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EDT 607371
Page 2 of 2

LL-W-94-1595

September 29, 1994

T. L. Erickson, Manager
Restoration Projects
Westinghouse Hanford Company
P.O. Box 1970
Richland, Washington 99352

Dear Mr. Erickson:

SOLID WASTE MANAGEMENT COMPLEX SITE DEVELOPMENT PLAN

Thank you for the opportunity to review the subject document. The plan does a good job of taking into consideration the impacts of facility layout on construction costs. This provides a good foundation upon which to build further refinements.

The Solid Waste Management Complex (SWMC) is like a dynamic interacting organism. Small differences in distance, traversed many times each day, multiply to become significant costs to production over the 30 year mission life. We believe that identifying the incremental impact of the alternative plans on operations over the long run is crucial to the development of a good Site Development Plan.

From a long range planning perspective, we would like to see some consideration of what alternatives provide the greatest long term utility to U. S. Department of Energy missions in the 200 Area (and perhaps to the regional community) after the mission for the SWMC facilities has ended. Specifically, administrative and support facilities should (to the extent that it's not critical to SWMC operations) be considered for potential of greater long term good if not placed adjacent to the SWMC industrial facilities.

We look forward to having a continuing influence as the SWMC site development progresses. As referenced in the plan, RL 4320.2C "Site Selection" describes the principles, engineering, economic, and site planning factor considerations for siting Hanford facilities to meet program requirements.

Sincerely,

A handwritten signature in dark ink, appearing to read "S. W. Seiler", with a horizontal line extending to the right.

S. W. Seiler, Manager
Site Planning

SWS:tcg

cc: S. R. Briggs - WHC
T. M. Geager - WHC
K. D. Johnson - WHC
G. D. O'Brien

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Release Date: 10/4/94

* * * * *

This document was reviewed following the
procedures described in WHC-CM-3-4 and is:

APPROVED FOR PUBLIC RELEASE

* * * * *

WHC Information Release Administration Specialist:

C. Willingham
(Signature)

10/4/94
(Date)

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Name: T. M. Greager

T. M. Greager
Signature

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7. Abstract

The main purpose of this Solid Waste Management Complex Site Development Plan is to optimize the location of future solid waste treatment and storage facilities and the infrastructure required to support them. An overall site plan is recommended. Further, a series of layouts are included that depict site conditions as facilities are constructed at the SWMC site. In this respect the report serves not only as the siting basis for future projects, but provides siting guidance for Project W-112, as well. The plan is intended to function as a template for expected growth of the site over the next 30 years so that future facilities and infrastructure will be properly integrated.

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10. RELEASE STAMP

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MASTER

**SOLID WASTE MANAGEMENT COMPLEX
SITE DEVELOPMENT PLAN**

September 1994

B. F. Campbell
C. R. Nash

Westinghouse Hanford Company
Richland, Washington

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**SOLID WASTE MANAGEMENT COMPLEX
SITE DEVELOPMENT PLAN**

1.0 INTRODUCTION

1.1 PURPOSE

The main purpose of this Solid Waste Management Complex (SWMC) Site Development Plan is to optimize the location of future solid waste treatment and storage facilities and the infrastructure required to support them. An overall site plan is recommended. Further, a series of layouts are included that depict site conditions as facilities are constructed at the SWMC site. In this respect the report serves not only as the siting basis for future projects, but provides siting guidance for Project W-112, as well. The current Tank Farm offices, personnel, and activities are not addressed in this document as the Solid Waste Program site development will have minimal affect on their facility requirements. The plan is intended to function as a template for expected growth of the site over the next 30 years so that future facilities and infrastructure will be properly integrated.

1.2 SCOPE

The overall plan is consistent with the 200 Areas' Development Plan, DOE guidance on site planning, and the current scope of solid waste planning, as defined in WHC-SD-W306-SD-001 (Berglin 1992).

1.3 USE AND CONTROL OF REPORT

This report is an internally controlled document intended to be used as the base reference for all SWMC site planning. Site requirements are expected to change in the future as programmatic and operations needs change. Changes to this document will require the approval of delegated representatives of Waste Receiving and Processing (WRAP) and Solid Waste Projects, Solid Waste Programs, the SWD Project Siting Coordinator, and the duly authorized Site Planning oversight organization.

This report is to provide guidance for siting of project W-112 facilities and all other SWMC improvements. Other organizations are encouraged to use this report for any information they may require pertaining to SWMC siting plans and programs.

2.0 SUMMARY

2.1 SITE PLANNING STUDY

The method used to develop and evaluate the many ideas that surfaced as optimization of the SWMC site layout progressed was organized and thorough.

First the purposes, goals, and objectives of the SWMC were closely examined so as to determine what, if any, improvements might be recommended over the present reference design (Figure G-1). Functional Design Criteria, Program Planning, and Conceptual Design Report (CDR) documents were reviewed in detail to develop background knowledge of the thinking that had gone into previous SWMC site plans.

Next, assumptions were specified (Section 4.2), evaluation criteria were defined (Section 5.2.2), evaluation criteria were interpreted, weighted (Appendix B) and then applied to each alternative (Appendix A), and the basis for scoring each alternative was documented (Table 3). Seven alternative layouts were generated, including the CDR layout which was designated as the baseline concept against which any new alternatives were evaluated. This was a progressive process in which each subsequent design evolved so as to better satisfy the criteria. The weighted scoring of each alternative is shown in Table 4.

This work resulted in the selection of Alternatives 6 and 7. These alternatives have essentially equal scores; WRAP 2A is privatized and located elsewhere in #6, whereas WRAP 2A is located at the SWMC in #7. These alternatives move Eugene Avenue 300 feet to the west. Congestion is thereby relieved and greatest flexibility in making future decisions at all stages of site development is provided. These two alternatives also have the least aggregate costs for provision of necessary infrastructure (Appendix K).

The SWMC site considered in this plan specifically includes the area bounded by 16th street on the south, 23rd street on the north, Dayton Avenue on the East, and the future Eugene Avenue on the west, as well as the smaller area between Eugene Avenue and the 23rd street loop. Small sections of land adjacent to, and west of, Eugene Avenue could be available for inclusion in the SWMC should the storage requirements have higher priority than the current plans for this land (additional burial ground).

2.2 RECOMMENDED SITE PLAN

A detailed site layout of the recommended plan is shown on Figure G-7. Note that WRAP 2A is included, see 4.2 ASSUMPTIONS, below. A series of drawings (Figures I-7.1 through I-7.7, Appendix I) shows how the site will appear at the various phases of construction of SWMC facilities as these are expected to occur over the next 20 years.

- WRAP 1 and WRAP 2A are shown at the same elevation, connected by a transfer corridor that carries automatic guided vehicle (AGV) traffic handling drums and boxes of waste.
- The W-112 shipping and receiving and the head gas sampling buildings are connected to the transfer corridor near WRAP 1.
- The automated storage building is connected to the transfer corridor to equally service the needs of WRAP 1 and WRAP 2A.
- The office and maintenance buildings can be located either north or south of 23rd street, near the WRAP 1 and WRAP 2A process buildings. The final location will be determined in the Project W-112 Definitive Design process.
- The long-term storage buildings are located close to W-112 shipping and receiving to facilitate ease of forklift travel and design of an AGV transfer system (if desired) to handle waste container traffic.
- The box storage building is located near WRAP 2A, to optimize the WRAP 2A and storage facilities relationships.
- The future Eugene Avenue is located 300 feet west of the location shown in the present CDR, which provides sufficient space to allow support functions (office/maintenance) to be consolidated below 23rd street with the treatment and storage facilities.
- WRAP 2B and the Thermal Treatment Facility (TTF) are located west of Eugene Avenue, lessening the impact on the operations of the SWMC as these more distant projects undergo construction.

Essential safety and economy aspects of the recommended arrangement are:

- Potential elimination of pedestrian and truck traffic from having to cross 23rd street.
- Potential elimination of the necessity for having to grade the area of the 23rd street loop for SWMC site development purposes.
- Provision of land or soils for additional mixed waste disposal structures, which may prove highly valuable in the future.

3.0 BACKGROUND

Site planning for solid waste facilities was initiated in 1987 when new regulations banned conventional burial trench storage of radioactive mixed wastes. Planning has since evolved through a series of studies to accommodate new solid waste storage and treatment needs resulting from the regulatory changes.

3.1 INITIAL SOLID WASTE FACILITIES SITING - 1988

The initial siting of solid waste facilities was addressed in an evaluation report (Havens 1988). The status of available knowledge limited the scope of this report to considerations only of surface storage facilities and the WRAP concept. Its strength was that it provided a sound basis for establishing the general land area for siting solid waste storage and processing facilities; namely, the acreage just west of Dayton avenue in 200 West Area.

3.2 A COMPREHENSIVE PLAN - 1991

A comprehensive HCWC site development plan was developed, in draft form, in 1991. This document integrated much of the previous planning and provided an evaluation of alternative sites for the Hanford Central Waste Support Complex (HCWSC). Although this report proposed some controversial recommendations and was never issued, it did contain excellent research and analytical information and was the first effort to bring together most all of the elements needed for a comprehensive SWMC site development plan.

3.3 CURRENT GUIDANCE - 1993

An internal letter recently issued by Restoration Projects and approved by Site Planning defined the overall SWMC site and reassigned Basalt Waste Isolation Project land to the 218-W-5 burial ground. This letter establishes the SWMC site boundaries and provides space allocation within this area to future SWMC projects. The general land area identified as the SWMC site in this document is the area defined in Section 2.1.

4.0 PLANNING BASIS

A thorough understanding of underlying assumptions, present site conditions and future projects to be accommodated comprise the broad parameters for the planning process.

4.1 PLANNING METHOD

The planning process used for development of the SWMC site plan is consistent with DOE Order 4320.2C. It is a structured methodology which involves (1) a programming approach aimed at identifying basic siting problems, (2) a design activity which examines interrelationships within and external to the site as a means of problem solving, and (3) an analysis of alternatives to optimize final siting decisions.

Each alternative was evaluated numerically (Appendix A). The evaluation criteria were approved and weighted by consensus of the Site Plan Review Team (Appendix B). Integration of less defined future projects, such as WRAP 2B and the Thermal Treatment Facility, is included in the development of alternatives.

4.2 ASSUMPTIONS

Several assumptions, listed below, were made to facilitate the planning and optimization process:

- The WRAP 1 location, orientation, and elevation are fixed and must be treated as the anchor point for all other SWMC facilities and infrastructure development.
- Based on preliminary information, those portions of the White Bluffs Trail within the SWMC area will be considered exempt from consideration as a cultural resource (see letter, PNL Cultural Resources, (Appendix L).
- Retrieval activities will extend into Dayton Avenue creating periodic long-term closures of Dayton Avenue between 27th and 16th.
- The W-112 transfer corridor will be physically tied to WRAP 1 and WRAP 2A to allow effective use of AGVs or forklift trucks for material movement.
- All SWMC site facilities are considered to be under one administrative control system for emergency response purposes.
- Use of land between Eugene Avenue and 23rd St Loop for SWMC purposes will be minimized in recognition of soil qualities that make it potentially useful for RCRA-compliant landfills.

- Privatization of some facilities, e.g., WRAP 2A, which is a strong potential, will be considered in this study. Its effect is expected to reduce land usage in 200W area, as other sites would be employed for this purpose.
- Contact-handled transuranic waste (CH TRU) shipments to the Waste Isolation Pilot Plant (WIPP) are planned to start in the year 2000. However, the study identifies contingency areas that could be developed to store WRAP 1 products in the event WIPP startup is delayed.
- Dayton Ave will be closed at the time of burial ground capping and the new Eugene Avenue will be the principal north-south route into the SWMC, accessed from a new road that makes 16th street the main access from 200 East.
- 16th Street will be the main access to the Solid Waste management Complex from 200 East primarily due to burial ground activities blocking 19th through 23rd east of Dayton Avenue.
- The new maintenance facility will be dedicated to the support of SWMC facilities and will be optimally located to serve SWMC functions.
- Two central office buildings with a footprint of 30,000 ft² each will be included in the SWMC.
- A rail spur will be provided into the SWMC site from the northwest to service WRAP 2B and will integrate with 218-W-5 burial ground plans.
- Commingling of vehicle types and mixing of vehicle traffic with pedestrian traffic within the site is to be avoided. Traffic patterns are to be kept as simple as possible. Mixing of over-the-road trucks with passenger cars or AGVs or fork lifts, etc., is to be minimized.
- The use of septic drain fields in the burial grounds is considered acceptable. The use of septic drain fields will have no significant impact on the level of nitrates in the groundwater.
- Burial ground covers eventually will be added that may extend up to 100-feet from the edge of the existing burial grounds.
- 23rd Street east of Dayton will be closed by 1996 due to burial ground and retrieval activities.
- Project L-016 is planned to provide septic sewer service for SWMC. Pending funding of L-016, SWMC facilities must provide their own septic drain systems.
- An Ecological Survey of the area in which SWMC is located indicates that no deleterious impacts are expected from development of this area as planned (see Appendix M).

4.3 EXISTING SITE CONDITIONS

The SWMC site, as presently defined, is shown in Appendix C, Figures C-1, C-2 and C-3. These figures provide information on physical characteristics, regional conditions, existing facilities, bordering land uses, and other considerations.

4.3.1 Site and Regional Conditions

Site and regional conditions do not significantly affect site planning decisions in the SWMC area. Existing populated areas are reasonably remote, cultural considerations are minimal, and there are no unique geological, hydrological or meteorological aspects to the site.

In total area the SWMC site, as previously defined with Eugene Avenue congruent with the westernmost section of 23rd Street Loop, comprises 245 acres of which 20+ acres lies north of 23rd Street (the "loop" section). Existing facilities occupy an area of about 40 acres from 22nd street to just south of 19th Street and about halfway from Dayton to Eugene Avenues. These facilities include the Radioactive Mixed Waste Storage buildings as well as the Tank Farm office and Solid Waste Program trailers.

The SWMC site is at the westernmost edge of utilized land in 200 West Area at this time. The primary borders of the SWMC currently are 16th Street north to 23rd while to the east and west the site is bordered by active and/or allocated burial grounds (per "Approved Site Evaluation Letter (File #2W-93-22)").

The northern part of the site has a natural slope of about three percent to the east. The slope of the middle and southern areas varies from one to six percent to the southwest. There are no low areas in the site that collect and hold precipitation.

The White Bluffs Trail runs diagonally southwest to northeast through the lower section of the site. The PNL's Cultural Resources group has indicated that development will not be restricted by the trail (see Appendix L).

4.3.2 Existing Facilities

Existing facilities within the SWMC area, and their characteristics, are listed in Table 1. These are the facilities that contribute significantly to existing land usage, utilities and personnel accommodations. Miscellaneous other facilities can be identified in site layouts (maps) that might be provided in subsequent analyses of the SWMC.

Table 1. Major SWMC Site Facilities - Existing

Project/Facility	Const Start	Size Sq Ft	Parking Sq Ft	No. of People	Water Gal/D	Sewage Gal/D	Peak Water G/H	Com-puters	Phones	KVA
MO 720 AND MO 721	1991	30,000	60,000	140	5,000	5,000	1,700	20	50	270
272WA SHOP	PRE 1990	24,000	30,000	250	5,000	5,000	1,700	10	22	250
2402-W-WL, 2403-WA-WD STORAGE	1991	52,000 157,000								200
TOTAL				390	10,000	10,000	3,400	30	72	720

4.3.3 Utilities

Sanitary water is supplied at the site from an existing 12-inch loop. The east side of the loop runs along Dayton Avenue, the north side along 23rd Street, the west side along coordinate W79100, and the south side along 19th street. Expansion of this loop will be required to better serve future facilities.

The existing electrical power to the SWMC is brought in by 13.8 kV overhead lines along Dayton avenue. Telecommunications lines are in place along 19th avenue west of Dayton to support the SWMC operations and engineering staff.

There is currently no raw water available near the site, and a new raw water line will be required.

Septic drainfields are currently provided for existing facilities requiring sanitary sewer service.

4.4 FUTURE FACILITIES

It is the goal of SWMC site planning to accommodate future Hanford requirements for solid waste storage and treatment facilities and related land use needs. A perspective on currently planned facilities relative to their role in site planning is discussed in Appendix D. Data on the more significant facilities are listed in Table 2, showing expected number of personnel and utility usage, as well as land use factors.

The time phasing of major future projects is shown in Appendix J. Time sequencing can have an impact on siting evaluation, particularly with regard to construction/laydown interactions with established facilities. As shown in the schedule, there are periods when construction and/or operations overlaps occur with adjacent facilities. The more significant overlaps are:

- WRAP 1 construction with W-112 construction.
- WRAP 1 operations with W-112 construction.
- W-112 construction with WRAP 2A construction.
- Operation of WRAP 1 and W-112 during construction of WRAP 2A.
- Operation of the SWMC during construction of WRAP 2B and TTF.

Table 2. Major SWOC Site Facilities - Future

Project/Facility	Const Start	Size Sq Ft	Parking Sq Ft	No. of People	Water Gal/D	Sewage Gal/D	Peak Water G/H	Com-puters	Phones	KVA
W-026/WRAP 1 2336-W	1994	52,000	14,000	60	1,050	1,050	350	50	40	2250
112/RMW STRG. - STORAGE - CORR/S/R - ADMIN(2) - MAINT.	1995 1996 1997 1997	170,000 59,000 60,000 22,000	 5,000 60,000 20,000	 20 300 100	 600 4,500 2,000	 600 4,500 2,000	 120 1,200 400	 5 300 50	 19 300 50	 350 900 150 200
W-113, RETRIEVAL *	1995			20	300	300	100	11	10	500
W-100/WRAP 2A 2337-W	1996	50,000	14,000	40/ SHIFT	9,000	6,000	500	20	50	6000
W-255/WRAP 2B	2005	100,000	30,000	150	6,000	2,300	1200	120	120	6000
THERMAL TREATMENT FACILITY W-242	2010	25,000	5000	40	10,000	500	1000	10	20	1000
TOTALS				730	23650	13250	4,270	566	609	17350

* Project W-221, Retrieval Phase II, is assumed to have the same impact relative to utilities and personnel as W-113, after W-113 operations are completed.

4.4.1 Land Use Philosophy

Within the SWMC a land use philosophy should be developed to provide guidance in locating facilities. At this time the site layout is in the development process and specific zoning and land use philosophy is difficult to layout due to existing facilities and projects outside of the control of the Solid Waste Division which will significantly affect the SWMC. One example of this being the new access road from State Route 240 to Beloit Avenue in 200A Area; this will significantly affect the main access to the SWMC changing it from its current location to 16th Street.

Even with changing site needs there are a few principles of land use which appear to be appropriate to follow:

- Grades between facilities should be minimal to minimize impacts to safety, operability, and wear on equipment.
- Offices for workers who support process plants and facilities in the Treatment Storage and Disposal (TSD) area should be located close to where work is being conducted.
- Offices for purely administrative support to the TSD should be located to provide for ALARA and avoid conflict with operations and construction/Demolition activities, while providing efficient interaction with the operating facilities being supported. Administration offices will be the last buildings to be removed.
- Facilities which do not require utilities should be located in undeveloped areas which do not already have utilities.
- Facilities storing materials should be sited with ALARA considerations. Storage of materials of potentially dangerous composition should be done away from the largest number of people as is practical.

4.4.2 Railroad Location

The railroad should be located to maximize its capability for use in the 218-W-5 burial ground and to minimize its impact on burial space. This leads to two preferred locations:

1. Parallel and next to Eugene Avenue. This minimizes its impact on burial ground space utilization.
2. Parallel to Eugene Avenue and down the middle of the unused portion of the 218-W-5 burial ground then turning to come into the process facilities. This allows for delivery of items to trenches on both sides of the railroad.

Consideration should also be given to location and how that affects traffic on roads when high dose loads are brought in either to treatment or disposal.

5.0 PLANNING ANALYSIS

5.1 SITE REQUIREMENTS

The SWMC provides for the storage, treatment, and disposal of current and future radioactive solid wastes, including selected wastes currently in retrievable storage, in full compliance with current and evolving regulations. In addition to the facilities discussed above, the following requirements are necessary to effectively conduct this activity.

5.1.1 Capacity to Meet Forecast Needs

The current planning basis, showing waste flows to and from the facilities comprising the SWMC, is defined in the system description (Berglin 1993). The real requirement, however, is to be able to accommodate the uncertainties in forecasting future waste quantities and characteristics. The general trend is for future waste volumes to increase with each succeeding forecast. Therefore, an important planning element is to provide for siting flexibility and expansion room for treatment and storage facilities.

5.1.2 Vehicular Traffic Accommodations

A key determinant for site plan optimization is the effectiveness of the layout and transport methodology in facilitating the safe movement of people and materials. This requires analysis of various traffic elements, such as:

- People to and from, around, and within the site performing various process, administrative and maintenance functions,
- Waste containers coming onsite for processing,
- Supplies coming onsite for use in the various process systems operations,
- Waste product containers going offsite to disposal or remaining either onsite or nearby for storage.

Traffic patterns considered include:

- Transporters, for both people and freight, moving to and from the SWMC site, and
- Transporters moving between, among and within the various solid waste storage and processing facilities.

The considerations of traffic on the site are discussed in detail in Appendix E, and in the descriptions of alternatives, Appendix H.

5.1.3 Personnel Accommodations

As shown in Tables 1 and 2, over 1,000 personnel will be permanently located on or very near the SWMC site. Over 600 of these will be in the core area of waste treatment, creating a fairly high personnel density situation. Individual projects provide the offices required for plant operations. Centralized office functions are provided by separate office buildings. The locational aspects influencing efficiency and safety are clearly important site planning factors.

5.1.4 Utilities and Land Improvements

- **Utilities.** The sanitary water loop will be expanded to better serve the new facilities and parts of the existing loop will be abandoned. Expansion of this loop will be required to better serve future facilities.

A new raw water line will be brought to Dayton Avenue from the 282W reservoir, located near the 200W power house. This is the source of raw water that will be the primary supply for fire protection.

At the outset of SWMC development, new septic drainfields will be provided for buildings requiring sanitary sewer service, i.e., one drainfield for the office buildings and maintenance facility, and another for the WRAP facilities. Once the sanitary sewer system is developed, these interim period drainfields will be abandoned.

- **Site Grading.** The portion of the SWMC site to receive major development is undisturbed land and somewhat irregular. It requires basic grading to provide a reasonably level site and effective, environmentally safe drainage. The basic grading plan for the entire SWMC area presented in Appendix F is based on the approved W-112 CDR. Note: The scoring of alternatives, Appendix A, reflects the deviations (Appendix K) from this plan in the evaluation of the site layouts.

The current approach for grading is to provide a stepped grade to more closely follow the existing contours which would more closely balance the cut and fill quantities. The northern portion will be mainly cut while the southern half will be mainly fill. Ditches and culverts along the roadways will carry precipitation runoff to the southwest corner of the site.

- **Roads.** Two new north-south roads will be added, Denver Avenue and Eugene Avenue. Both will be 24 feet wide, paved, with 6-foot shoulders. The currently unpaved sections of 16th, 19th, and 23rd streets will be paved along with the new sections.

5.2 EVALUATION OF ALTERNATIVES

Several alternative siting layouts of future facilities were evaluated. In the development of these alternatives, location and orientation of storage units, treatment facilities, and roads were varied to develop a set of options which depict a reasonable range of the choices available. Evaluation of the alternatives was accomplished by grading against a set of predetermined criteria (Section 5.2.2).

5.2.1 Siting Alternatives Summary

The following siting alternatives were selected to provide a logical yet diverse set of options that would serve as an effective decision base. The drawings are located in Appendix G, Figures G-1 through G-7.

Alternative 1	This is the base case alternative, comparable to that shown in the W-112 CDR. Maintenance and office facilities are located north of 23rd Street (Figure G-1). WRAP 2A, TTF, W-312 (with W-241) and Denver Avenue are included to show how the SWMC would appear when completed.
Alternative 2	Similar to the base case, but with the maintenance building located south of 23rd Street (Figure G-2).
Alternative 3	W-112 Shipping and Receiving is relocated further west of WRAP 1, effecting a separation of WRAP 1 S/R and W-112 S/R truck traffic (Figure G-3).
Alternative 4	WRAP 2B and TTF located west of Eugene Avenue, obviating the railroad crossing of Eugene Avenue (Figure G-4).
Alternative 5*	WRAP 2A is privatized and not located on the SWMC site. Office buildings are relocated south of 23rd Street (Figure G-5).
Alternative 6*	WRAP 2A is privatized, as above, and Eugene avenue is relocated 300 feet further west than the base case, providing more land for SWMC facilities arrangement (Figure G-6).
Alternative 7	Same as Alternative 6, but with WRAP 2A incorporated in the site (Figure G-7). NOTE: This alternative is the recommended site plan.

More detailed discussion of the features of each of the above alternatives is provided in Appendix H. The preferred alternative is reviewed in detail in Section 6.0.

* Alternatives 5 and 6 are included only to show that privatization, per se, is not a decision driver relative to Site Planning. Even if applied to WRAP-2B and TTF, privatization may provide a different focus on these facilities, but should not negatively impact overall Site Planning, nor alter conclusion of this report.

5.2.2 Evaluation Criteria

The criteria developed for numerical evaluation of siting alternatives, and their assigned weightings, are as follows: (Weightings are scaled from 1 to 5, with 5 representing the greatest significance.)

Safety (5):

- Distances between process facilities where pedestrian traffic is required, and related traffic hazard.
- Maintenance accessibility
- Vehicular traffic separation
- Construction/Operations interferences between projects
- Personnel density - increasing injury risk level

Construction Costs (4):

- Grading
- Utility extension and road development
- Serial construction interferences
- Distance to onsite receptor (hazard classification effect, if any)

Environment (3):

- Site disturbance:
 - Roads/Railroads
 - Area Grading
 - (Sewage and water runoff effects relative to water table, burial grounds, monitoring wells, are considered equivalent for all options and are not factored into the evaluation.)

Future Expansion and Flexibility (4):

- Expansion room available for each process facility
- Land available for storage expansion
- Ability to further optimize siting as time phasing proceeds

Effect on Adjacent Operations and Programs (2):

- W-5 LLW burial grounds
- Mixed low-level waste (MLLW) Disposal Facilities
- Tank Farms

The weighting applied to each category of criteria is based on the consensus judgment of cognizant management. The factors considered in developing these criteria include those, as applicable, from RL Order 4320.2C and others uniquely appropriate to the SWMC siting problem. The justification for the assigned weightings is discussed Appendix B.

5.3 EVALUATION

Each of the above alternatives was evaluated against the criteria established in Section 5.2.2. A score of 1-5 was assigned for each criteria (Appendix A) based on the scoring guidance shown in Table 3. These scores were then multiplied by the criteria weighting factor (Section 5.2.2) to obtain a weighted score for each alternative against each criteria. The summation of these weighted scores denotes the preference ranking of the alternatives. The results of this process are summarized in Table 4.

Table 3. Scoring Basis

Evaluation Criteria	High Score (4-5)	Middle Score (3)	Low Score (1-2)
<u>Construction cost drivers</u> <ul style="list-style-type: none"> Grading Roads Utilities 	<u>Construction cost drivers less than base case</u> <ul style="list-style-type: none"> Grading Roads Utilities 	<u>Base case</u>	<u>Construction cost drivers greater than base case</u> <ul style="list-style-type: none"> Grading Roads Utilities
<u>Operational Safety</u> <ul style="list-style-type: none"> Pedestrian distance & traffic hazard. Maintenance accessibility. Vehicular traffic separation. Construction-operations interference. Personnel density causing potentially more risk of injury. 	<ul style="list-style-type: none"> Less distance; no evident road crossing risk. ditto Fewer points of traffic crossing and commingling. Clean separation. Greater facility dispersion. 	<ul style="list-style-type: none"> Base case conditions or equal. ditto ditto ditto ditto 	<ul style="list-style-type: none"> Greater distance; road crossing risk evident. ditto More points of traffic crossing and commingling. Close proximity of construction to operating facility. Greater crowding
<u>Environment</u> Site disturbance	Less disturbance than base case.	Base case is KEH grading plan.	More disturbance than base case.
<u>Impact on other programs</u> <ul style="list-style-type: none"> Tank farms W-025 trenches W-5 burial grounds 	<ul style="list-style-type: none"> Less impact than base case. ditto ditto 	<ul style="list-style-type: none"> Same impact as base case. ditto ditto 	<ul style="list-style-type: none"> More impact than base case. ditto ditto
<u>Future expansion and flexibility</u> <ul style="list-style-type: none"> Treatment facility expandability. Additional storage bldg land availability and proximity. Ability to further optimize siting as each phase is committed. 	<ul style="list-style-type: none"> Expansion of each facility easier than base case. More land available than base case. More viable options for future phases than base case. 	<ul style="list-style-type: none"> Capability to expand equal to base case. Land available same as base case. Options for future phases same as base case. 	<ul style="list-style-type: none"> Expansion more restricted than base case. Less land available than base case. Fewer viable options for future phases than base case.

Table 4. SWMC Site Concepts Evaluation Scoring Matrix

CRITERIA/ WGT'G FACTORS	SCORE/WGT'D SCORE OF EACH SITE PLAN EVALUATED (ALTERNATIVES 1 THROUGH 7)						
	1	2	3	4	5	6	7
CONSTRUCTION COSTS 4	3/12	3.2/12.8	3/12	3.2/12.8	3.4/13.6	3.8/15.2	3.8/15.2
OPERATIONAL SAFETY 5	3/15	3.6/18.0	4/20	3.8/19	4.2/21.0	4.4/22	4.2/21
ENVIRONMENTAL IMPACTS 3	3/9	3/9	3/9	2.5/7.5	3.5/10.5	3/9	3/9
IMPACT ON OTHER PROJECTS 2	3/6	3.3/6.6	3.3/6.6	3.3/6.6	3.7/7.4	3.3/6.6	3.3/6.6
EXPANSION FLEXIBILITY 4	3/12	2.3/9.2	2.3/9.2	3/12	2.3/9.2	4.3/17.2	4.3/17.2
TOTAL WEIGHTED SCORE	54	55.6	56.8	57.9	61.7	70.0	69.0

See Appendix A for the assignment and interpretation of scores allocated to each concept and the totals calculated in this matrix, and Appendix K for comparative data on utility runs and grading volumes that were applied in the scoring process.

6.0 RECOMMENDED MASTER PLAN

6.1 DOMINANT SITE ATTRIBUTES

6.1.1 Eugene Avenue Location

The recommended master plan (Figure G-7) shows the SWMC site as it would appear when completed. The plan suggests optimal locations for all of the presently identified production plants and storage buildings, including WRAP 2A. A key attribute of the plan is that Eugene Avenue is moved about 300-feet to the west of the location shown in the CDR. This relocation provides space essential for optimization of SWMC building arrangements for effective long-term operations.

6.1.2 Construction Phasing

The plan recognizes that development of the SWMC will occur over an extended period of time. With the groundbreaking for WRAP 1, major construction starts in April 1994 and continues through the several phases of W-112 into the first quarter of FY 1999. The WRAP 2A, WRAP 2B, and the TTF projects will carry construction at the SWMC well into the second decade of the next century.

A series of site layouts depicting the buildings and infrastructure involved in each construction phase of the SWMC site development is included in Appendix I, Figures I-7.1 through I-7.7).

6.1.3 Conflicts Between Operations and Construction

The additional space provided by this plan earned high marks in the evaluations. Even should WRAP 2A be privatized, this plan not only helps to ease overall traffic congestion in and around the site once operations begin, it also ameliorates the major problem of conflicts between operating plants and construction of the buildings that will be added to the site for many years to come.

6.2 BUILDING LOCATIONS

6.2.1 SWMC Area Redefined

This master plan recommends locating the new (near-term) storage, treatment, office, and maintenance buildings within the area bounded by 23rd street on the north and 22nd street on the south, with Eugene Avenue moved 300 feet west. This arrangement provides the roads and utilities and site grading directly required by the SWMC at least cost if WRAP 2A is included. If the office/maintenance area is located to the south of 23rd, the area to the north of 23rd will not require grading, utility spurs, etc. The final SWMC area boundary definition will be provided in Project W-112 Definitive Design. WRAP 2B and the TTF are both located west of Eugene Avenue, away from the busiest area of the SWMC. Their parking lots are accessed from Eugene Avenue.

6.2.2 Main SWMC Processing Functions

- WRAP 1 (2336-W), the flagship facility of the SWMC, stands as the anchor facility, south of 23rd street toward the eastern third of the site.
- WRAP 2A (2337-W) is situated due west of WRAP 1.
- The buildings serving the main functions of the SWMC are all connected by a transfer corridor (part of the W-112 Project) designed to accommodate AGVs facilitating intra-building transport of waste and waste product containers.
- The W-112 shipping and receiving and head gas sampling buildings are situated close to WRAP 1, tied into the transfer corridor that runs along the south side of WRAP 1 to WRAP 2A. The W-112 automated storage building is situated on the north side of the transfer corridor near WRAP 2A.

6.2.3 Support Functions

- The office buildings are located to the south side of 23rd street, basically west of WRAP 1 and WRAP 2A. The maintenance building is situated east of the office buildings, on the south side of 23rd street just north of WRAP 2A. The parking lots for all of these buildings are accessed from 23rd street.

The maintenance building is a vital SWMC function once WRAP 2A comes on line, and is essential when WRAP 2B and the TTF are operational. Maintenance support for WRAP 1 can be adequately provided by expanding the capabilities within the new maintenance building (M0273), scheduled for completion in FY 1994 to support the existing storage building complex south of 22nd street.

- The three long-term storage buildings are grouped around an access roadway that is south of the transfer corridor servicing WRAP 1/WRAP 2A. An access roadway also reaches these buildings from 22nd street. The ignitable storage and box storage buildings are situated closer to WRAP 2A to more directly service that facility.
- Land for a future radioactive mixed waste (RMW) land disposal expansion area is available in the 23rd street loop.
- Land both north and south of 22nd street on the east side of Eugene Avenue is available for future storage use.

6.3 TRAFFIC PATTERNS

6.3.1 People Traffic

A large fraction of the people housed in the office buildings and the maintenance building will require daily access to WRAP 1 (2336-W) and WRAP 2A (2337-W). An essential element of this plan is the minimization of risk to these people. That goal is significantly realized by this scheme because this relatively high density of pedestrian traffic now need not cross 23rd street to reach the WRAP 1/WRAP 2A process facility complex.

Pedestrian traffic to WRAP 2B and the TTF from the office buildings must cross Eugene Avenue.

6.3.2 Vehicle Traffic

Small truck traffic between the maintenance building and the WRAP 1 complex must route to 23rd street and then along Dayton or Eugene Avenues, or via the access road east of WRAP 1.

Truck-trailer traffic enters only to the east side of WRAP 1, from Dayton Avenue (until abandoned), or along the access road east of WRAP 1 from 22nd or 23rd streets (Denver Avenue). Considerations should be given to semi-truck traffic and parking in the TSD. Provisions will be made in the TSD for Waste Receipts and Shipments with semi-truck traffic.

WRAP 2B and TTF passenger cars enter their parking lots from Eugene Avenue.

6.3.3 AGV Traffic

A pivotal feature of this arrangement is that the pathways are optimized for potential AGV traffic from W-112 shipping/receiving to the long-term storage buildings. Cross congestion between AGVs and truck-trailer traffic is eliminated (trucks could access the long-term storage buildings directly, if necessary). A detailed study of building spacing requirements is needed to establish optimum grouping of these buildings nearer to WRAP 1, which could further shorten potential AGV pathways.

6.4 UTILITIES

Certain of the utility headers and laterals serving the SWMC buildings located east of Eugene Avenue are lengthened by the 300 feet that Eugene Avenue is moved to the west. However, in the aggregate, sewer lines are shortest for the recommended layout if WRAP 2A is included in the plan. Power, telecommunication, and water lines may be longer in the preferred option because of moving a portion of the primary utility corridor 300 feet to the west. The utility corridor will be optimized in the Project W-112 Definitive Design process.

6.5 SITE GRADING

Site grading will be the same as for Alternative 5 except that the area to be graded will be about 300 feet wider from 23rd street to 19th street due to the westerly location of Eugene Avenue. This recommended plan, similar to Alternative 5, does not require grading north of 23rd street (see Appendix A).

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APPENDIX A: CRITERIA APPLICATION

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Evaluation Criteria	Alternative 2	Alternative 3	Alt
Construction Costs			
• Grading.	• (3) Same as base case.	• (3) Same as base case.	• (2) Increased by V of Eugene.
• Roads.	• (4) Paving of 23rd street loop not required.	• (4) Paving of 23rd street loop not required.	• (5) Paving of 23rd railroad run because needed, eliminated F
• Utilities.	• (3) Same as base case.	• (3) Same as base case.	• (3) Same as base
• Hazard class.	• (3) Same as base case.	• (3) Same as base case.	• (3) Same as base
• Facilities cost.	• (3) same as base case.	• (2) Longer transfer corridor needed.	• (3) Same as base
• Average score.	• (3.2)	• (3)	• (3.2)
Operational Safety			
• Pedestrian distance & traffic hazard.	• (4) Maintenance south of 23rd street, maintenance crew crossing of 23rd street no longer necessary.	• (4) Maintenance south of 23rd street, maintenance crew crossing of 23rd street no longer necessary.	• (4) Maintenance to WRAP-2B and TTF
• Maintenance accessibility.	• (5) Maintenance south of 23rd street, better access to operating facilities.	• (5) Maintenance south of 23rd street, better access to operating facilities.	• (5) Maintenance in respect to operating
• Vehicular traffic separation.	• (4) Maintenance trucks no longer cross 23rd street to reach operating facilities.	• (5) Maintenance trucks no longer cross 23rd street, and other truck traffic can use Eugene or Dayton to unload at WRAP-1 or W-112.	• (4) Maintenance to street, but must cross offset by eliminating
• Construction operations reference.	• (2) Maintenance building construction adds to congestion south of 23rd street.	• (3) Maintenance building construction congestion south of 23rd streets offset by moving W-112 S/R away from WRAP-1.	• (4) Maintenance b south of 23rd street WRAP-2B west of E
• Personnel density causing potentially more risk of injury.	• (3) Standoff with base case. Increased people south of 23rd offset by decrease north of 23rd.	• (3) Standoff with base case. Increased people south of 23rd offset by decrease north of 23rd.	• (3) Standoff with b south of 23rd and w decreased people n
• Average score.	• (3.6)	• (4)	• (3.8)
Environment			
• Site disturbance Roads and RR.	• (3) Same as base case.	• (3) Same as base case.	• (3) Somewhat less
• Area grading.	• (3) Same as base case.	• (3) Same as base case.	• (2) Grading increase
• Average score.	• (3)	• (3)	• (2.5)
Impact on others			
• Tank farms.	• (3) Same as base case.	• (3) Same as base case.	• (3) Same as base
• W-025 trenches.	• (4) Land available for additional W-025 trenches overlaid on 23rd street loop area.	• (4) Land available for additional W-025 trenches overlaid on 23rd street loop area.	• (4) Land available overlaid on 23rd st
• W-5 burial grounds.	• (3) Same as base case.	• (3) Same as base case.	• (3) Impact on W-
• Average score	• (3.3)	• (3.3)	• (3.3)
Future expandability/flexibility			
• Treatment facility expandability.	• (3) Same as base case.	• (3) Slight encroachment on WRAP-2A expandability is offset by added expandability of long term storage buildings.	• (4) More expansi
• Additional storage building land availability and proximity.	• (2) Moving maintenance south of 23rd street used land previously available for storage buildings.	• (2) Moving maintenance south of 23rd street used land previously available for storage buildings.	• (3) Added expans buildings at junction
• Ability to further optimize size as each phase is committed.	• (2) Early phases of W-112 construction (S/R and storage buildings) partially closes off access for WRAP-2A construction.	• (2) Early phases of W-112 construction (S/R and storage buildings) partially closes off access for WRAP-2A construction.	• (2) Early phases (storage buildings) p WRAP-2A constr
• Average score.	• (2.3)	• (2.3)	• (3)

	Alternative 5	Alternative 6	Alternative 7
and TTF located west of Eugene, but decrease north, in 23rd street loop.	<ul style="list-style-type: none"> • (3) Increased by WRAP-2B and TTF located west of Eugene, but decrease north, in 23rd street loop. • (5) Paving of 23rd street loop not required, shorter railroad run because large turn radius no longer needed, eliminated RR crossing of Eugene. • (3) Same as base case. • (3) Same as base case. • (3) Same as base case. 	<ul style="list-style-type: none"> • (3) Increased grading required by the additional 300-ft width is more offset by grading not required in the 23rd street loop. • (5) Paving of 23rd street loop not required; the railroad run is not a standoff with base case; RR of Eugene is eliminated; minor extensions of 22nd and 23rd streets required. • (4) Utilities less than base case • (3) Same as base case. • (3) Same as base case. 	<ul style="list-style-type: none"> • (3) Increased grading required by the additional 300-ft width is more offset by grading not required in the 23rd street loop. • (5) Paving of 23rd street loop not required; the railroad run is not a standoff with base case; RR of Eugene is eliminated; minor extensions of 22nd and 23rd streets required. • (4) Utilities less than base case • (3) Same as base case. • (3) Same as base case.
not required, shorter radius no longer g of Eugene.	• (3.4)	• (3.8)	• (3.8)
ss Eugene to previous advantages.	<ul style="list-style-type: none"> • (4) No 23rd street pedestrian crossing needed. 	<ul style="list-style-type: none"> • (4) No 23rd street pedestrian crossing needed, traffic hazards and pedestrian distances significantly decreased. 	<ul style="list-style-type: none"> • (4) No 23rd street pedestrian crossing needed, traffic hazards and pedestrian distances significantly decreased.
centrally located with longer cross 23rd e; however, this is sing of Eugene.	<ul style="list-style-type: none"> • (5) Maintenance now more centrally located with respect to operating facilities. • (4) No traffic crosses 23rd street, but maintenance traffic crosses Eugene; however, this is offset by eliminating RR crossing of Eugene. 	<ul style="list-style-type: none"> • (5) Maintenance now more centrally located with respect to operating facilities. • (4) No traffic crosses 23rd street, but maintenance traffic crosses Eugene; however, this is offset by eliminating RR crossing of Eugene. 	<ul style="list-style-type: none"> • (5) Maintenance now more centrally located with respect to operating facilities. • (4) No traffic crosses 23rd street, but maintenance traffic crosses Eugene; however, this is offset by eliminating RR crossing of Eugene.
struction congestion than offset by moving rd.	<ul style="list-style-type: none"> • (4) Construction congestion south of 23rd street is decreased by eliminating WRAP-2A, but partially offset by construction of office buildings. • (4) Increased people south of 23rd is offset by decreased people from eliminating WRAP-2A. 	<ul style="list-style-type: none"> • (5) Construction congestion south of 23rd street is decreased by eliminating WRAP-2A and providing more space for laydown and other construction activities. This is partially offset by construction of office buildings. • (4) Less crowding of facilities reduces risk of injury due to personnel density. 	<ul style="list-style-type: none"> • (4) Ample space south of 23rd street to accommodate WRAP-2A laydown and other construction activities. This extra space is particularly valuable for ongoing construction of office and support buildings in this area over time. • (4) Less crowding of facilities reduces risk of injury due to personnel density, even with WRAP-2A.
Increased people gene is offset by rd.	• (4.2)	• (4.4)	• (4.2)
se case.	<ul style="list-style-type: none"> • (3) Less land for RR turn radius, and no RR crossing of Eugene, somewhat less than base case. • (4) Grading decreased, none north of 23rd street. 	<ul style="list-style-type: none"> • (3) Less land for RR turn radius, and no RR crossing of Eugene, partially offset by lengthening 22nd and 23rd streets. • (3) Grading decreased north of 23rd street but offset by 300-ft additional site width. 	<ul style="list-style-type: none"> • (3) Less land for RR turn radius, and no RR crossing of Eugene, partially offset by lengthening 22nd and 23rd streets. • (3) Grading decreased north of 23rd street but offset somewhat by 300-ft additional site width.
needed west of Eugene.	• (3.5)	• (3)	• (3)
ional W-025 trenches area. ificant.	<ul style="list-style-type: none"> • (3) Same as base case. • (5) A lot more land available for additional W-025 trenches overlaid on 23rd street loop area. • (3) Impact on W-5 not significant. 	<ul style="list-style-type: none"> • (3) Same as base case. • (5) A lot more land available for additional W-025 trenches overlaid on 23rd street loop area. • (2) Impact on W-5 somewhat significant. 	<ul style="list-style-type: none"> • (3) Same as base case. • (5) A lot more land available for additional W-025 trenches overlaid on 23rd street loop area. • (2) Impact on W-5 somewhat significant.
	• (3.7)	• (3.3)	• (3.3)
for WRAP-2A.	• (3) More expansion space for WRAP-1.	• (5) Optimize expansion capability for the site.	• (5) Optimize expansion capability for the site and provides space between facilities for non-production uses.
long term storage street and Eugene.	• (3) Some added expandability of long term storage buildings at junction of 22nd street and Eugene.	• (4) Increased land for expandability of long term storage buildings at junction of 22nd street and Eugene and south of 22nd also.	• (4) Increased land for expandability of long term storage buildings at junction of 22nd street and Eugene (WRAP-2A encroaches on this area somewhat). The increased area south of 22nd remains available.
construction (S/R and loses off access for	<ul style="list-style-type: none"> • (1) Opportunities for process plant optimization limited by early decision for location of office buildings south of 23rd street. 	<ul style="list-style-type: none"> • (4) Opportunities for process plant optimization optimum. WRAP-2A and TTF could be sited east of Eugene if desired. 	<ul style="list-style-type: none"> • (4) Space availability for process plant and support building location optimization remains strong.
	• (2.3)	• (4.3)	• (4.3)

APPENDIX B: EVALUATION CRITERIA WEIGHTING

EVALUATION CRITERIA WEIGHTING

Operational safety is rated at a 5 level of significance in keeping with accepted social and moral responsibility of U.S. Industry as well as the heightened safety awareness within the Hanford site. Maintenance accessibility was considered a factor in this category since safety is often compromised if accessibility is low.

Construction costs, amortized over the expected 30 year operational life of the SWMC area, are not of the highest significance. (Control of costs against a firmly established budget was not considered a contributing element in the makeup of this criteria.) Yet, as stewards of government funds, we are obligated to prudently minimize the expenditures involved. Accordingly, construction costs were accorded a reasonably high significance of 4.

Environmental impacts, while of a concern similar to personnel safety, has less of a direct impact than operational safety or costs and direct or future impacts are uncertain. These considerations warrant a medium significance level of 3, in keeping with its importance, but less significance than operational safety or costs.

Future Expansion and Siting Flexibility are major considerations because of the technological, permitting and waste volume uncertainties in the solid waste arena. Inadequate flexibility to adapt to future needs could force environmentally and economically compromising decisions. A level of significance equal to cost impacts, 4, was applied to the flexibility criteria.

Land Use and Operation of Adjacent Activities. The potential exits for SWMC siting decisions to impact planning of other facilities, such as LLW burial grounds, tank farms and RCRA disposal facilities. Decisions could be beneficial or detrimental, but in any case would be resolved in an arbitrational/consensual manner. The significance relates more to the extra effort that resolutions will require and is therefore accorded a relatively low significance level of 2.

APPENDIX C: EXISTING SITE CONDITION DIAGRAMS

APPENDIX D: PROJECT PERSPECTIVE

PROJECT PERSPECTIVE

Project W-026, WRAP Module 1 (2336-W)

WRAP 1, now in the early stages of construction, is the anchor point for the material handling functions of Project W-112 which affects the location of WRAP 2A. The current design configuration and site orientation of WRAP 1 remains fixed. The siting of other facilities that interface with WRAP 1, either directly or indirectly, are optimized with respect to the location of WRAP 1.

Project W-100, WRAP Module 2A (2337-W)

WRAP 2A, which addresses the treatment of MLLW to meet RCRA waste form and disposal requirements, is nearing Advanced Conceptual Design Report (ACDR) completion. Because of the relatively innocuous nature of this waste, its high volume and its treatment parallelism in private industry, there is a significant potential for commercialization of this project. The effect of WRAP 2A commercialization is examined.

Project W-112, Phase V Storage (Bldg #s to be provided in Title I Design)

W-112 is a complex project providing numerous facilities serving a number of purposes (roads and site utilities, administrative offices, maintenance support, long- and short-term MLLW storage and waste transport to and from treatment facilities and to disposal sites). This broad spectrum of functions makes this project pivotal to the site planning process. This project has advanced through conceptual design and the start of Title I design is imminent.

Project W-113, Waste Retrieval Phase I (Bldg #s to be provided in Title I Design)

The first production phase of waste retrieval will be located in the 218W-4C burial grounds, trench 04. Additional truck traffic and material flow generated by this project is considered in SWOC site planning.

Project W-156, Alpha Caisson Retrieval

Alpha Caisson Retrieval is a 1997 line item project located in the 218W-4B burial grounds. The primary factor of impact for this project is the transportation routes for moving shielded casks to WRAP 2B. (unanswered is the question of where hi rad waste is stored before 2B is on line since there appears to be a substantial gap in the time phasing of these two projects)

Project W-174, Enhanced Solid Low-Level Radioactive Waste Disposal

This project is planned for the disposal of solid low-level Class III waste. The waste flow paths are considered, but siting impacts are not significant.

Project W-221, Waste Retrieval Phase 2

This project has minimal impact on the siting of SWMC facilities and is considered in the same context as Project W-113. This project will have multiple locations including other trenches in 218W-4C and other burial grounds adjacent to the SWMC area. Interruption of Power during Phase 2 Retrieval is not considered a problem under the assumption that Project W-112 relocates power transmission down Eugene avenue.

Project W-242, Thermal Treatment Facility

The TTF scope is currently undergoing change. For this evaluation it is assumed the TTF will orient only to Hanford site solid waste (dioxins, other) for which the required (or preferred) technology will be thermal treatment. The primary siting considerations will be integration with the SWMC infrastructure.

Project W-247, Waste Reduction and Reclamation

This was a concept facility in which all newly generated solid LLW was previously considered to be processed. Containers were to be opened, sorted and waste separated into recyclable/reusable, compactable/non-compactable and possibly, contaminated/non-contaminated streams. The need for this facility as a centralized function serving the waste generator is not currently considered viable and is not included in the SWMC site planning.

Project W-255, Wrap Module 2B

The considerations stated for TTF will also be applicable to WRAP 2B. Because of its assumed greater throughput, WRAP 2B has been given priority over TTF in the siting evaluation. Railroad to WRAP 2B will be required.

Project W-025

An area is being used for the second W-025 RCRA trench in 218-W-5 burial (Trenches T31 and T34) ground between 23rd Street and the first W-025 trench. Land just west of these trenches has been considered to be potentially useful in construction of additional RCRA trenches in the options analysis.

Rail Road To Treatment Facilities

Alternate routings of the RR to WRAP 2B (other facilities do not require rail service) are limited to how far west of Eugene Avenue the road must drift to satisfy needs of WRAP 2B and W-5 Burial Ground plans.

Landlord Projects

Two landlord projects, the new road joining 200 West Area with SR-240 and the proposed central sanitary disposal system, have potential impacts that are considered.

Other Projects

The following projects have also been addressed with primary emphasis on their identification on the layout as scoped by the cognizant engineer. This assures consideration of their interaction with other elements of the layout. The significant projects include:

- W-272 Special Case Storage Pad
- W-297 CWC Fencing and Lights
- W-298 CWC Equipment Storage and Protective Cover Structure
- W-312 Alkali Metal Storage
- W-349 Special Case Solid Mixed Waste Temporary Storage
- W-373 Long Length Waste Equipment Storage Facility

APPENDIX E: TRAFFIC CONSIDERATIONS ON THE SWMC SITE

TRAFFIC CONSIDERATIONS ON THE SWMC SITE

PROPOSED

Intra-SWMC site transfers would be by automated guided vehicles (AGVs).

AGVs could be used for all transfers within the SWMC site in the manner already planned for transfers of waste containers between W-112 and WRAP 1. Computerized programming controls and maintains records of all movement and location of the AGVs and their loads. None of the AGVs would be man-driven. Onboard dead reckoning navigation systems supplemented by radar or laser guidance can reliably verify position and direct the vehicle through to its correct destination along pre-selected pathways.

Dedicated AGV pathways would be provided throughout the SWMC site. The AGV pathways would be designed to eliminate, or at least minimize, intermingling with truckways in the yards between SWMC buildings. Because of the loads expected on the AGVs, these pathways are to be design with no more than a 3% grade with the optimum grade being $\leq 1.5\%$. The final grade will be determined in the Project W-112 Definitive Design.

AGVs may be found the most effective means to transport containers to the burial grounds. Special roadways might be required, although some vendors sell models with big wheels and rugged construction that are virtually all terrain vehicles (ATVs).

Receiving

Waste containers and commodities used in the process plants would continue to be transported to the SWMC site by trucks dispatched and routed by the normal Hanford traffic control system. Early on, WRAP 1 will provide point of receiving of all containers. Later, containers will be delivered to the Phase V Storage building (W-112).

Intra-site Transfers

From the receiving function onward, all further movement of commodities and waste containers could be by AGVs. The major advantages are:

- Information about each container's contents and location is entered and maintained automatically in the Plant Management System (PMS).
- The AGVs automatic travel path programming and built-in safety features virtually eliminate collisions.
- The tight turn radii and small size in relation to payload of these vehicles allows more efficient use of space.

Payloads

AGVs are available in configurations and sizes to carry single drums, pallets of four 55- or 83-gallon drums, Standard Waste Boxes for the TRUPACT II transporters, and B-25 Boxes (4 x 4 x 8) intended for burial. They can handle payloads of up to 100's of 1000's of pounds, if necessary.

Oversize Boxes

One decision needed is how/where to receive and handle boxes larger than those mentioned above. It may be that the individual WRAP facilities should have exclusive capability to receive these unusual loads as they come onto the SWMC site, rather than providing redundant capability in W-112. This requires, and may complicate, access for large trucks within the site, which the AGV idea strives to avoid. These large trucks will require a significant amount of space to accommodate their large turning radius. This turning radius will be factored into the Project W-112 Definitive Design effort.

Process Plant Interfaces

WRAP 1 is configured to receive, move around the plant, fill and load out 55- or 83-gallon drums from its process enclosures. Destination: WIPP or LLW burial at Hanford. Boxes are handled into and out of WRAP 1 for Non Destructive Assay/ Non Destructive Examination (NDA/NDE). Both types of containers are planned to be transported by AGV, within WRAP 1 and to and from W-112.

WRAP 2A is presently configured to receive 55- or 83-gallon drums and the normal range of boxes, also via AGV from W-112. WRAP 2A also has capability to handle the occasional oversize box. One enhancement of WRAP 2A that should be considered is that of much greater use of boxes for loading out final product. For instance, the grouting process could be configured to fill boxes (perhaps already positioned on an AGV) that would then be sampled and moved out to W-112 or, more efficiently yet, directly to burial.

Much of the traffic to W-112 Storage will be directly from W-113 Retrieval.

SWMC TRAFFIC

A preliminary analysis of traffic expected in and around the SWMC leads to the conclusion that the major groups of vehicles should be routed so as to eliminate congestion by minimizing commingling of various vehicle types.

TRAFFIC SEPARATION

Separation of vehicle types can be achieved by close-coupling the process buildings with the maintenance building and the key interim storage buildings. These buildings, huddling close together both functionally and physical, are connected by short pathways (covered and uncovered) dedicated to AGV vehicles carrying all containers and commodities between them. Truck and passenger cars must access their own specialty areas, separated as completely as possible to avoid crossing each other's pathways.

TRAFFIC DENSITIES

Calculations of traffic densities were made assuming the processing plants operate at nominal capacities. If production is increased by adding shifts the totals of vehicular traffic, and to some extent the degree of congestion, increase also.

Passenger Cars

About 800 people (460 passenger cars) per day are expected into the SWMC, accessing the site primarily from the south. Of these, about 500 (250 cars) will park at the north portion of the SWMC, i.e., 300 (150 cars) at the office buildings, and 200 (100 cars) at WRAP 1, WRAP 2A AND 2B and the maintenance facility. The rest (210 cars) will park at several sites near the south end of the SWMC. The main access for passenger cars is going to be from 16th and the north-south access road, which is currently planned to be Denver Avenue.

Trucks

About 17-20 truck/trailer rigs per day are expected into the SWMC. Of these, about 5 will transport product waste containers away from the SWMC; 6-7 will transport waste containers to the site for processing, 2 will bring in supplies for plant operations, and 2-3 will bring in new drums or boxes for process use.

PREFERRED TRAFFIC FLOW PATTERNS

Passenger Cars

The preferred site layout locates the processing buildings such that parking lots for passenger car traffic are accessed off Eugene, from either 22nd or 23rd streets. Passenger car traffic should be routed away from the infield between the processing buildings. Passenger car parking for the office buildings is accessed from Eugene avenue. The main access for passenger cars is going to be from 16th and the north-south access road, which is currently planned to be Denver Avenue.

Trucks

The preferred site layout has a single point of shipping/receiving for these trucks, located at WRAP-1/W-112 docks on the east edge of the site, to be accessed initially from Dayton avenue, or later from Denver avenue. Truck traffic would be minimized in the infield area between the processing buildings. A dedicated truck lane provided for incoming traffic on the main arterial, either Dayton or Eugene avenues as appropriate, would substantially reduce conflicts and congestion with passenger cars. If Dayton is closed early, then Denver Avenue may be the main arterial prior to construction of WRAP 2A. Dedicated truck lanes may be required if warranted by traffic congestion.

AGVs or Forklifts

Between 8 and 12 AGVs or forklift trucks can support a close-coupled site layout having internal transfers of all types of waste containers and commodities. Transfers that would use AGVs in the preferred layout include those between W-112 shipping/receiving and the W-112 storage buildings, WRAP 1, WRAP 2A, and possibly the 2402 and 2403 storage buildings, and Thermal Treatment Facility and WRAP 2B. All of this traffic can, by computer monitoring and control through state-of-art radio links and dead reckoning techniques, allow considerable flexibility in drive path configurations and distances between destinations.

AGVs or forklifts used strictly internally in a process facility are not counted in this traffic.

TRAFFIC COMMINGLING

Commingling of vehicle types can be avoided in a loose-coupling arrangement by assuring separation of over-the-road trucks and passenger cars traffic paths. The loose-coupled scheme uses vans or truck/trailer rigs to move most loads onto and within the site, i.e., offloading only waste containers at the W-112 central shipping/receiving. New drums and process supplies would be offloaded at each facility. AGV or forklift use for intra-SWMC transfers becomes minimal. The buildings are substantially separated to provide plenty of room for truck/trailer turning, maneuvering and parking. As in the close-coupled scheme, conflicts between passenger car and truck maneuvering is minimized by specific routing and parking of cars in designated parking lots.

APPENDIX F: CONCEPTUAL SITE GRADING PLANS

CONCEPTUAL SITE GRADING PLANS

1.0 INTRODUCTION AND EXISTING SITE CONDITIONS

This appendix evaluates site grading including utility and roadway data for 7 alternate site plan arrangements used for long range planning of the Solid Waste Management Complex (SWMC). The existing terrain is well drained and slopes to the southwest at grades varying from 0.5% to 8% with an elevation change of 100 feet from north to south. Most of the undeveloped sections of the site are relatively undisturbed and are covered with sagebrush and native grasses. The site is served with some unimproved roads. A sanitary water line runs along the south side of 19th street and continues to the south west across the 200 west plateau. Drawings in Appendix G show existing facilities and the proposed location of the new facilities for each of the 7 alternate site plans.

2.0 GRADING

Grading plans have been developed for the entire SWMC site to provide optimum drainage for current and future facilities. The infrastructure upgrades portion of the project have considered integrating local topography for roads with the topography of planned new facilities to facilitate a minimum of grading. A stepped grade approach has been used which more closely follows the existing contours and provides an optimum balance for the cut and fill quantities.

Comparative quantities and cost for grading each of the 7 alternate site plans have been evaluated and listed in Appendix K. All the earthwork costs shown in this table do not include clearing, grubbing, water for construction, surveying, or stabilization, thus allowing direct comparisons of earthwork for the 7 alternates without additions for multiple labor tasks. Project budget dollars would include an additional 15 to 20% for these items plus contingency and escalation determined by the final project schedule.

Grading plans for the Conceptual Design Report (CDR), WHC-SD-W112-CDR-001, Rev. 0, and each of these 7 alternate site layouts are described as follows:

2.1 CONCEPTUAL DESIGN REPORT (CDR) GRADING PLAN

The extent of the CDR grading involving the SWMC site was only minimal as compared to the overall site. Two plateaus for this site grading were formed and located at the following areas:

1. Office and maintenance building area north of 23rd Street and east of Eugene Avenue.
2. Area bounded by 19th and 23rd Streets in the north/south direction and by Denver and Eugene avenues in the east/west directions.

The new roads were placed approximately at existing grade by extending Eugene southward to intersect with 19th Street which had been extended westward from Denver Ave. The north end of Eugene Ave was also extended from 23rd Street to the guard house located near 27th street.

2.2 ALTERNATE 1 BASE CASE GRADING PLAN

The facility layout shown on Figure G-1 has been used as the base case for a comparative analysis. The grading plan for Alternate 1 includes a basic cross site slope of 2% for removal of surface water. To avoid excessive fill at the southern end of the site, grading has been done with several steps at selected points to lower the final grade.

2.3 ALTERNATES 2 to 6 GRADING PLANS

- 2&3 Grading plans for Alternates 2 and 3 are identical to Alternate 1. The only differences in these 3 alternates is in the layout of the facilities.
- 4 Alternate 4 Site Plan moves the Thermal Treatment Facility (TTF) and Waste Receiving and Processing (WRAP) 2B to the west side of Eugene Avenue. Additional grading will now be required for these facilities. However, this will leave more area available for future storage on the east side of Eugene Ave.
- 5&6 Alternates 5 and 6 Site Plans move the offices and maintenance facilities to the south side of 23rd street and closer to the process areas. Alternate 6 Site Plan will also move Eugene Avenue 300 feet west, making more space available for process and storage areas.

2.4 ALTERNATE 7 GRADING PLAN

Alternate 7 Site Plan, the preferred site plan arrangement for the SWMC considers the requirements that funding and construction proceed in a timed or phased sequence. This alternate moves the offices and maintenance facilities to the south side of 23rd street as in Alternate 6 and in addition adds WRAP 2A in the layout. The total area of both Alternates 6 and 7 are equal with Alternate 7 having a preferred storage layout that best addresses site traffic flow and access. As each local area is developed for new facilities, the associated new roads and utility corridors are extended at the same time even though they may not be utilized immediately. The following 3 phases provide for a timed construction of earthwork, utilities, and roadways. This will facilitate infrastructure planning for water, sewer, drainage, access roads, site traffic flow, and other projects.

2.4.1 PHASE I GRADING

The grading plan for this phase will support all the facilities shown on Figure 7.5 in Appendix I.

The area bounded between 22nd and 23rd Street in the north-south direction and Dayton and Eugene Avenue in the east-west direction will be graded. Estimated quantities for cut and fill during phase I are 500,800 cubic yards of cut and 110,000 cubic yards of fill. The following roads will be constructed during this phase:

- Eugene Avenue between 22nd and 27th Street (North/South)
- 22nd street (East/West)
- 23rd street extension (East/West)
- 19th Street between Denver Ave and Dayton Ave (East/West)
- Denver Avenue between 16th and 22nd Street (North/South)

Denver Avenue will be built during this phase to provide a bypass around Dayton Avenue which will be closed south of 19th Street for project W-113 retrieval activities. The utilities along this road will also be installed at this time to complete the utility loop to the WRAP facility.

To avoid extra costs the excess cut material will be hauled directly to the phase II and III areas between 16th and 22nd Street. The areas to be filled will be cleared and grubbed before receiving the phase I fill. The fill will be compacted during placement. All disturbed areas will be hydroseeded or stabilized after rough grading and compaction is completed. The project cost to complete this phase is approximately \$1,000,000 and will provide a continuous perimeter access for the SWMC.

2.4.2 PHASE II GRADING

The grading plan for this phase will support the new facilities shown on Figure 7.6 in Appendix I.

Eugene Ave and 19th Street will be extended to their point of intersection. The area bounded by 19th, 22nd, Denver Ave and Eugene Ave will be graded to accommodate new and future facilities. The Grade of existing facilities will remain unaffected. Estimated quantities for cut and fill during phase II are 411,600 cubic yards of cut and 524,500 cubic yards of fill. Phase I will provide 113,000 cubic yards of compacted fill, the remaining fill will be provided from phase II cut areas. This is a stepped grading approach to optimize the cut/fill ratio in order to minimize overall grading costs.

2.4.3 PHASE III GRADING

The grading plan for this phase will support the new facilities shown on Figure 7.7 in Appendix I.

The WRAP 2B and TTF area west of Eugene Ave and the area bounded by 16th, 19TH, Denver Ave and Eugene Ave will be graded. Eugene Ave and 16th Street will be extended to their point of intersection. The railroad serving WRAP 2B will be constructed, the cut material will be used for fill in the WRAP 2B and TTF areas west of Eugene. Estimated quantities for cut and fill during phase III are 729,200 cubic yards of cut and 1,126,700 cubic yards of fill. With 277,800 cubic yards of fill already in place from phase I construction and 729,200 cubic yards provided by phase III cut, the remaining 119,700 cubic yards of fill will be hauled in from borrow pits.

3.0 UTILITIES AND ROADS

Utility and road layouts are similar for all site plan alternates. The only significant difference is between Alternate 6 and 7 where Eugene Ave has been relocated 300 feet to the west. Underground utilities generally run parallel to the roads. Rough order of magnitude lengths and cost for each site plan alternate are shown in the Appendix K. Costs are based on unit costs for linear feet of finished paved road and linear feet of common utility trench with water and sanitary lines.

4.0 SUMMARY

Seven alternate site plans were considered for the overall project grading with variations of facility locations. Two of the plans, Alternates 6 and 7, move Eugene Avenue 300 feet west. Safety, traffic flows, utility corridors, project schedules, construction sequencing and land use optimization were considered during generation of the alternates. Alternate 7 site plan was chosen as the preferred alternative, because this is a progressive plan involving multiple phases of grading in which each subsequent phase is evolved to better satisfy the criteria and meet multiple project support dates.

The phased approach of Alternate 7 provides the following advantages over the base case (Alternate 1) grading plan.

1. Grading will be performed in timed sequence phases based on available funding and project support dates.
2. There will be added flexibility to award multiple contracts and interface outyear projects.
3. Grading adjustments to the latter phases can be made without incurring extra construction costs.
4. The expected minimum cost savings for Alternate 7 site plan versus the base case site plan will be \$730,000.
5. The new grading will develop more useable additional core area (300 feet wider site) than the CDR layout or base case plan which will relieve core area congestion and provide greater flexibility for optimization of SWMC buildings in making future decisions at all stages of site development.
6. Alternate 7, phase I will initially require project funding of only one third of the total cost for grading roads and corridor to support access and corridors to over fifty percent of the full site.

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OVERALL SITE PLAN (PROJECT: W-112)

METERS: 0 100 200 300 400 500 600

FEET: 0 250 500 750 1000 1250 1500

NOT
1- RC
2- TC
B:
FC

NOTES

1- ROAD CROWNS AND DITCHES NOT SHOWN FOR CLARITY.

2- TO CONVERT CONTOURS FROM METERS TO FEET, MULTIPLY BY 3.281.

FOR EXAMPLE: EL 215.0 M x 3.281 = EL 705.38 FT

SOLID
WASTE
MANAGEMENT
COMPLEX

FIGURE F-7

2-J:EN:ACD2:12.0:SN OPT7ALL.DWG

F-9/F-10

METERS:

11

SOLID
WASTE
MANAGEMENT
COMPLEX

F-11/F-12

FIGURE F-7 (SH 1)

METERS:

FE

SOLID
WASTE
MANAGEMENT
COMPLEX

FIGURE F-7 (SH 3)

F-15/F16

NORTH

DAYTON AVENUE

27TH STREET

LOOP

23RD

METERS:

FE:

FEET:

SOLID
WASTE
MANAGEMENT
COMPLEX

FIGURE F-7 (SH 4)

APPENDIX G: SITE LAYOUTS OF ALTERNATIVES

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STORAGE FACILITIES
LOCATED ABOVE

BLE STORAGE
ORANGE
ERM DRUM STORAGE
ERM DRUM STORAGE
ERM DRUM STORAGE
TED STORAGE
AS SAMPLING
ION AREA

UTILITIES		
BLDG	SNS	**WATER
S/R	-	340'
OFFICES	*2020'	280'
MAINT	20'	600'
WRAP 2A	100'	720'
WRAP 2B	50'	160'
TTF	810'	300'
WRAP 1	*2250'	-
STOR FAC	-	1180'

* INCLUDES LINE TO DRAINFIELD
** DOES NOT INCLUDE MAIN LINES
DOES NOT INCLUDE FIRE HYDRANTS

LEGEND

- SW--- SANITARY WATER
- RW--- RAW WATER
- SNS--- SANITARY SEWER
- EXISTING SANITARY WATER
- EXISTING FENCE
- EXISTING GRAVEL ROAD
- EXISTING PAVED ROAD
- PROPOSED PAVED ROAD
- EXISTING FACILITIES
- FUTURE FACILITIES

SOLID
WASTE
MANAGEMENT
COMPLEX

FIGURE G-1

CPIN51

NORTH

ALTERNATIVE 2 SITE F
(MAINT SOUTH OF 23RD)

STORAGE FACILITIES
LOCATED ABOVE

ABLE STORAGE
STORAGE
TERM DRUM STORAGE
TERM DRUM STORAGE
TERM DRUM STORAGE
WATED STORAGE
GAS SAMPLING
NSIGN AREA

UTILITIES		
BLOG	SNS	**WATER
S/R	-	400'
OFFICES	*1900'	80'
MAINT	170'	200'
WRAP 2A	200'	940'
WRAP 2B	50'	180'
TTF	900'	300'
WRAP 1	*2300'	-
STOR FAC	-	1070'

* INCLUDES LINE TO DRAINFIELD
** DOES NOT INCLUDE MAIN LINES
DOES NOT INCLUDE FIRE HYDRANTS

LEGEND

---SW--- SANITARY WATER
---RW--- RAW WATER
---SNS--- SANITARY SEWER
--- EXISTING SANITARY WATER
--- EXISTING FENCE
--- EXISTING GRAVEL ROAD
--- EXISTING PAVED ROAD
--- PROPOSED PAVED ROAD
EXISTING FACILITIES

FUTURE FACILITIES

SOLID
WASTE
MANAGEMENT
COMPLEX

FIGURE G-2

TE PLAN
23RD)

G-5/G-6

NORTH

ALTERNATIVE 3 SITE
(S/R CLOSER TO EUGE

UTILITIES		
BLDG	SNS	**WATER
S/R	-	130'
OFFICES	*1900'	80'
MAINT	230'	300'
WRAP 2A	200'	800'
WRAP 2B	50'	180'
TTF	900'	300'
WRAP 1	*2300'	-
STOR FAC	-	1070'

* INCLUDES LINE TO DRAINFIELD
 ** DOES NOT INCLUDE MAIN LINES
 DOES NOT INCLUDE FIRE HYDRANTS

LEGEND

---SW---	SANITARY WATER
---RW---	RAW WATER
---SNS---	SANITARY SEWER
---	EXISTING SANITARY WATER
---	EXISTING FENCE
---	EXISTING GRAVEL ROAD
---	EXISTING PAVED ROAD
---	PROPOSED PAVED ROAD
---	EXISTING FACILITIES
---	FUTURE FACILITIES

SOLID
WASTE
MANAGEMENT
COMPLEX

FIGURE G-3

ITE PLAN
(UGENE)

OPTICS

ALTERNATIVE 4 SI
(WRAP 2B & TTF WEST)

UTILITIES		
BLDG	SNS	**WATER
S/R	-	300'
OFFICES	*1750'	80'
MAINT	170'	200'
WRAP 2A	300'	500'
WRAP 2B	150'	670'
TTF	150'	840'
WRAP 1	2300'	-
STOR FAC	-	1020'

* INCLUDES LINE TO DRAINFIELD
 ** DOES NOT INCLUDE MAIN LINES
 DOES NOT INCLUDE FIRE HYDRANTS

LEGEND

---SW--- SANITARY WATER
 ---RW--- RAW WATER
 ---SNS--- SANITARY SEWER
 --- EXISTING SANITARY WATER
 --- EXISTING FENCE
 --- EXISTING GRAVEL ROAD
 --- EXISTING PAVED ROAD
 --- PROPOSED PAVED ROAD

EXISTING FACILITIES
 FUTURE FACILITIES

SOLID
WASTE
MANAGEMENT
COMPLEX

FIGURE G-4

OPTNS4

E 4 SITE PLAN
 F WEST OF EUGENE)

ALTERNATIVE 5
(WRAP 2A PRIV)

2. STORAGE FACILITIES
LOCATED ABOVE

MITABLE STORAGE
K STORAGE
NG TERM DRUM STORAGE
NG TERM DRUM STORAGE
NG TERM DRUM STORAGE
OMATED STORAGE
AD GAS SAMPLING

PANSION AREA

UTILITIES		
BLDG	SNS	**WATER
S/R	-	340'
OFFICES	*1790'	240'
MAINT	150'	100'
WRAP 2A	-	-
WRAP 2B	210'	700'
TTF	100'	800'
WRAP 1	*1730'	-
STOR FAC	-	550'

* INCLUDES LINE TO DRAINFIELD
 ** DOES NOT INCLUDE MAIN LINES
 DOES NOT INCLUDE FIRE HYDRANTS

LEGEND

- SW--- SANITARY WATER
- RW--- RAW WATER
- SNS--- SANITARY SEWER
- EXISTING SANITARY WATER
- EXISTING FENCE
- EXISTING GRAVEL ROAD
- EXISTING PAVED ROAD
- PROPOSED PAVED ROAD
- EXISTING FACILITIES
- FUTURE FACILITIES

FUTURE LINE TO
200W SANITARY
SEWER SYSTEM

SOLID
WASTE
MANAGEMENT
COMPLEX

FIGURE G-5

IVE 5 SITE PLAN
2A PRIVATIZED)

G-11/G-12

TN55

ALTERNATIVE 7 SI
(EUGENE 300' W)

APPENDIX H: DESCRIPTION OF ALTERNATIVES

DESCRIPTION OF ALTERNATIVES

ALTERNATIVE 1

This alternative is virtually the same as that shown in the W-112 CDR, except that WRAP 2B and the Thermal Treatment Facility are added to the site plan (see Figure G-1).

PLANT LOCATIONS

- The process plants and new storage buildings are located between 22nd and 23rd streets, except for TTF, which is located just south of 22nd street. This location lends assurance that the prevailing northwest winds will blow TTF stack effluents, however minor, away from the office and process areas. The office and maintenance buildings are located north of the process plants in the 23rd street loop.
- WRAP 1 and WRAP 2A are located in line east to west and connected by an access corridor for AGVs handling waste containers, but separated to allow space for the W-112 Interim Storage module with its long axis running east and west. The W-112 Shipping and Receiving module and the Head Gas Sampling module are located on the south side of the access corridor.
- WRAP 1's shipping and receiving function serves all of the SWMC site until W-112 shipping and receiving comes on line. The W-112 shipping and receiving module, located on the south side of the access corridor close to WRAP 1 shipping and receiving, keeps all shipping and receiving functions and their administrative control at this central location. Off loading of trucks-trailers with process supplies and commodities occurs at each individual plant, i.e., WRAP 2A, WRAP 2B and the maintenance facility.
- Land is identified as being available for future storage off 22nd street and Eugene Avenue and north of 22nd street near Dayton Avenue.

TRAFFIC PATTERNS

- Passenger cars enter the process plants' parking lots off 22nd and 23rd streets. Traffic to the office and maintenance buildings can also enter those parking lots off 23rd street loop, which reduces congestion with other traffic on 22nd street and Eugene Avenue.
- Small trucks and/or pedestrian traffic between the office and maintenance buildings and the processing plants necessitates continual crossings of 23rd street, a potentially serious hazard.

- Truck-trailer rigs are routed from Dayton Avenue (until it is closed) or Eugene Avenue into the paved area between the process plants, thereby reducing potential congestion with the car traffic. The long-term storage buildings have double access, from the truck yard between the plants or from 22nd street.
- AGVs carrying waste containers have direct access between the buildings located along the access corridor. This layout does not provide optimum AGV passage between the other buildings on site.
- The railroad into WRAP 2B crosses Eugene Avenue.

UTILITIES

- Sanitary water is routed to the process plants and office buildings from mains that run along 22nd and 23rd streets from headers buried along Dayton and Eugene Avenues.
- The sanitary sewers all discharge to lines along Eugene Avenue that lead to 2 septic drainfields west of Eugene between 22nd and 23rd street. The drainfields are not located near disposal facilities.
- The electric power service and communications loops for the plant management system are supplied from a buried duct bank loop that rings the site, running along 22nd and 23rd streets from headers along Dayton and Eugene Avenues.

SITE GRADING

The office and process areas were to be graded with a uniform slope to the south. The grading plan was to be compatible with the final design for WRAP 1. Collection fixtures in paved areas will intercept and divert runoff water away from disposal facilities to a collection basin located southwest of 22nd and Eugene Avenue. The only grading required west of Eugene Avenue is for the railroad to WRAP 2B.

CONSTRUCTION PHASING

Construction phasing of the base case site plan is depicted by Figures I-1.1 through I-1.7.

ALTERNATIVE 2 Figure G-2

This alternative has only two changes from the arrangement discussed in Alternative 1, above; maintenance and office building locations.

PLANT LOCATIONS

- The maintenance facility is now located south of 23rd street, nearly in line with WRAP 1 and WRAP 2A. Space for the maintenance facility is acquired by rotating W-112's interim storage module so that its long axis runs north and south, shortening the distance between WRAP 1 and WRAP 2A and freeing up land just east of Eugene Avenue.
- The office buildings are now located on the western side of the 23rd street loop. This frees up the eastern half of the 23rd street loop area for expansion of W-025 if additional RMW land disposal trenches is needed.

TRAFFIC PATTERNS

- Small trucks or pedestrian traffic between the maintenance building and the process plants now does not cross 23rd street.
- Pedestrian traffic between the office buildings and the process plant area still must continually cross 23rd street.
- The maintenance facility shares passenger car parking with WRAP 2A, but its truck traffic enters via the truck driveway from Eugene Avenue.
- Entry into the office building parking lots is from either Eugene Avenue or 23rd street.
- AGVs carrying waste containers have direct access between the buildings located along the access corridor. Again, this layout does not provide optimum AGV passage between the other buildings on site.
- Again, the railroad into WRAP 2B crosses Eugene Avenue.

UTILITIES

- There are no substantive changes in utilities from that discussed in Alternative 1, above.

SITE GRADING

Same as for Alternative 1.

ALTERNATIVE 3 Figure G-3

This alternative shifts major functions to a more in-line arrangement. The office buildings are located westward as in Alternative 1, providing additional land for storage just west of the 218-W-5 RMW burial trenches (T-31 & T-34).

PLANT LOCATIONS

- The shipping and receiving function of W-112 is now located west of WRAP 2A. Assuming that WRAP 1's shipping and receiving function remains operational, this scheme provides two terminals for truck traffic.
- The access corridor extends along the south line of WRAP 1, WRAP 2A, the gas sampling and the interim storage buildings, providing a direct connection between these facilities, the W-112 shipping and receiving building and the WRAP 1 shipping and receiving function. Note that this location of the gas sampling building encroaches on WRAP 1 expansion space.
- The maintenance facility is rotated so that its long axis runs east and west, opening land to the south for the W-112 shipping and receiving function.
- The long-term storage buildings are located closer to the WRAP 1/WRAP 2A process buildings. As suggested on the site layout, these buildings can be easily expanded to the south.

TRAFFIC PATTERNS

- Small truck and pedestrian traffic between the maintenance building and the process plants does not cross 23rd street.
- Pedestrian traffic between the office buildings and the process area still must cross 23rd street.

The density of truck/trailer traffic delivering waste containers, production supplies and commodities to the SWMC site requires careful analysis and design, especially if all of this traffic terminates at a single shipping and receiving location, as shown in the other concepts.

- Truck traffic in this alternative can now terminate at either the WRAP 1 or the W-112 shipping and receiving functions, allowing complete separation of traffic to each of these functions.
- The principle of separating truck-trailer traffic from passenger car traffic at the process plants is retained by locating personnel parking off 22nd and 23rd streets.
- The access corridor provides excellent controlled access for AGV waste container traffic between the main production support buildings, and could be used for AGV transfer of commodities and supplies, too.
- This arrangement shortens the distance AGVs must travel to reach the storage buildings. However, the narrower truck-trailer yard tends to increase congestion, which could impede the AGV traffic that must cross this yard to reach the storage buildings to the south.

UTILITIES

- Utility runs are substantially the same as in the other concepts.

SITE GRADING

Same as for Alternative 1.

ALTERNATIVE 4 Figure G-4

This alternative solves a major potential obstruction to traffic along Eugene Avenue and opens up more land for storage within the main SWMC area.

PLANT LOCATIONS

- WRAP 2B and the TTF are both located west of Eugene Avenue. This frees up additional storage space northeast of Eugene Avenue and 22nd street.
- The long-term storage buildings are placed in a more dispersed array, and some have their long axes directed east-west rather than north-south.
- The office buildings are situated on the west side of the 23rd street loop, retaining the advantage of freeing up land to the east for possible expansion of the W-025 burial grounds.

TRAFFIC PATTERNS

- Small truck and pedestrian traffic between the maintenance building or the office buildings and the process plants has the same pattern as Alternative 2, above.
- The railroad into WRAP 2B now does not cross Eugene Avenue, but is routed from the north, parallel to and west of Eugene Avenue. In this alternative, the railroad enters WRAP 2B from the north, which avoids consuming open land for the long radius rail turning curve. A question remains as to whether this routing will encroach on a possible deep burial trench shown in some documents as located directly north of the W-5 burial grounds.
- Passenger car traffic enters the office buildings, WRAP 1 and WRAP 2B parking lots from 23rd street, as in the other concepts. The office buildings parking lots can also be entered from Eugene Avenue, but further north, away from the congested 23rd street intersection.

- Cars enter the WRAP 2B and the TTF parking lots from Eugene Avenue, which clouds the principle of clear separation of passenger car from truck-trailer traffic achieved in the other concepts. The entrances to these parking lots are either side of the SWMC truck-trailer entrance. Simulation studies can determine whether additional turn lanes should be provided to relieve congestion.
- This arrangement of long-term storage buildings retains the principle of in-out AGV access from either end of each building, but truck yard congestion is relieved because of redirecting the traffic patterns around these buildings.

UTILITIES

- Utility runs in this alternative appear to be equivalent to those of the other concepts, because the buildings are located essentially the same distances from the power ductbanks, water and sewer lines.

SITE GRADING

Grading between Eugene and Dayton Avenues will be the same as for Alternative 1. Additional grading will be required west of Eugene for WRAP 2B and the TTF.

ALTERNATIVE 5 Figure G-5

WRAP 2A is not located at the SWMC in this alternative.

PLANT LOCATIONS

- The office buildings and the maintenance building are all located south of 23rd street.
- The long-term storage buildings are located in an east-west line alongside 22nd street.
- The W-112 shipping and receiving building and the interim storage building are located on the south side of an access corridor that extends west from WRAP 1. The head gas sampling building adjoins this corridor on its north side, directly across from the interim storage building.
- Both WRAP 2B and the TTF are located west of Eugene Avenue.
- Land is freed up within the SWMC for future storage in two places, viz., at 22nd street and Eugene Avenue and north of 22nd street near Dayton Avenue.

- The land within the 23rd street loop is freed up for future storage.

TRAFFIC PATTERNS

- Pedestrian traffic from the maintenance and office buildings does not cross 23rd street.
- Small truck traffic between maintenance building and the process buildings may route to 23rd street or to Eugene Avenue.
- This version retains truck-trailer access to WRAP 1, W-112 shipping and receiving and the long-term storage buildings. Entry to the truck yard is from Dayton Avenue (until abandoned), 22nd street and 23rd street.
- Passenger car traffic enters the parking lots of the office and maintenance buildings, WRAP 2B and the TTF from Eugene Avenue.
- The railroad enters WRAP 2B from the north, on a line parallel with Eugene Avenue.

UTILITIES

Again, this alternative involves no notable changes in utility access over the other schemes.

SITE GRADING

Site grading will be same as for Alternative 4 except that the area north of 23rd ST does not require final grading as no facilities are located there, however, this area will still be excavated and levelled to provide fill material for the south end of the site.

ALTERNATIVE 6 Figure G-6

Again, WRAP 2A is not located at the SWMC in this alternative. Furthermore, Eugene Avenue is moved about 300-feet to the west, providing space to better optimize SWMC building arrangements.

BUILDING LOCATIONS

- The office and maintenance buildings are arranged in an east-west line along 23rd street east of WRAP 1.
- The W-112 shipping and receiving, the head gas sampling building and the interim storage building are close to WRAP 1, tied into the access corridor.

- The long-term storage buildings are grouped around an access roadway that extends south from the access corridor.
- WRAP 2B and the TTF are located west of Eugene Avenue.
- Much larger land areas in the 23rd street loop, and both north and south of 22nd street at Eugene Avenue become available for future storage use.

TRAFFIC PATTERNS

- Pedestrian traffic between the office and maintenance buildings does not cross 23rd street to reach the WRAP 1 complex. Pedestrian traffic to WRAP 2B and the TTF from the office buildings must cross Eugene Avenue.
- Small truck traffic between the maintenance building and the WRAP 1 complex must route to 23rd street and then along Dayton or Eugene Avenues or via the access road east of WRAP 1.
- Truck-trailer traffic enters only to the east side of WRAP 1, from Dayton Avenue (until abandoned) or along the access road east of WRAP 1 from 22nd or 23rd streets.
- WRAP 2B and TTF passenger cars enter their parking lots from Eugene Avenue.
- A pivotal feature of this arrangement is that the pathways for AGV traffic from WRAP 1 to the long-term storage buildings are more nearly optimized. They have been shortened and are dedicated to AGV traffic. Cross congestion between AGVs and truck-trailer traffic is eliminated (trucks could access buildings 4 and 5 directly, if necessary). A detailed study of building spacing requirements is needed to establish optimum grouping of these buildings nearer to WRAP 1, which could further shorten the AGV pathways.

UTILITIES

Certain of the utility headers and laterals serving the SWMC buildings located east of Eugene Avenue are lengthened by the 300-feet or so that Eugene is moved to the west.

SITE GRADING

Site grading will be the same as for Alternative 4 except that the area to be graded will be about 300 feet wider due to the new location for Eugene Avenue.

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APPENDIX I: CONSTRUCTION SEQUENCE DRAWINGS

CONSTRUCTION SEQUENCE - RECOMMENDED PLAN

Figure	7.1
	7.2
	7.3
	7.4
	7.5
	7.6
	7.7

WRAP MO

LEGEND

- EXPANSION AREA
- EXISTING FENCE
- EXISTING GRAVEL ROAD
- EXISTING PAVED ROAD
- PROPOSED PAVED ROAD
- EXISTING FACILITIES
- FUTURE FACILITIES

**SOLID
WASTE
MANAGEMENT
COMPLEX**

FIGURE I-7.1

OPTNS7A

NORTH

LONG TERM DRU

W-112 STORAGE FACILITIES
LOCATED ABOVE

- 1) IGNITABLE STORAGE
- 2) BOX STORAGE
- 3) LONG TERM DRUM STORAGE
- 4) LONG TERM DRUM STORAGE
- 5) LONG TERM DRUM STORAGE
- 6) AUTOMATED STORAGE
- 7) HEAD GAS SAMPLING

LEGEND

- EXPANSION AREA
- EXISTING FENCE
- EXISTING GRAVEL ROAD
- EXISTING PAVED ROAD
- PROPOSED PAVED ROAD
- PROPOSED GRAVEL ROAD
- EXISTING FACILITIES
- FUTURE FACILITIES

SOLID
WASTE
MANAGEMENT
COMPLEX

FIGURE I-7.2

OPTNS78

DRUM STORAGE

IGNITABLE

W-112 STORAGE FACILITIES
LOCATED ABOVE

- 1) IGNITABLE STORAGE
- 2) BOX STORAGE
- 3) LONG TERM DRUM STORAGE
- 4) LONG TERM DRUM STORAGE
- 5) LONG TERM DRUM STORAGE
- 6) AUTOMATED STORAGE
- 7) HEAD GAS SAMPLING

LEGEND

- EXPANSION AREA
- EXISTING FENCE
- EXISTING GRAVEL ROAD
- EXISTING PAVED ROAD
- PROPOSED PAVED ROAD
- EXISTING FACILITIES
- FUTURE FACILITIES

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WASTE
MANAGEMENT
COMPLEX

FIGURE I-7.3

OPTK57C

NORTH

AUTOMATED STORAGE, HEAD GAS
TRANSFER CORRIDOR & SHIPPING/RE

W-112 STORAGE FACILITIES
LOCATED ABOVE

- 1) IGNITABLE STORAGE
- 2) BOX STORAGE
- 3) LONG TERM DRUM STORAGE
- 4) LONG TERM DRUM STORAGE
- 5) LONG TERM DRUM STORAGE
- 6) AUTOMATED STORAGE
- 7) HEAD GAS SAMPLING

LEGEND

- EXPANSION AREA
- EXISTING FENCE
- EXISTING GRAVEL ROAD
- EXISTING PAVED ROAD
- PROPOSED PAVED ROAD
- EXISTING FACILITIES
- FUTURE FACILITIES

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WASTE
MANAGEMENT
COMPLEX

FIGURE I-7.4

CPTN570

W
ADDITIONAL LONG TERM STORAGE &

W-112 STORAGE FACILITIES
LOCATED ABOVE

- 1) IGNITABLE STORAGE
- 2) BOX STORAGE
- 3) LONG TERM DRUM STORAGE
- 4) LONG TERM DRUM STORAGE
- 5) LONG TERM DRUM STORAGE
- 6) AUTOMATED STORAGE
- 7) HEAD GAS SAMPLING

LEGEND

- EXPANSION AREA
- EXISTING FENCE
- EXISTING GRAVEL ROAD
- EXISTING PAVED ROAD
- PROPOSED PAVED ROAD
- EXISTING FACILITIES
- FUTURE FACILITIES

SOLID
WASTE
MANAGEMENT
COMPLEX

FIGURE I-7.5

GE & MAINTENANCE BLDGS

OPTNS7E

NORTH

OFFICE

W-112 STORAGE FACILITIES LOCATED ABOVE

- 1) IGNITABLE STORAGE
- 2) BOX STORAGE
- 3) LONG TERM DRUM STORAGE
- 4) LONG TERM DRUM STORAGE
- 5) LONG TERM DRUM STORAGE
- 6) AUTOMATED STORAGE
- 7) HEAD GAS SAMPLING

LEGEND

- EXPANSION AREA
- EXISTING FENCE
- EXISTING GRAVEL ROAD
- EXISTING PAVED ROAD
- PROPOSED PAVED ROAD
- EXISTING FACILITIES
- FUTURE FACILITIES

SOLID WASTE MANAGEMENT COMPLEX

FIGURE I-7.6

OPTMS7F

NORTH

23

WRAP 2B & THERM

LEGEND

W-112 STORAGE FACILITIES LOCATED ABOVE

- 1) IGNITABLE STORAGE
- 2) BOX STORAGE
- 3) LONG TERM DRUM STORAGE
- 4) LONG TERM DRUM STORAGE
- 5) LONG TERM DRUM STORAGE
- 6) AUTOMATED STORAGE
- 7) HEAD GAS SAMPLING

- EXPANSION AREA
- EXISTING FENCE
- EXISTING GRAVEL ROAD
- EXISTING PAVED ROAD
- PROPOSED PAVED ROAD
- EXISTING FACILITIES
- FUTURE FACILITIES

SOLID WASTE MANAGEMENT COMPLEX

FIGURE I-7.7

OPTNS7C

APPENDIX J: PROJECT OVERVIEW SCHEDULE

09/19/94

J-2

APPENDIX K: UTILITY COMPARISON MATRIX

PRELIMINARY STUDY COST COMPARISONS

QUANTITY	ALTERNATE SITE PLAN						
	1	2	3	4	5	6‡	7‡
Cut (CY)	1945000	1945000	1945000	1945000	1575000	1650000	1650000
Fill (CY)	1075000	1075000	1075000	1522000	679000	1770000	1770000
Cost X 1000	\$2,914	\$2,914	\$2,914	\$2,686	\$2,035	\$2,275	\$2,275
Corridor for waterlines (lin ft)	18100	19100	19100	19100	19100	20300	20300
	10230	9240	9060	10310	7480	9000	9210
*Utility hookups (lin ft)							
Cost	\$511,500	\$462,000	\$450,000	\$515,500	\$366,500	\$450,000	\$460,500
†Roadways (lin ft)	15530	14100	14100	14100	14100	15100	15100
Cost	\$795,000	\$705,000	\$705,000	\$705,000	\$705,000	\$755,000	\$755,000
Total Cost X 1000	\$4,220	\$4,080	\$4,070	\$3,910	\$3,110	\$3,480	\$3,490

* Includes sanitary sewer line but no electrical/telecommunications

† Does not include driveways and parking lots

‡ Site extended 300 feet west