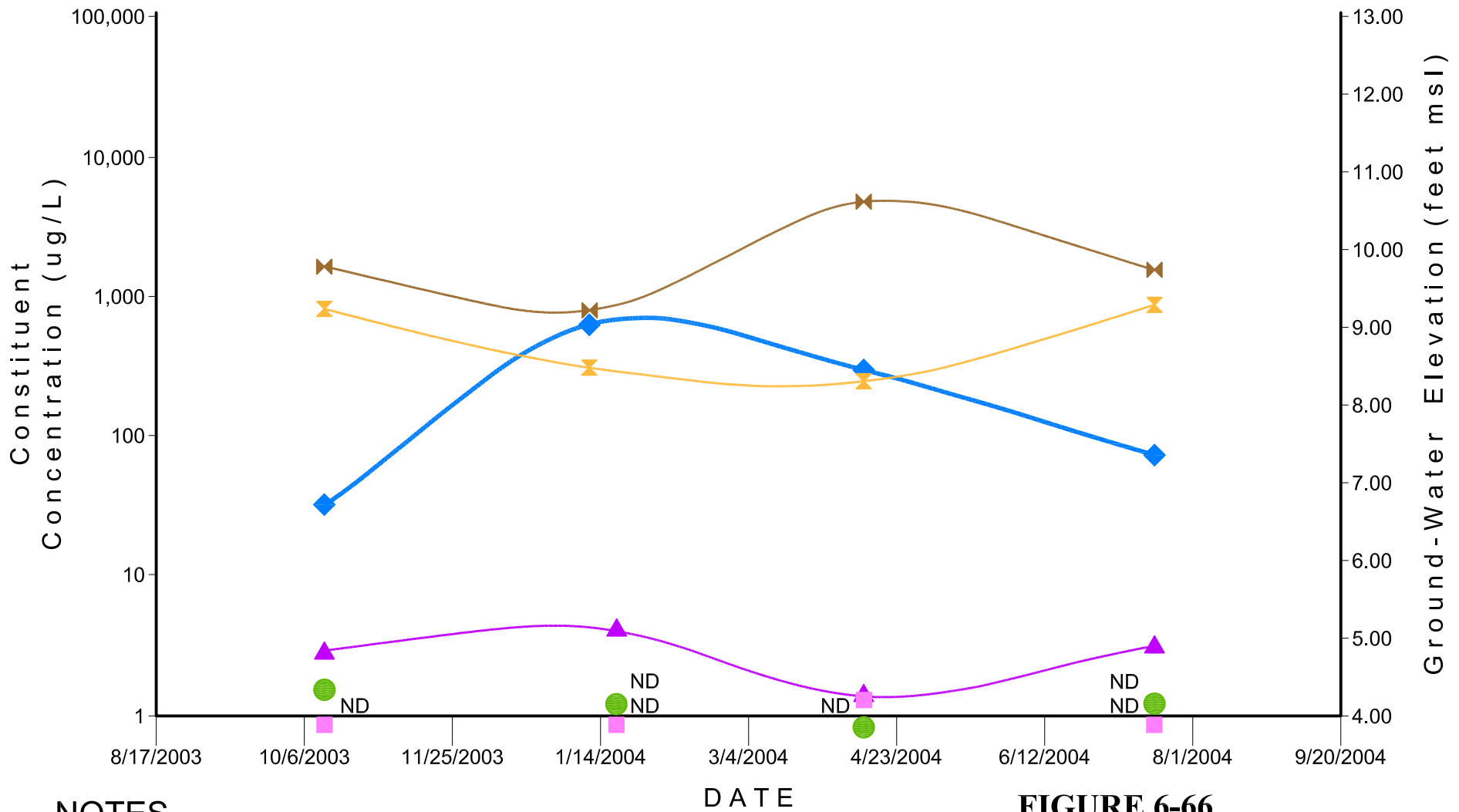


# EXPLANATION

- ◆ Ground-Water Elevation
- Benzene Concentration
- ▲ Naphthalene Concentration
- 1,2,4-Trimethylbenzene Concentration
- ✕ TPH-Dx Concentration
- ✕ TPH-Gx Concentration



## NOTES

ND = Concentration of 1 ug/L is non-detectable.

**FIGURE 6-66**

**HYDROGRAPH & CONSTITUENT CONCENTRATION LEVELS FOR MW-21(A)**  
**Remedial Investigation/Feasibility Study**  
**Astoria Area-Wide Petroleum Site**  
**Astoria, Oregon**



# Explanation

- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - 0-10
  - >10-100

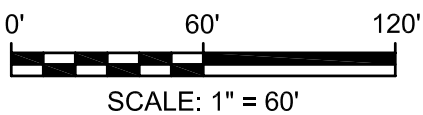


## Key Plan - AOC 3



**FIGURE 6-67**

**GASOLINE RANGE HYDROCARBONS IN SOIL  
3 FEET AND LESS - AOC 3  
Remedial Investigation/Feasibility Study  
Astoria Area-Wide Petroleum Site  
Astoria, Oregon**



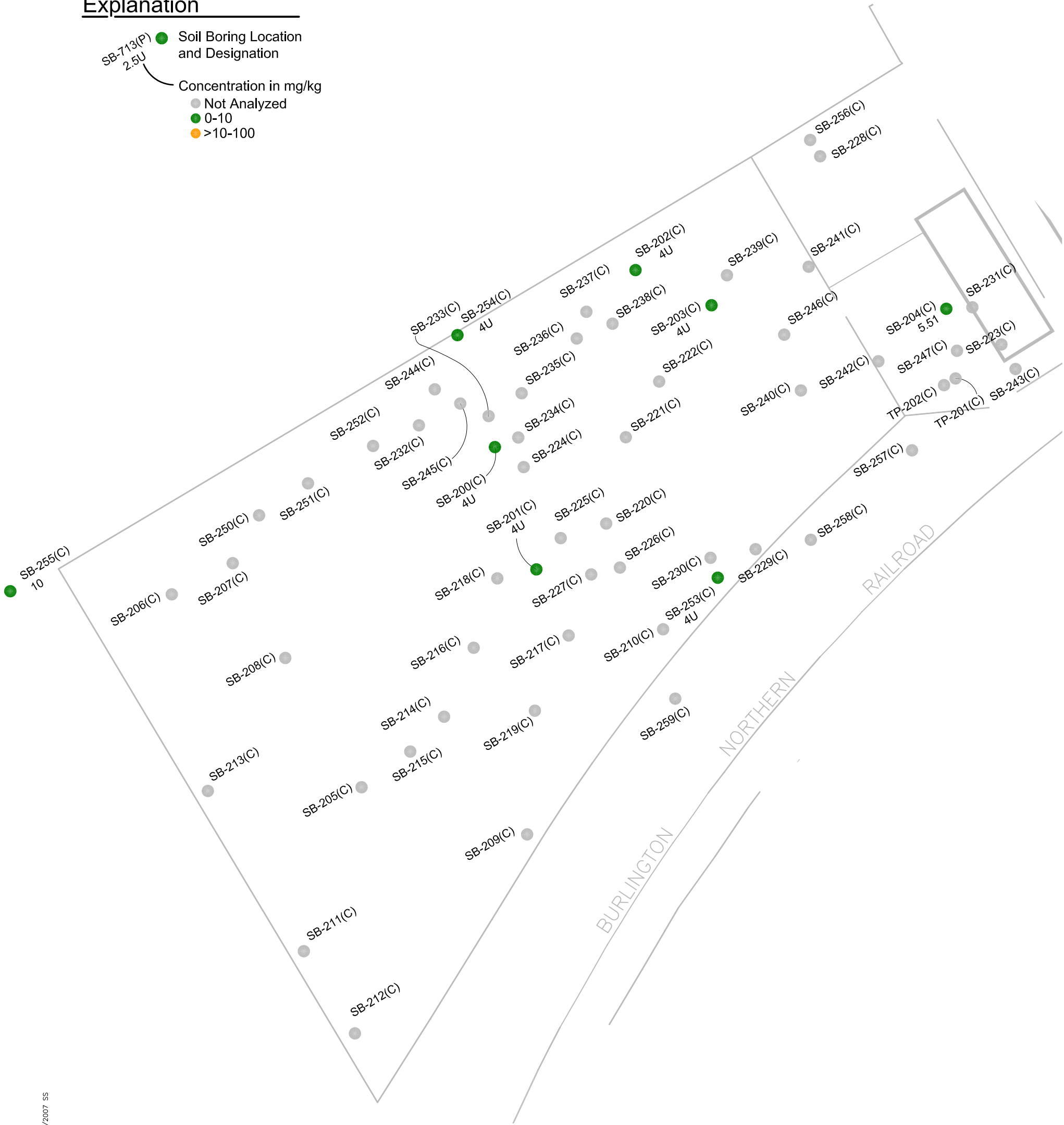
**Notes:**

Guide to analytical data flags is in Table 6-1.

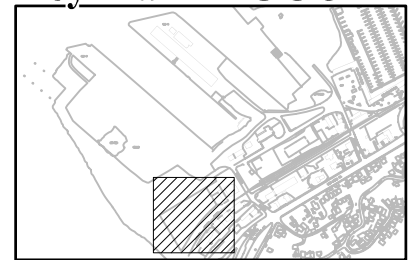
For locations with multiple analytical results, the highest concentration is presented on this figure.

# Explanation

- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - 0-10
  - >10-100

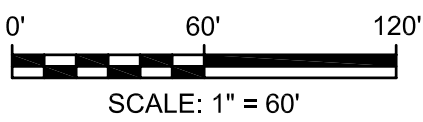


## Key Plan - AOC 3



**FIGURE 6-68**

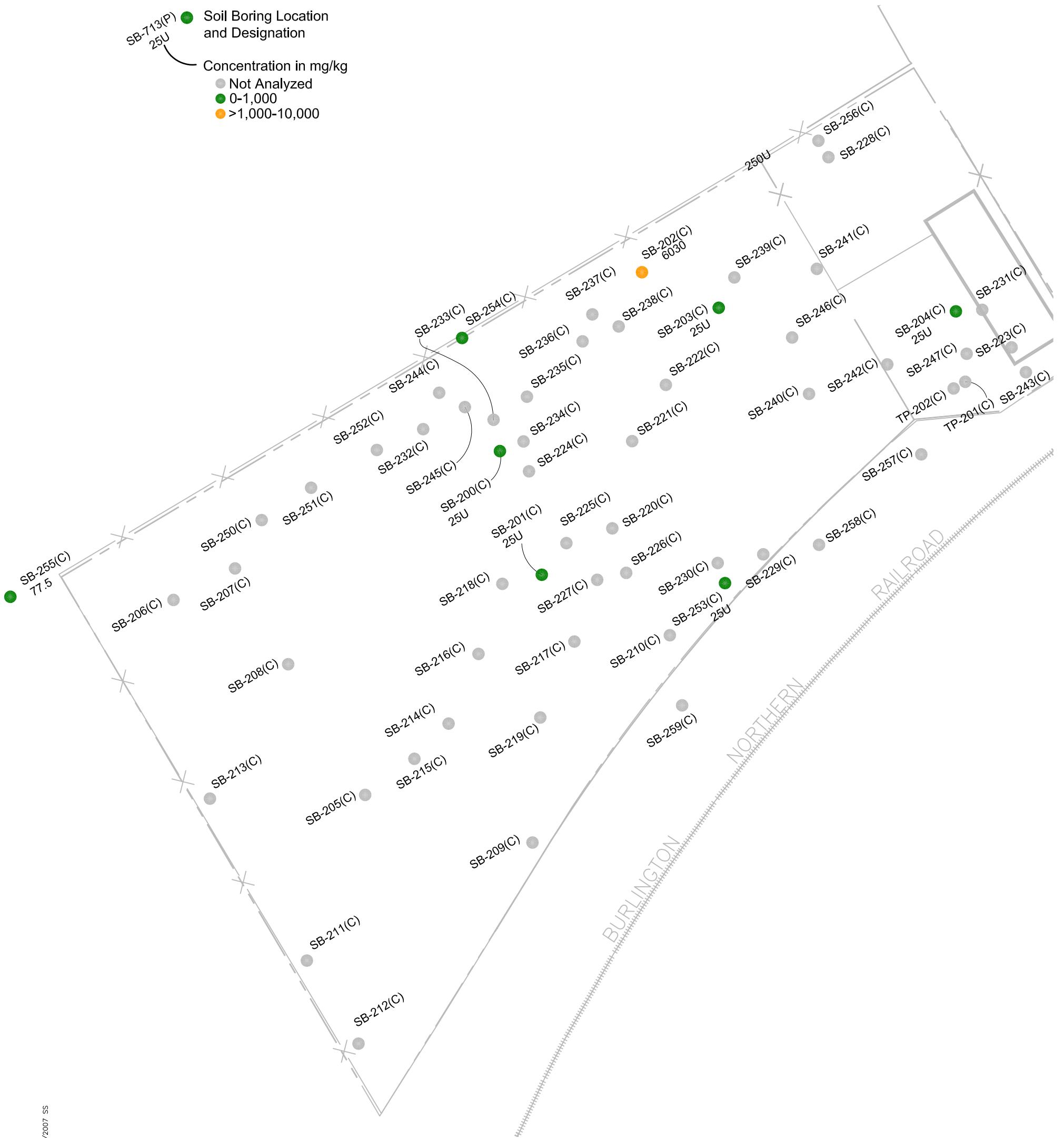
**GASOLINE RANGE HYDROCARBONS IN SOIL  
GREATER THAN 3 FEET - AOC 3  
Remedial Investigation/Feasibility Study  
Astoria Area-Wide Petroleum Site  
Astoria, Oregon**



**Notes:**  
 Guide to analytical data flags is in Table 6-1.  
 For locations with multiple analytical results, the highest concentration is presented on this figure.

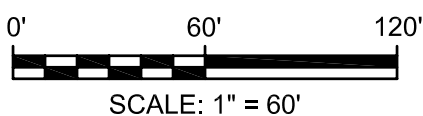
# Explanation

- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - 0-1,000
  - >1,000-10,000

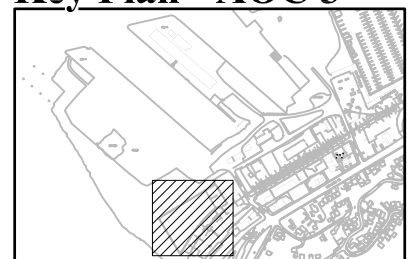


**Notes:**

Guide to analytical data flags is in Table 6-1.  
 For locations with multiple analytical results, the highest concentration is presented on this figure.



**Key Plan - AOC 3**



**FIGURE 6-69**

**DIESEL RANGE HYDROCARBONS IN SOIL  
 3 FEET AND LESS - AOC 3  
 Remedial Investigation/Feasibility Study  
 Astoria Area-Wide Petroleum Site  
 Astoria, Oregon**

# Explanation

- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - 0-1,000
  - >1,000-10,000

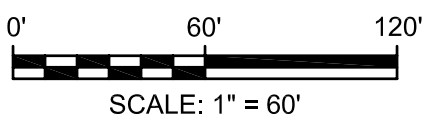


## Key Plan - AOC 3



FIGURE 6-70

# DIESEL RANGE HYDROCARBONS IN SOIL GREATER THAN 3 FEET - AOC 3 Remedial Investigation/Feasibility Study Astoria Area-Wide Petroleum Site Astoria, Oregon



**Notes:**  
 Guide to analytical data flags is in Table 6-1.  
 For locations with multiple analytical results, the highest concentration is presented on this figure.

**Explanation**

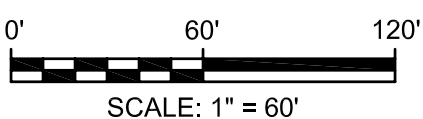
- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - 0-10,000



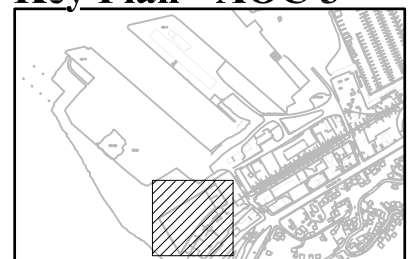
**Notes:**

Guide to analytical data flags is in Table 6-1.

For locations with multiple analytical results, the highest concentration is presented on this figure.



**Key Plan - AOC 3**



**FIGURE 6-71**

**RESIDUAL RANGE OIL HYDROCARBONS IN SOIL  
3 FEET AND LESS - AOC 3  
Remedial Investigation/Feasibility Study  
Astoria Area-Wide Petroleum Site  
Astoria, Oregon**

# Explanation

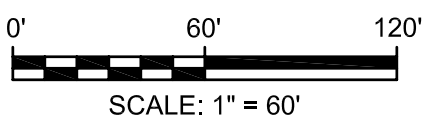
- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - 0-10,000



**Notes:**

Guide to analytical data flags is in Table 6-1.

For locations with multiple analytical results, the highest concentration is presented on this figure.



**Key Plan - AOC 3**



**FIGURE 6-72**

**RESIDUAL RANGE OIL HYDROCARBONS IN SOIL  
GREATER THAN 3 FEET- AOC 3  
Remedial Investigation/Feasibility Study  
Astoria Area-Wide Petroleum Site  
Astoria, Oregon**

# Explanation

- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - 0-0.1

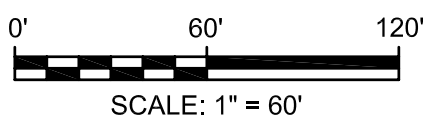


**Key Plan - AOC 3**



**FIGURE 6-73**

**BENZENE IN SOIL**  
**3 FEET AND LESS - AOC 3**  
**Remedial Investigation/Feasibility Study**  
**Astoria Area-Wide Petroleum Site**  
**Astoria, Oregon**



Notes:

Guide to analytical data flags is in Table 6-1.

For locations with multiple analytical results, the highest concentration is presented on this figure.

# Explanation

- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - 0-0.1



## Key Plan - AOC 3

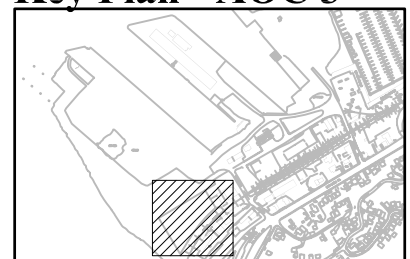
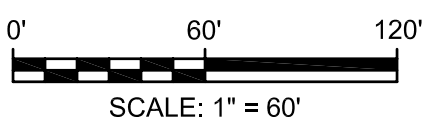


FIGURE 6-74

### BENZENE IN SOIL GREATER THAN 3 FEET - AOC 3 Remedial Investigation/Feasibility Study Astoria Area-Wide Petroleum Site Astoria, Oregon



**Notes:**

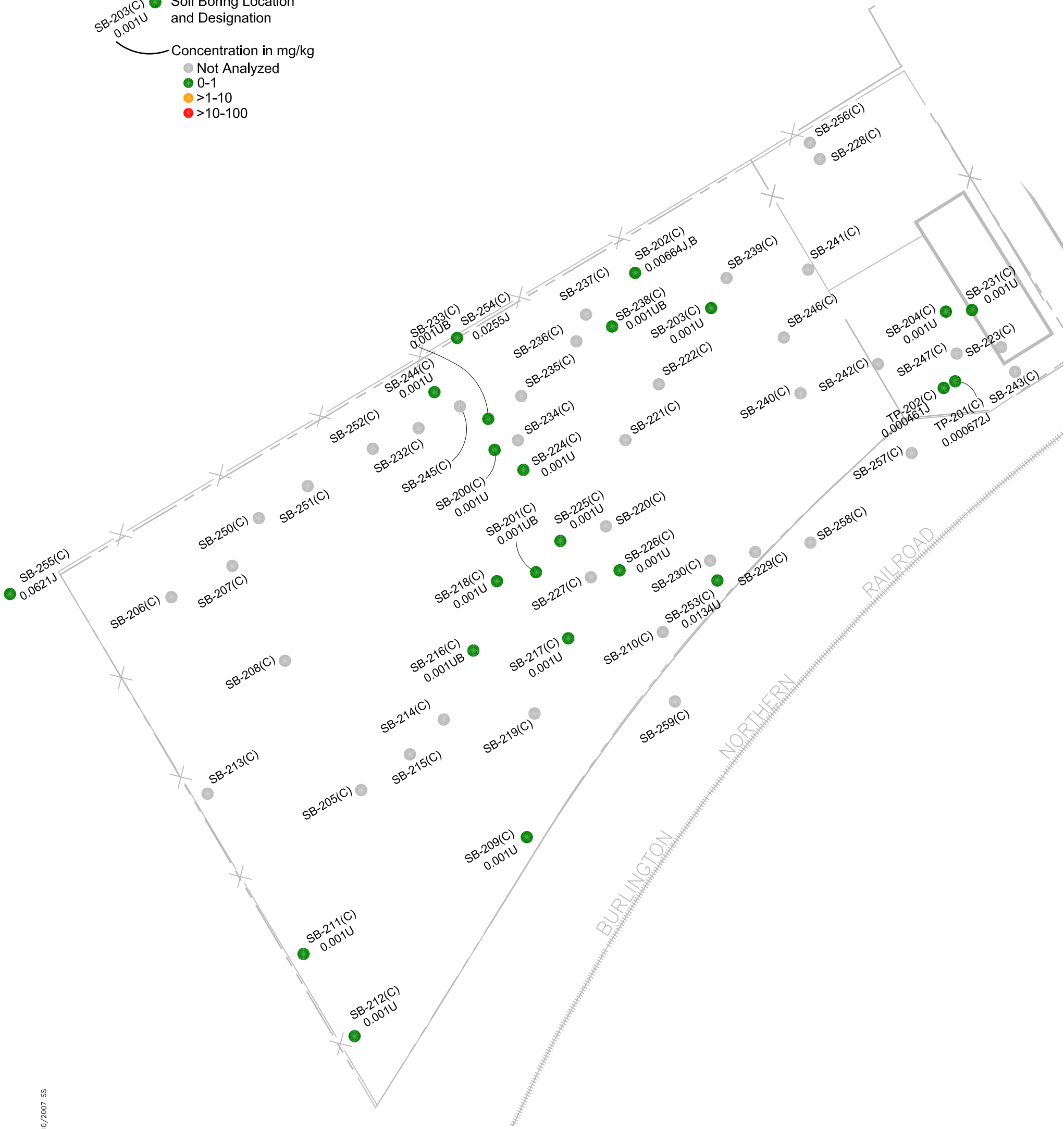
Guide to Analytical Data Flags is in Table 6-1

For Locations with Multiple Analytical Results, the highest Concentration is presented on this figure.

G:\0900\992\101\009\10077\009\June2007\G992101\_10077\_009\_SO\_BZ\_G13FT\_07 14:00 09/11/2007 SS

**Explanation**

- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - 0-1
  - >1-10
  - >10-100

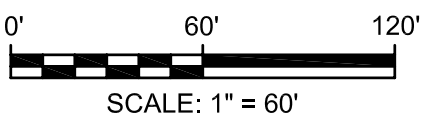


**Key Plan - AOC 3**



**FIGURE 6-75**

**NAPHTHALENE IN SOIL  
3 FEET AND LESS - AOC 3  
Remedial Investigation/Feasibility Study  
Astoria Area-Wide Petroleum Site  
Astoria, Oregon**



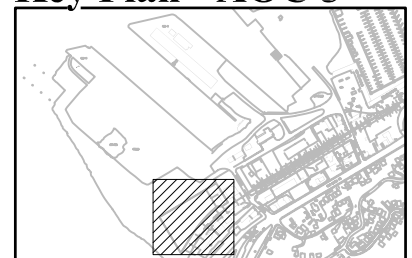
**Notes:**  
 Guide to analytical data flags is in Table 6-1.  
 For locations with multiple analytical results, the highest concentration is presented on this figure.

**Explanation**

- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - 0-1
  - >1-10
  - >10-100



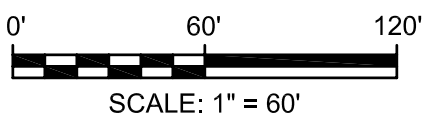
**Key Plan - AOC 3**



**FIGURE 6-76**

**NAPHTHALENE IN SOIL  
 GREATER THAN 3 FEET - AOC 3  
 Remedial Investigation/Feasibility Study  
 Astoria Area-Wide Petroleum Site  
 Astoria, Oregon**

**Notes:**  
 Guide to analytical data flags is in Table 6-1.  
 For locations with multiple analytical results, the highest concentration is presented on this figure.

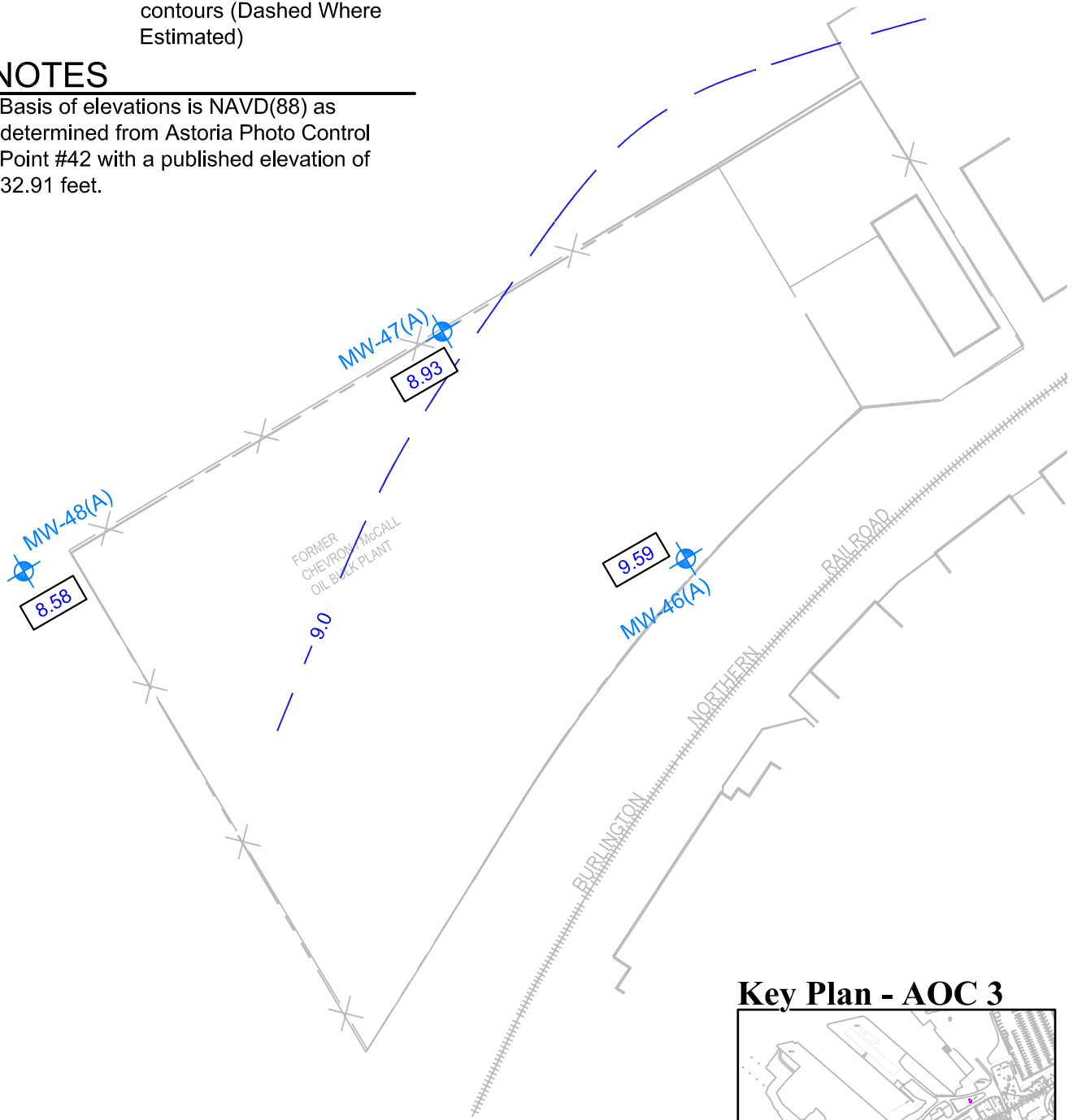


# EXPLANATION

- 10.31 ← Ground water elevation
- ⊕ MW-27 ← Monitoring well location & designation
- 9.0 ← Ground water elevation contours (Dashed Where Estimated)

# NOTES

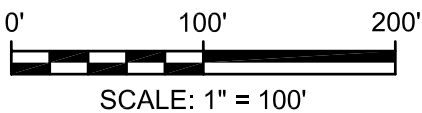
Basis of elevations is NAVD(88) as determined from Astoria Photo Control Point #42 with a published elevation of 32.91 feet.



**Key Plan - AOC 3**



**FIGURE 6-77**  
**POTENTIOMETRIC SURFACE**  
**AOC 3 - JULY 19, 2004**  
**Remedial Investigation/Feasibility Study**  
**Astoria Area-Wide Petroleum Site**  
**Astoria, Oregon**



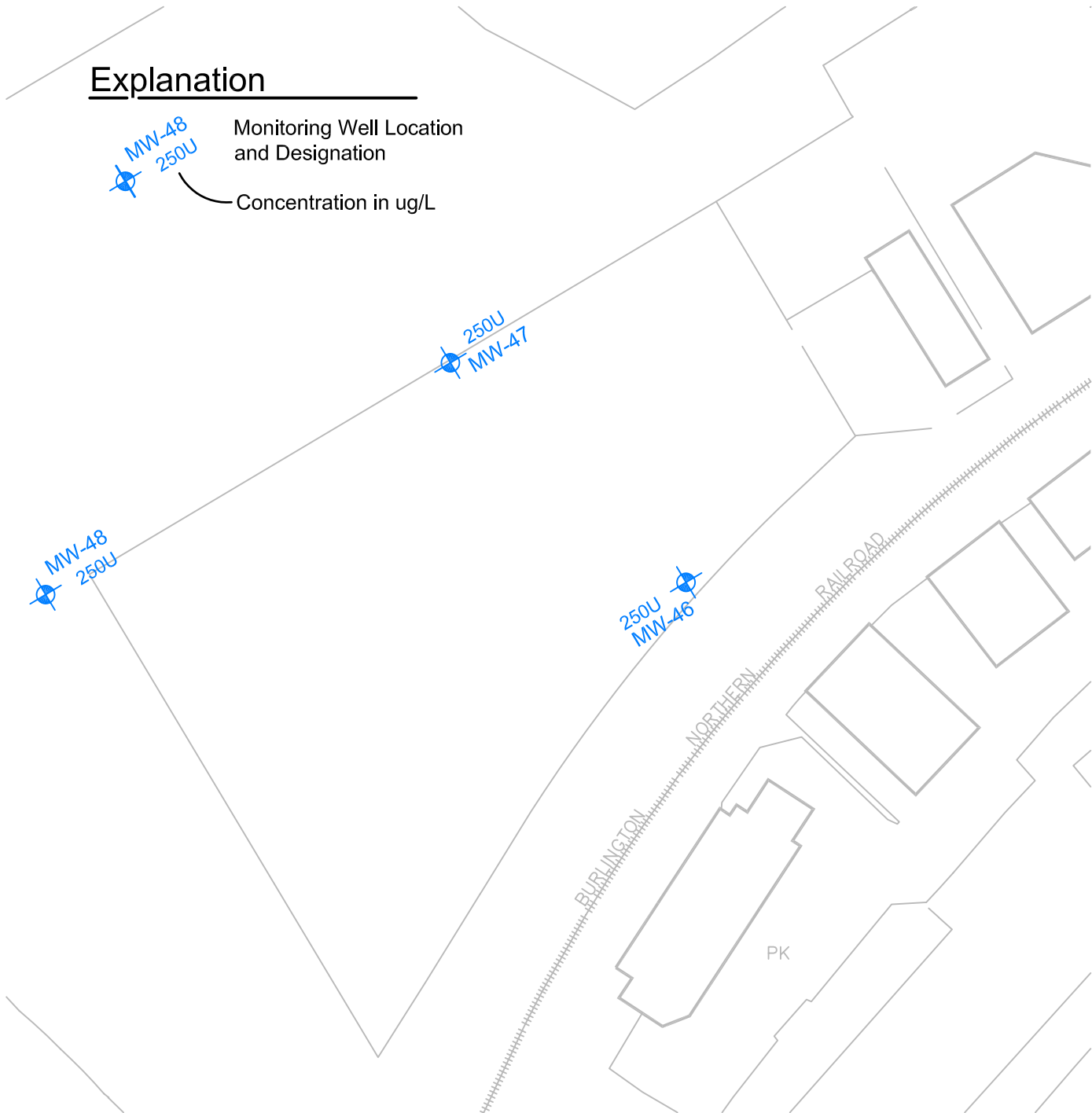
**EnviroLogic Resources, Inc.**  
 ENVIRONMENTAL • WATER RESOURCES SCIENTISTS

# Explanation

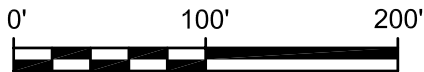
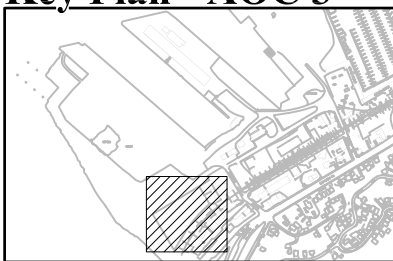


Monitoring Well Location and Designation

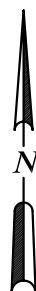
Concentration in ug/L



## Key Plan - AOC 3



SCALE: 1" = 100'



### Notes:

Guide to analytical data flags is in Table 6-1.

For locations with multiple analytical results, the highest concentration is presented on this figure.

## FIGURE 6-78

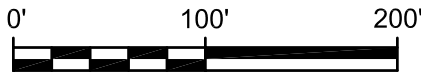
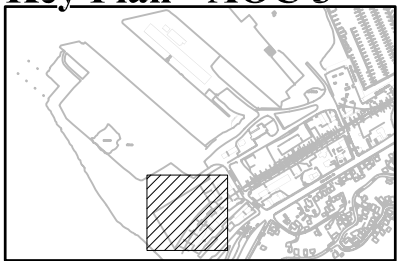
**DIESEL RANGE HYDROCARBONS  
IN GROUND WATER - August 2004 - AOC 3  
Remedial Investigation/Feasibility Study  
Astoria Area-Wide Petroleum Site  
Astoria, Oregon**

# Explanation


 MW-48  
 U  
 Monitoring Well Location and Designation  
 Concentration in ug/L



## Key Plan - AOC 3



SCALE: 1" = 100'



### Notes:

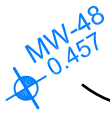
Guide to analytical data flags is in Table 6-1.

For locations with multiple analytical results, the highest concentration is presented on this figure.

## FIGURE 6-79

**TOTAL BTEX**  
**IN GROUND WATER - August 2004 - AOC 3**  
**Remedial Investigation/Feasibility Study**  
**Astoria Area-Wide Petroleum Site**  
**Astoria, Oregon**

# Explanation



Monitoring Well Location and Designation

Concentration in ug/L

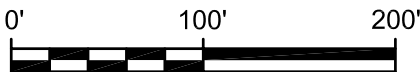
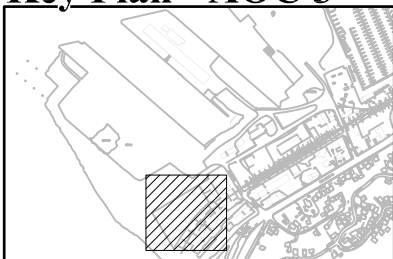


**Notes:**

Guide to analytical data flags is in Table 6-1.

For locations with multiple analytical results, the highest concentration is presented on this figure.

## Key Plan - AOC 3



SCALE: 1" = 100'



## FIGURE 6-80

**NAPHTHALENE  
IN GROUND WATER - August 2004 - AOC 3  
Remedial Investigation/Feasibility Study  
Astoria Area-Wide Petroleum Site  
Astoria, Oregon**





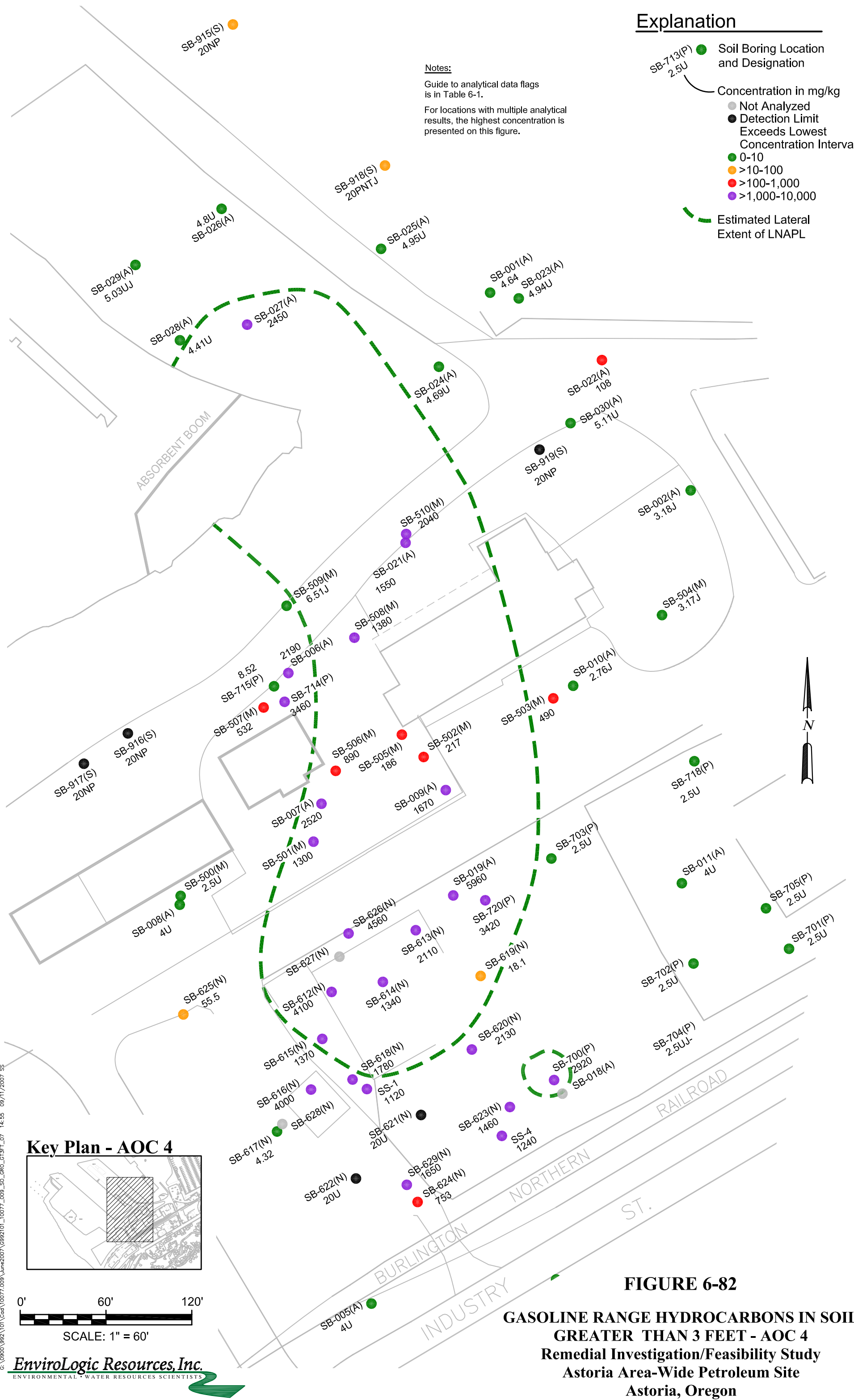
## Explanation

- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - Detection Limit
  - Exceeds Lowest Concentration Interval
  - 0-10
  - >10-100
  - >100-1,000
  - >1,000-10,000
- Estimated Lateral Extent of LNAPL

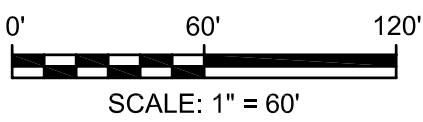
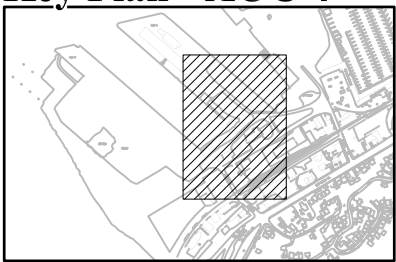
### Notes:

Guide to analytical data flags is in Table 6-1.

For locations with multiple analytical results, the highest concentration is presented on this figure.



### Key Plan - AOC 4



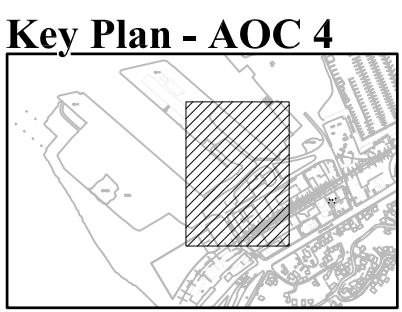
**FIGURE 6-82**

**GASOLINE RANGE HYDROCARBONS IN SOIL  
GREATER THAN 3 FEET - AOC 4  
Remedial Investigation/Feasibility Study  
Astoria Area-Wide Petroleum Site  
Astoria, Oregon**

# Explanation

- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - 0-1,000
  - >1,000-10,000
  - >10,000-100,000

**Notes:**  
 Guide to analytical data flags is in Table 6-1.  
 For locations with multiple analytical results, the highest concentration is presented on this figure.



**FIGURE 6-83**

**DIESEL RANGE HYDROCARBONS IN SOIL  
 3 FEET AND LESS - AOC 4  
 Remedial Investigation/Feasibility Study  
 Astoria Area-Wide Petroleum Site  
 Astoria, Oregon**

G:\0900\992\101\Cad\10077\009\June2007\6992101\_10077\_009\_SO\_DRG\_LE3FT\_07\_13:13\_09/10/2007 SS

## Explanation

### Notes:

Guide to analytical data flags is in Table 6-1.

For locations with multiple analytical results, the highest concentration is presented on this figure.

- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - 0-1,000
  - >1,000-10,000
  - >10,000-100,000
- Estimated Lateral Extent of LNAPL



### Key Plan - AOC 4



**FIGURE 6-84**

**DIESEL RANGE HYDROCARBONS IN SOIL  
GREATER THAN 3 FEET - AOC 4  
Remedial Investigation/Feasibility Study  
Astoria Area-Wide Petroleum Site  
Astoria, Oregon**

G:\09000\992\101\Cad\10077\009\June2007\6992101\_10077\_009\_SO\_DR0\_GT3FT\_07\_14-28\_09/11/2007 SS



**Explanation**

- Soil Boring Location and Designation
- Concentration in mg/kg
- 0-10,000
- Estimated Lateral Extent of LNAPL

**Notes:**

Guide to analytical data flags is in Table 6-1.

For locations with multiple analytical results, the highest concentration is presented on this figure.

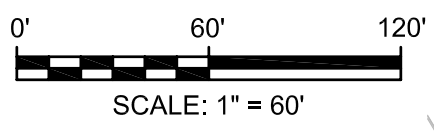
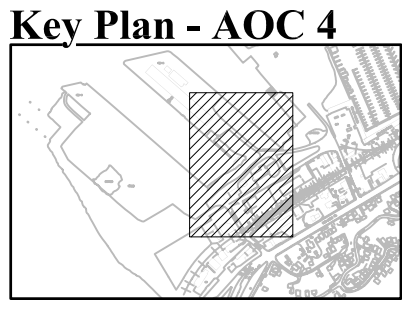


G:\0900\992\101\Cad\10077\009\June2007\G992101\_10077\_009\_SC\_HOL\_G13F\_07 12:58 09/13/2007 SS

**Explanation**

- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - 0-0.1
  - >0.1-1.0
  - >1.0-10
  - >10-100

**Notes:**  
 Guide to analytical data flags is in Table 6-1.  
 For locations with multiple analytical results, the highest concentration is presented on this figure.



G:\0900\942\101\Geo\10077\09\Map\007\09R2101\_10077\_009\_SO\_BZ\_LEFT\_07 11:24 09/10/2007 SS

**FIGURE 6-87**

**BENZENE IN SOIL  
 3 FEET AND LESS - AOC 4  
 Remedial Investigation/Feasibility Study  
 Astoria Area-Wide Petroleum Site  
 Astoria, Oregon**

**Explanation**

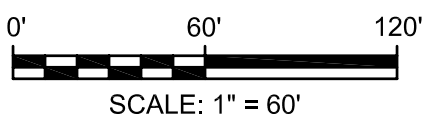
- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - Detection Limit
  - Exceeds Lowest Concentration Interval
  - 0-0.1
  - >0.1-1.0
  - >1.0-10
  - >10-100
- Estimated Lateral Extent of LNAPL

**Notes:**

Guide to analytical data flags is in Table 6-1.  
 For locations with multiple analytical results, the highest concentration is presented on this figure.



**Key Plan - AOC 4**



**FIGURE 6-88**

**BENZENE IN SOIL  
 GREATER THAN 3 FEET - AOC 4  
 Remedial Investigation/Feasibility Study  
 Astoria Area-Wide Petroleum Site  
 Astoria, Oregon**

G:\0900\992\101\Cad\10077\009\June2007\6992101\_10077\_009\_SO\_BZ\_G13FT\_07 13:07 09/13/2007 SS

# Explanation

- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - 0-100
  - >100-1,000

**Notes:**

Guide to analytical data flags is in Table 6-1.

For locations with multiple analytical results, the highest concentration is presented on this figure.



**Key Plan - AOC 4**



**FIGURE 6-89**

**ETHYLBENZENE IN SOIL  
3 FEET AND LESS - AOC 4  
Remedial Investigation/Feasibility Study  
Astoria Area-Wide Petroleum Site  
Astoria, Oregon**

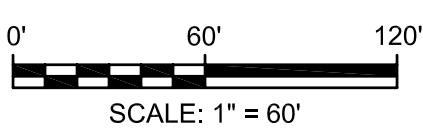
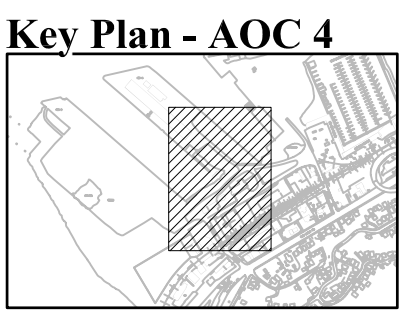
G:\0900\992\101\Cad\10077\009\June2007\6992101\_10077\_009\_SO\_EBZ\_LE3FT\_07 14:49 09/11/2007 SS

**Explanation**

- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - 0-100
  - >100-1,000
- Estimated Lateral Extent of LNAPL

**Notes:**

Guide to analytical data flags is in Table 6-1.  
 For locations with multiple analytical results, the highest concentration is presented on this figure.



**FIGURE 6-90**

**ETHYLBENZENE IN SOIL  
 GREATER THAN 3 FEET - AOC 4  
 Remedial Investigation/Feasibility Study  
 Astoria Area-Wide Petroleum Site  
 Astoria, Oregon**

G:\0900\992\101\Cad\10077\009\June2007\6992101\_10077\_009\_SO\_EBZ\_GTFI\_07\_13:18\_09/10/2007 SS

**Explanation**

- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - 0-10
  - >10-100

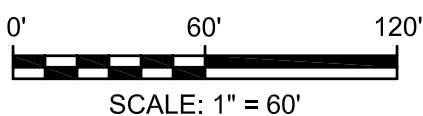
**Notes:**

Guide to analytical data flags is in Table 6-1.

For locations with multiple analytical results, the highest concentration is presented on this figure.



**Key Plan - AOC 4**



**FIGURE 6-91**

**TOLUENE IN SOIL  
3 FEET AND LESS - AOC 4  
Remedial Investigation/Feasibility Study  
Astoria Area-Wide Petroleum Site  
Astoria, Oregon**

G:\0900\992\101\Cad\10077\009\June2007\6992101\_10077\_009\_SO\_BZME\_LE.FT\_07\_08-36\_09/11/2007 SS

# Explanation

- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - 0-10
  - >10-100
- Estimated Lateral Extent of LNAPL

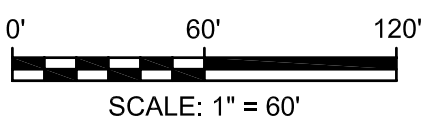
### Notes:

Guide to analytical data flags is in Table 6-1.

For locations with multiple analytical results, the highest concentration is presented on this figure.



### Key Plan - AOC 4



**FIGURE 6-92**

## TOLUENE IN SOIL GREATER THAN 3 FEET - AOC 4 Remedial Investigation/Feasibility Study Astoria Area-Wide Petroleum Site Astoria, Oregon

G:\0900\992\101\Cad\100777\009\June2007\G992101\_10077\_009\_SO\_BZME\_GT3FT\_07\_08\_36\_09/11/2007 SS

## Explanation

- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - 0-10
  - >10-100
  - >100-1,000

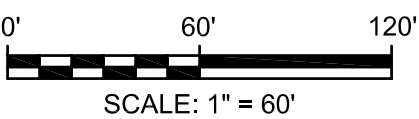
### Notes:

Guide to analytical data flags is in Table 6-1.

For locations with multiple analytical results, the highest concentration is presented on this figure.



### Key Plan - AOC 4



**FIGURE 6-93**

**XYLENES IN SOIL  
3 FEET AND LESS - AOC 4  
Remedial Investigation/Feasibility Study  
Astoria Area-Wide Petroleum Site  
Astoria, Oregon**

# Explanation

- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - 0-10
  - >10-100
  - >100-1,000
- Estimated Lateral Extent of LNAPL

### Notes:

Guide to analytical data flags is in Table 6-1.  
For locations with multiple analytical results, the highest concentration is presented on this figure.



### Key Plan - AOC 4

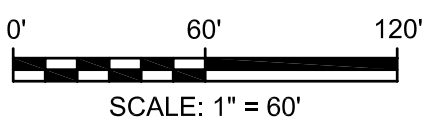


FIGURE 6-94

## XYLENES IN SOIL GREATER THAN 3 FEET - AOC 4 Remedial Investigation/Feasibility Study Astoria Area-Wide Petroleum Site Astoria, Oregon

## Explanation

- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - 0-10
  - >10-100
  - >100-1,000

### Notes:

Guide to analytical data flags is in Table 6-1.

For locations with multiple analytical results, the highest concentration is presented on this figure.



**FIGURE 6-95**

**1, 2, 4-TRIMETHYLBENZENE IN SOIL  
3 FEET AND LESS - AOC 4  
Remedial Investigation/Feasibility Study  
Astoria Area-Wide Petroleum Site  
Astoria, Oregon**

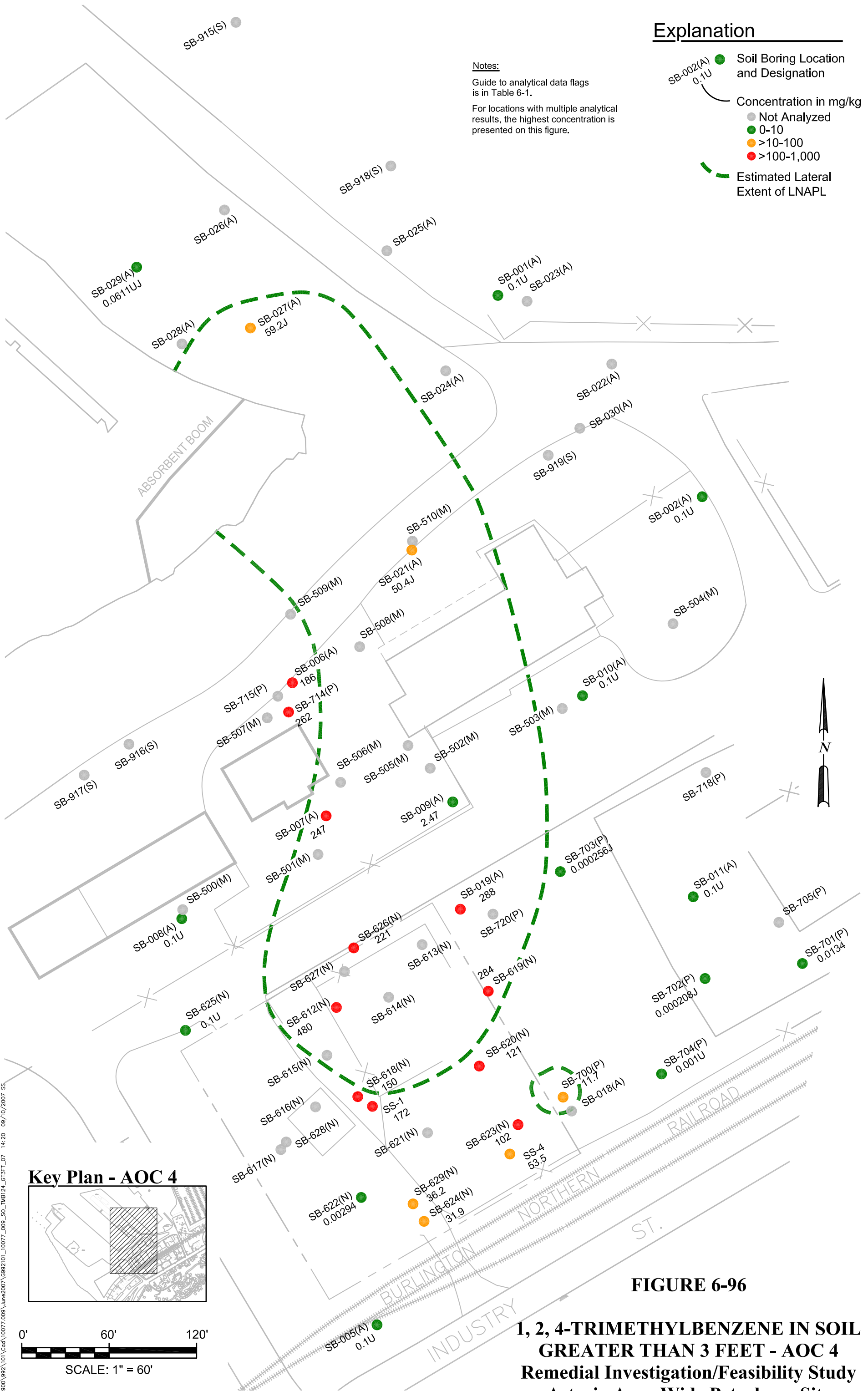
# Explanation

- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - 0-10
  - >10-100
  - >100-1,000
- - - Estimated Lateral Extent of LNAPL

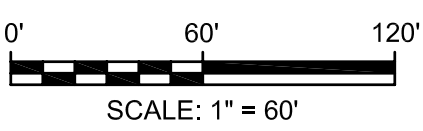
### Notes:

Guide to analytical data flags is in Table 6-1.

For locations with multiple analytical results, the highest concentration is presented on this figure.



### Key Plan - AOC 4



G:\9900\992\101\Cad\10077\009\June2007\0992101\_10077\_009\_SO\_TMB124\_G13FT\_07 14:20 09/10/2007 SS

**FIGURE 6-96**

**1, 2, 4-TRIMETHYLBENZENE IN SOIL GREATER THAN 3 FEET - AOC 4 Remedial Investigation/Feasibility Study Astoria Area-Wide Petroleum Site Astoria, Oregon**

## Explanation

- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - 0-1
  - >1-10
  - >10-100
  - >100-1,000

### Notes:

Guide to analytical data flags is in Table 6-1.

For locations with multiple analytical results, the highest concentration is presented on this figure.



**FIGURE 6-97**

**1, 3, 5-TRIMETHYLBENZENE IN SOIL  
3 FEET AND LESS - AOC 4  
Remedial Investigation/Feasibility Study  
Astoria Area-Wide Petroleum Site  
Astoria, Oregon**

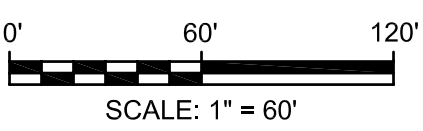
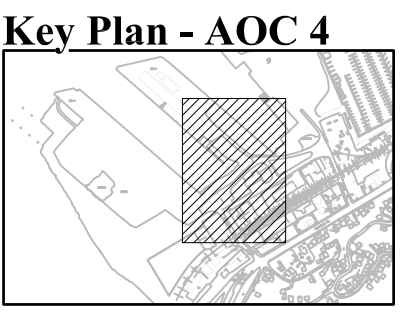
G:\0900\992\101\Cad\100777\_009\June2007\992101\_10077\_009\_SO\_TMB135\_LE3FT\_07

# Explanation

- Soil Boring Location and Designation
- Not Analyzed
- 0-1
- >1-10
- >10-100
- >100-1,000
- - - Estimated Lateral Extent of LNAPL

**Notes:**

Guide to analytical data flags is in Table 6-1.  
 For locations with multiple analytical results, the highest concentration is presented on this figure.



**FIGURE 6-98**

**1, 3, 5-TRIMETHYLBENZENE IN SOIL GREATER THAN 3 FEET - AOC 4 Remedial Investigation/Feasibility Study Astoria Area-Wide Petroleum Site Astoria, Oregon**

G:\9800\992\101\Cad\10077\009\June2007\0992101\_10077\_009\_50\_TMB135\_G13FT\_07 13:11 09/13/2007 SS

# Explanation

- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - 0-1
  - >1-10
  - >10-100

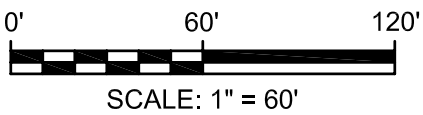
**Notes:**

Guide to analytical data flags is in Table 6-1.

For locations with multiple analytical results, the highest concentration is presented on this figure.



**Key Plan - AOC 4**



**FIGURE 6-99**

**NAPHTHALENE IN SOIL  
3 FEET AND LESS - AOC 4  
Remedial Investigation/Feasibility Study  
Astoria Area-Wide Petroleum Site  
Astoria, Oregon**

G:\0900\992\101\Cad\10077\009\June2007\6992101\_10077\_009\_SO\_NAPH\_LE.FT\_07 13:22 09/13/2007 SS

**Explanation**

- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - 0-1
  - >1-10
  - >10-100
- Estimated Lateral Extent of LNAPL

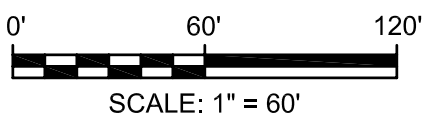
**Notes:**

Guide to analytical data flags is in Table 6-1.

For locations with multiple analytical results, the highest concentration is presented on this figure.



**Key Plan - AOC 4**



**FIGURE 6-100**

**NAPHTHALENE IN SOIL  
GREATER THAN 3 FEET - AOC 4  
Remedial Investigation/Feasibility Study  
Astoria Area-Wide Petroleum Site  
Astoria, Oregon**

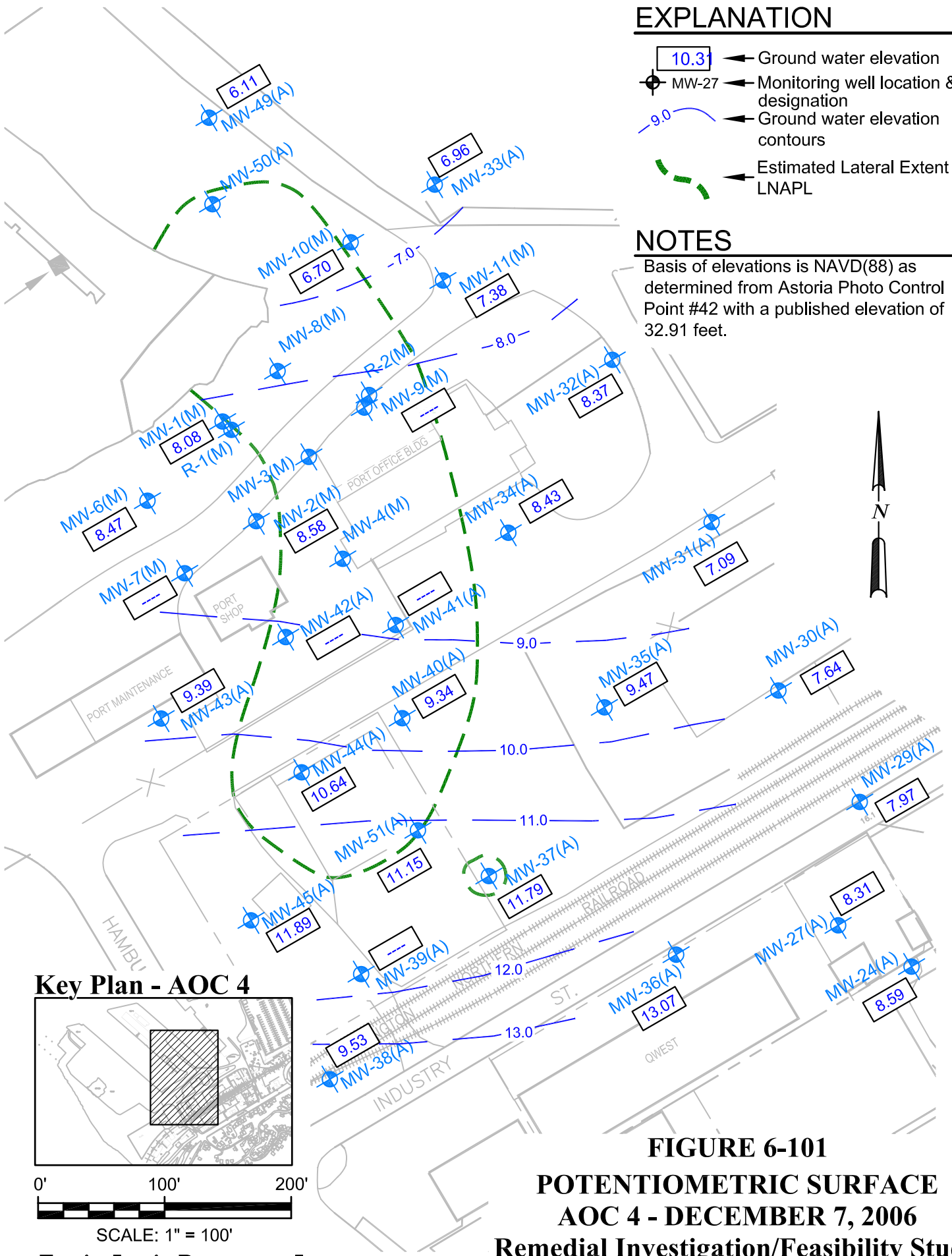
G:\0900\992\101\Cad\10077\009\June2007\G992101\_10077\_009\_SO\_MAPH\_G13F\_T\_07 13:49 09/10/2007 SS

# EXPLANATION

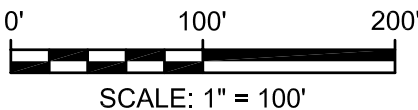
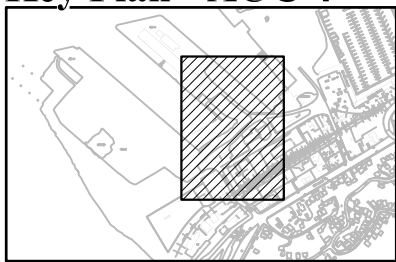
- 10.31 ← Ground water elevation
- ⊕ ← MW-27 ← Monitoring well location & designation
- 9.0 — ← Ground water elevation contours
- ← Estimated Lateral Extent of LNAPL

# NOTES

Basis of elevations is NAVD(88) as determined from Astoria Photo Control Point #42 with a published elevation of 32.91 feet.









## Key Plan - AOC 4



**EnviroLogic Resources, Inc.**  
 ENVIRONMENTAL • WATER RESOURCES SCIENTISTS

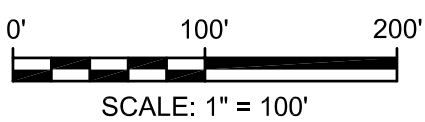
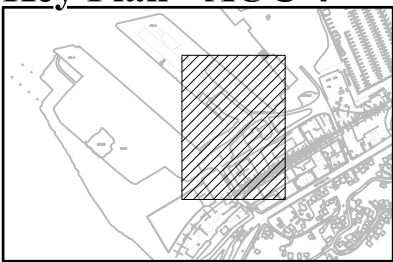
**FIGURE 6-101**  
**POTENTIOMETRIC SURFACE**  
**AOC 4 - DECEMBER 7, 2006**  
**Remedial Investigation/Feasibility Study**  
**Astoria Area-Wide Petroleum Site**  
**Astoria, Oregon**

### Explanation

-  Monitoring Well Location and Designation
-  Concentration in ug/L
-  Well Contains Product
-  Estimated Lateral Extent of LNAPL
-  Concentration Contour
-  Estimated Concentration Contour



### Key Plan - AOC 4



**Notes:**

Guide to analytical data flags is in Table 6-1.

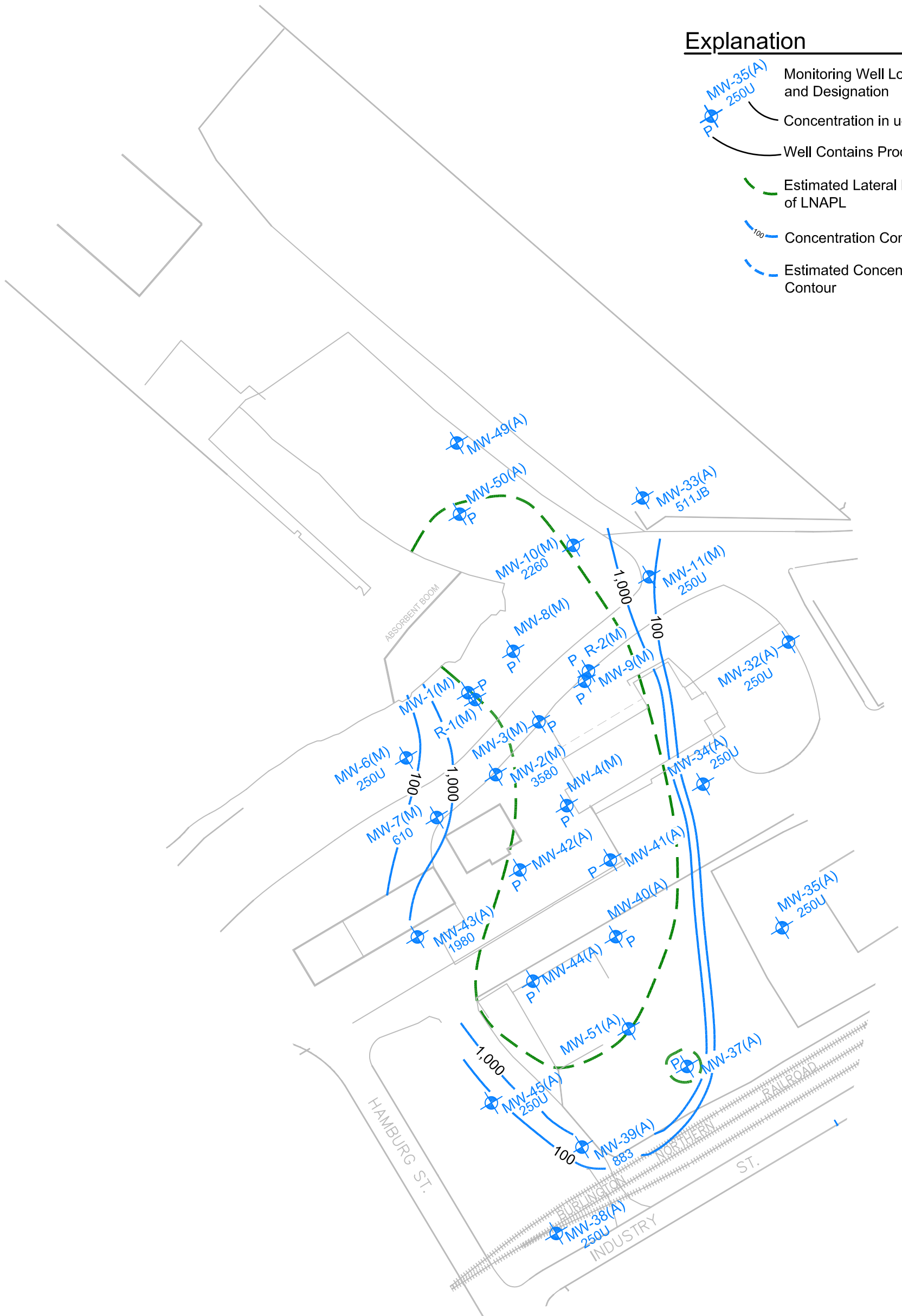
For locations with multiple analytical results, the highest concentration is presented on this figure.

**FIGURE 6-102**

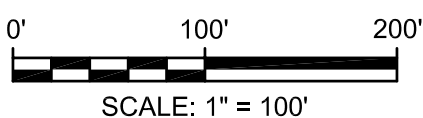
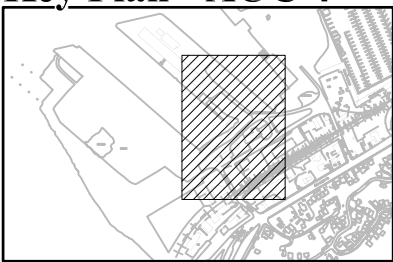
**GASOLINE RANGE HYDROCARBONS  
IN GROUND WATER - August 2004 - AOC 4  
Remedial Investigation/Feasibility Study  
Astoria Area-Wide Petroleum Site  
Astoria, Oregon**

## Explanation

- Monitoring Well Location and Designation
- Concentration in ug/L
- Well Contains Product
- Estimated Lateral Extent of LNAPL
- Concentration Contour
- Estimated Concentration Contour



### Key Plan - AOC 4



#### Notes:

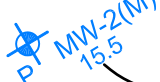
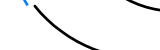

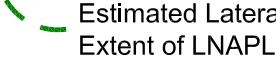

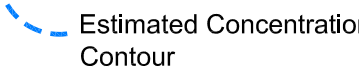
Guide to analytical data flags is in Table 6-1.

For locations with multiple analytical results, the highest concentration is presented on this figure.

### FIGURE 6-103

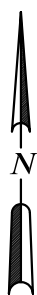
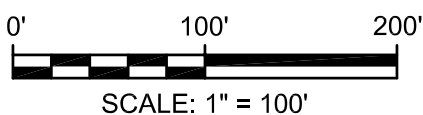
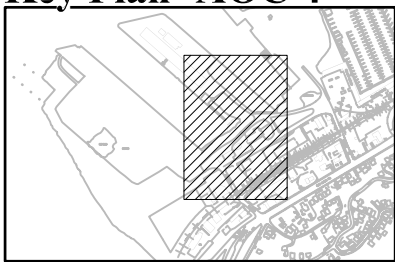
**DIESEL RANGE HYDROCARBONS  
IN GROUND WATER - August 2004 - AOC 4  
Remedial Investigation/Feasibility Study  
Astoria Area-Wide Petroleum Site  
Astoria, Oregon**

**Explanation**

-  Monitoring Well Location and Designation
-  Concentration in ug/L
-  Well Contains Product
-  Estimated Lateral Extent of LNAPL
-  Concentration Contour
-  Estimated Concentration Contour



**Key Plan- AOC 4**



Notes:

Guide to analytical data flags is in Table 6-1.

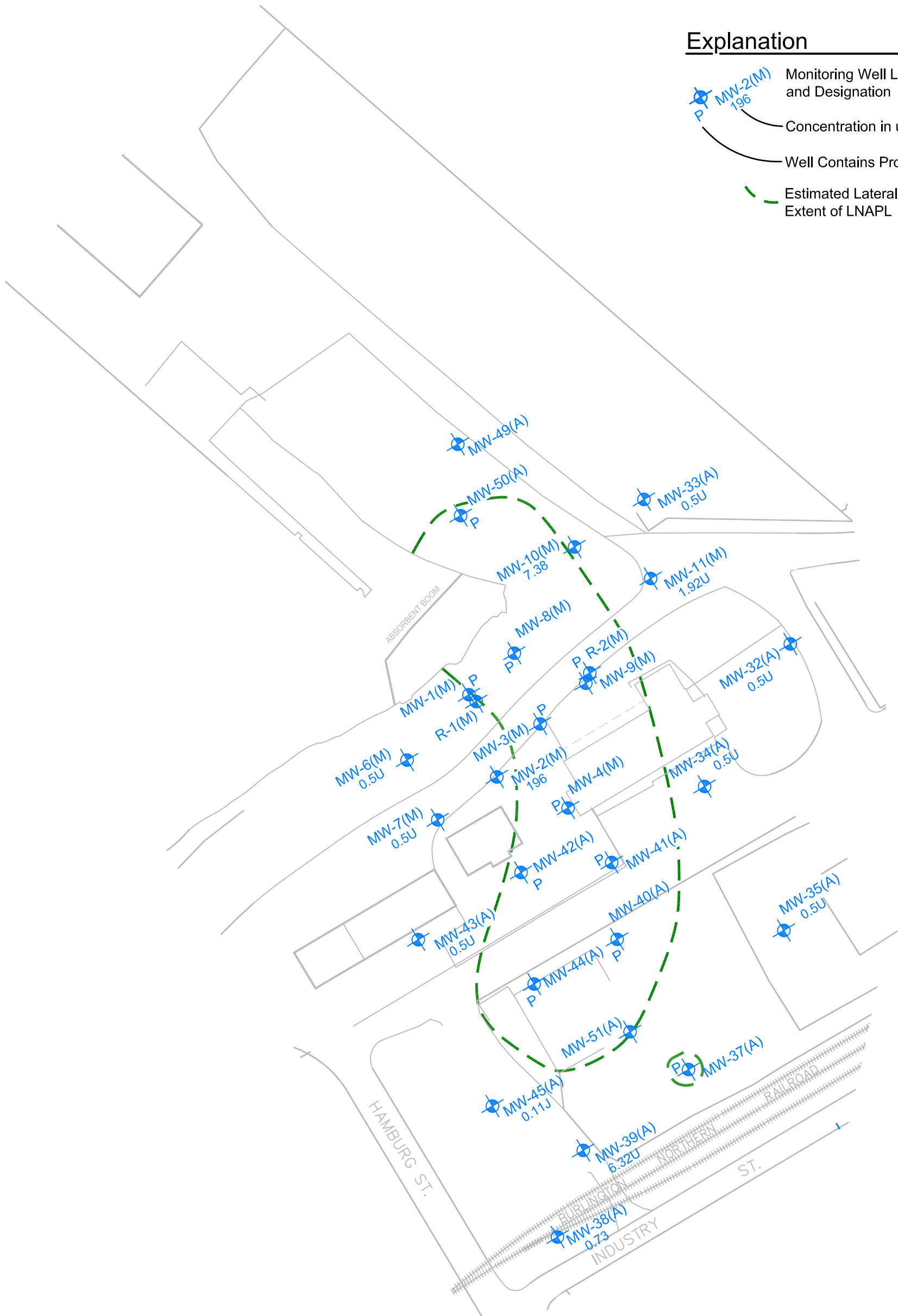
For locations with multiple analytical results, the highest concentration is presented on this figure.

**FIGURE 6-104**

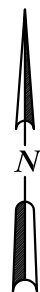
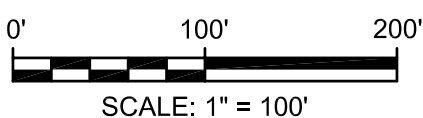
**BENZENE  
IN GROUND WATER - August 2004 - AOC 4  
Remedial Investigation/Feasibility Study  
Astoria Area-Wide Petroleum Site  
Astoria, Oregon**

### Explanation

- Monitoring Well Location and Designation
- Concentration in ug/L
- Well Contains Product
- Estimated Lateral Extent of LNAPL



### Key Plan - AOC 4



#### Notes:

Guide to analytical data flags is in Table 6-1.

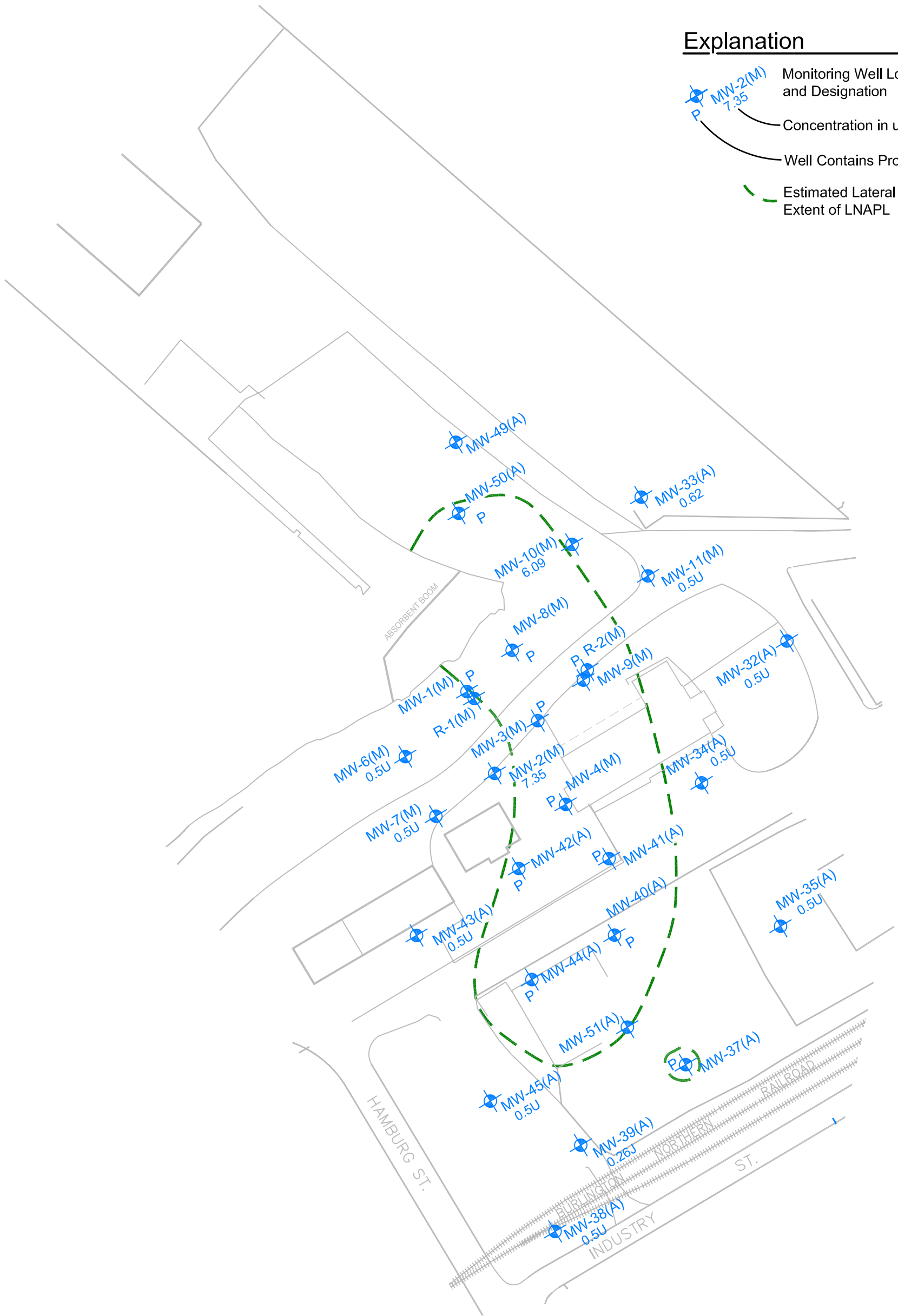
For locations with multiple analytical results, the highest concentration is presented on this figure.

### FIGURE 6-105

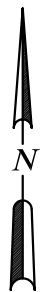
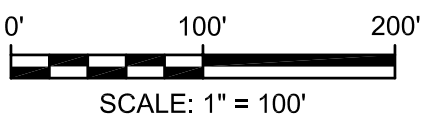
### ETHYLBENZENE IN GROUND WATER - August 2004 - AOC 4 Remedial Investigation/Feasibility Study Astoria Area-Wide Petroleum Site Astoria, Oregon

### Explanation

- Monitoring Well Location and Designation
- Concentration in ug/L
- Well Contains Product
- Estimated Lateral Extent of LNAPL



### Key Plan - AOC 4



#### Notes:

Guide to analytical data flags is in Table 6-1.

For locations with multiple analytical results, the highest concentration is presented on this figure.

**FIGURE 6-106**

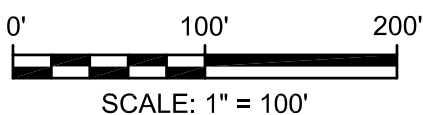
**TOLUENE  
IN GROUND WATER - August 2004 - AOC 4  
Remedial Investigation/Feasibility Study  
Astoria Area-Wide Petroleum Site  
Astoria, Oregon**

**Explanation**

- MW-2(M)  
29.4  
Monitoring Well Location and Designation
- P  
Well Contains Product
- Estimated Lateral Extent of LNAPL
- Concentration in ug/L



**Key Plan - AOC 4**



**Notes:**



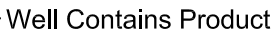


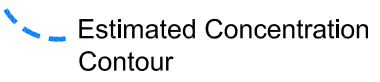
Guide to analytical data flags is in Table 6-1.

For locations with multiple analytical results, the highest concentration is presented on this figure.

**FIGURE 6-107**

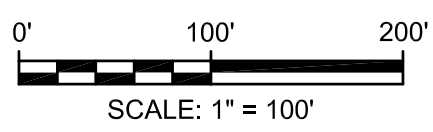
**XYLENES  
IN GROUND WATER - August 2004 - AOC 4  
Remedial Investigation/Feasibility Study  
Astoria Area-Wide Petroleum Site  
Astoria, Oregon**

**Explanation**

-  Monitoring Well Location and Designation
-  Concentration in ug/L
-  Well Contains Product
-  Estimated Lateral Extent of LNAPL
-  Concentration Contour
-  Estimated Concentration Contour



**Key Plan - AOC 4**




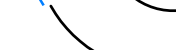
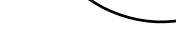

Notes:  
 Guide to analytical data flags is in Table 6-1.  
 For locations with multiple analytical results, the highest concentration is presented on this figure.

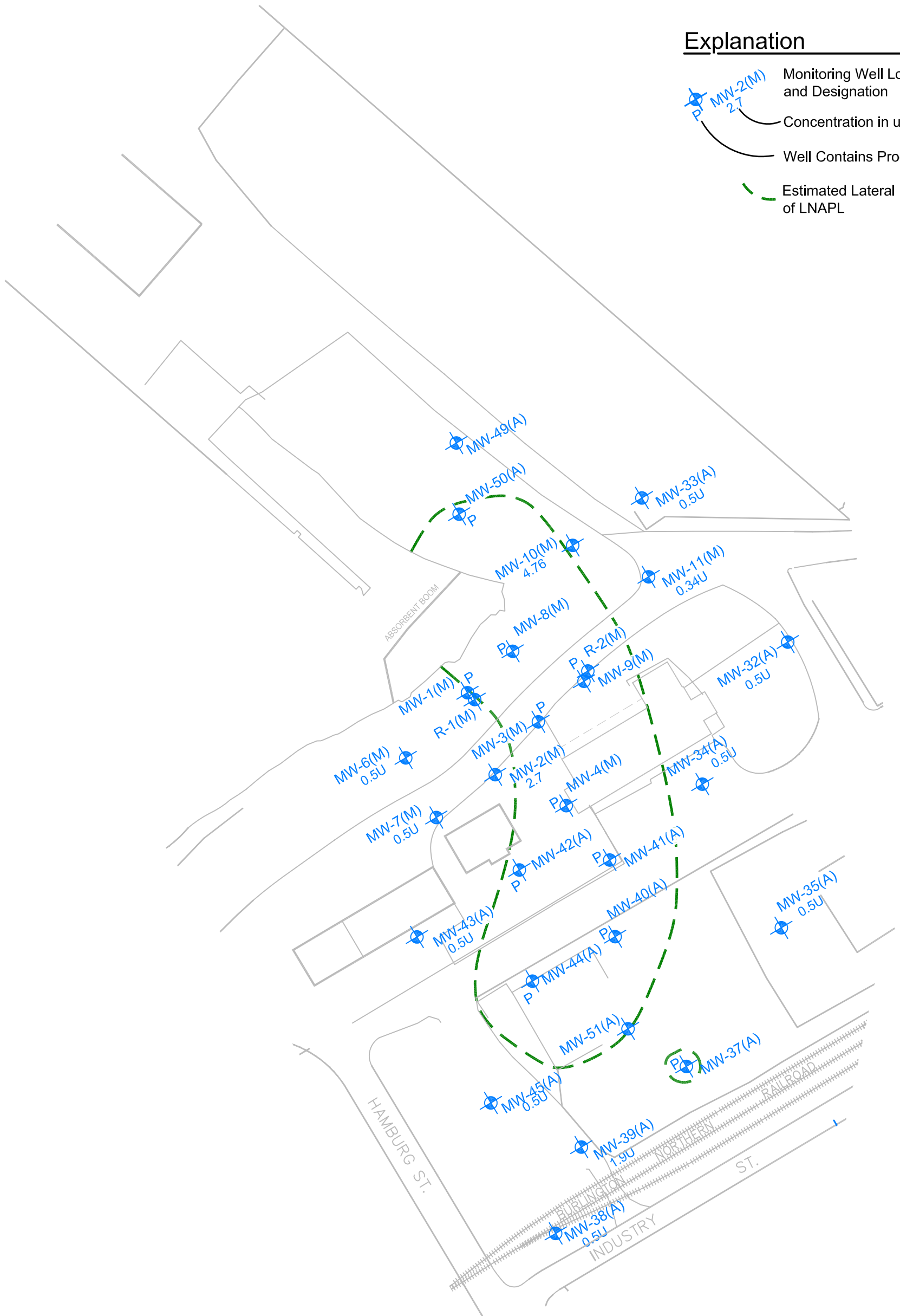
**FIGURE 6-108**

**1, 2, 4 - TRIMETHYLBENZENE  
 IN GROUND WATER - August 2004 - AOC 4  
 Remedial Investigation/Feasibility Study  
 Astoria Area-Wide Petroleum Site  
 Astoria, Oregon**

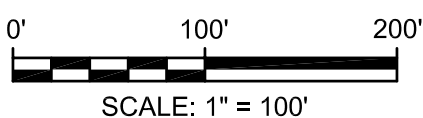
G:\0900\992\101\Cad\10077\009\June2007\G992101\_10077\_009\_GW\_TMB124\_200403\_07 13:10 09/11/2007 SS

### Explanation

-  Monitoring Well Location and Designation
-  Concentration in ug/L
-  Well Contains Product
-  Estimated Lateral Extent of LNAPL



### Key Plan - AOC 4



### Notes:

Guide to analytical data flags is in Table 6-1.

For locations with multiple analytical results, the highest concentration is presented on this figure.

### FIGURE 6-109

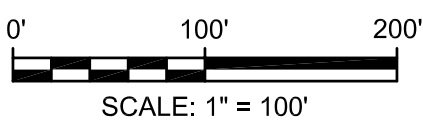
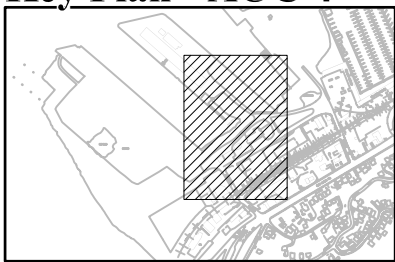
**1, 3, 5 - TRIMETHYLBENZENE  
IN GROUND WATER - August 2004 - AOC 4  
Remedial Investigation/Feasibility Study  
Astoria Area-Wide Petroleum Site  
Astoria, Oregon**

### Explanation

- Monitoring Well Location and Designation
- Concentration in ug/L
- Well Contains Product
- Estimated Lateral Extent of LNAPL
- Concentration Contour
- Estimated Concentration Contour



### Key Plan - AOC 4



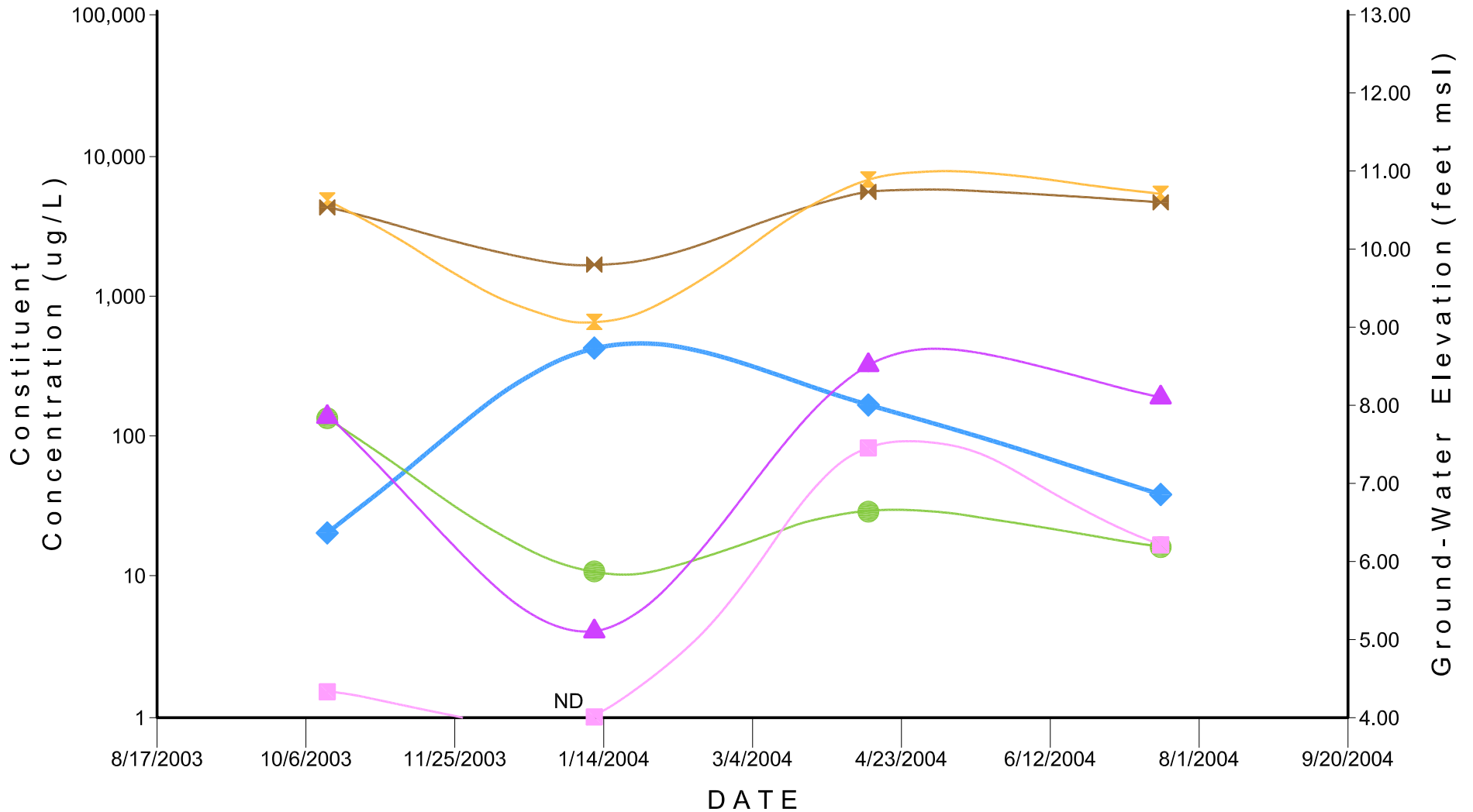
**Notes:**  
 Guide to analytical data flags is in Table 6-1.  
 For locations with multiple analytical results, the highest concentration is presented on this figure.

**FIGURE 6-110**

**NAPHTHALENE  
 IN GROUND WATER - August 2004 - AOC 4  
 Remedial Investigation/Feasibility Study  
 Astoria Area-Wide Petroleum Site  
 Astoria, Oregon**

# EXPLANATION

- ◆ ← Ground-Water Elevation
- ▲ ← Naphthalene Concentration
- ✕ ← TPH-Dx Concentration
- ← Benzene Concentration
- ← 1,2,4-Trimethylbenzene Concentration
- ✕ ← TPH-Gx Concentration



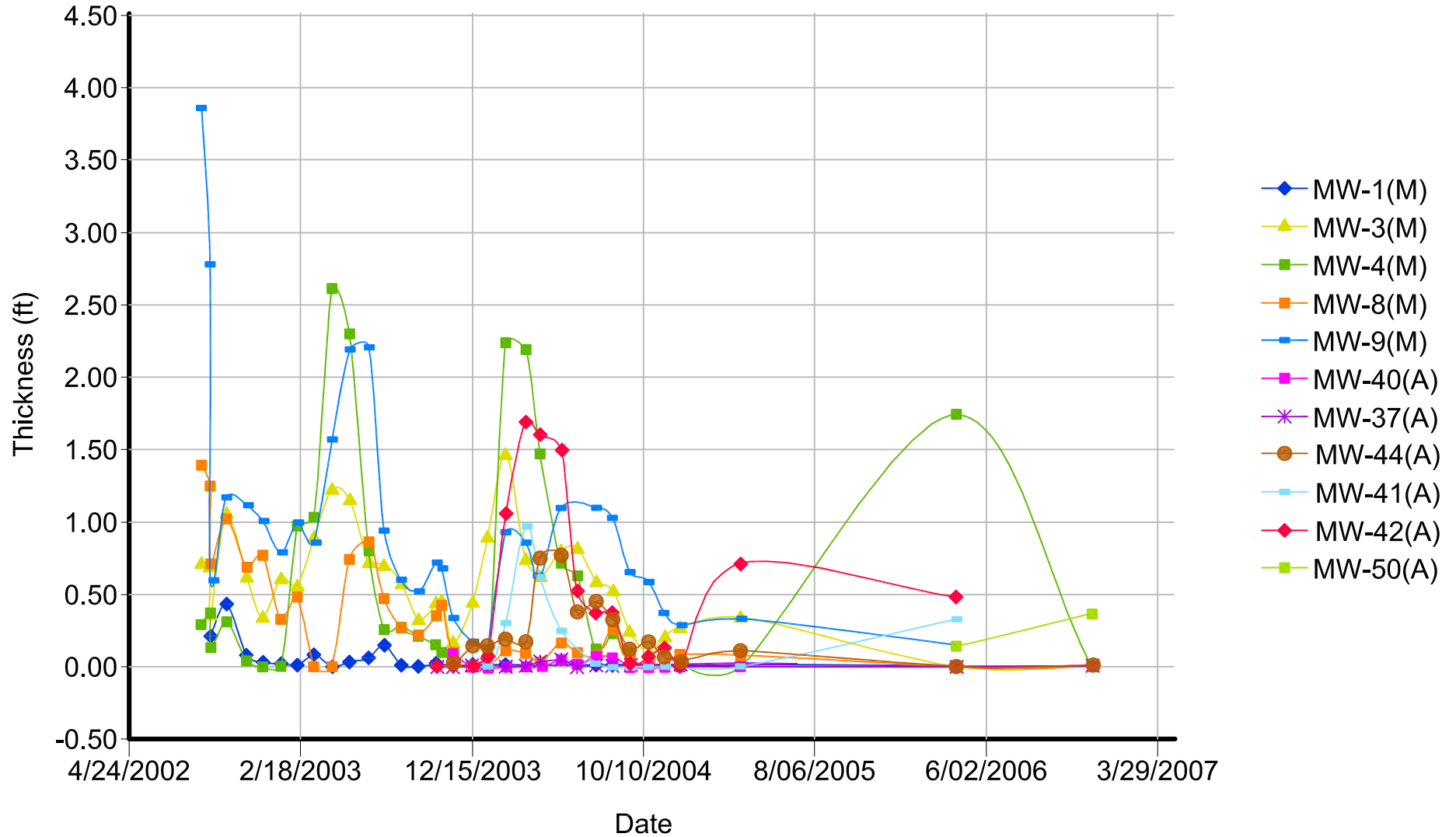
## NOTES

1. ND = Concentration of 1 ug/L is non-detectable.

**FIGURE 6-111**

**HYDROGRAPH & CONSTITUENT CONCENTRATION  
LEVELS FOR MW-2(M)  
Remedial Investigation/Feasibility Study  
Astoria Area-Wide Petroleum Site  
Astoria, Oregon**

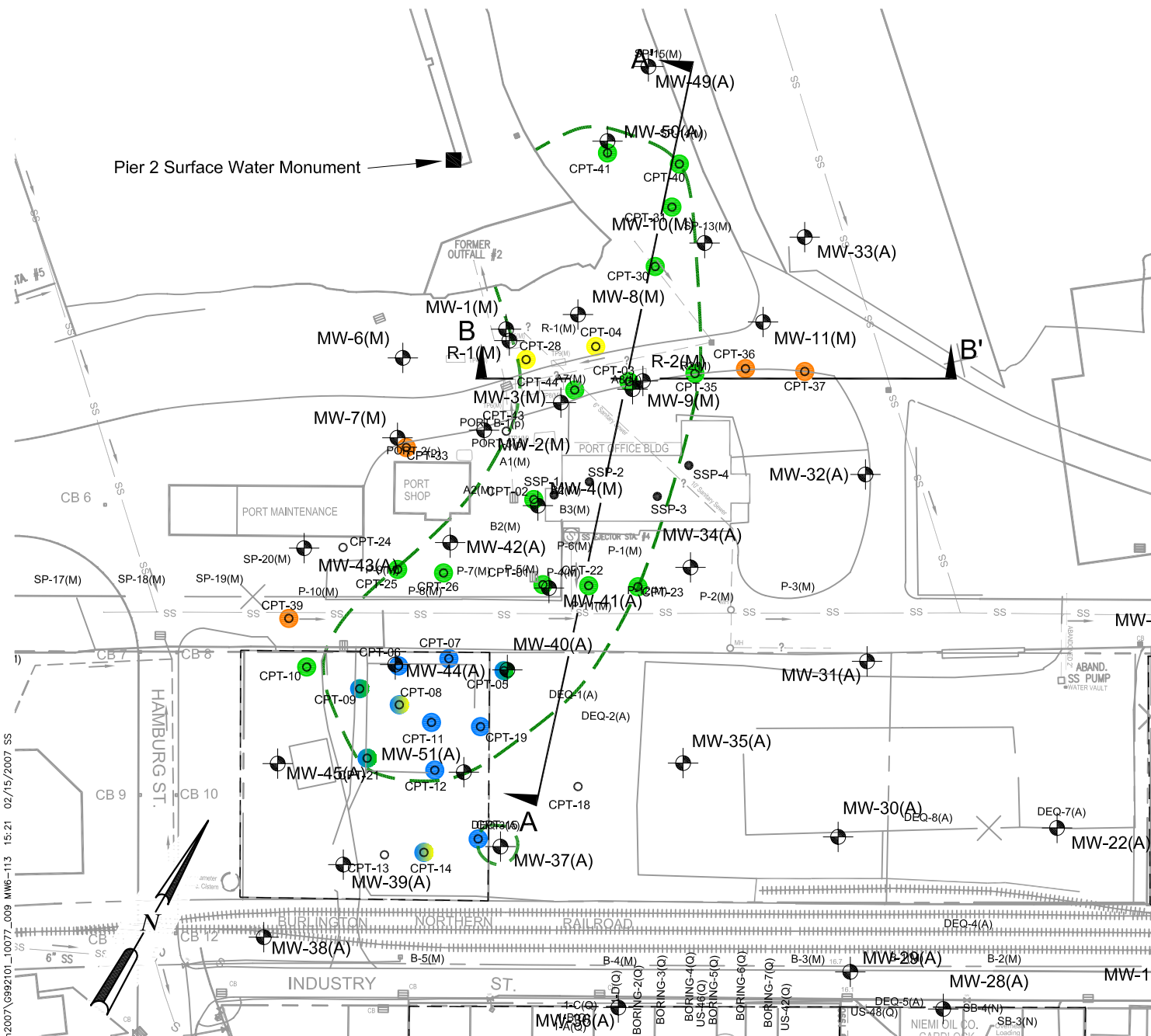
### Product Thickness



**FIGURE 6-112**  
**PRODUCT THICKNESS**  
Remedial Investigation/Feasibility Study  
Astoria Area-Wide Petroleum Site  
Astoria, Oregon

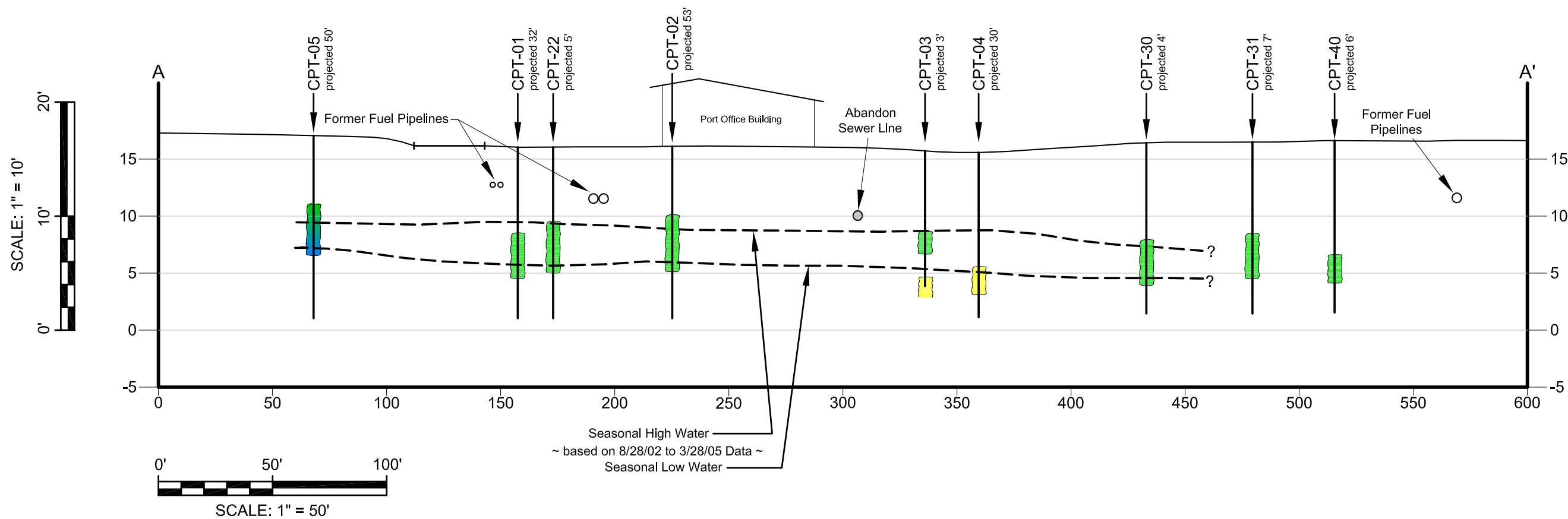
# EXPLANATION

- MW-40 ← Monitoring-Well Location & Designation
  - SVP-1 ← Soil Vapor Monitoring Point Location & Designation
  - CPT-30 ← CPT/ROST Location and Designation
  - ← Estimated Lateral Extent of LNAPL Based on Monitoring Wells Observations and September 2004 ROST Borings.
- 
- Primarily Degraded Diesel Hydrocarbon Mixtures.
  - Primarily Gasoline Hydrocarbon Mixtures.
  - Primarily Diesel Hydrocarbon Mixtures.
  - Primarily Oil Hydrocarbon Mixtures.



**FIGURE 6-113**

**ESTIMATED LATERAL EXTENT OF LNAPL FALL 2004**  
**Remedial Investigation/Feasibility Study**  
**Astoria Area-Wide Petroleum Site**  
**Astoria, Oregon**



### EXPLANATION

- CPT / ROST Fluorescence
- Primarily Degraded Diesel Hydrocarbon Mixtures.
- Primarily Gasoline Hydrocarbon Mixtures.
- Primarily Diesel Hydrocarbon Mixtures.

**FIGURE 6-114**  
**CROSS SECTION A-A'**  
**CPT Borings**  
**Astoria Area-Wide Petroleum Site**  
**Astoria, Oregon**



G:\0900\992\101\Cad\10077\009\June2007\G992101\_10077\_009\_F6-116 13:22 07/12/2007 SS

Pier 3

SW-105



Slip 2

Pier 2

SD-104  
SW-104

SD-103

Absorbent Boom

SD-701(A)

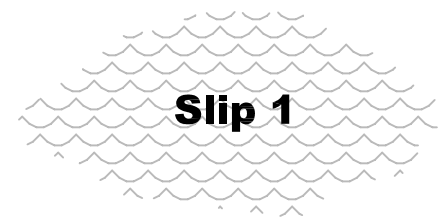
SD-101  
SW-101

SD-102  
SW-102

SD-100  
SW-100

SD-700(A)

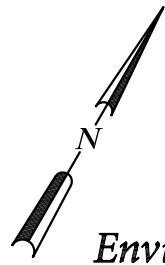
Slip 1



Pier 1

PORT SHOP

PORT OFFICE BLDG



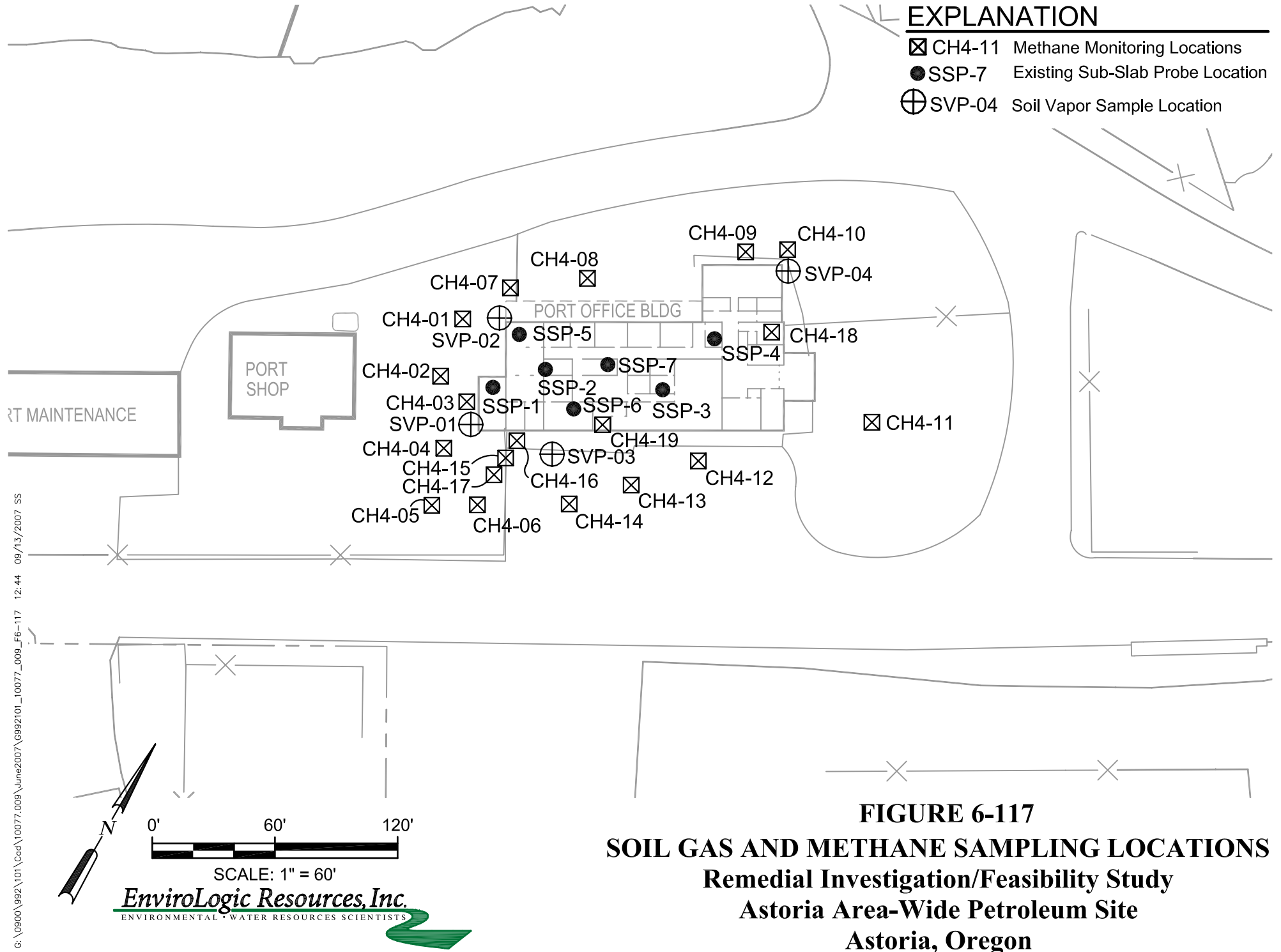
**EXPLANATION**

- SD-103 ● Surface Sediment Sample
- SW-105 ● Water Column Sample



**FIGURE 6-116**

**SLIP 2 SAMPLING STATIONS**  
Remedial Investigation/Feasibility Study  
Astoria Area-Wide Petroleum Site  
Astoria, Oregon



**FIGURE 6-117**  
**SOIL GAS AND METHANE SAMPLING LOCATIONS**  
 Remedial Investigation/Feasibility Study  
 Astoria Area-Wide Petroleum Site  
 Astoria, Oregon

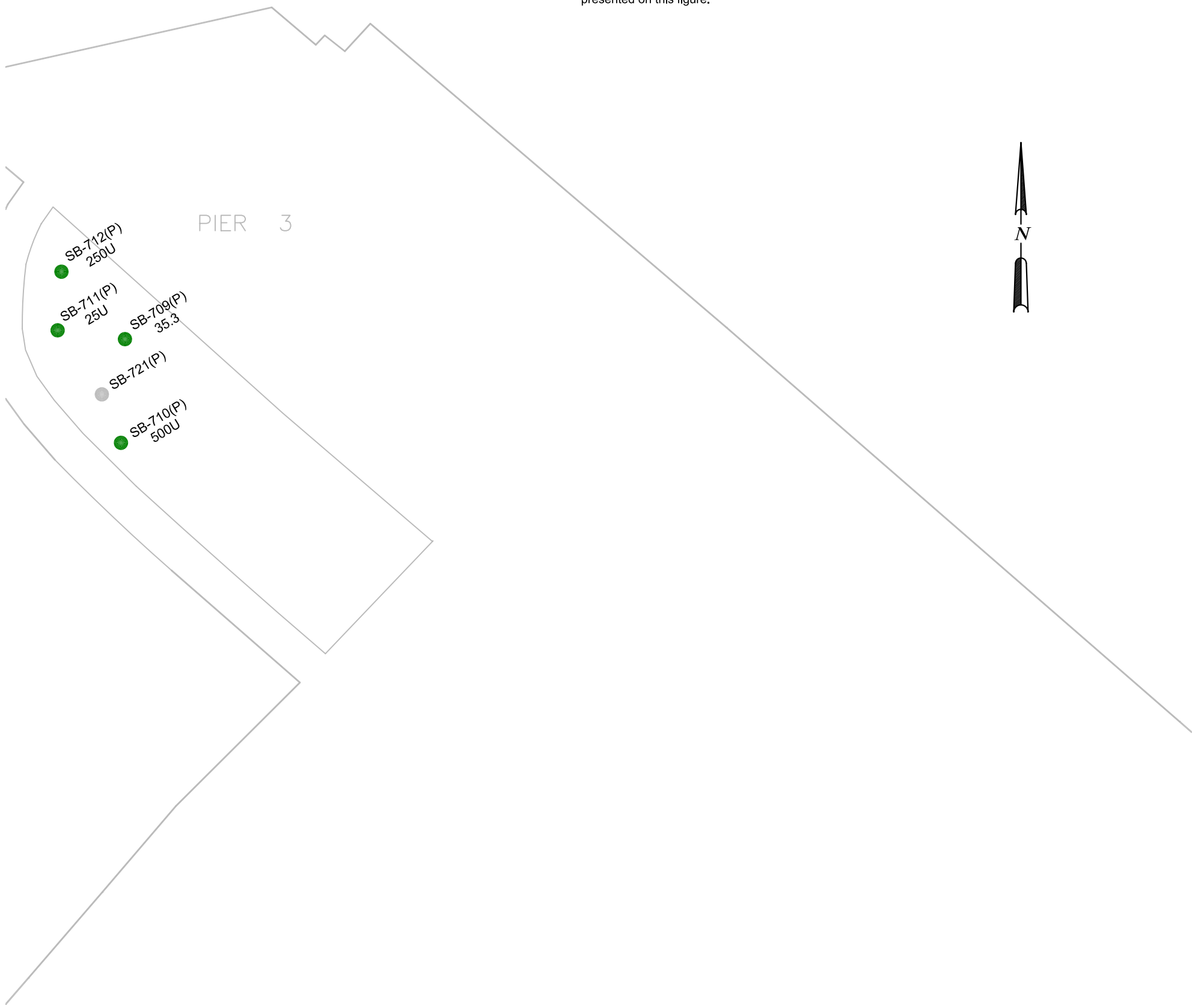
# Explanation

- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - 0-1,000

### Notes:

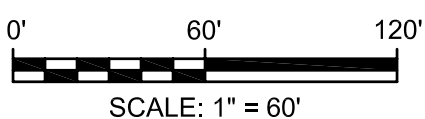
Guide to analytical data flags is in Table 6-1.

For locations with multiple analytical results, the highest concentration is presented on this figure.



SB-713(P)  
25U

### Key Plan - AOC 5

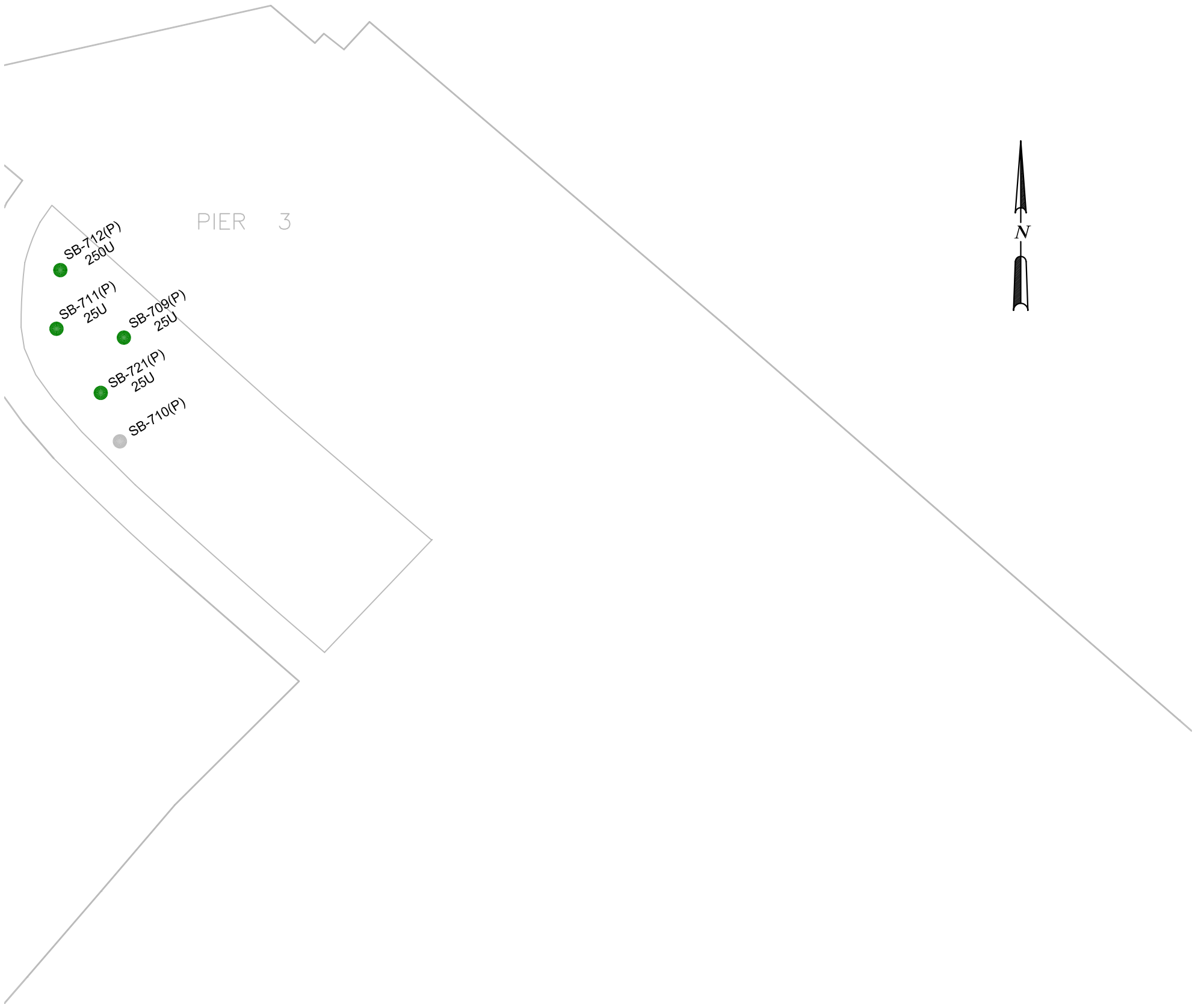


**FIGURE 6-118**

**DIESEL RANGE HYDROCARBONS IN SOIL  
3 FEET AND LESS - AOC 5  
Remedial Investigation/Feasibility Study  
Astoria Area-Wide Petroleum Site  
Astoria, Oregon**

**Explanation**

- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - 0-1,000



SB-713(P) 25U ●

**Key Plan - AOC 5**



**Notes:**  
 Guide to analytical data flags is in Table 6-1.  
 For locations with multiple analytical results, the highest concentration is presented on this figure.

**FIGURE 6-119**

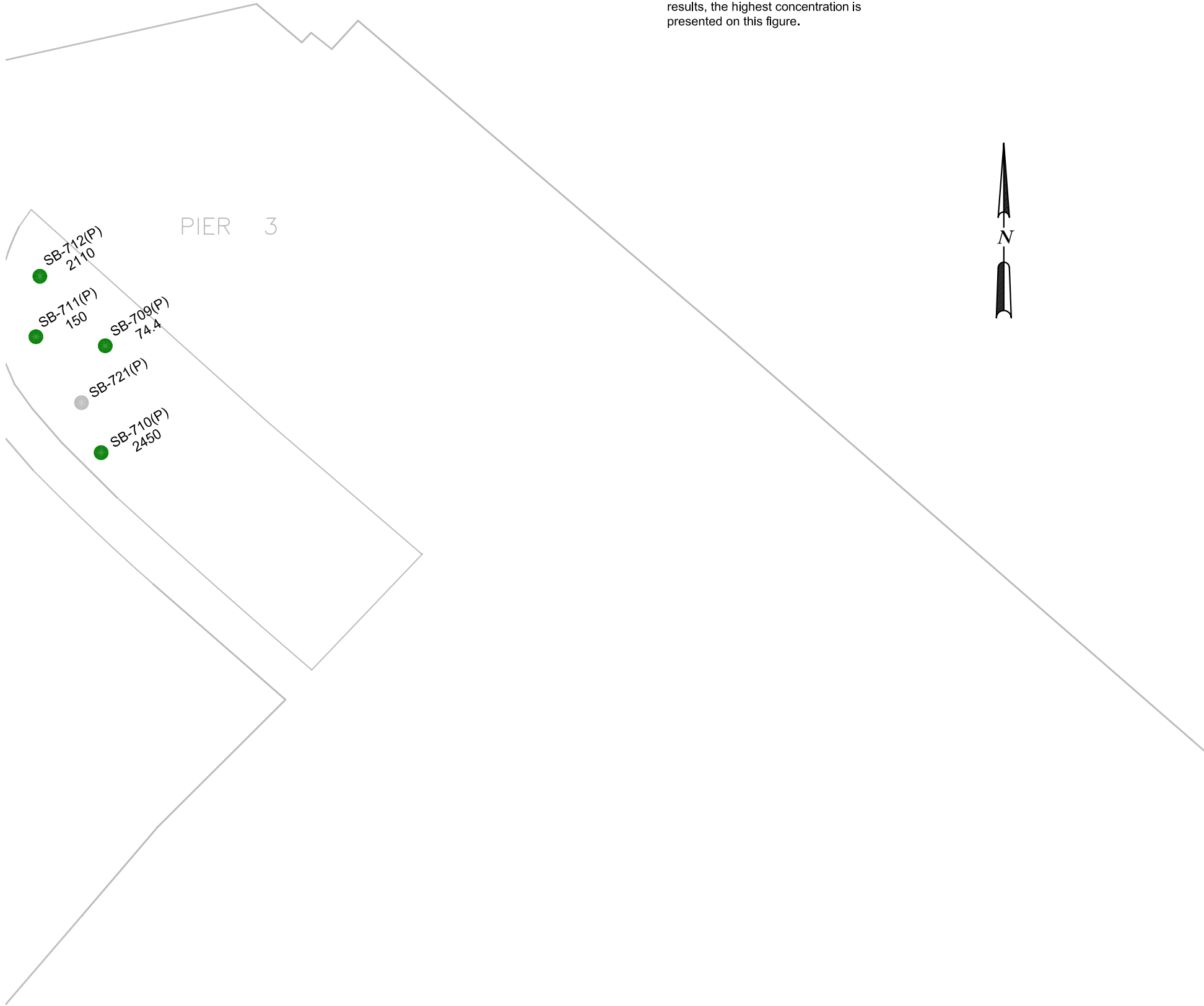
**DEISEL RANGE HYDROCARBONS IN SOIL  
 GREATER THAN 3 FEET - AOC 5  
 Remedial Investigation/Feasibility Study  
 Astoria Area-Wide Petroleum Site  
 Astoria, Oregon**

G:\0900\992\101\Cad\10077\009\June2007\6992101\_10077\_009\_SO\_DRG\_GT3FT\_07\_14-28-09/11/2007 SS

**Explanation**

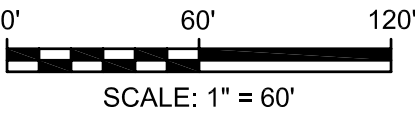
- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - 0-10,000

**Notes:**  
 Guide to analytical data flags is in Table 6-1.  
 For locations with multiple analytical results, the highest concentration is presented on this figure.



SB-713(P)  
50U ●

**Key Plan - A0C 5**



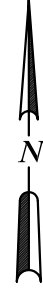
**FIGURE 6-120**

**RESIDUAL RANGE OIL HYDROCARBONS IN SOIL  
 3 FEET AND LESS - A0C 5  
 Remedial Investigation/Feasibility Study  
 Astoria Area-Wide Petroleum Site  
 Astoria, Oregon**

G:\0900\992\101\Cad\10077.009\June2007\6982101\_10077\_009\_SO\_HOIL\_LE3FT\_07\_13.00-09/13/2007.SS

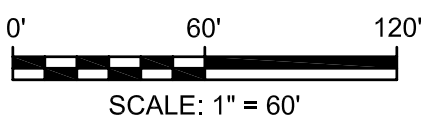
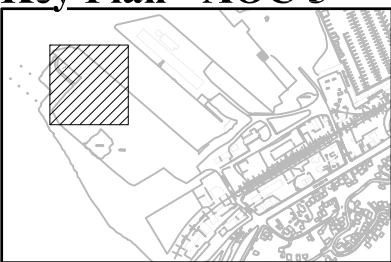
**Explanation**

- Soil Boring Location and Designation
- Concentration in mg/kg
  - Not Analyzed
  - 0-10,000



SB-713(P)  
50U ●

**Key Plan - AOC 5**



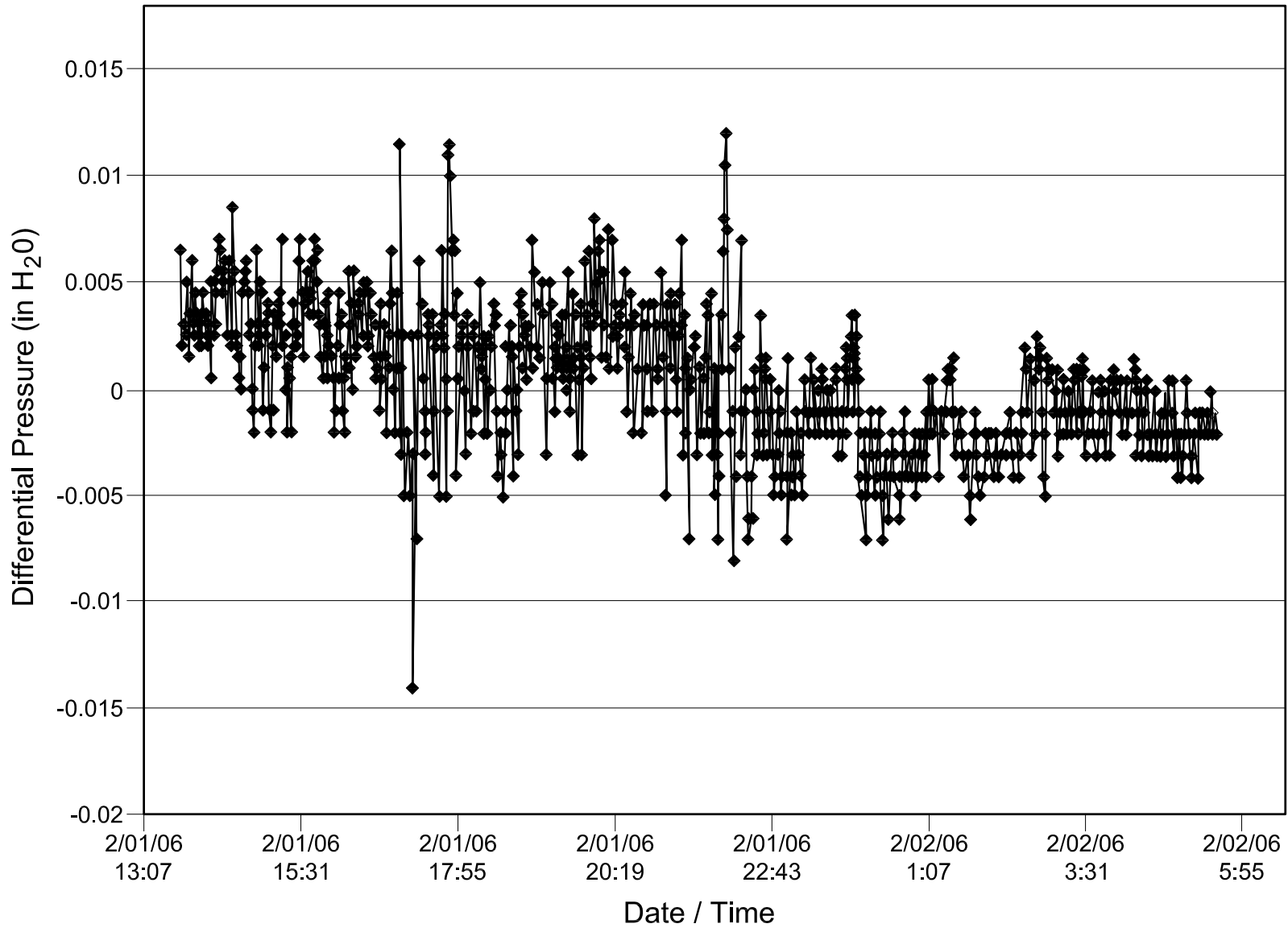
**Notes:**

Guide to analytical data flags is in Table 6-1.  
For locations with multiple analytical results, the highest concentration is presented on this figure.

**FIGURE 6-121**

**RESIDUAL RANGE OIL HYDROCARBONS IN SOIL  
GREATER THAN 3 FEET - AOC 5  
Remedial Investigation/Feasibility Study  
Astoria Area-Wide Petroleum Site  
Astoria, Oregon**

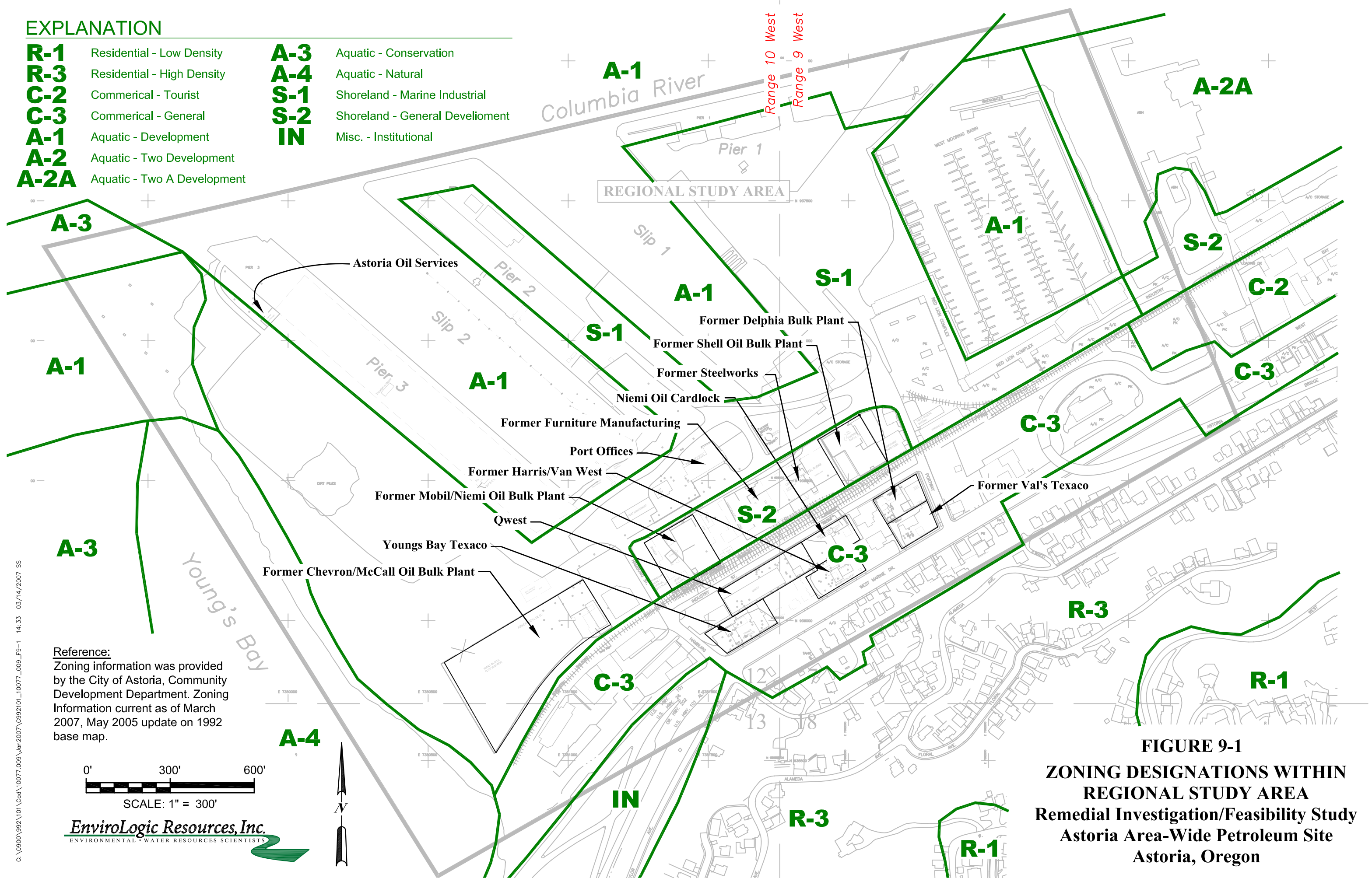
SSP-03 (Test 2) Pressure Differential



**FIGURE 7-1**  
**DIFFERENTIAL PRESSURE**  
**Remedial Investigation/Feasibility Study**  
**Astoria Area-Wide Petroleum Site**  
**Astoria, Oregon**

**EXPLANATION**

- |             |                             |            |                                 |
|-------------|-----------------------------|------------|---------------------------------|
| <b>R-1</b>  | Residential - Low Density   | <b>A-3</b> | Aquatic - Conservation          |
| <b>R-3</b>  | Residential - High Density  | <b>A-4</b> | Aquatic - Natural               |
| <b>C-2</b>  | Commerical - Tourist        | <b>S-1</b> | Shoreland - Marine Industrial   |
| <b>C-3</b>  | Commerical - General        | <b>S-2</b> | Shoreland - General Develioment |
| <b>A-1</b>  | Aquatic - Development       | <b>IN</b>  | Misc. - Institutional           |
| <b>A-2</b>  | Aquatic - Two Development   |            |                                 |
| <b>A-2A</b> | Aquatic - Two A Development |            |                                 |



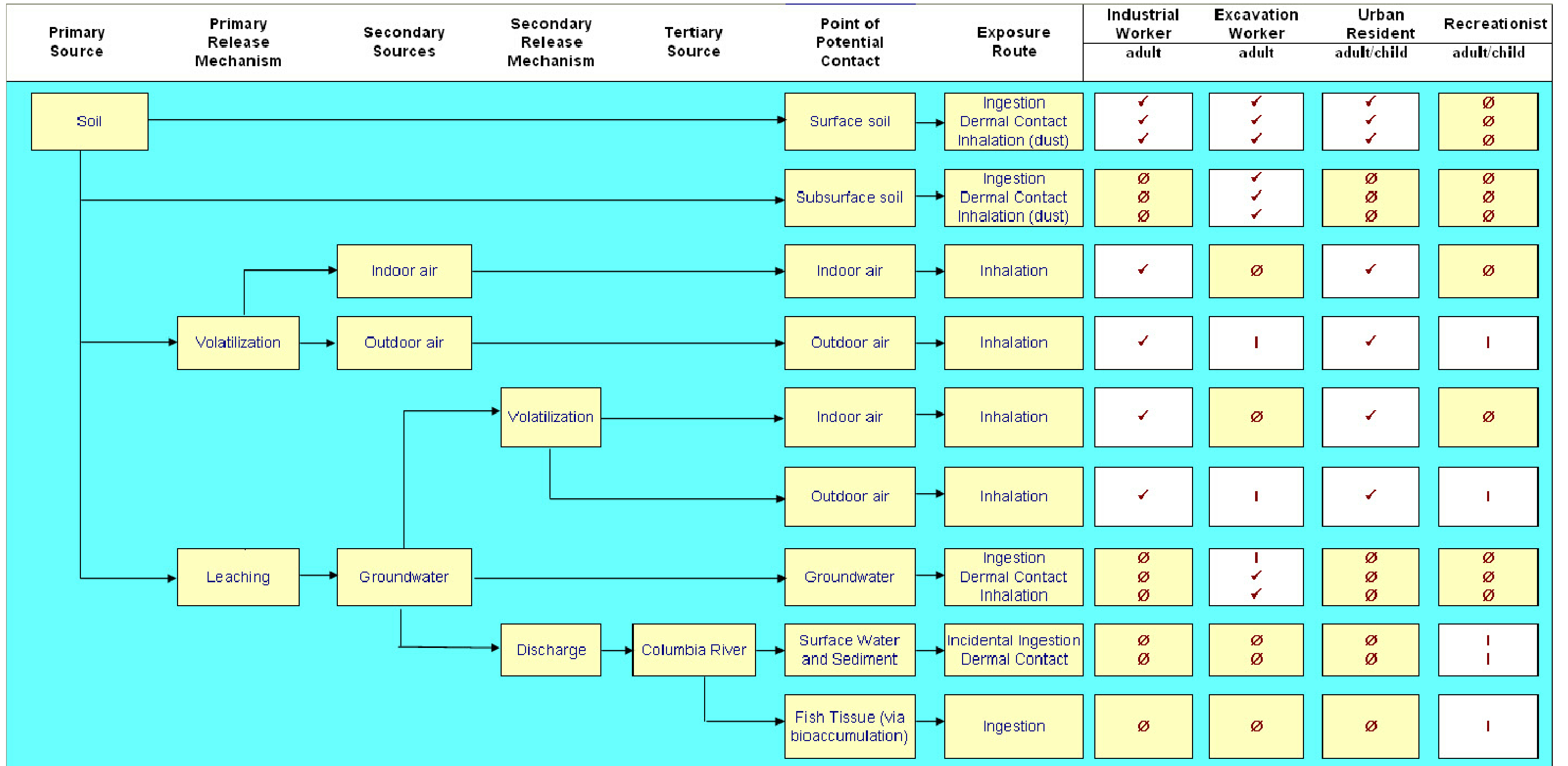
Reference:  
 Zoning information was provided by the City of Astoria, Community Development Department. Zoning Information current as of March 2007, May 2005 update on 1992 base map.

0' 300' 600'  
 SCALE: 1" = 300'

**EnviroLogic Resources, Inc.**  
 ENVIRONMENTAL · WATER RESOURCES SCIENTISTS

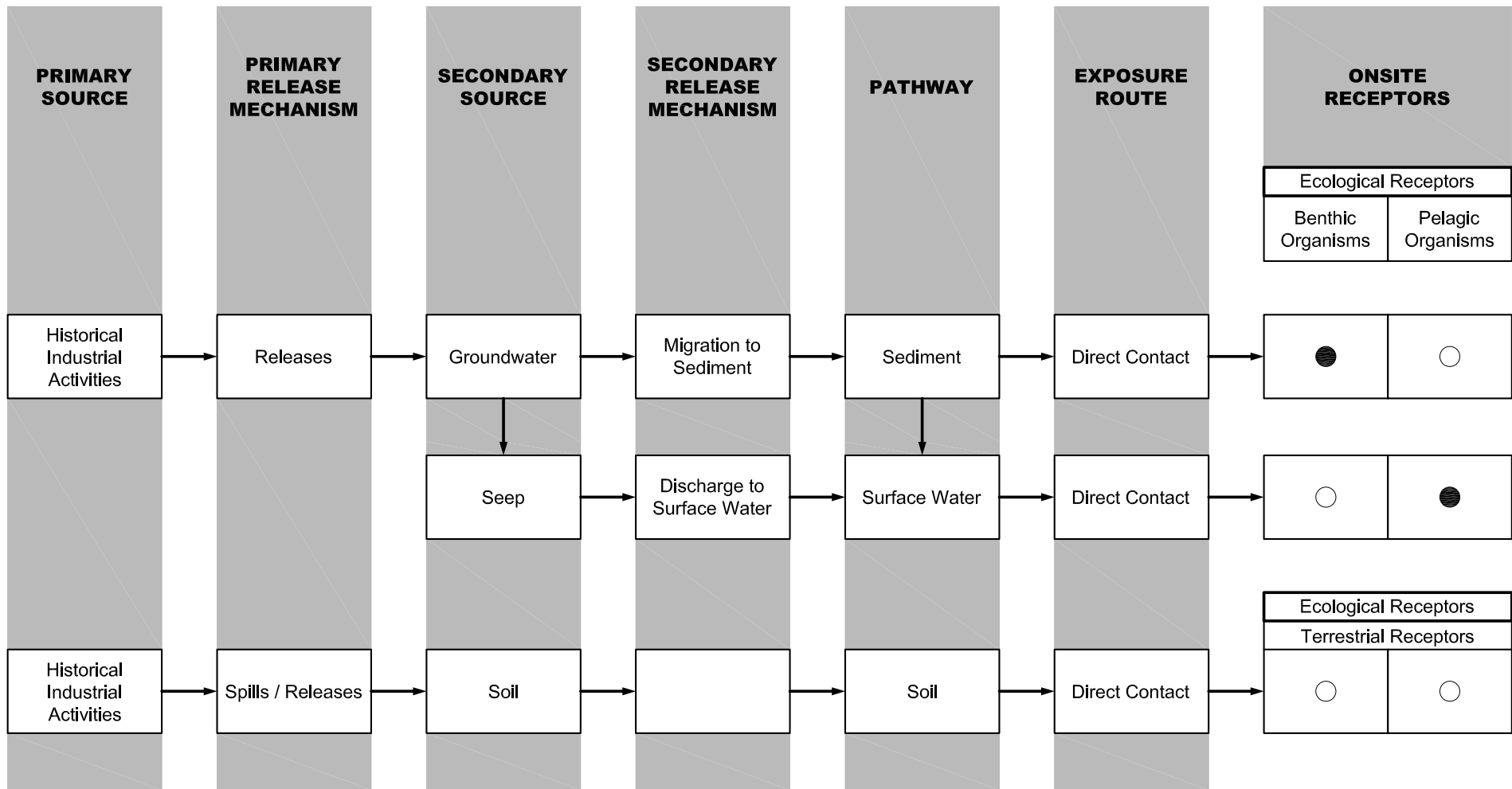
**FIGURE 9-1**  
**ZONING DESIGNATIONS WITHIN REGIONAL STUDY AREA**  
**Remedial Investigation/Feasibility Study**  
**Astoria Area-Wide Petroleum Site**  
**Astoria, Oregon**

G:\09000\992\101\Cad\10077\009\Jan2007\G992101\_10077\_009\_F9-1 14:33 03/14/2007 SS



Notes:  
 Primary pathway →  
 Potentially complete exposure route ✓  
 Incomplete exposure route ∅  
 Insignificant exposure route I

**FIGURE 10-1**  
**CONCEPTUAL SITE MODEL**  
**POTENTIAL HUMAN EXPSOURE PATHWAYS**  
 Remedial Investigation/Feasibility Study  
 Astoria Area-Wide Petroleum Site  
 Astoria, Oregon

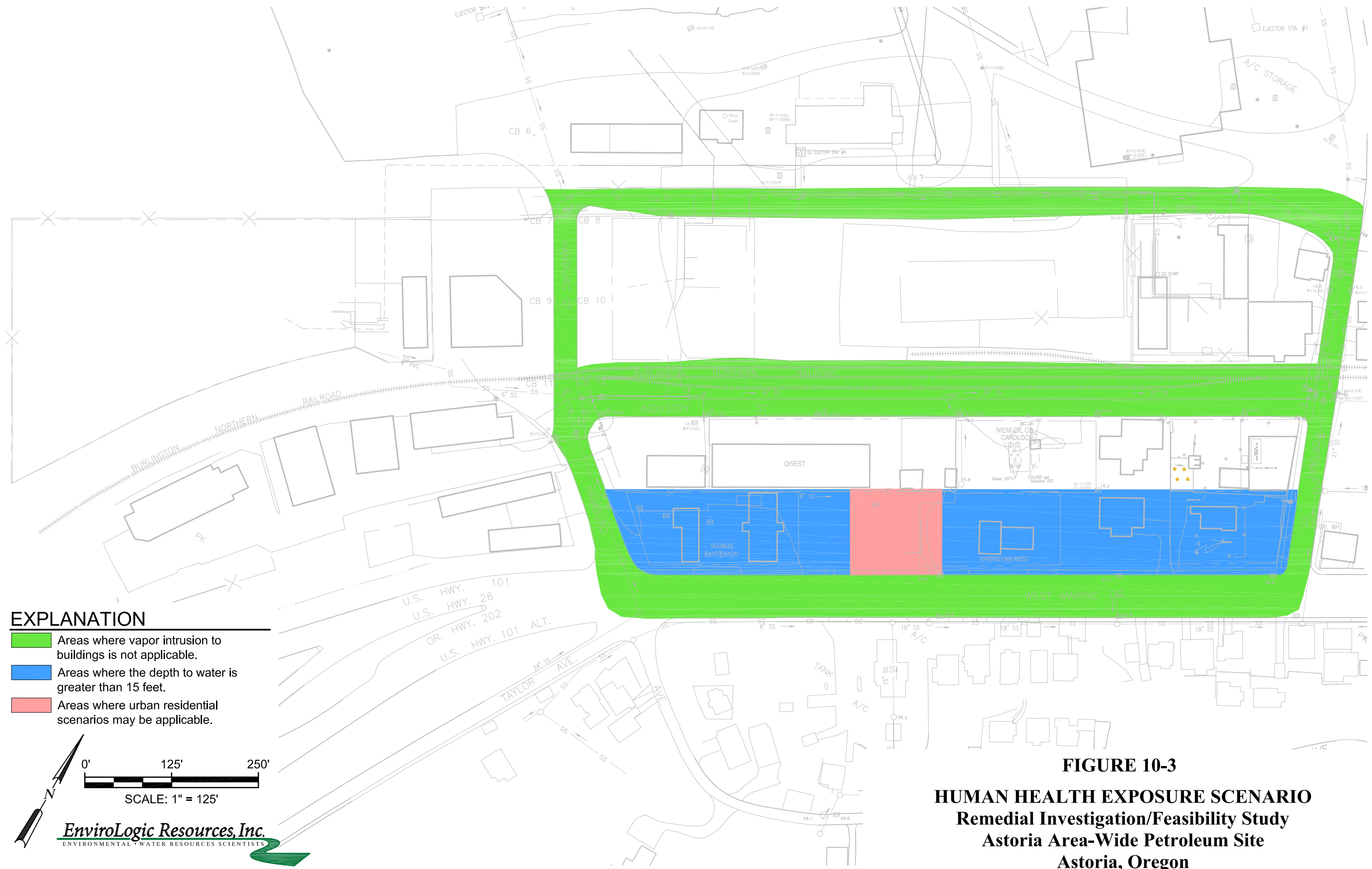


**NOTES**

- Potentially Complete Pathway; Quantitative Evaluation
- Incomplete Pathway
- Primary Pathway

**FIGURE 10-2**  
**ECOLOGICAL CONCEPTUAL SITE MODEL**  
**Remedial Investigation/Feasibility Study**  
**Astoria Area-Wide Petroleum Site**  
**Astoria, Oregon**

c:\09001\982\101\Cad\10077\009\_Ven\2007\0929101\_10077\_009\_F10-3 13:36 02/16/2007 SS



**EXPLANATION**

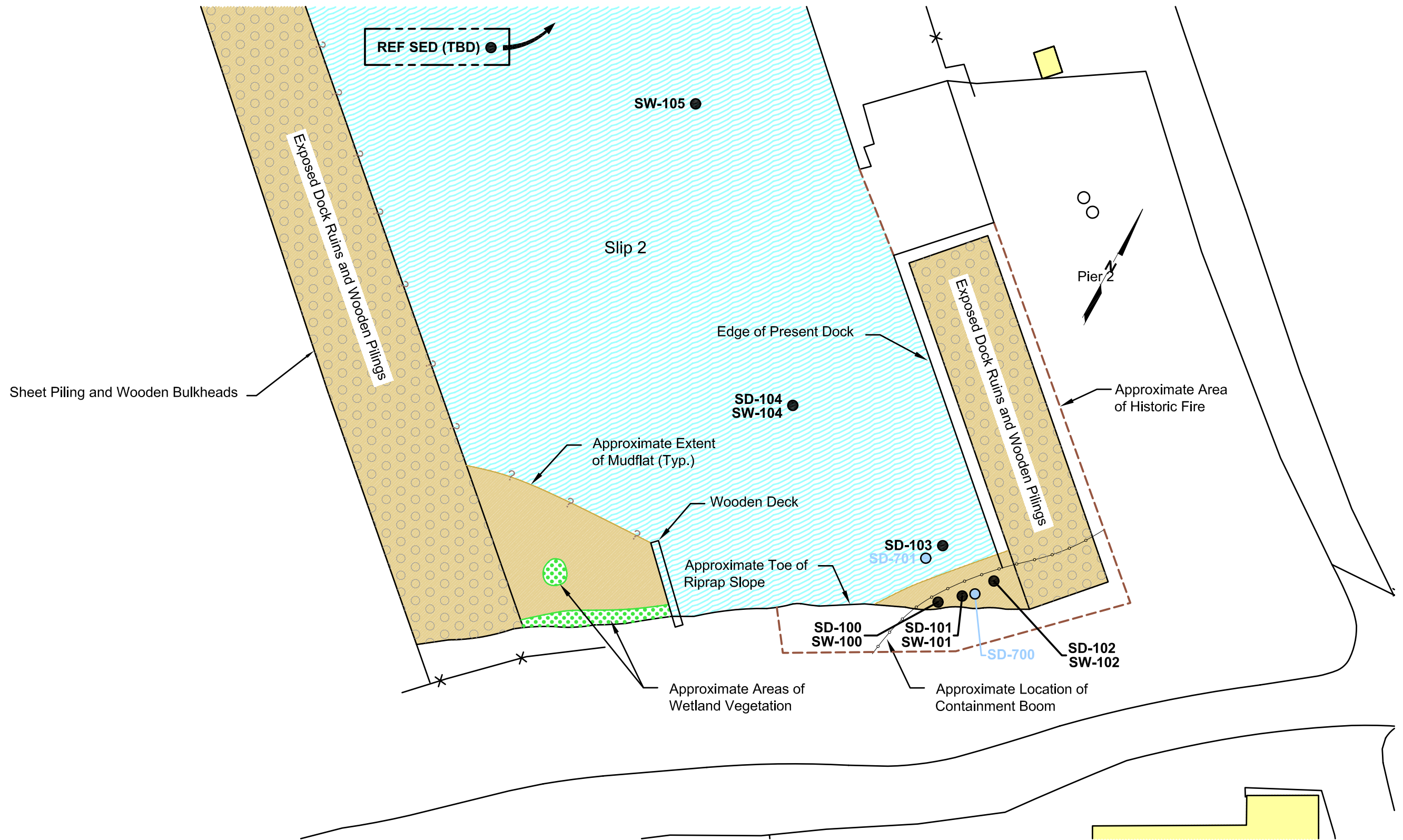
- █ Areas where vapor intrusion to buildings is not applicable.
- █ Areas where the depth to water is greater than 15 feet.
- █ Areas where urban residential scenarios may be applicable.

SCALE: 1" = 125'

**EnviroLogic Resources, Inc.**  
ENVIRONMENTAL • WATER RESOURCES SCIENTISTS

**FIGURE 10-3**  
**HUMAN HEALTH EXPOSURE SCENARIO**  
**Remedial Investigation/Feasibility Study**  
**Astoria Area-Wide Petroleum Site**  
**Astoria, Oregon**

c:\0900\992\101\Cad\100777\009\June2007\G992101\_100777\_009\_F10-4 13:34 07/24/2007 SS



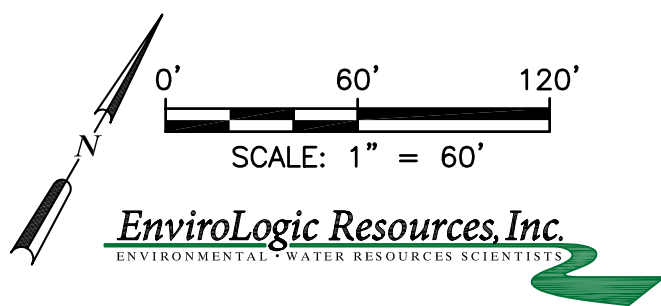
**EXPLANATION**

- SD-700 APPROXIMATE SEDIMENT SAMPLE LOCATION & NUMBER (EnviroLogic, June 19, 2003)
- SD-101 SURFACE SEDIMENT SAMPLE
- SW-101 WATER COLUMN SAMPLE

**NOTES**

1. Base map prepared from AutoCAD file provided by EnviroLogic Resources, Inc., dated 5/02.
2. Conditions shown as observed at approximate tidal height of +2.5' Columbia River Datum (CRD).

**FIGURE 10-4**  
**INTERTIDAL HABITAT**  
**Remedial Investigation/Feasibility Study**  
**Astoria Area-Wide Petroleum Site**  
**Astoria, Oregon**

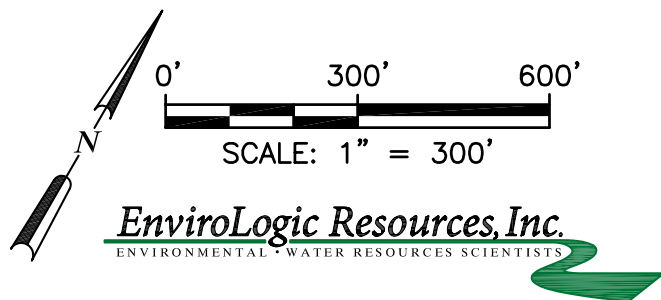
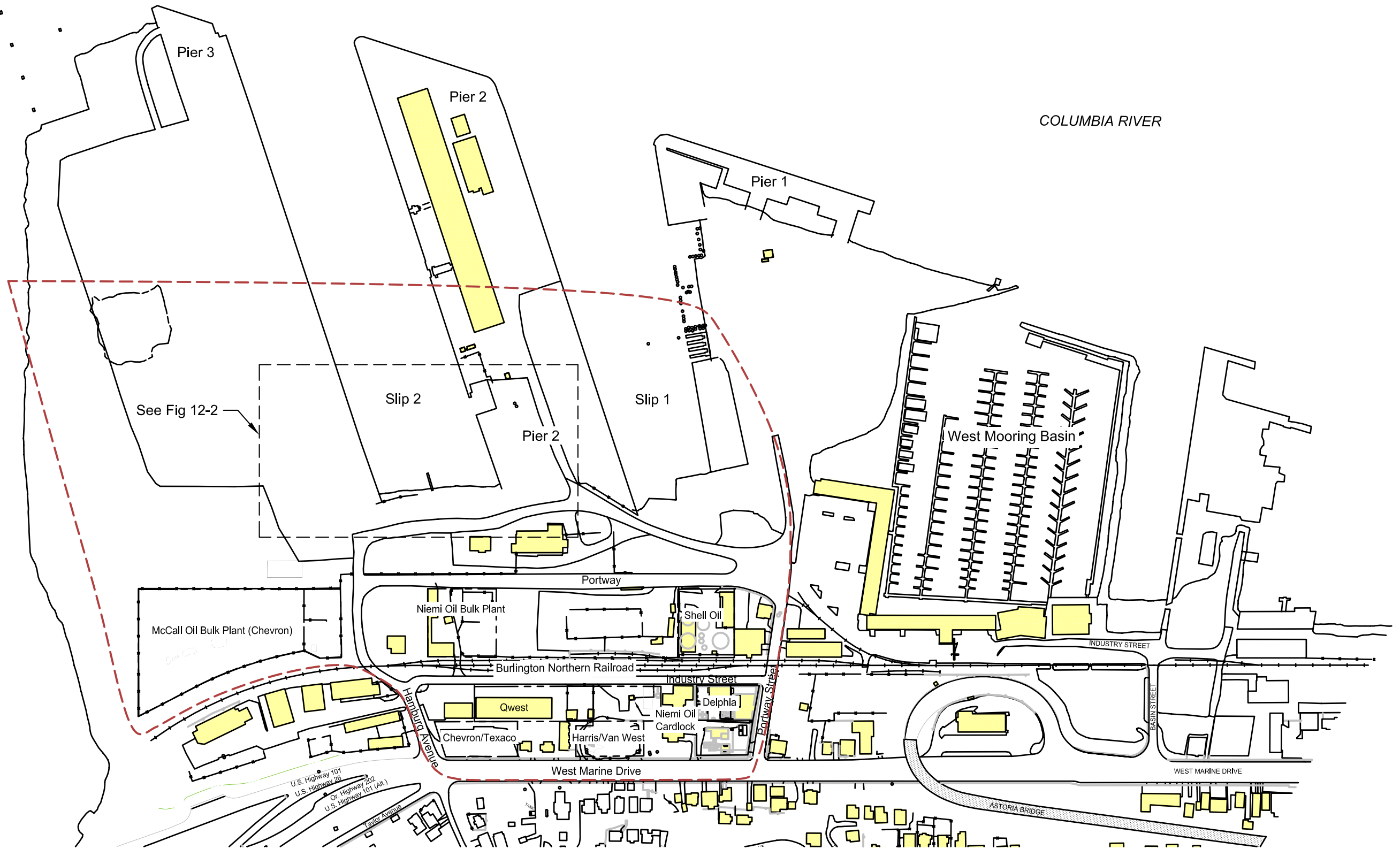




c:\0900\992\101\Cad\100777.009\June2007\G992101\_100777\_009\_F12-1 13:44 07/25/2007 SS

COLUMBIA RIVER

COLUMBIA RIVER



**EnviroLogic Resources, Inc.**  
ENVIRONMENTAL • WATER RESOURCES SCIENTISTS

**EXPLANATION**

----- AREA EVALUATED IN LEVEL 1 SCOPING ECOLOGICAL RISK ASSESSMENT

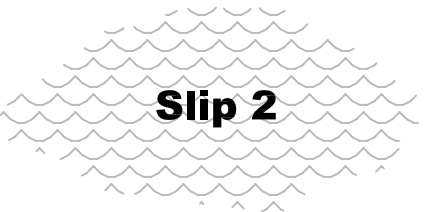
**FIGURE 12-1**

**LEVEL 1 ERA STUDY AREA**  
**Remedial Investigation/Feasibility Study**  
**Astoria Area-Wide Petroleum Site**  
**Astoria, Oregon**

G:\0900\992\101\Cad\10077\009\June2007\G992101\_10077\_009\_F12-2 13:48 07/25/2007 SS

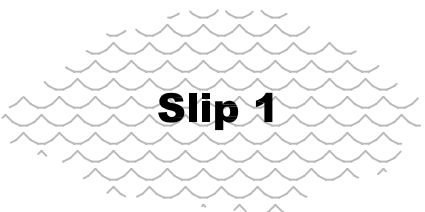
Pier 3

SW-105



Slip 2

Pier 2



Slip 1

Pier 1

SD-104  
SW-104

SD-103

Absorbent Boom

SD-701(A)

SD-101  
SW-101

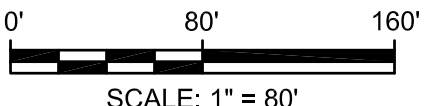
SD-102  
SW-102

SD-100  
SW-100

SD-700(A)

PORT OFFICE BLDG

PORT SHOP



**EXPLANATION**

- SD-103 ● Surface Sediment Sample
- SW-105 ● Water Column Sample

**FIGURE 12-2**  
**ERA SEDIMENT AND WATER**  
**COLUMN SAMPLE LOCATIONS**  
**Remedial Investigation/Feasibility Study**  
**Astoria Area-Wide Petroleum Site**  
**Astoria, Oregon**



