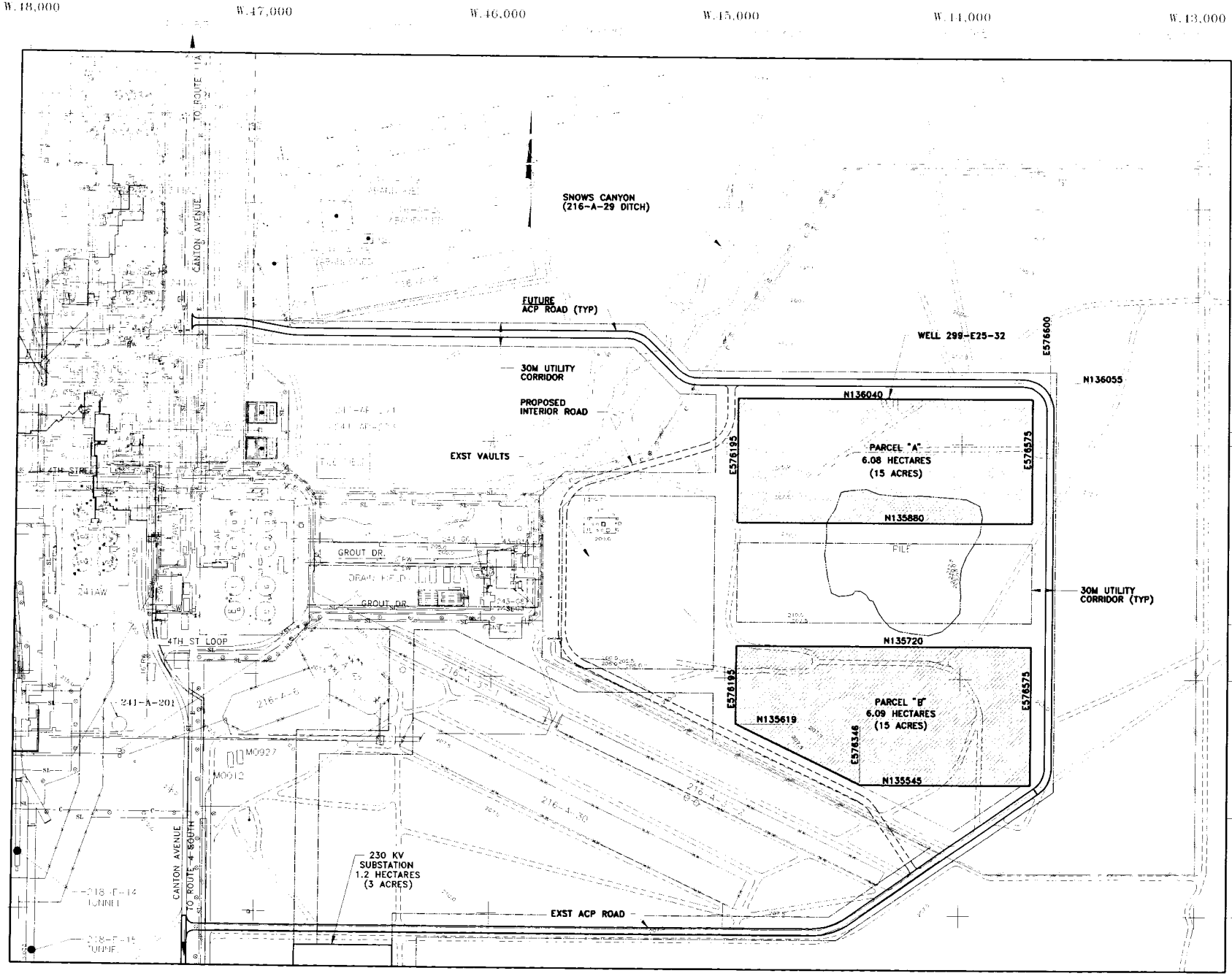
0 45 90 180 270 360

1 cm = 45 meters

Cad File E23377C2 Drawn by TA DAVIN

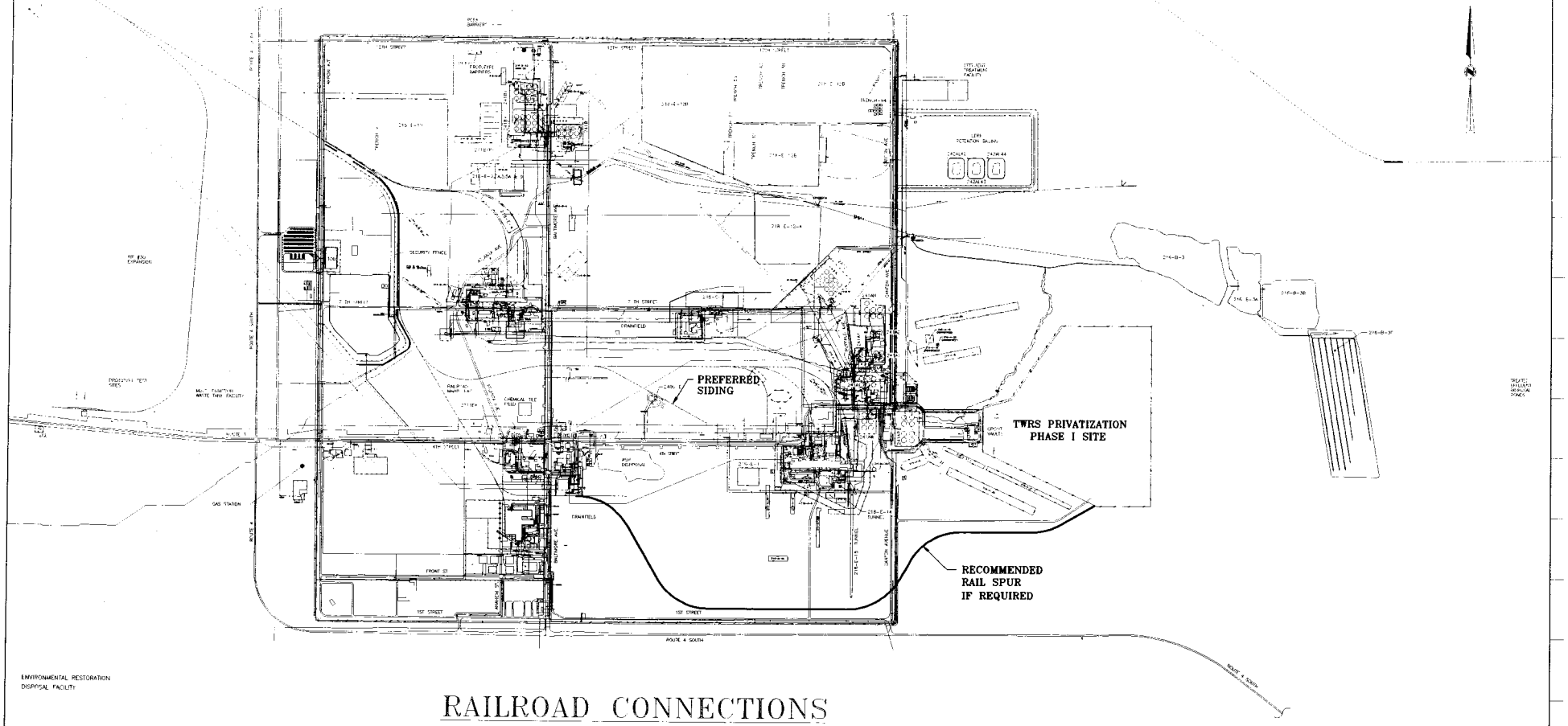
ALTERNATIVE 2

ES-E23382-C-002



ALTERNATIVE 3
ES-E23382-C-003

WHC-SD-TWR-ES-003
Revision 0



RAILROAD CONNECTIONS
200 EAST AREA

SITE PLAN
SCALE: 1:19000

0 190 380 760 1140 1520

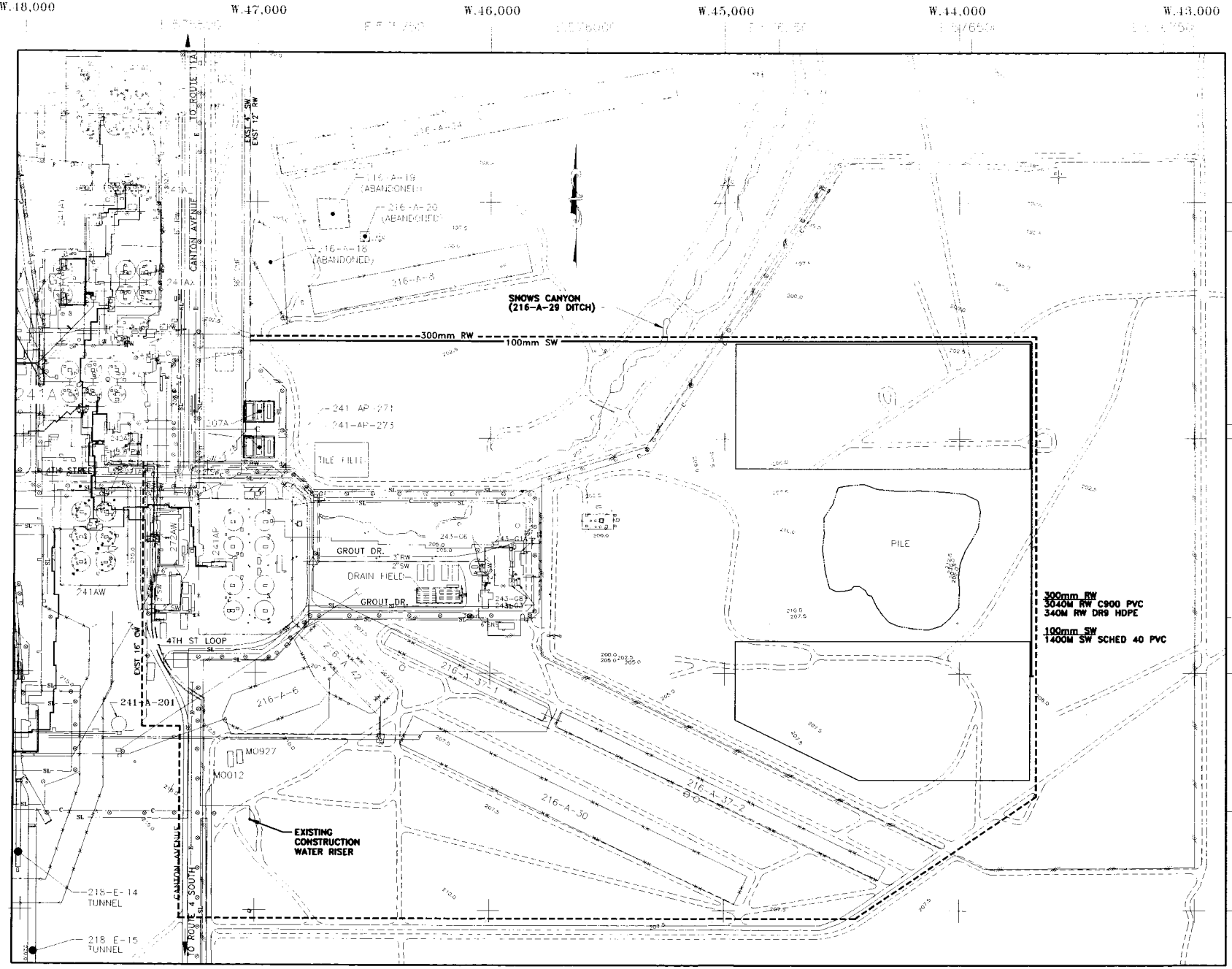
1 cm = 190 meters

NOTE: THIS MAP IS FOR REFERENCE ONLY. DO NOT USE FOR CONSTRUCTION OR ENGINEERING PURPOSES.

OF KAISER HANFORD COMPANY
MAPPING SERVICES

CADFILE: E2338204
DATE: 8-1-96
CUSTOMER:
DRAWN BY: TA DAVIN
TITLE: 200 EAST AREA

RAIL ACCESS
ES-23382-C-004



LEGEND

W.46,000 HANFORD PLANT COORDINATES (FEET)
N.40,000

E 576,000 WASHINGTON STATE COORDINATES (METERS)
N 135,750

SITE PLAN

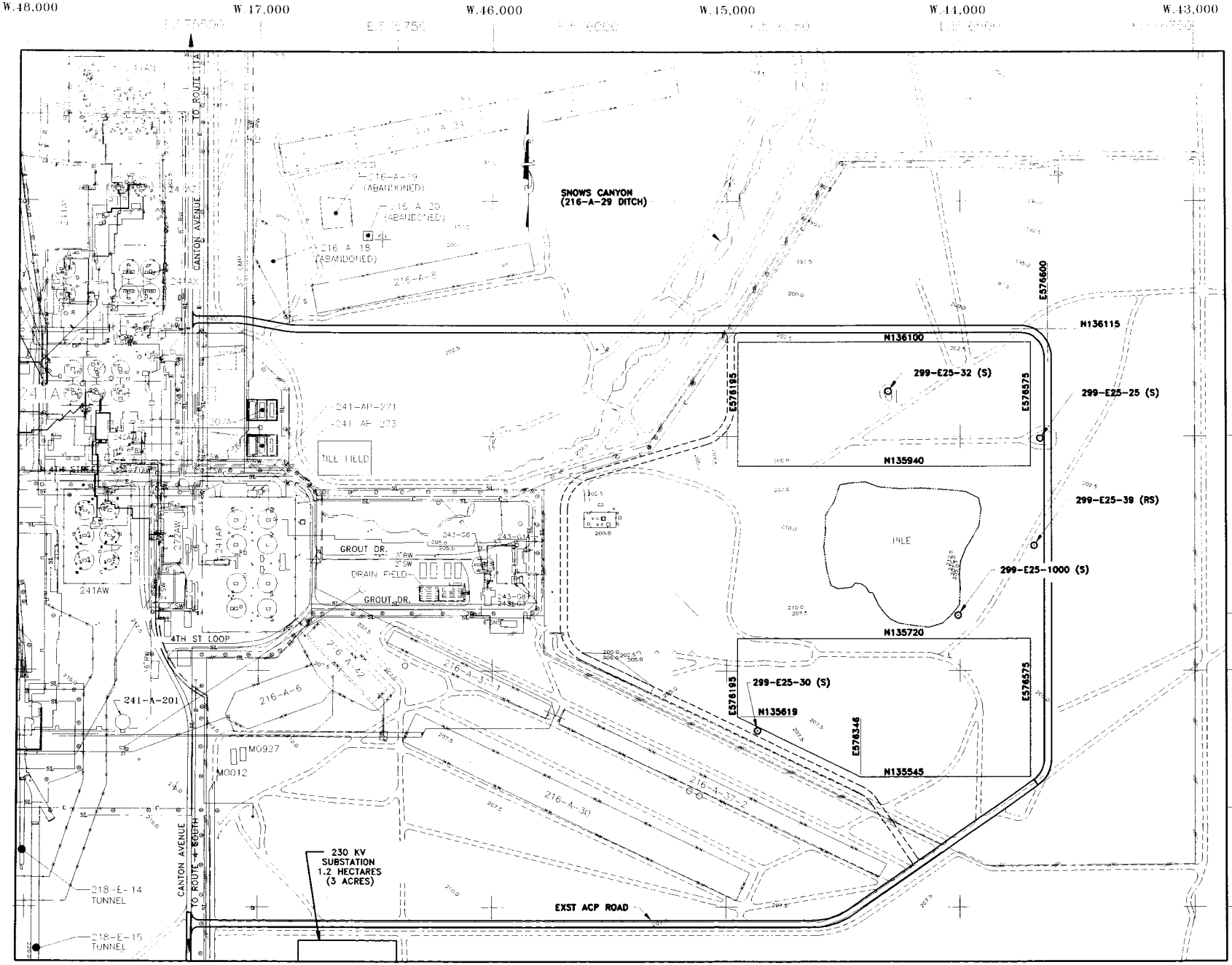
SCALE: 1:4500

0 45 90 180 270 360

1 cm = 45 meters

Drawn by TA DAVIN

Cad File E23377C8



LEGEND

W.46,000 N.40,000 — HANFORD PLANT COORDINATES (FEET)

E 576,000 N 135,750 — WASHINGTON STATE COORDINATES (METERS)

SITE PLAN

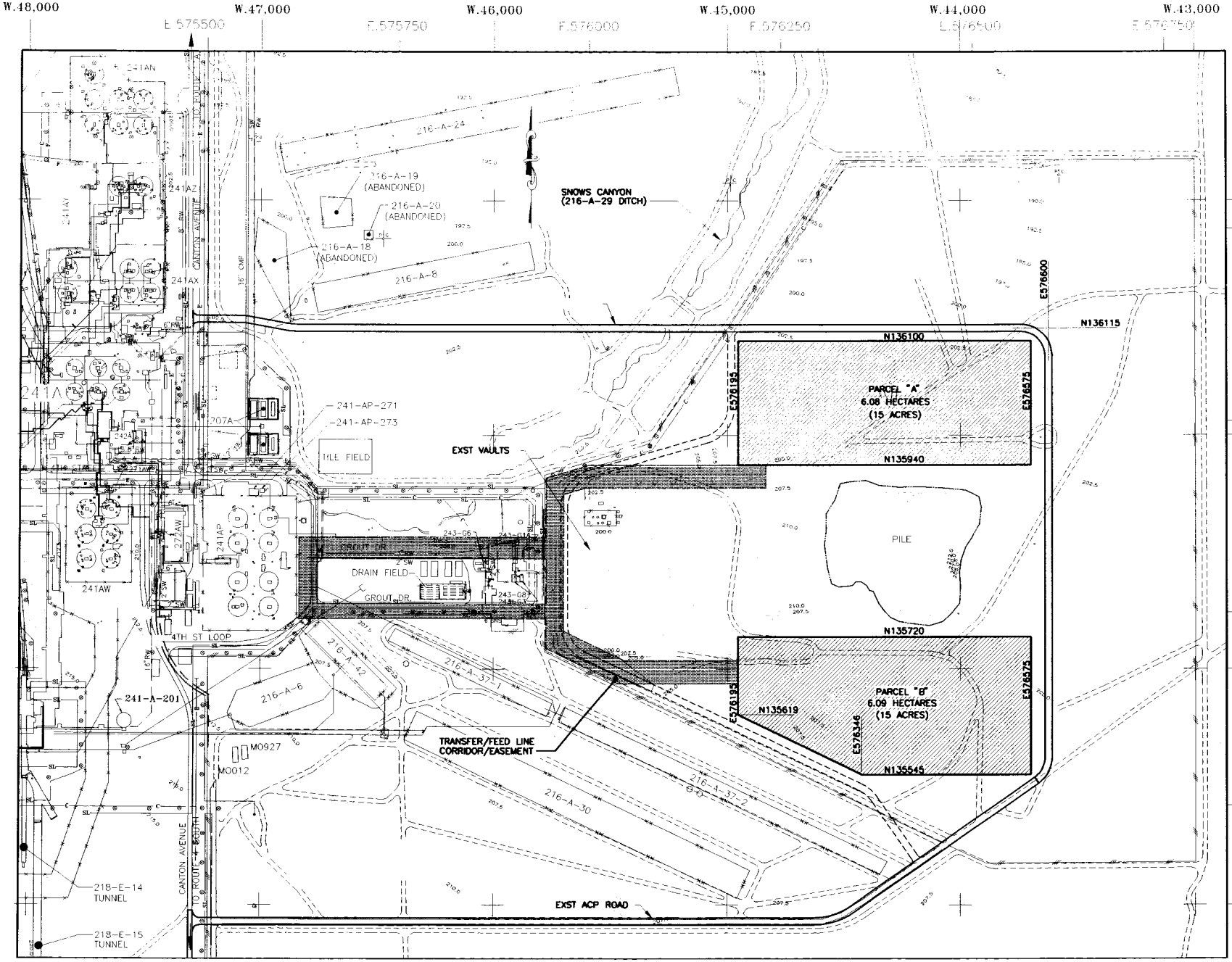
SCALE: 1:4500

0 45 90 180 270 360

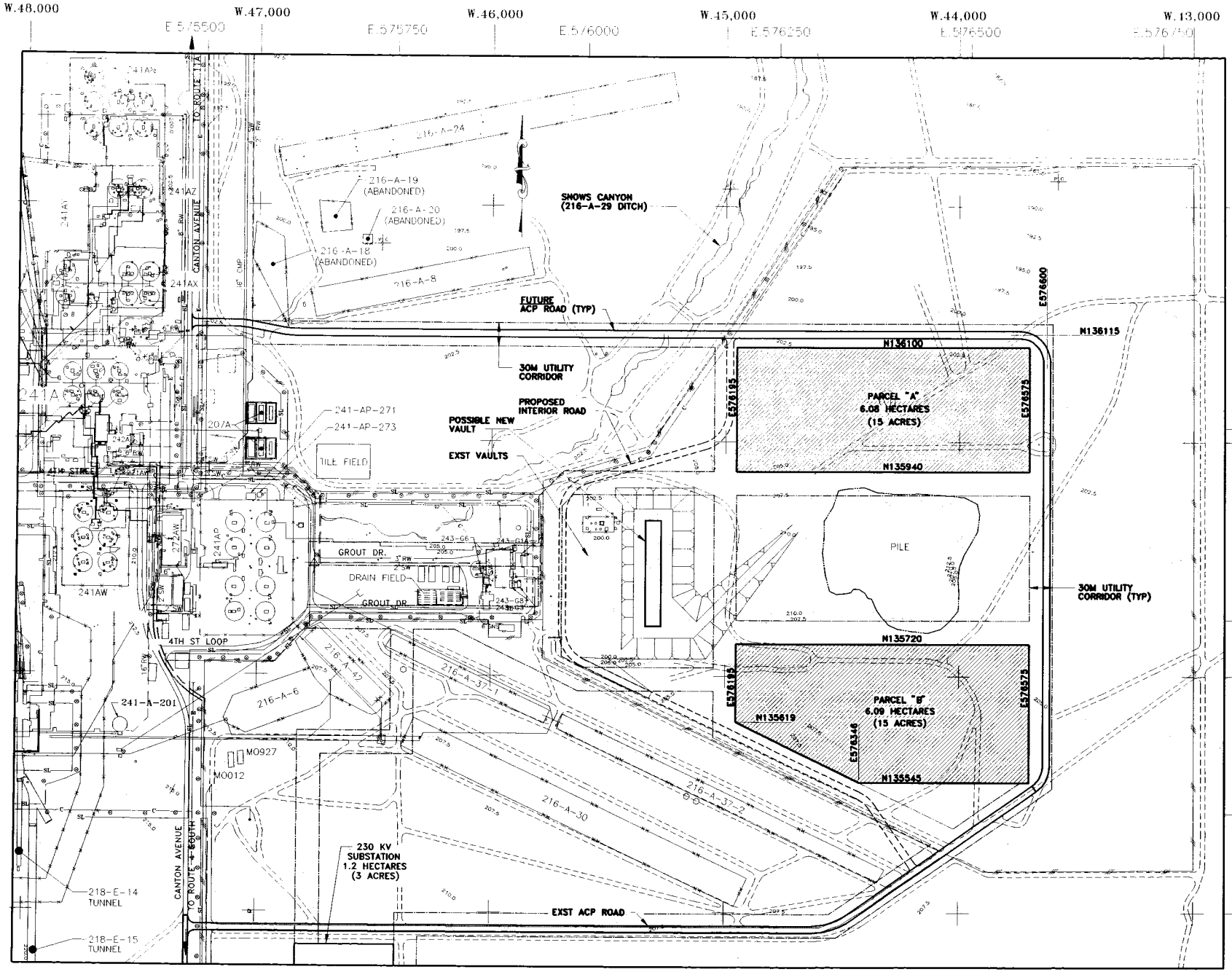
1 cm = 45 meters

Drawn by TA DAVIS

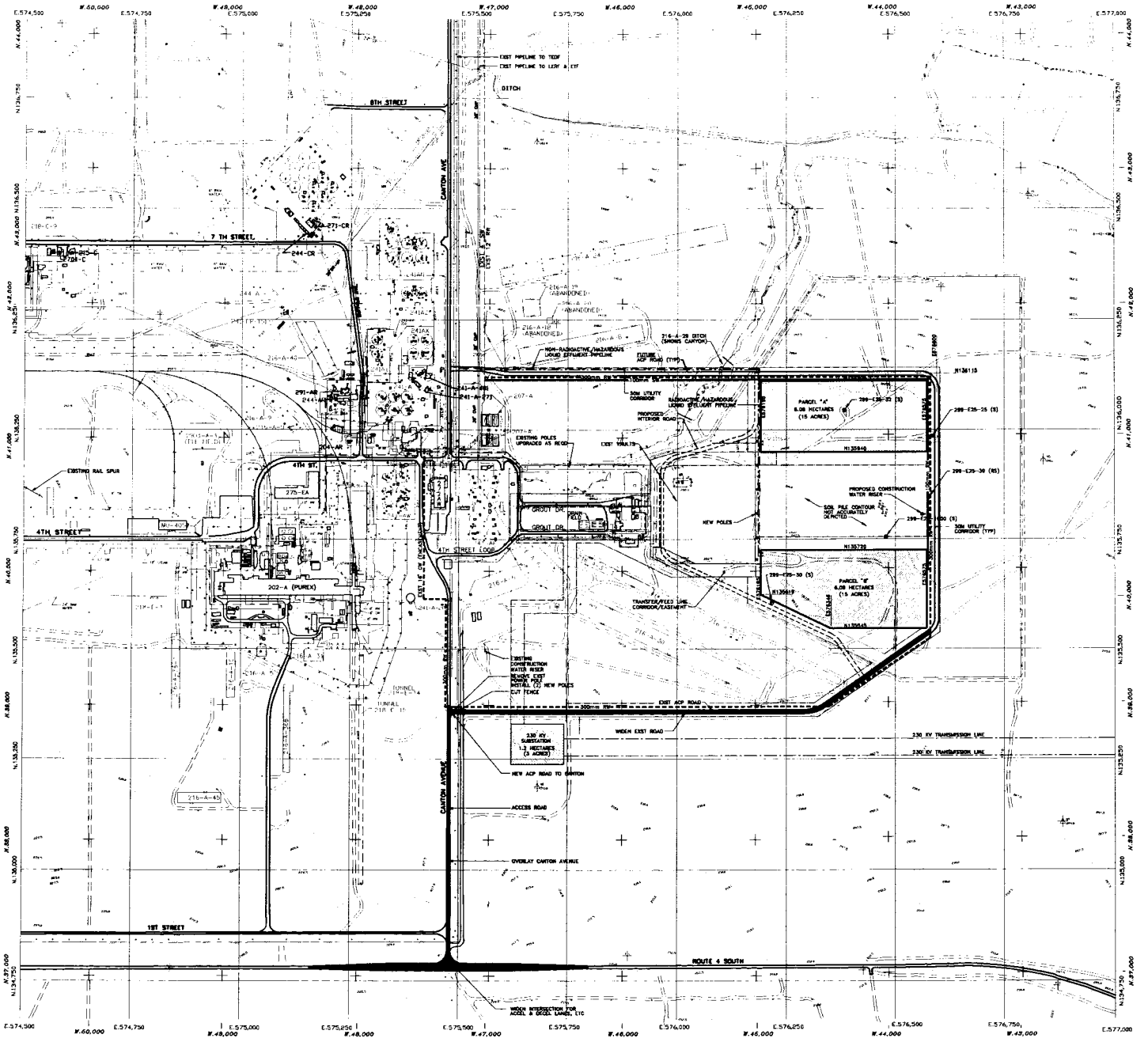
Cad File E23377C1



WASTE TRANSFER LINE CORRIDORS
ES-E23382-C-007



POSSIBLE NEW IMMOBILIZED WASTE VAULT
ES-E23382-C-008



MASTER SITE PLAN
SCALE: 1:4500

0 45 90 180 270 360
1 CM = 45 METERS
Drawn by: D.R. JOYCE
Cad File: PRELIMES.DWG

LEGEND

W.46,000 N.40,000	HANFORD PLANT COORDINATES (FEET)
E.576,000 N.135,750	WASHINGTON STATE COORDINATES (METERS)

MASTER SITE PLAN

ES-E23382-C-009

DISTRIBUTION SHEET

To	From	Page 1 of 1
Distribution	WHC TWRS Process Design R. J. Parazin	Date 09/30/96
Project Title/Work Order		EDT No. 618849
TWRS Privatization Phase I Site Development Engineering Study		ECN No. N/A

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T. R. Hoertkorn	B4-55	x			
W. F. Edwards	A2-45	x			
W. A. Rutherford	A2-45	x			
R. B. Simmons-Green	S7-53	x			
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M. D. Rickenbach	G3-12	x			
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R. L. Ackerman	S3-04	x			
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M. N. Islam	R3-08	x			
P. C. Miller	R1-51	x			
R. J. Parazin (14)	H5-49	x			
L. E. Thomas	R3-08	x			
W. L. Adams	S5-13	x			
A. L. Johnson	H6-20	x			
Central Files (original + 1)	A3-88	x			