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PROPOSED PLAN OF REMEDIAL ACTION

FOR THE

Fifth and Church Streets Site

Wilmington, Delaware



April, 1998

DNREC Project DE-1082

Prepared by:

**Delaware Department of Natural Resources & Environmental Control
Division of Air and Waste Management
Site Investigation & Restoration Branch**

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FIFTH AND CHURCH STREETS SITE PROPOSED PLAN OF REMEDIAL ACTION

I. INTRODUCTION

In January 1997, The Mother Union AME Church (“the Church”), entered into a letter agreement with the Department of Natural Resources and Environmental Control (“DNREC” or “Department”) under the authority granted by the Hazardous Substance Cleanup Act (7 Del. C., Ch. 91) (“HSCA”). The parties agreed that DNREC would review environmental assessment documents pertaining to their property located at 50 Church Street, Wilmington, Delaware (Block 1086, Parcels 112 and 36) (the “Site” or “Property”). The Church had proposed the property as a building site for a new church structure. DNREC recommended that additional environmental evaluation should be performed concurrent with geotechnical study. In September 1997 additional soil samples were taken on the property. This investigation revealed a hitherto unknown area of petroleum hydrocarbon contamination in soil. After evaluation of the additional sampling, the Church and DNREC entered into a second agreement under the Voluntary Cleanup Program on October 16, 1997. The agreement covered the remedial investigation, feasibility study, remedial design, remedial action and any interim action which may be taken at the Site under HSCA.

The purpose of the remedial investigation is to evaluate the nature and extent of contamination at the Site, evaluate risks to the public and the environment associated with identified contamination, and to develop remedial alternatives for the Site if required to be protective of public health and the environment. The selected remedial action will be incorporated into the planned construction of the church building.

All work will be performed in accordance with the Delaware Regulations Governing Hazardous Substance Cleanup (“Regulations”), the Delaware Standard Operating Procedures for Chemical Analytical Program, July 1994 (“SOPCAP”) and the Facility Evaluation Guidance Manual, 1994.

This document is the Department’s Proposed Plan of Remedial Action for the property. This Proposed Plan is issued under the provisions of HSCA and the Regulations. It presents the Department’s assessment of the risk to public health and the environment posed by the Site and a comparison of the remedial alternatives. The Proposed Plan of Remedial Action also presents a summary of the background and history of the property, describes the results of the previous investigations and presents a discussion of the remedial action objectives and a review of the applicable local, state and federal regulations.

The Department will provide public notice and opportunity to comment on the Proposed Plan in accordance with Section 12 of the Regulations. At the conclusion of the comment period, the Department, after review and consideration of the comments received, shall issue a Final Plan of Remedial Action which shall designate the selected remedial action. The Proposed Plan, the comments received from the public, responses to the comments and the Final Plan and the basis for all these actions will constitute the “Remedial Decision Record”.

II. SITE DESCRIPTION AND HISTORY

The site occupies most of a city block bounded by Church Street, Fifth Street, Lord Street and Spruce Street in Wilmington. The 1-acre rectangular property is found on the United States Geological Survey (USGS) Wilmington South Quadrangle Topographic Map (7.5 minute series) at Latitude 39° 44' 18" and Longitude 75° 32' 34" (Figure 1).

The western end of the block is occupied by residences fronting on Spruce Street. Residences are also found along Lord and Fifth Streets. Property use on Church Street is commercial. The site is generally flat, sloping slightly toward the southwest. Its elevation is 25 feet above sea level.

Between 1865 and 1960, the property was occupied by tanning industry facilities. The last buildings to occupy the site were demolished in the late 1970's. Concrete slab and foundation structures were visible on the surface of the site until recently.

III. PREVIOUS INVESTIGATIONS

In July 1986, Duffield Associates, environmental consultant to the Church, prepared a Phase I Environmental Site Assessment Report on the property. The Report noted the presence of semi-volatile hydrocarbons at reportable levels and the potential for significant lead contamination in soil. There was also a suspicious fibrous material found on the site and tentatively identified as containing asbestos.

IV. REMEDIAL INVESTIGATION

Two phases of investigation occurred as part of the Remedial Investigation. Duffield Associates, on behalf of the Church, reported interim results of the first phase in October with a recommendation for additional sampling. The additional sampling was performed in November and results were reported in December 1997.

The October sampling event consisted of twenty test pits. Twenty-five samples of soil and debris were analyzed by X-Ray Induced Fluorescence (XRF) by DNREC. Six of these samples were split with Lancaster Laboratories for comparison to the XRF results and for speciation of the chromium. Samples of the fibrous material were included in this analysis. One test pit discovered the presence of a petroleum fuel product on the north side of the site near Lord Street.

Twenty-three (23) Geoprobe borings were made in November and soil samples were obtained. DNREC screened the soil samples using XRF methods for 18 inorganic contaminants. Two of the borings were converted to small diameter monitoring wells. Two ground water samples and five soil samples were sent to a laboratory for analysis of 23 inorganic contaminants by EPA methods. Twelve additional borings were performed in the vicinity of the hydrocarbon

contamination near Lord Street. The purpose of these borings was to evaluate the extent of the free phase petroleum in this portion of the site. Samples from these borings were screened in the field with portable instruments for the presence of volatile organic compounds.

The locations of soil borings and ground water monitoring wells from both phases of investigation are indicated on Figure 2

V. RESULTS OF INVESTIGATION

Soils

Phase 2 performed in November was successful in determining the extent of the petroleum in soils along Lord Street. The petroleum product was identified as heavy fuel oil and will be considered in this Proposed Plan. However, two additional areas of petroleum contaminated soil were also discovered—one at the corner of Fifth and Church Streets (the southeast corner of the site) and one in the southwest corner of the site in a small drainage structure.

Upon further investigation by excavation in January 1998, the subsurface contamination in the southeast corner is associated with treated wood used to insulate the floor of a cooler box structure. The treated wood material is encased on all sides in concrete. The petroleum in the treated material does not affect soils immediately outside the concrete structure. The concrete floor of the cooler box containing the treated wood is approximately two feet below the bottom elevation of the new building's foundation footings and would therefore not be breached during construction. This area has been dropped from consideration in the Proposed Plan because the extent of the cooler box is limited, the nature of the petroleum substance as wood treatment, and the fact that it is already encapsulated in concrete and will not be disturbed by future site activities.

Further investigation in the southwest corner of the site revealed about 485 cubic yards of subsurface soil significantly impacted by kerosene range hydrocarbons. This contamination is potentially significant and will be addressed in this Proposed Plan.

The expanded investigation also included surface and subsurface soils suspected of contamination by metals. Analyses for inorganics (heavy metals) by XRF methods and by EPA methods are not expected to agree exactly and, in this case, did not. Usually the laboratory results are 40 to 60 per cent lower than the XRF results. In order to make a direct comparison, Duffield calculated "correction factors" for the XRF results for lead, chromium and arsenic. Using this procedure, it appears that only arsenic is widespread on the site at a level that DNREC considers unacceptable for residential use. The level of arsenic is significantly below the acceptable concentration for non-residential use when compared to the USEPA Risk Based Concentration. The results of soils analysis for arsenic, chromium and lead are presented in Table 1.

Table 1. Inorganic contaminants in soil, November 1997

		Lead (mg/kg)	Chromium ⁴ (mg/kg)	Arsenic (mg/kg)
Lab Data	MW-2	274	227	5.8
	SB-2	261	386	38.6
	SB-8	658	335	51.5
	SB-11	8.1	24.2	4.8
	SB-18	157	206	157
Field Screening Data (corrected) ¹	Minimum	6	24	2
	Maximum	913	14561	668
	Mean	92	206	29
	95% Upper Confidence Level of Mean	176	1489	91
Comparative Concentrations (surface soil)	DNREC URS ² (non-critical area, restricted use)	1000	5000	61
	EPA RBCs ³ (non-residential)	(not listed)	10000	610 ⁵

Notes:

1. Correction factors calculated by Duffield Associates: Lead, 44%, Chromium, 41% and Arsenic, 63%.
2. The DNREC Uniform Risk Based Remediation Standard (URS) was adopted as guidance in February 1998.
3. The EPA Risk Based Concentrations (RBCs) are non-regulatory concentrations of contaminants that are used by the US EPA as guidance. They are listed here for comparison only.
4. Chromium III and compounds.
5. As a non-carcinogen.

The elevated levels of arsenic throughout the site are addressed in this Proposed Plan. Lead and chromium are present at the site at elevated levels in some samples. All results obtained for concentrations of chromium with a valence of +6 are below DNREC's Uniform Risk Standard. Based on lab and field analysis, no other inorganic contaminants present a concern.

The fibrous waste material referred to above in "Previous Investigations" was found in several locations in the subsurface. It has a high level of chromium and is now thought to be chromed leather shavings. This material is present on the site in limited quantity. It will be treated as contaminated soil.

Groundwater

Water samples from two monitoring wells were analyzed for the contaminants already found to be present in site soils—petroleum, chromium, lead and arsenic. The results show that the site has contributed to significant arsenic contamination in the shallow ground water. There also

appears to be site contribution to petroleum contamination (identified as Diesel Range Organics) in ground water. These results are summarized below.

Table 2. Groundwater Contamination, November 1997

	Chromium (mg/l)	Lead (mg/l)	Arsenic (mg/l)	TPH <i>DRO</i> ¹
MW-1	< 0.030	< 0.10	0.467	1.1
MW-2	< 0.030	< 0.10	< 0.010	.58
<i>DNREC URS</i> For Groundwater	.018	.015	.001	.2 ²

Notes:

1. Total Petroleum Hydrocarbons-Diesel Range Organics
2. C9 through C10 Aromatic Hydrocarbons

Elevated levels of Arsenic and Total Petroleum Hydrocarbons in ground water are addressed in the Proposed Plan.

Data Quality

The analytical results from samples obtained for the Remedial Investigation were reviewed by the SIRB chemist. The analysis was conducted in accordance with the HSCA Standard Operating Procedure. There were no major deficiencies noted.

VI. REMEDIAL ACTION OBJECTIVES

To summarize the results of investigations reported above, four areas of concern were identified:

1. Fuel oil contamination in soil along Lord Street.
2. Kerosene range petroleum contamination in 485 cubic yards of soil in the southwest corner of the site.
3. Elevated levels of arsenic in surface and subsurface soils throughout the site.
4. Contamination of shallow groundwater with arsenic and petroleum hydrocarbons.

According to 8.4(1) of the Regulations, during a remedial investigation, qualitative and quantitative remedial action objectives are established during the Remedial Investigations. These objectives are to be consistent with the HSCA statute and the Regulations but fit the specific site and areas of concern that have been identified. For the Fifth and Church Streets site, the significant findings are:

- The site has recently been an undeveloped, unfenced vacant lot. Until construction activity began most of the site surface was covered with old concrete slabs, rubble and fill. The proposed future use of the site is a church and parking lot.

1. Prevent contact with soil that has an arsenic concentration greater than 61 mg/Kg.
2. Prevent contact with soil that has a petroleum hydrocarbon concentration greater than 500 mg/Kg.
3. Prevent ingestion of or contact with shallow groundwater that has an arsenic concentration greater than 1 ug/L or a petroleum hydrocarbon concentration greater than 200 ug/L.

VII. EVALUATION OF POTENTIAL REMEDIAL ALTERNATIVES

Initial Screening Criteria

The Regulations provide that remedial alternatives, including a “no action” alternative, are identified and evaluated against initial screening criteria identified in Section 8.5. The criteria are 1) protection of human health, welfare and the environment, and 2) acceptable and feasible engineering practice.

To accomplish the remedial action objectives, two potential remedial alternatives were identified for screening:

1. A Presumptive Remedy consisting of permanently capping the site with a building and paved parking area, deed restricting the property and placing a Groundwater Management Zone (GMZ) on the property.
2. No further action.

Alternative 1: Permanent Capping, On-site Treatment of Petroleum Contaminated Soils, Deed Restriction, Groundwater Management Zone, Operations and Maintenance would involve grading the site for building and parking lot construction under an appropriate health and safety plan. Soil excavation and off-site disposal of soils would be minimized. The foundation of the building would be designed as a “pile and beam” type to minimize excavation. The finished site would encapsulate the existing soils with concrete slab, asphalt paving or a minimum of two feet of clean fill. The fuel oil near Lord Street would be collected in a drain system and removed by periodic pumping. The kerosene contaminated soil in the southwest corner would be treated with a passive ventilation system to enhance its natural attenuation and prevent the accumulation of fumes in confined spaces. A contingency plan would be included to monitor the emissions from this vent system and treat them if necessary to protect public health and safety and to avoid nuisance odors.

In addition, the property owner would attach a deed restriction to the property limiting the use of the property to commercial purposes (including church use) only. A statement would be included in the deed restriction requiring prior DNREC approval for any excavation activities following the remediation. DNREC would place a Groundwater Management Zone (GMZ) on the property to prohibit the use of shallow groundwater at the site.



An important component of Alternative 1 would be an "Operation and Maintenance Plan" which

Construction activity at the site is permitted by the City of Wilmington.

Community acceptance - Alternative 1 is anticipated to be acceptable to the community. The site improvements will considerably reduce the current risks associated with the site, which are significant. The expansion of the parking lot as a remedial measure should also help alleviate any problems the surrounding neighborhood might have had with on-street parking during church services.

Provision for Long Term Monitoring - Alternative 1 requires monitoring of the fuel oil collection system and the passive ventilation system. There will also be a determination made in the future that the systems have reached the end of their useful lives and should be removed. The ventilation system will require additional monitoring for compliance with regulations governing air emissions and impacts on the health and welfare of the public in the surrounding neighborhood. The continued presence of contaminated soil under the parking lot will require heightened maintenance of the asphalt surface. Monitoring and maintenance will be covered in an "Operations and Maintenance Plan".

Technical practicability – The components of Alternative 1 are collectively and individually technically feasible.

Restoration time frame – The encapsulation of contaminated soils in Alternative 1 will take several weeks to implement as the property is renovated. This is a reasonable timeframe. The collection of fuel oil with the passive drain system and the passive ventilation of the kerosene contaminated soil could continue for several years which is considered by DNREC to be reasonable for the risks associated with these two areas of concern.

Reduction in toxicity, mobility and volume - Alternative 1 would reduce mobility and minimize exposure to potentially toxic material. The volume and concentration of arsenic contaminated soil would generally remain the same or be slightly reduced if material is removed for off-site disposal. The volume of petroleum contaminated soil and its toxicity will be significantly reduced over time. The mobility of the fuel oil contamination will be completely controlled by the collection system. The mobility of the kerosene will increase as it is emitted to the air at a slow rate. If the rate and volume of emission is unacceptable, then treatment such as carbon filtration will be required to control its mobility.

Long term effectiveness - Alternative 1 is effective in the long term in protecting public health, welfare and the environment, and will be maintained by the implementation of the "Operation and Maintenance Plan" to be developed during remedial design. The church structure and parking lot are considered permanent amenities.

Short term effectiveness - Alternative 1 is protective of public health, welfare and the environment in the short term. Potential short-term risks from exposure to excavated materials will be minimized through the use of appropriate Health and Safety procedures, excavation and filling procedures and site access controls.

VIII. PROPOSED REMEDIAL ACTION PLAN

Based on the above criteria, Alternative 1 (permanent capping with a building and paved parking lot, recovery of fuel oil through a drain and sump system, treatment of kerosene contaminated soil with a ventilation system, deed restriction, and GMZ) is the proposed remedial action to be completed at the property.

IX. PUBLIC PARTICIPATION

The Department actively solicits public comments or suggestions on the Proposed Plan and welcomes opportunities to answer questions. Please direct written comments to:

DNREC Site Investigation & Restoration Branch
ATTN: Stephen F. Johnson
715 Grantham Lane
New Castle, Delaware 19720

or call (302) 323-4540. The public comment period begins on May 4, 1998 and closes on May 26, 1998. Requests for a public meeting must be received by the close of business at 4:30 PM on Wednesday May 13th. Requests should be directed to Stephen F. Johnson, at the address given above.

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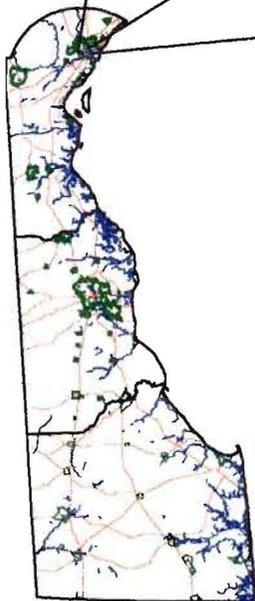
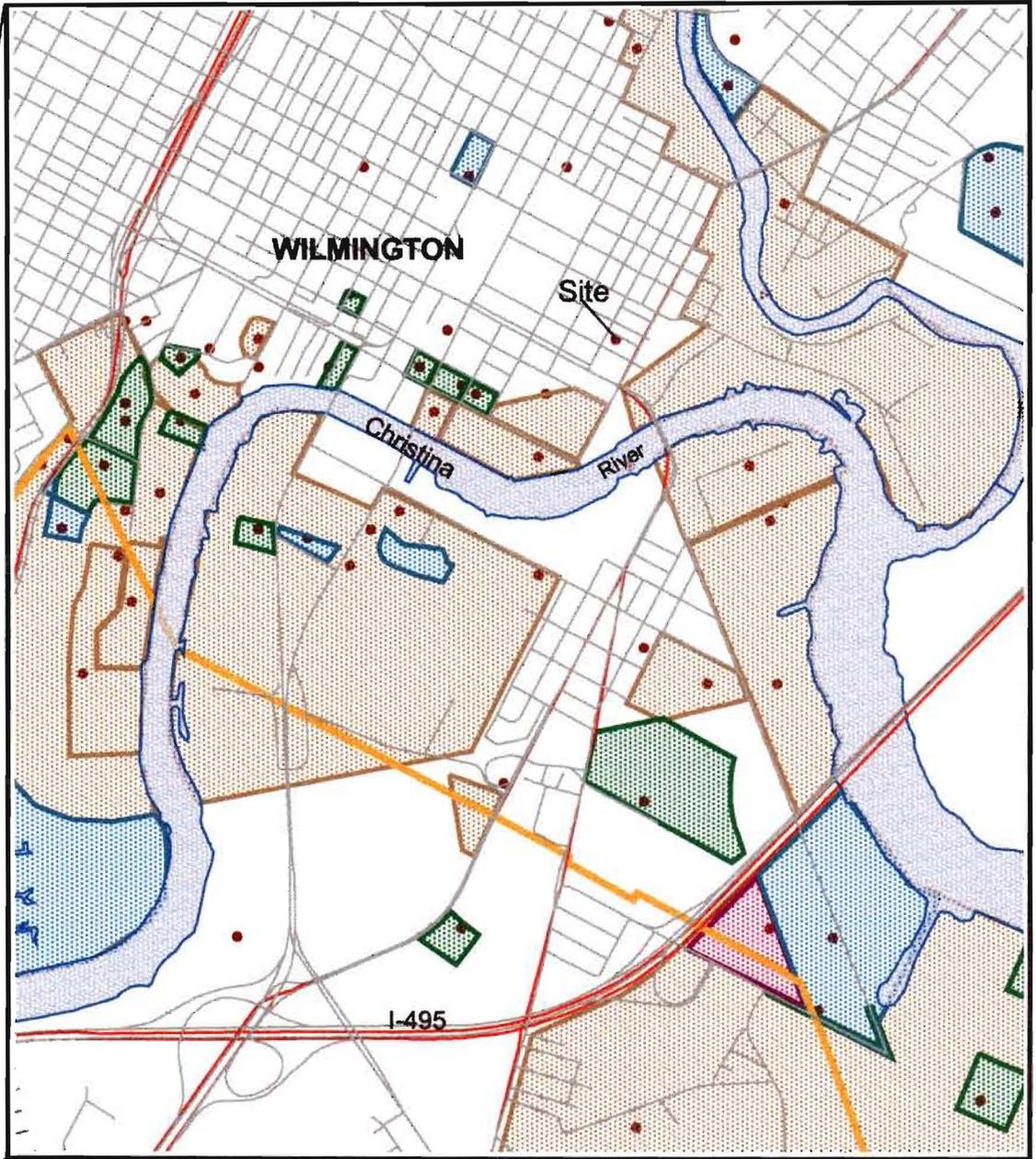


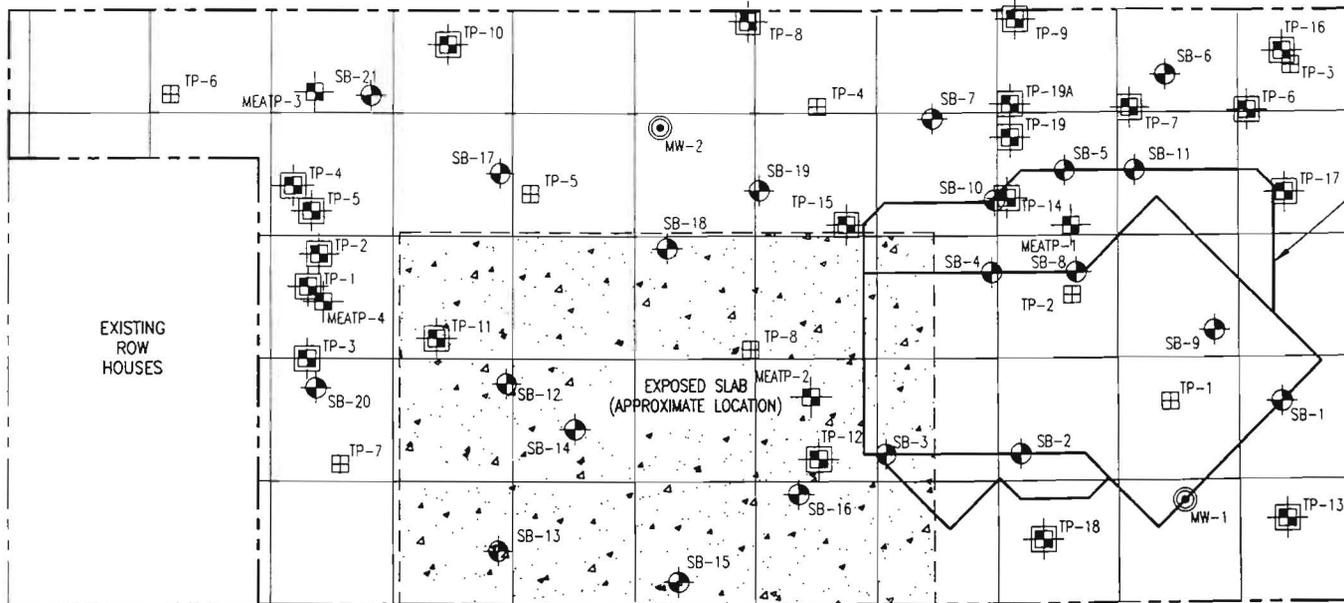
Figure 1: Location of Fifth and Church Streets Site

LORD STREET

SPRUCE STREET

CHURCH STREET

N



APPROXIMATE BUILDING FOUNDATION FOOTPRINT FOR PROPOSED CHURCH BUILDING

EXISTING ROW HOUSES

EXPOSED SLAB (APPROXIMATE LOCATION)

5th STREET

TEST PIT, SOIL BORING AND MONITORING WELL LOCATION SKETCH

FIFTH AND CHURCH STREETS

WILMINGTON

NEW CASTLE COUNTY ~ DELAWARE

KEY:

- TP-3 APPROXIMATE TEST PIT LOCATION (PERFORMED 1989)
- TP-3 APPROXIMATE TEST PIT LOCATION (PERFORMED 1996)
- TP-3 APPROXIMATE TEST PIT LOCATION (PERFORMED 1997)
- MW-1 APPROXIMATE TEMPORARY MONITORING WELL LOCATION
- SB-1 APPROXIMATE SOIL BORING LOCATION

DUFFIELD ASSOCIATES

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Drawn: BSH	Chk'd: JMM	Date: 26 NOVEMBER 1997
Scale: 1" = 30'	W.O.: 1623.EF	
Drawing No: B-1623EF-2		FIGURE 2