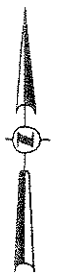


**Table 1**  
**Param Petroleum Site**  
**Burlington, NJ**  
**Evaluation of Remedial Action Alternatives**  
**(Groundwater)**

Remedial Alternative	Protection of Human Health and the Environment			Implementability	Consistency With Applicable Laws and Regulations	Potential Impacts on the Local Community	Potential for Natural Resource Injury	Estimated Costs (Net Present Value)
	Effectiveness and Reliability in Attaining Applicable Remediation Standard	Reduction of Toxicity, Mobility or Volume	Risk Minimization					
<b>Monitored Natural Attenuation (MNA)</b>	MNA is only intended to monitor and restrict use of the groundwater; however historic and recent groundwater results indicated that contaminants have been effectively attenuated by natural processes.	The MNA alternative offers relatively little reduction in toxicity, mobility, or volume. It relies only on natural attenuation to reduce toxicity by eventually degrading the compounds.	MNA relies only on natural attenuation process and use restriction of the groundwater to minimize the risk. This alternative would entail minimum short-term risks, but increased long-term risks compared to other alternatives evaluated.	The MNA alternative is readily implementable as it is a common, well-established approach. It would require very little effort to implement.	The MNA alternative is consistent with the <i>New Jersey Technical Requirements for Remediation</i> .	Even though the MNA alternative would have little disturbance to the local community, it may be perceived by the community as unprotective.	MNA, EMNA, and ISCO are considered to equally offer minimum potential for natural resource injury due to their implementation.	Capital Costs ≈ \$10,000 O&M Costs ≈ \$340,000 <b>TOTAL</b> <b>≈ \$350,000</b>
<b>Enhanced Monitored Natural Attenuation (EMNA)</b>	EMNA, although offers less aggressive contaminant degradation than ISCO, would allow Advanced ORC to contact with contaminants for up to 12 months.	The EMNA offers the greatest reduction in the toxicity, mobility, or volume of the contaminants through natural degradation enhanced with ORC Advanced injection.	The EMNA alternative will reduce the risk most effectively by degrading and reducing the contaminant concentrations on site. The alternative may have moderate risks/impacts to nearby residents due to injection activities.	The EMNA alternative is readily implementable, as it is an easily applied treatment with demonstrated effectiveness. Its implementation would involve some injection activities.	The EMNA alternative is consistent with the <i>New Jersey Technical Requirements for Remediation</i> .	Compared to ISCO, the EMNA alternative provides slightly lower short-term impacts due to its smaller number of injection points, but the alternative may provide higher long-term impacts due to its longer required period to reach the cleanup standards.	MNA, EMNA, and ISCO are considered to equally offer minimum potential for natural resource injury due to their implementation.	Capital Costs ≈ \$250,000 O&M Costs ≈ \$400,000 <b>TOTAL</b> <b>≈ \$600,000</b>
<b>In-Situ Chemical Oxidation (ISCO)</b>	Contaminants would effectively be degraded by chemical reaction of the ISCO alternative; however, its effectiveness will depend on the contact between the reducing/oxidizing materials and the contaminants.	The ISCO offers the greatest reduction in the toxicity, mobility, or volume by actively pursuing contaminant degradation through injection of RegenOx.	The ISCO alternative may entail slightly higher risks/impacts to workers, compared to EMNA due to a larger number of injection locations and potential hazard from chemical reaction.	The ISCO alternative is readily implementable. The alternative is expected to achieve the applicable remediation standards most quickly, but would likely require higher effort for injection activities compared to EMNA.	The ISCO alternative is consistent with the <i>New Jersey Technical Requirements for Remediation</i> .	The ISCO alternative is expected to have slightly higher short-term impacts to the community, compared to EMNA, due to its larger number of injection locations. The alternative, however, would greatly reduce long-term impacts to the community because its short period required to achieve the cleanup standards	MNA, EMNA, and ISCO are considered to equally offer minimum potential for natural resource injury due to their implementation.	Capital Costs ≈ \$300,000 O&M Costs ≈ \$250,000 <b>TOTAL</b> <b>≈ \$550,000</b>
<b>Air Sparging /Soil Vapor Extraction (AS/SVE)</b>	Relatively high effectiveness of extraction system as part of the AS/SVE alternative is expected for this site due to high permeability of the impact aquifer. However, it may not be effective to address TBA at depth.	The AS/SVE alternative, although considered to be more aggressive in reducing mobility and volumes of the contaminants than EMNA and ISCO, would not directly degrade the contaminants.	The AS/SVE alternative may have a higher short-term risk to workers during installation of the systems and would likely also involve greater long-term risks due to its longer operation period compared to the EMNA and ISCO alternatives.	AS/SVE is readily implementable; however, it is considered slightly less favorable than other alternatives because it would require considerable system installation and system maintenance efforts.	The AS/SVE alternative is consistent with the <i>New Jersey Technical Requirements for Remediation</i> .	Installation of AS/SVE system may provide some disturbance to the community due to noise, exhaust and other operational activities	AS/SVE would result in potential for water runoff to downgradient streams/waterways, etc; thus considered as the least favorable in meeting this criterion.	Capital Costs ≈ \$500,000 O&M Costs ≈ \$1,200,000 <b>TOTAL</b> <b>≈ \$1,700,000</b>



**LEGEND:**

- SITE PROPERTY LINE
- BUILDING/STRUCTURE
- PAST UST LOCATION (13 USTs) (REMOVED IN 1994)
- 12,000 gal. USTs (3)
- MONITORING WELL
- STREAM GAUGE (SEDIMENT/ SURFACE WATER SAMPLE LOCATION)
- SOIL BORING

SAMPLE LOCATION	MW-2*				NJGWQS
	DATE	7/28/2004	10/27/2004	9/11/2006	
Benzene	<b>1290.0</b>	NS	<b>642.0</b>	<b>483.0</b>	1
Methyl Tert Butyl Ether (MTBE)	<b>208.0</b>	NS	<b>137</b>	<b>65.0</b>	70

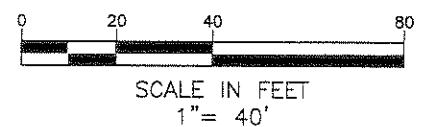
SAMPLE LOCATION	MW-8**		NJGWQS
	DATE	12/5/2006	
Lead	<b>5.4</b>	<b>5</b>	5

SAMPLE LOCATION	MW-4*		MW-4		NJGWQS
	DATE	7/28/2004	10/27/2004	9/11/2006	
Benzene	<b>268</b>	NS	<b>122</b>	<b>151</b>	1

SAMPLE LOCATION	MW-1				NJGWQS
	DATE	7/28/2004	10/27/2004	9/11/2006	
Benzene	<b>0.65J</b>	ND	<b>23.3</b>	<b>1U</b>	1
Methyl Tert Butyl Ether (MTBE)	<b>59.7</b>	<b>29.2</b>	<b>2.140</b>	<b>28.3</b>	70
Tertiary Butyl Alcohol (TBA)	<b>284</b>	<b>102</b>	<b>9.050</b>	<b>6.870</b>	100

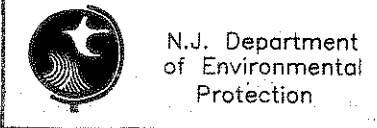
SAMPLE LOCATION	MW-7**		NJGWQS
	DATE	9/11/2006	
Tertiary Butyl Alcohol (TBA)	<b>211</b>	<b>261</b>	100

**Notes for Legend:**  
 All results reported in parts per billion (ug/l)  
 - **Bolded values indicate positive detections**  
 - **Bolded and shaded values indicate that one or more Criteria have been exceeded**  
 - 'ND' = Not detected  
 - 'NS' = No sample was collected  
 \* No groundwater samples were collected from MW-2 and MW-4 during the October 2004 sampling event because free-phase product was detected.  
 \*\* No groundwater samples were collected from MW-7 and MW-8 during the July and October 2004 sampling events.



SOURCE: ARMAND CORPORATION, 11/14/04.

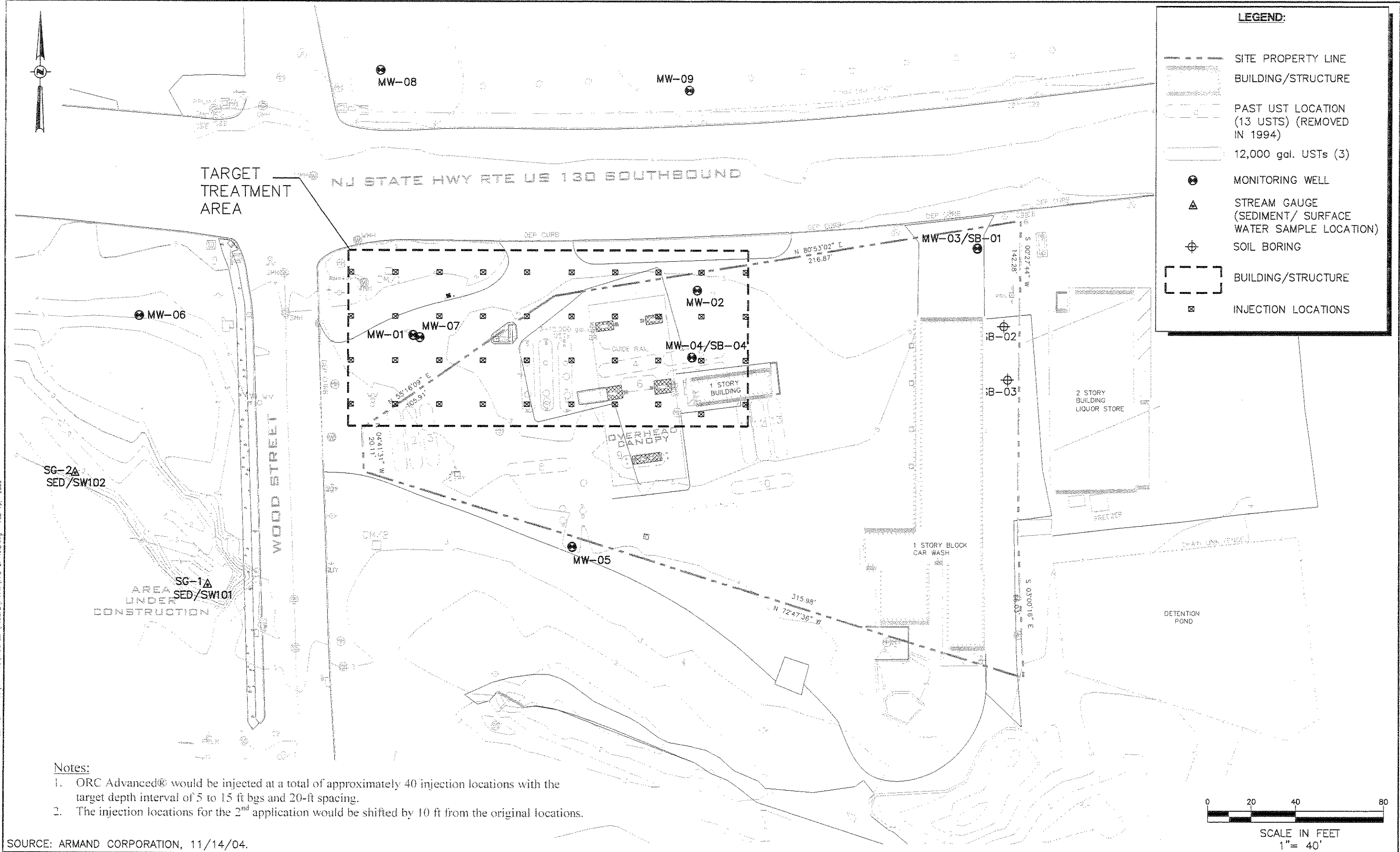
PARAM PETROLEUM, ROUTE 130 & WOOD STREET, BURLINGTON CITY, BURLINGTON COUNTY, NEW JERSEY  
**GROUNDWATER EXCEEDANCE MAP - 2004 TO 2006**  
 NJDEP CONTRACT No. A-60243



The Louis Berger Group, Inc.  
 412 Mt Kemble Ave.  
 Morristown, NJ

**FIGURE 3**

THE LOUIS BERGER GROUP, INC. MORRISTOWN, NJ CAD FILE: I:\DRAWINGS\GRAPHICS\CADD\TUP\NUTREZ\PARAM\PTIS-SP-RAS.dwg Feb 19, 2009

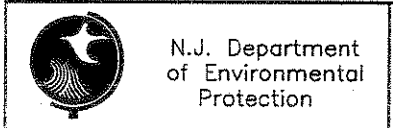


**LEGEND:**

- SITE PROPERTY LINE
- BUILDING/STRUCTURE
- PAST UST LOCATION (13 USTs) (REMOVED IN 1994)
- 12,000 gal. USTs (3)
- MONITORING WELL
- STREAM GAUGE (SEDIMENT/ SURFACE WATER SAMPLE LOCATION)
- SOIL BORING
- BUILDING/STRUCTURE
- INJECTION LOCATIONS

- Notes:**
1. ORC Advanced® would be injected at a total of approximately 40 injection locations with the target depth interval of 5 to 15 ft bgs and 20-ft spacing.
  2. The injection locations for the 2<sup>nd</sup> application would be shifted by 10 ft from the original locations.

SOURCE: ARMAND CORPORATION, 11/14/04.

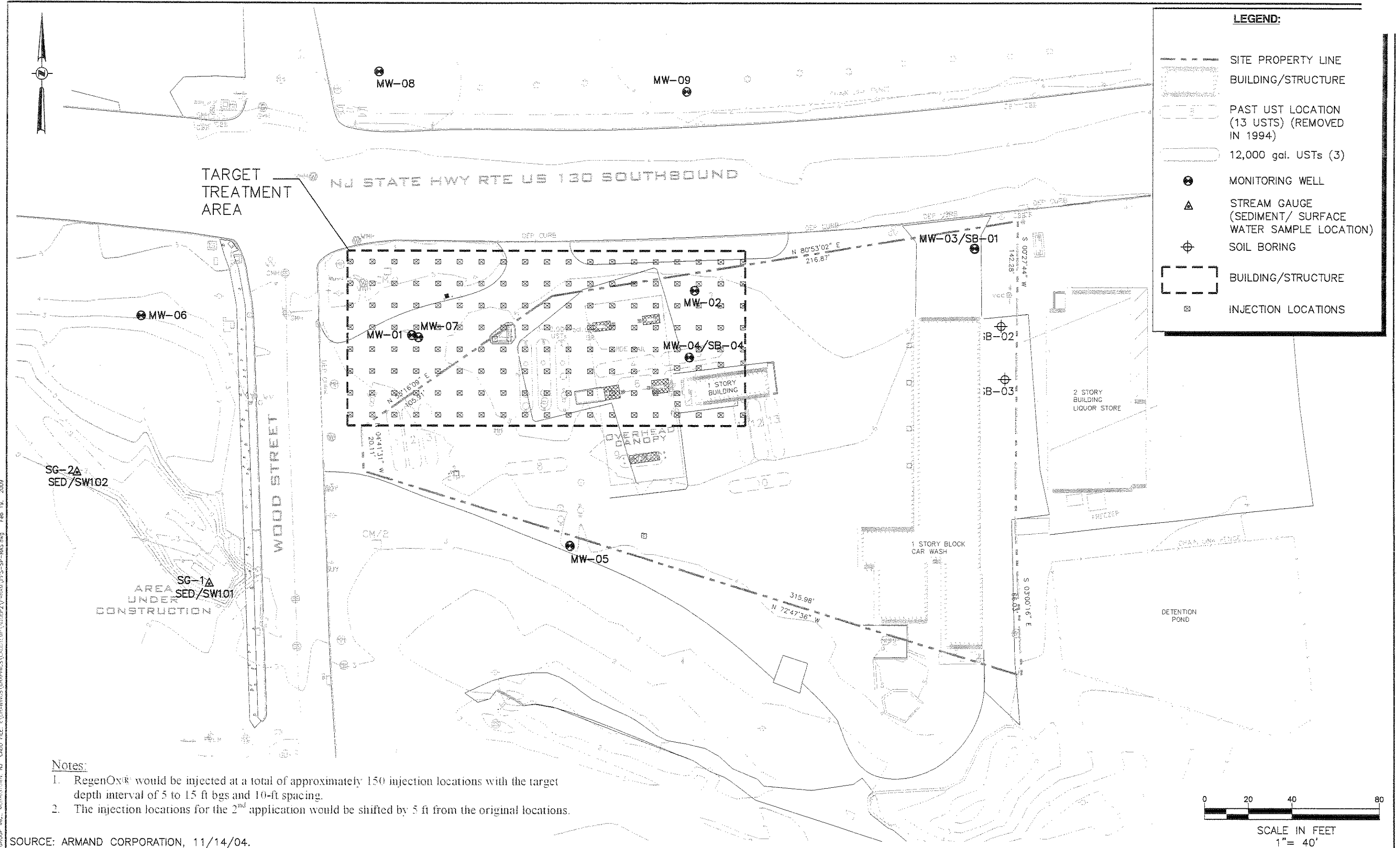


PARAM PETROLEUM, ROUTE 130 & WOOD STREET, BURLINGTON CITY, BURLINGTON COUNTY, NEW JERSEY  
**PROPOSED ORC ADVANCED® INJECTION LOCATIONS**  
 NJDEP CONTRACT No. A-60243

The Louis Berger Group, Inc.  
 412 Mt Kemble Ave.  
 Morristown, NJ

**FIGURE 4**

THE LOUIS BERGER GROUP, INC., MORRISTOWN, NJ CAD FILE: L:\DRAWINGS\GRAPHICS\CADD\TEMP\NJB02\PARAM\PTG-SP-RAS.dwg Feb 19, 2009

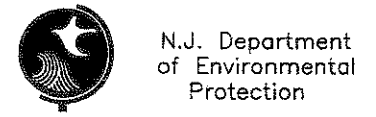


**Notes:**

1. RegenOx® would be injected at a total of approximately 150 injection locations with the target depth interval of 5 to 15 ft bgs and 10-ft spacing.
2. The injection locations for the 2<sup>nd</sup> application would be shifted by 5 ft from the original locations.

SOURCE: ARMAND CORPORATION, 11/14/04.

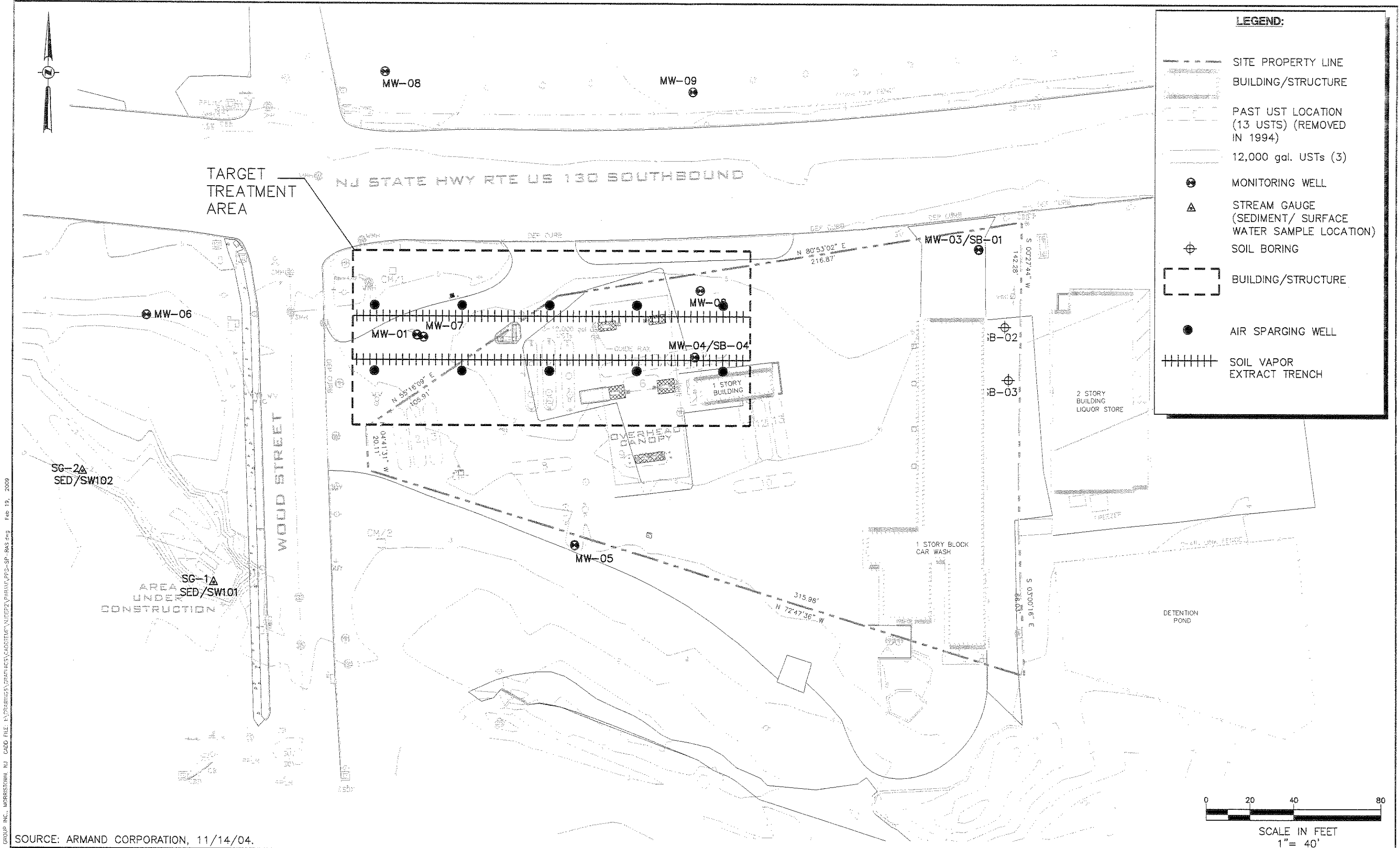
PARAM PETROLEUM, ROUTE 130 & WOOD STREET, BURLINGTON CITY, BURLINGTON COUNTY, NEW JERSEY  
**PROPOSED REGENOX® INJECTION LOCATIONS**  
 NJDEP CONTRACT No. A-60243



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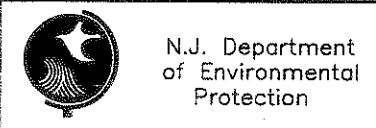
**FIGURE 5**

THE LOUIS BERGER GROUP, INC., MORRISTOWN, NJ CAD FILE: I:\DRAWINGS\GRAPHICS\CADD\TEMP\PARAM\_PDS-SP-BAS.dwg Feb 19, 2009



SOURCE: ARMAND CORPORATION, 11/14/04.

PARAM PETROLEUM, ROUTE 130 & WOOD STREET, BURLINGTON CITY, BURLINGTON COUNTY, NEW JERSEY  
**PROPOSED SOIL VAPOR EXTRACTION/AIR SPARGING SYSTEM**  
 NJDEP CONTRACT No. A-60243



The Louis Berger Group, Inc.  
 412 Mt Kemble Ave.  
 Morristown, NJ

**FIGURE 5**

THE LOUIS BERGER GROUP, INC., MORRISTOWN, NJ, CAD FILE: I:\CORPORATE\SYSTEMS\GARDEN\PROJECTS\PARAM\PPS-SP-RAS.dwg, Feb 19, 2009