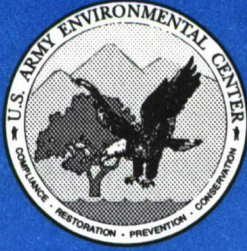


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Phase 2 Remedial Investigation Report Army Materials Technology Laboratory

**Task Order 1
Remedial Investigation/Feasibility Study**

Contract Number DAAA15-90-D-0009

Volume 3 - Figures

May 1994

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West Chester,
Pennsylvania 19380-1499



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Task Order 1

**PHASE 2 REMEDIAL INVESTIGATION FOR BASE CLOSURE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
ARMY MATERIALS TECHNOLOGY LABORATORY
WATERTOWN, MASSACHUSETTS**

Contract No. DAAA15-90-D-0009

VOLUME 3

May 1994

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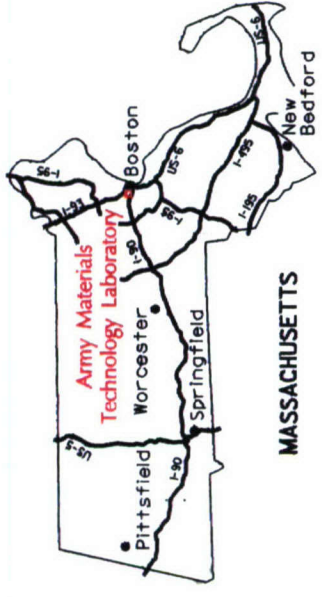
TABLE OF CONTENTS

LIST OF FIGURES

<u>Figure No.</u>	<u>Title</u>	<u>Page</u>
ES-1	Phase 2 Sampling Locations	F-1
1-1	Location of MTL	F-2
1-2	Topographic Map of MTL and Surrounding Area	F-3
1-3	Geographical Subdivisions of MTL	F-4
2-1	Well Completion (Manhole Type)	F-5
2-2	Underground Fuel Oil Cleanup Vicinity of Fuel Oil Storage Building 227	F-6
2-3	MTL Tunnel System	F-7
2-4	Archaeological Vulnerability at MTL	F-8
3-1	Topographic Profile	F-9
3-2	Wind Rose (Calms Included) for MTL	F-10
3-3	Wind Rose (Calms Excluded) for MTL	F-11
3-4	General Bedrock Geology Map of the Boston Basin	F-12
3-5	Approximate Depth to Bedrock Surface	F-13
3-6	Geologic Cross-Section Locations	F-14
3-7	Geological Cross-Section A-A'	F-15
3-8	Geological Cross-Section B-B'	F-16
3-9	Groundwater Contours: Deep Wells	F-17
3-10	Groundwater Contours: Water Table Wells	F-18
4-1	Examples of GPR Signatures: Park Traverse, 270 West	F-19

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MANAGERS DESIGNERS CONSULTANTS
LIST OF FIGURES
(Continued)

<u>Figure No.</u>	<u>Title</u>	<u>Page</u>
4-2	Examples of GPR Signatures: Park Traverse, 470 West	F-20
4-3	Geophysical Interpretation: Parking Lot Between Buildings and 131	F-21
4-4	Geophysical Interpretation: Along North Beacon Street	F-22
4-5	Geophysical Interpretation: Areas Near Building 60	F-23
4-6a	Geophysical Confirmation of Pipe Configurations at Various Sewer Junctions: 09SLG01	F-24
4-6b	Geophysical Confirmation of Pipe Configurations at Various Sewer Junctions: 17AQU01 and 17AQU02	F-25
4-6c	Geophysical Confirmation of Pipe Configurations at Various Sewer Junctions: 16AQU01	F-26
4-6d	Geophysical Confirmation of Pipe Configurations at Various Sewer Junctions: 18AQU03	F-27
4-7	Phase 2 Surface Soil Sampling Locations	F-28
4-8	Phase 2 Soil Boring Locations	F-29
4-9	Phase 2 Monitor Well Sampling Locations	F-30
4-10	Phase 2 River and Storm Sewer Sampling Locations	F-31
4-11	Areas of Storm Sewer Inspection	F-32
4-12	Phase 2 Sanitary Sewer Inspection and Sampling Locations	F-33
4-13	Elevated Outdoor Gamma Readings	F-34
4-14	Phase 2 Air Samples	F-35
4-15	Phase 2 Cistern, Tank, Sump, and Dry Well Samples	F-36
4-16	Schematic of Building 313C Cistern	F-37
6-1	Conceptual Site Diagram for MTL Baseline Risk Assessment	F-38
6-2	Likely Future Use Zones at the MTL	F-39

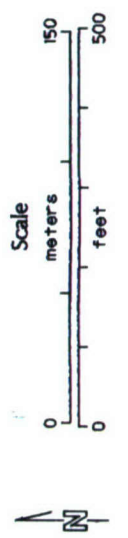


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- Surface Soil Sampling Location
- Soil Boring Location
- Soil Boring/Monitor Well Location
- Soil Sampling Grid
- Pre-Existing Monitor Well
- Phase 2 Monitor Well
- Phase 2 Deep Monitor Well
- Sediment and Surface Water Sampling Location
- Shallow and Deep Sediment Sampling Location (and Surface Water Sampling Location in some cases)
- Building where Chemical Wipe Samples were collected

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Figure ES-1
Phase 2
Sampling Locations



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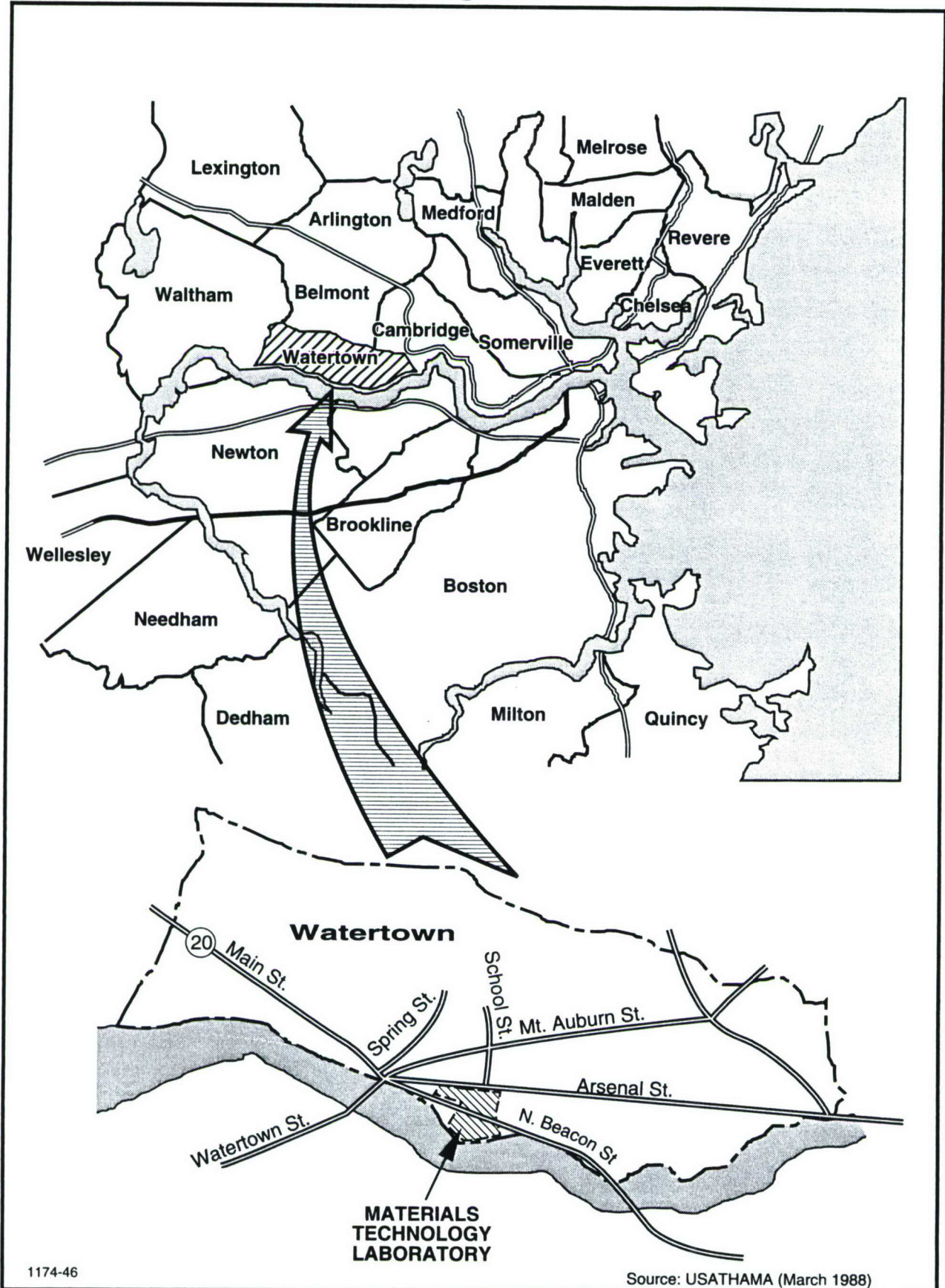


FIGURE 1-1 LOCATION OF MTL

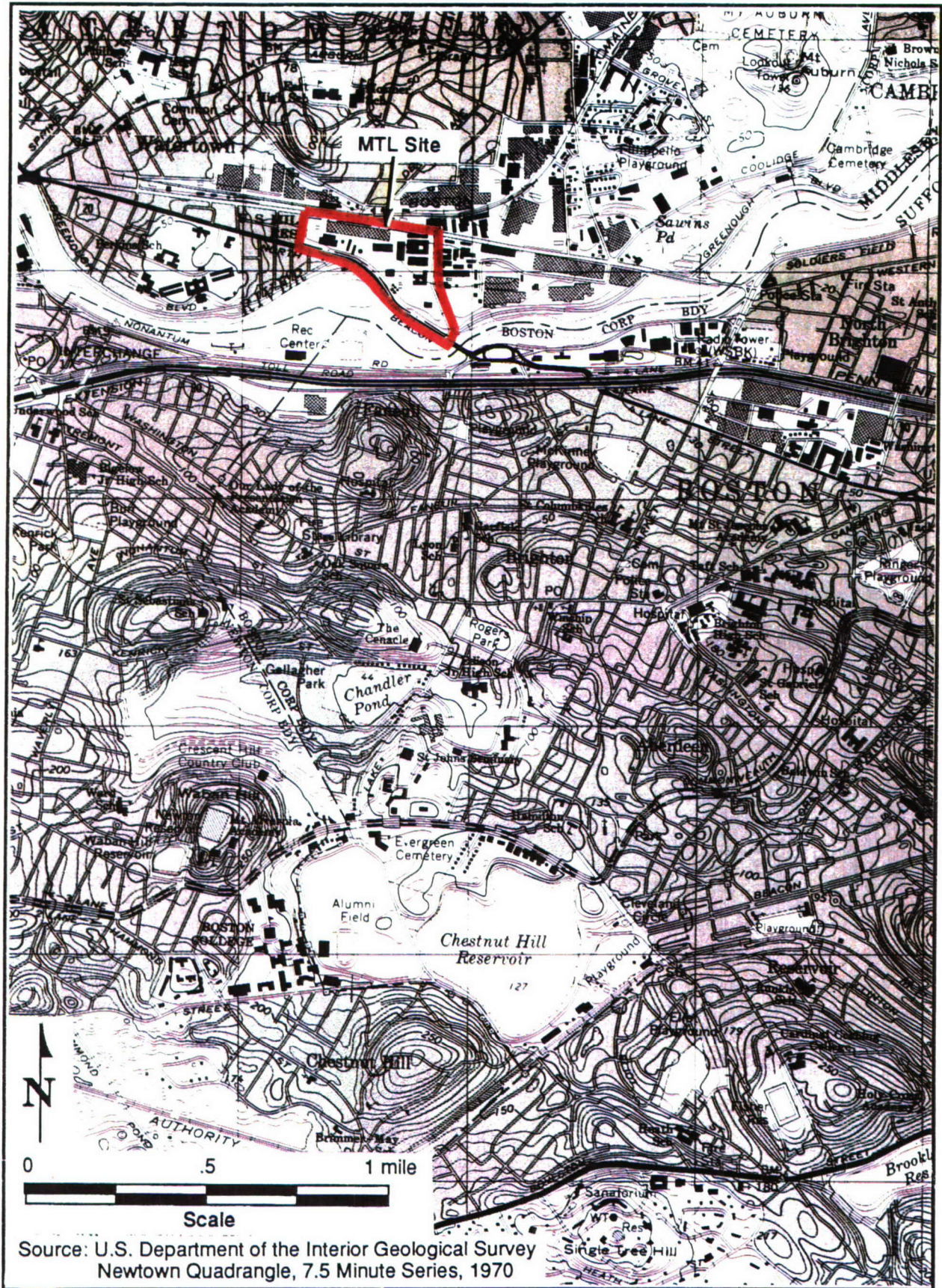
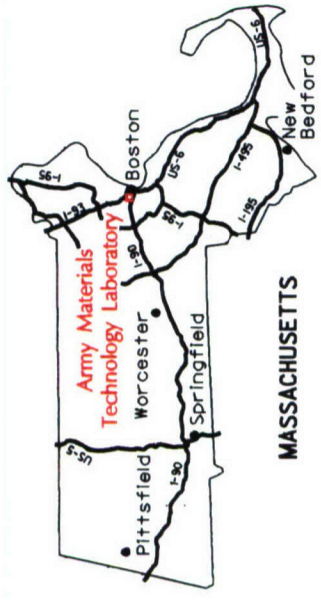
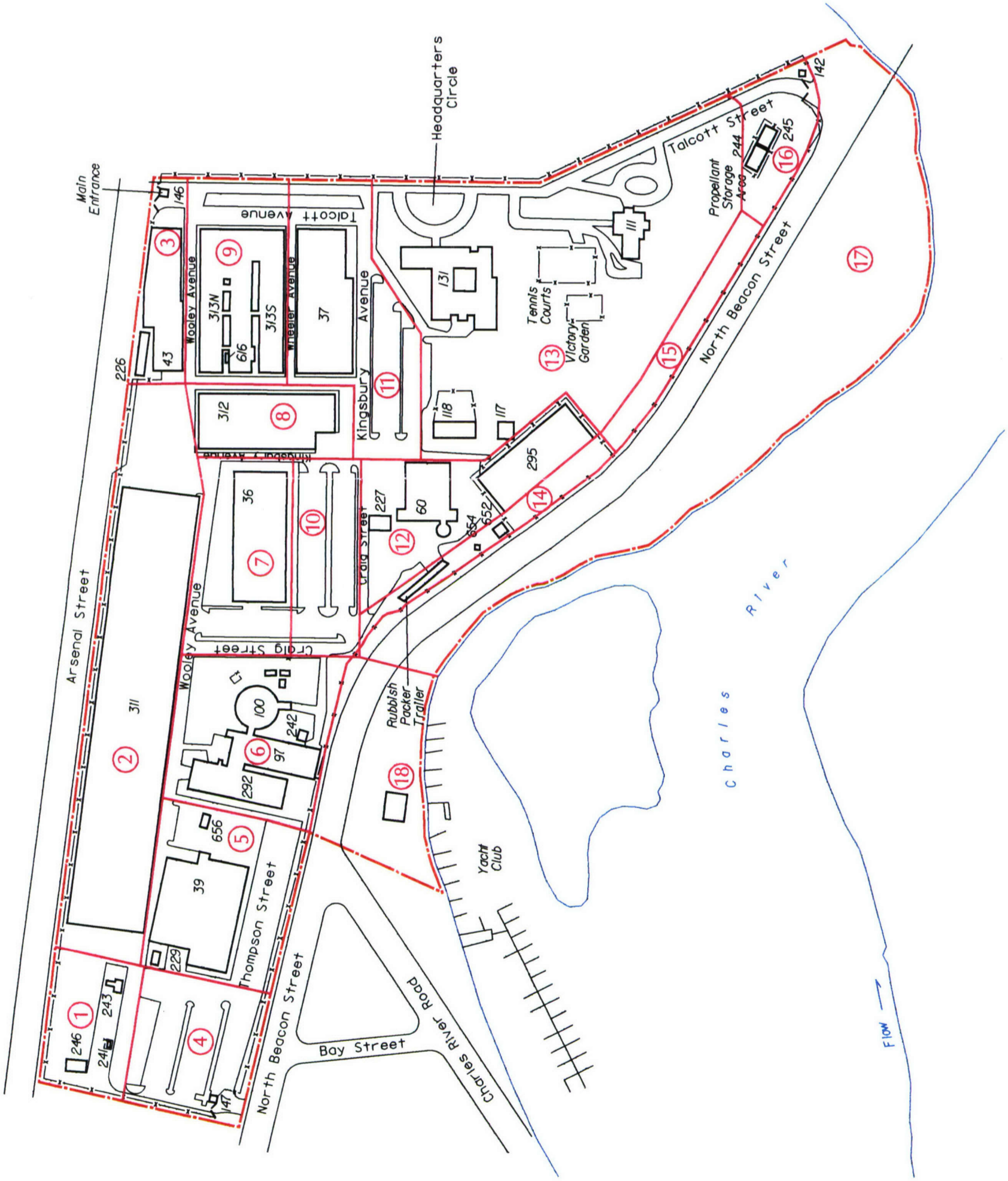


FIGURE 1-2 TOPOGRAPHIC MAP FOR MTL AND SURROUNDING AREA



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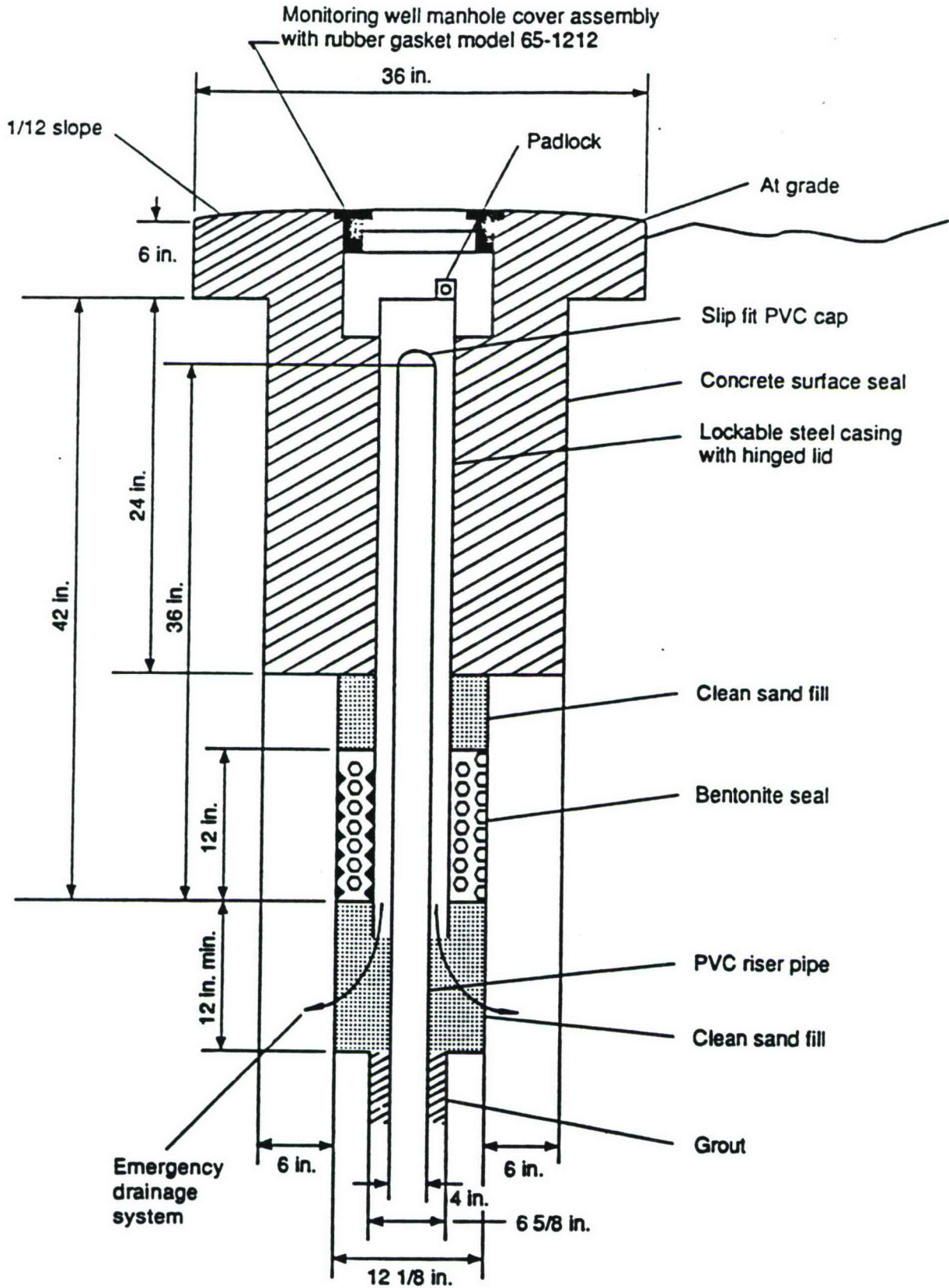
Figure 1-3
Geographical
Subdivisions of MTL

- ⑬ Sampling Unit Numbers
(Source: E.G.&G., 1988)
- Sampling Unit Boundary
(Source: E.G.&G., 1988)



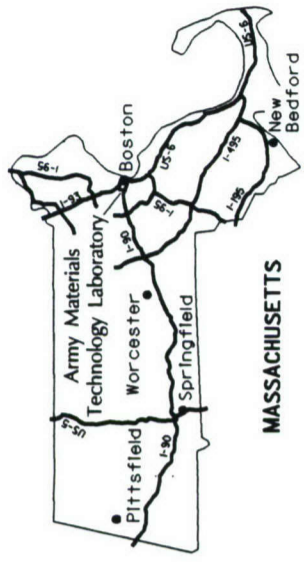
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Source: EG&G, 1990

FIGURE 2-1 WELL COMPLETION (MANHOLE TYPE)



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Kingsbury Avenue

4" Fuel Oil Previously Abandoned Underground In Place Removed April 30, 1992

Underground Wall Abandoned In this Location

Oil Leak In this Location

Sanitary Sewer Removed April 30, 1992

Manhole 227

Manhole 75

In Tank Bayonet Heaters Heaters Found Leaking Oil

Building 60 Power Plant

2" Fuel Oil Transfer

Building 227 Service Tanks

2" Fuel Oil Transfer

Condensate from Bayonet In Tank Heaters

Contaminated Area (Soil Removed from this Area)

Sanitary Sewer

Manhole 114

To Intercept Point on Main Line Vicinity Manhole 114

Sanitary Sewer Abandoned

Rubbish Packer Trailer

654

2" Fuel Transfer

Building 295 Tank Farm

Storage Tanks

652

117

118

North Beacon Street

Charles River

652

654

117

118

652

654

117

118

652

654

117

118

652

654

117

118

Craig Street

Sanitary Sewer

2" Fuel Oil Transfer

Removed April 30, 1992

Contaminated Area (Soil Removed from this Area)

Condensate from Bayonet In Tank Heaters

Sanitary Sewer

Manhole 114

To Intercept Point on Main Line Vicinity Manhole 114

Sanitary Sewer Abandoned

Rubbish Packer Trailer

654

2" Fuel Oil Transfer

Building 295 Tank Farm

Storage Tanks

652

117

118

North Beacon Street

Charles River

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Sanitary Sewer

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Figure 2-2
Underground Fuel Oil Cleanup
Vicinity of Fuel Oil Storage
Building 227

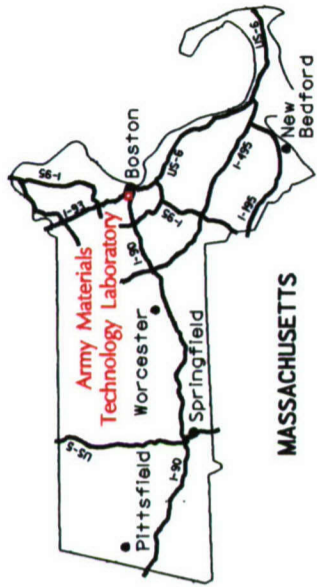
Area of Soil Excavation

Source: MTL, 1992





20-OCT-1992



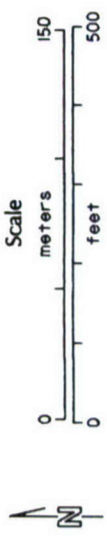


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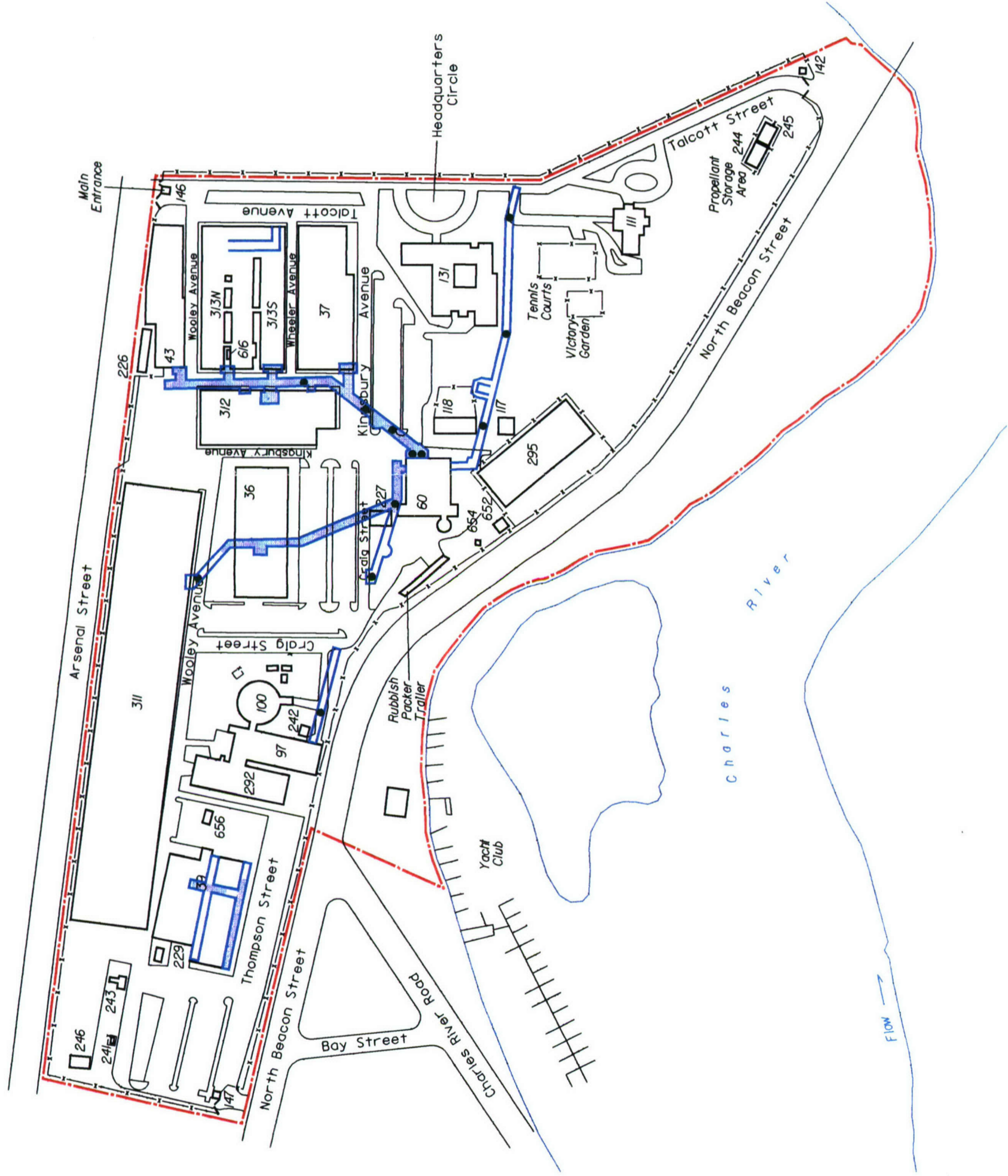
-  Tunnel and Manhole
-  Tunnel Portion Visually Inspected by Weston Personnel

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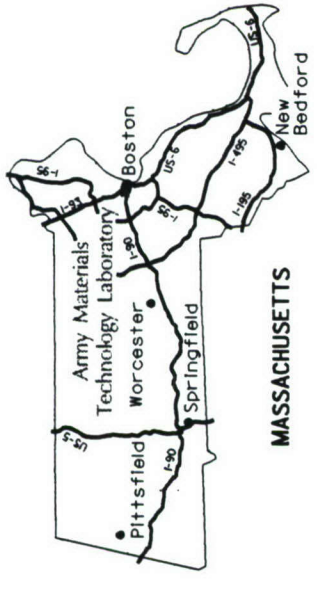
Figure 2-3
MTL Tunnel
System



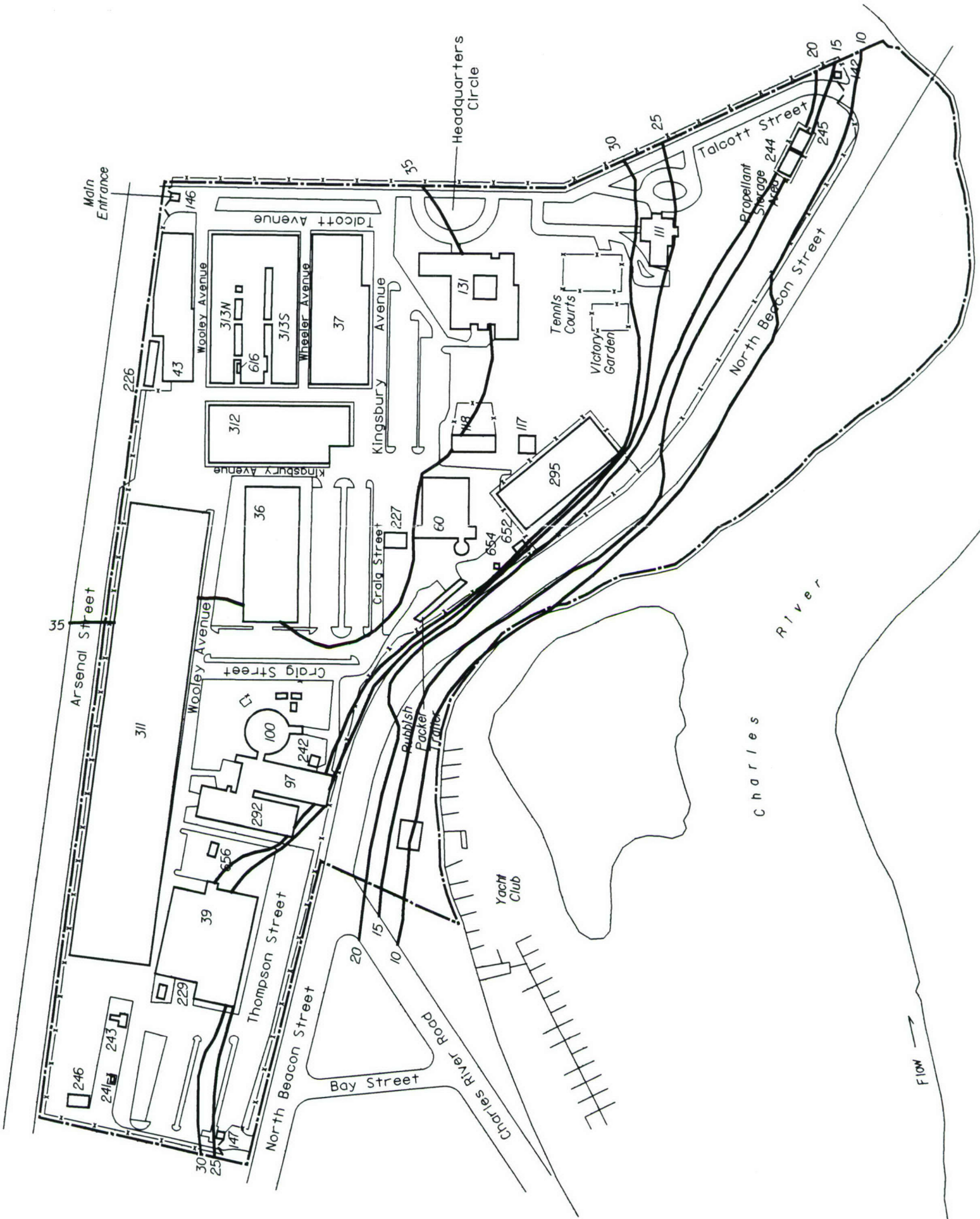
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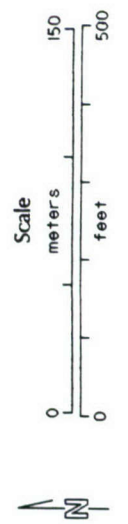


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Figure 3-1
Topographic Profile

— Elevation in Feet
(Above Mean Sea Level)

Source: E.G.&G., June 1990

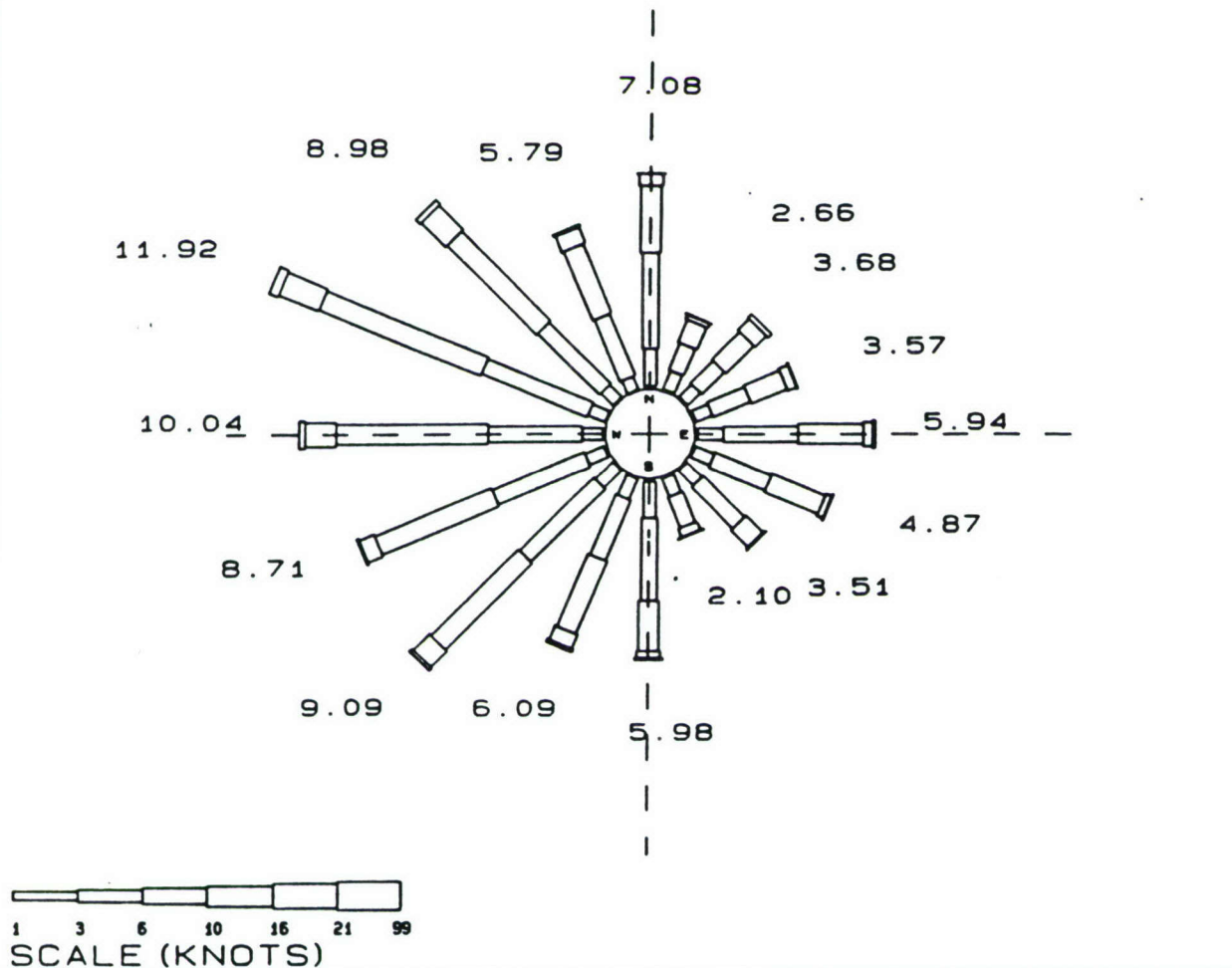


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BOSTON LOGAN INTERNATIONAL AIRPORT
1985 THROUGH 1989
CALMS EXCLUDED



	WIND SPEED (KNOTS)						PERCENT OCCURRENCE						
	1-3	3-6	6-10	10-16	16-21	>21	1-3	3-6	6-10	10-16	16-21	>21	
N	0.09	1.25	3.15	2.17	0.37	0.04	S	0.11	1.18	2.74	1.64	0.21	0.09
NNE	0.05	0.66	0.96	0.80	0.17	0.02	SSW	0.04	0.74	2.15	2.57	0.49	0.10
NE	0.05	0.58	1.05	1.30	0.52	0.18	SM	0.04	0.79	3.41	4.00	0.73	0.12
ENE	0.06	0.57	1.33	1.26	0.30	0.05	MSW	0.07	0.66	3.25	4.13	0.54	0.06
E	0.08	0.85	2.44	2.15	0.31	0.11	W	0.05	0.68	3.07	5.01	1.04	0.18
ESE	0.05	0.67	1.99	1.91	0.20	0.04	MNW	0.04	0.60	3.77	5.77	1.43	0.31
SE	0.04	0.70	1.92	0.77	0.06	0.02	NM	0.04	0.56	2.87	4.17	1.13	0.21
SSE	0.03	0.65	1.08	0.30	0.02	0.01	NNM	0.03	0.48	2.19	2.46	0.56	0.08

FIGURE 3-3 WIND ROSE (CALMS EXCLUDED) FOR MTL

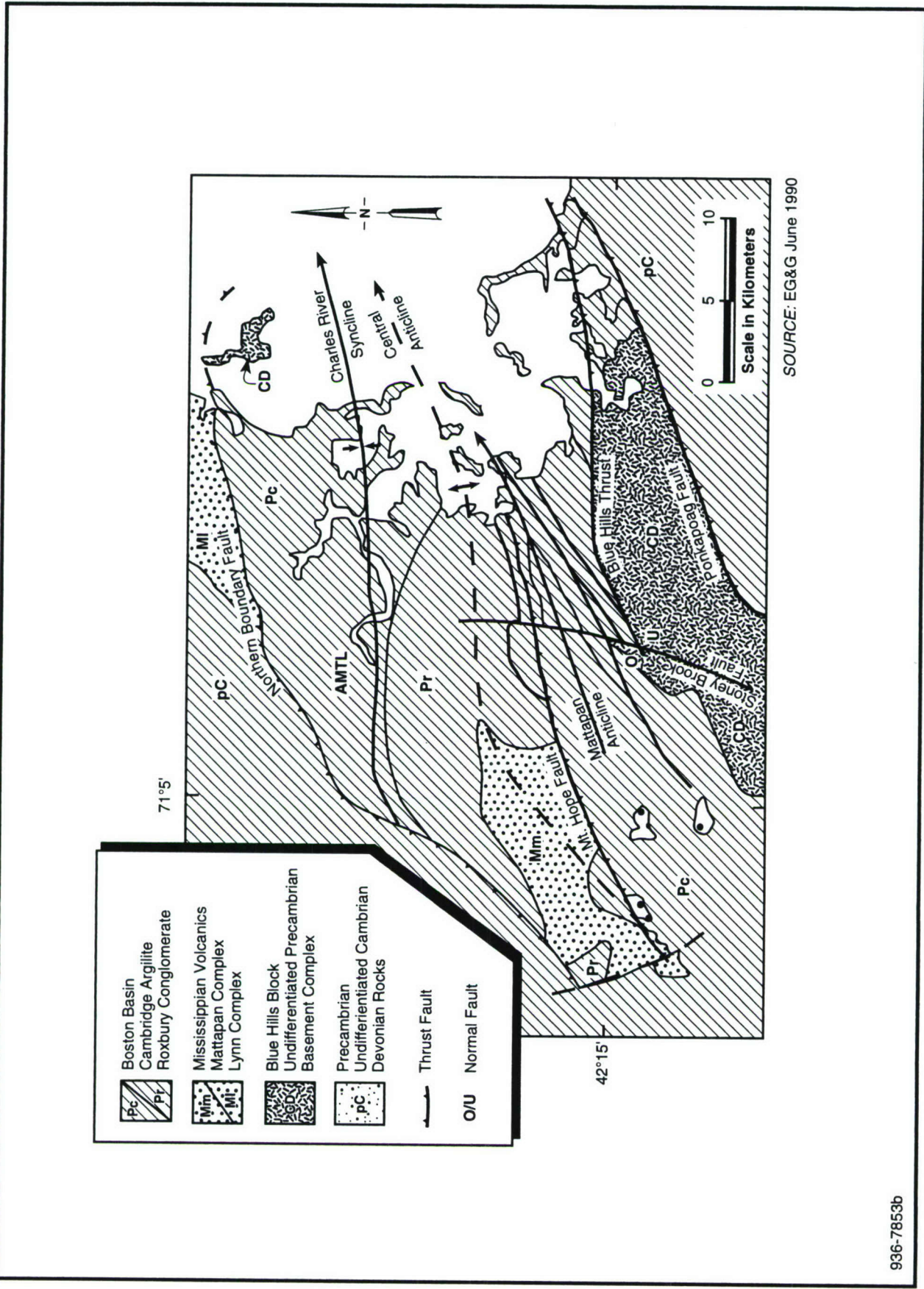
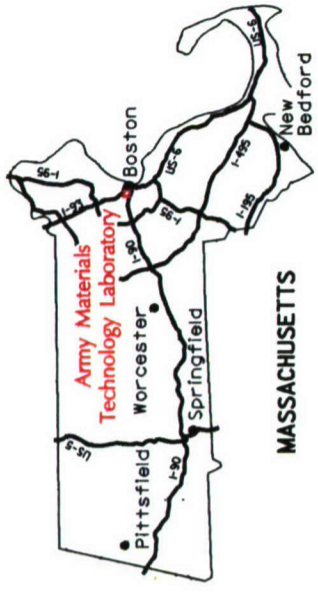


FIGURE 3-4 GENERAL BEDROCK GEOLOGY MAP OF THE BOSTON BASIN (BILLINGS, 1976)

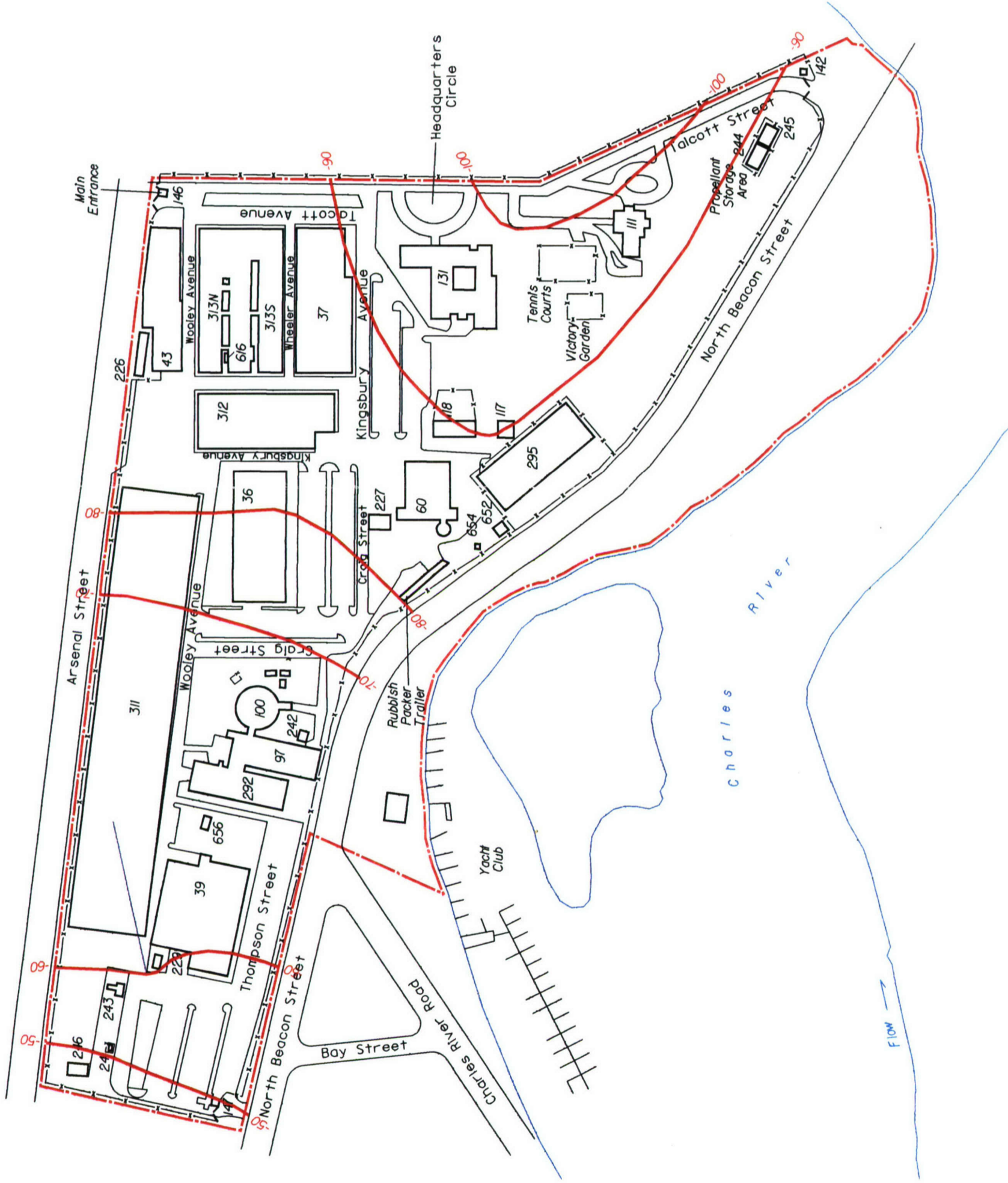
936-7853b



MASSACHUSETTS

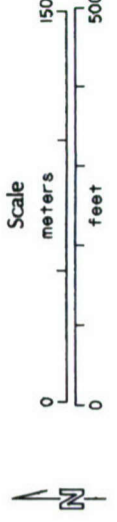
Estimated Bedrock Depth
in Feet BGS Based on Phase
1 Seismic Refraction Survey
and Phase 2 Soil Boring Program

-50

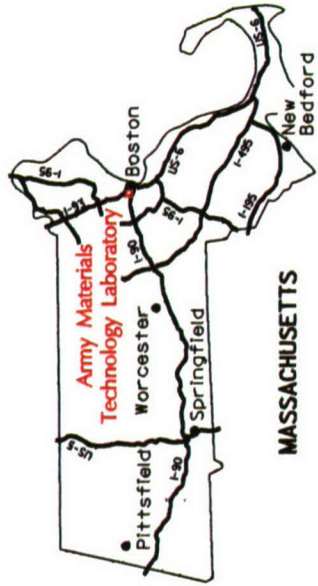


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Figure 3-5
Approximate Depth
to Bedrock Surface



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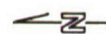
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- Phase 1 Monitor Well
- Phase 2 Water Table Monitor Well
- ⊗ Phase 2 Deep Monitor Well
- ▲ Soil Borling
- Geologic Cross Section

B

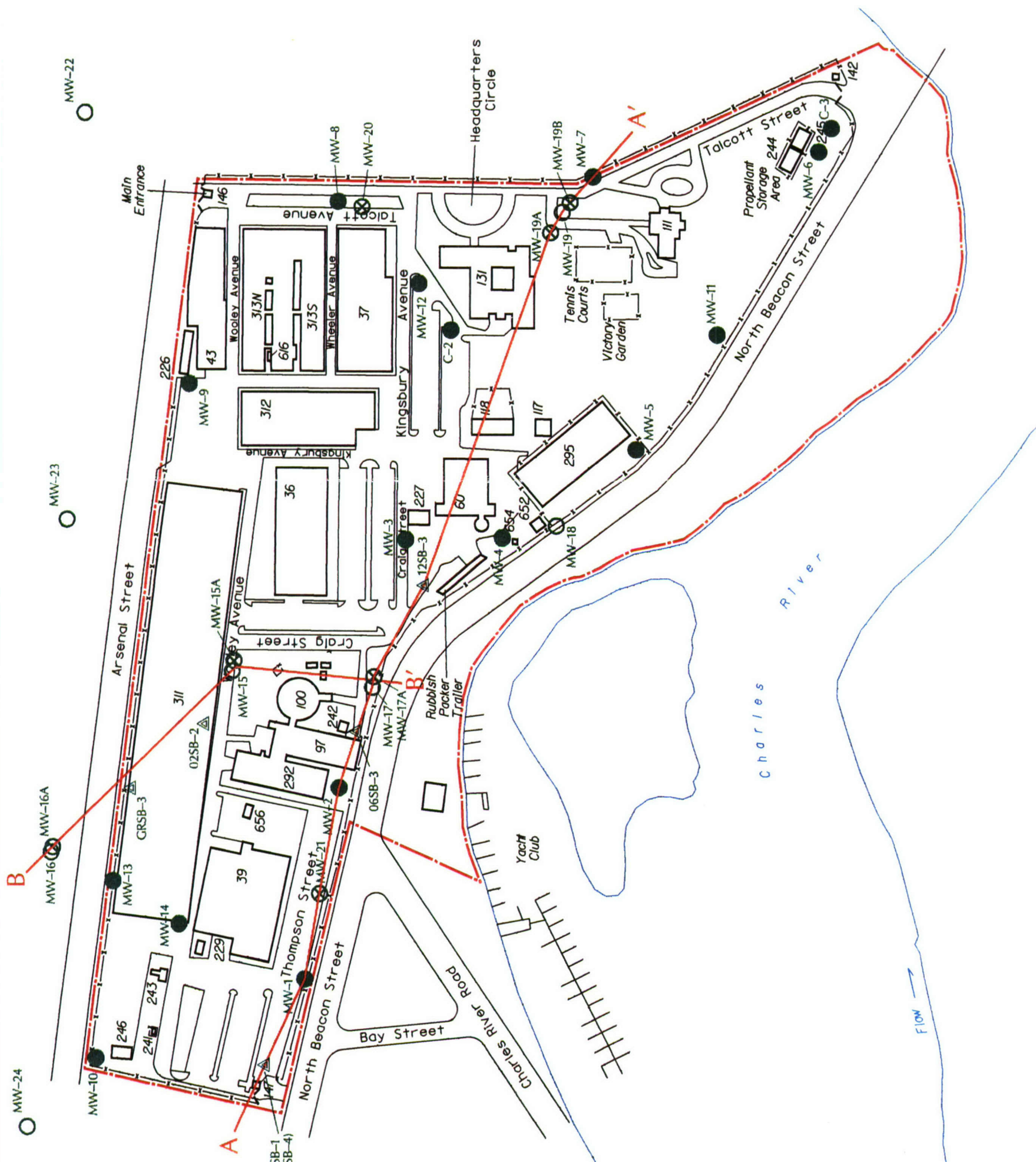
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Figure 3-6
Geologic Cross
Section Locations

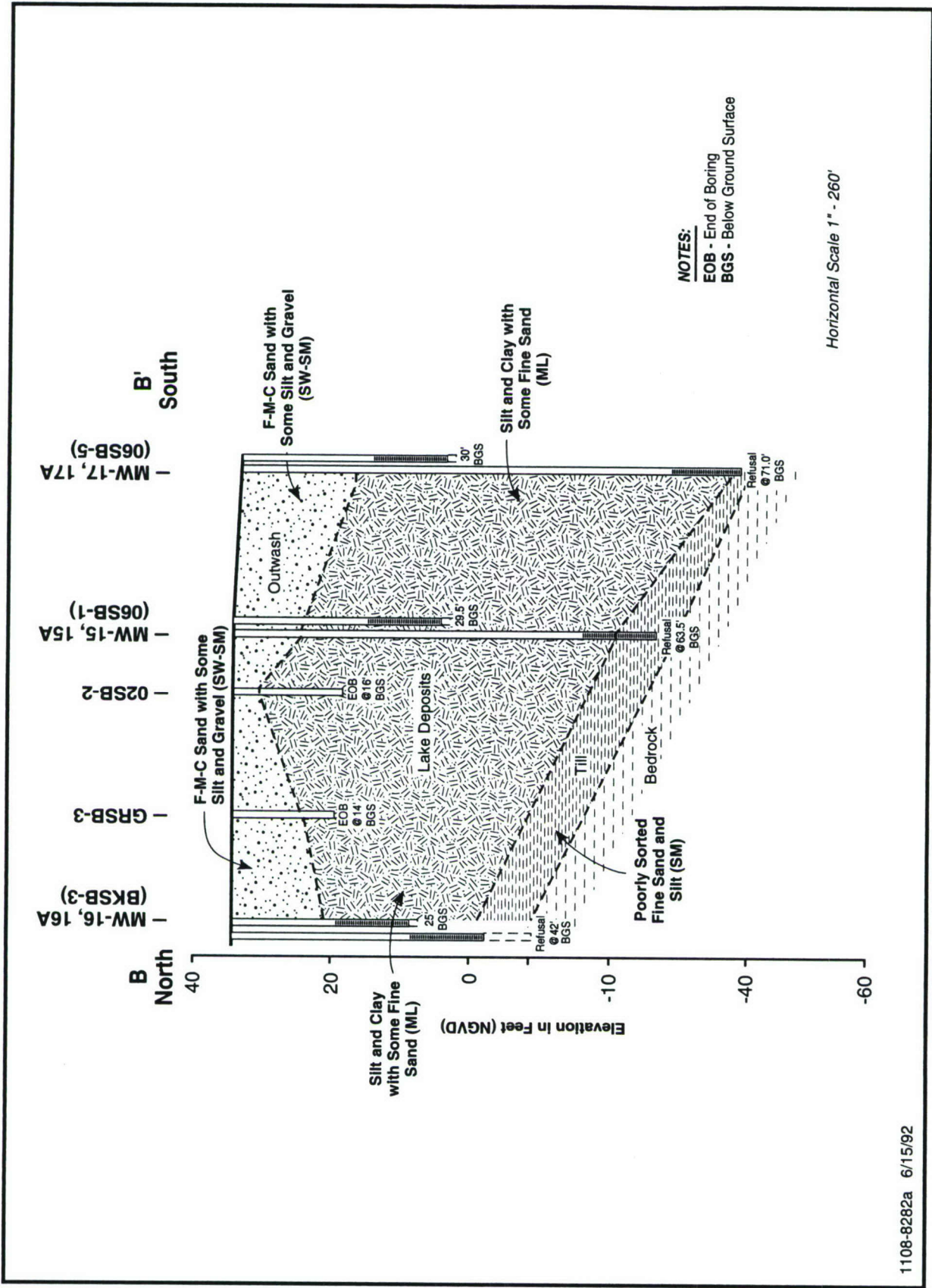


Scale
meters
feet

07-OCT-1992

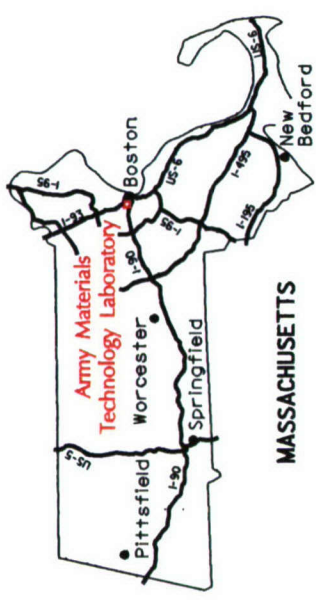


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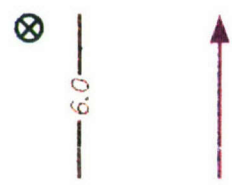
FIGURE 3-8 GEOLOGICAL CROSS SECTION B-B'



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Phase 2 Deep Monitor Well
 Groundwater elevation in feet, based on 09-Dec-1991 water level measurements. All elevations referenced to National Geodetic Vertical Datum of 1929.

Flow Path

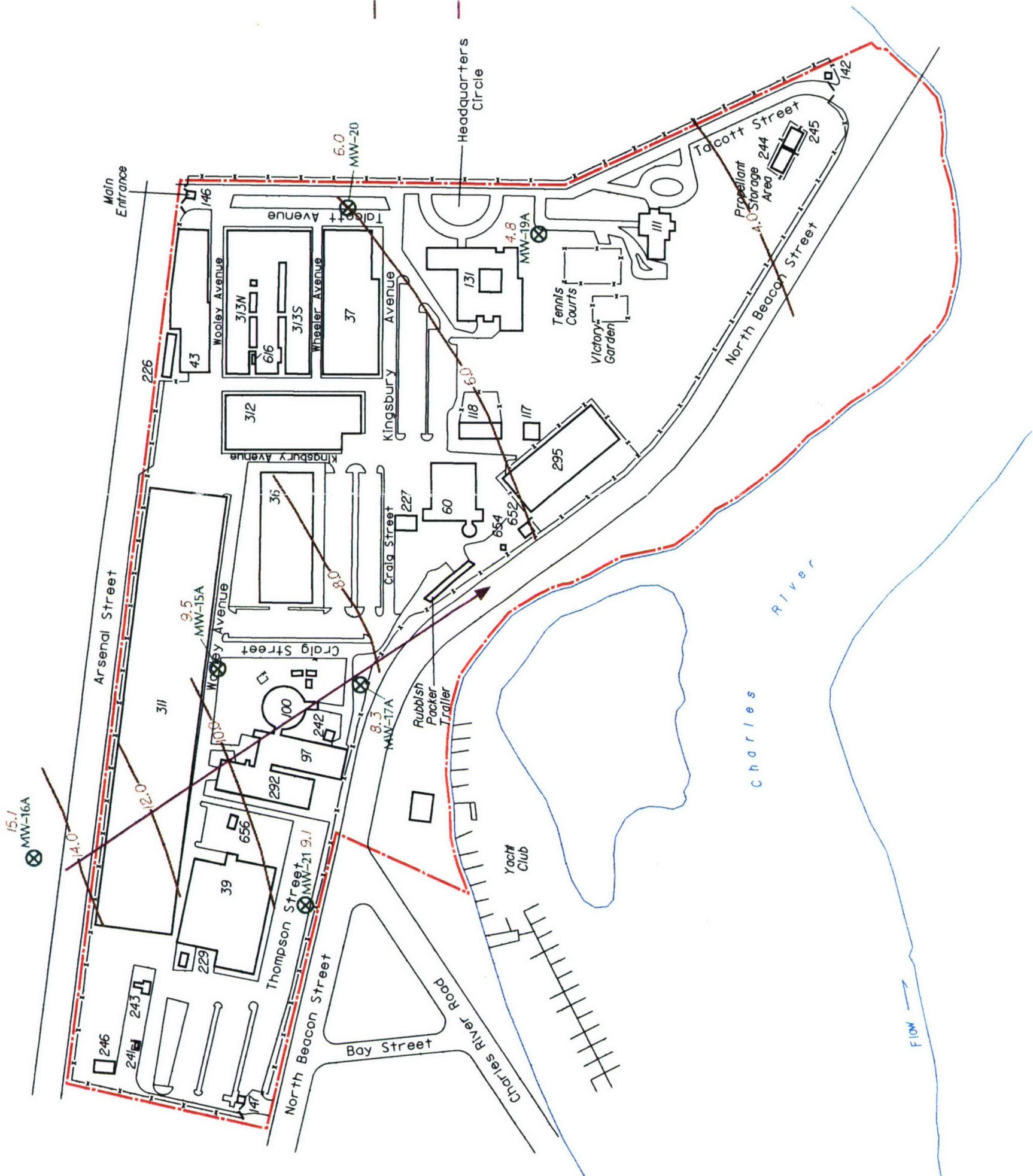


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Figure 3-9
 Groundwater Contours
 Deep Wells

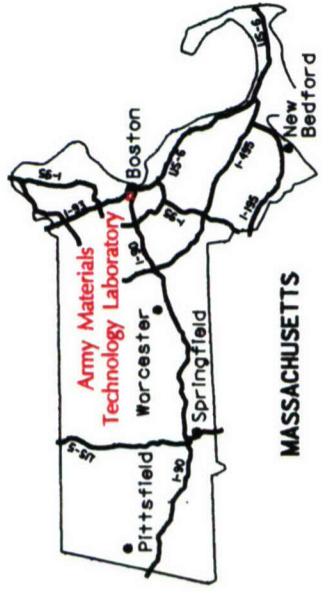


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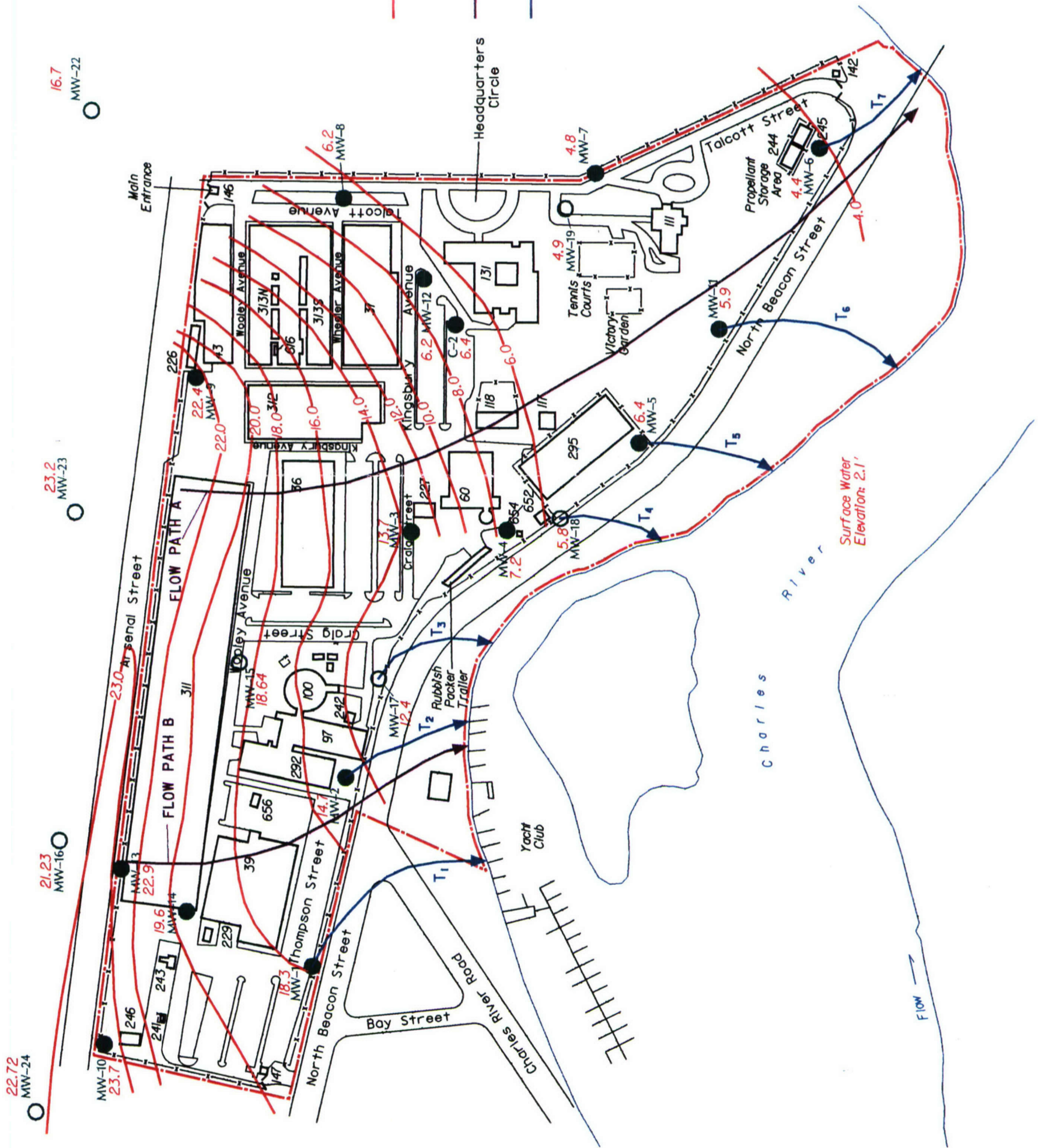
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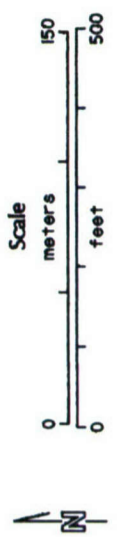
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● Phase 1 Monitor Well
 ○ Phase 2 Water Table Monitor Well
 Groundwater elevation in feet, based on 09-Dec-1991 water level measurements. All elevations referenced to National Geodetic Vertical Datum of 1929.
 Flow Path A and Flow Path B used to calculate the hydraulic gradient across the site.
 Flow Paths T₁ through T₇ used to calculate estimates of travel times between down gradient property line wells and the Charles River.



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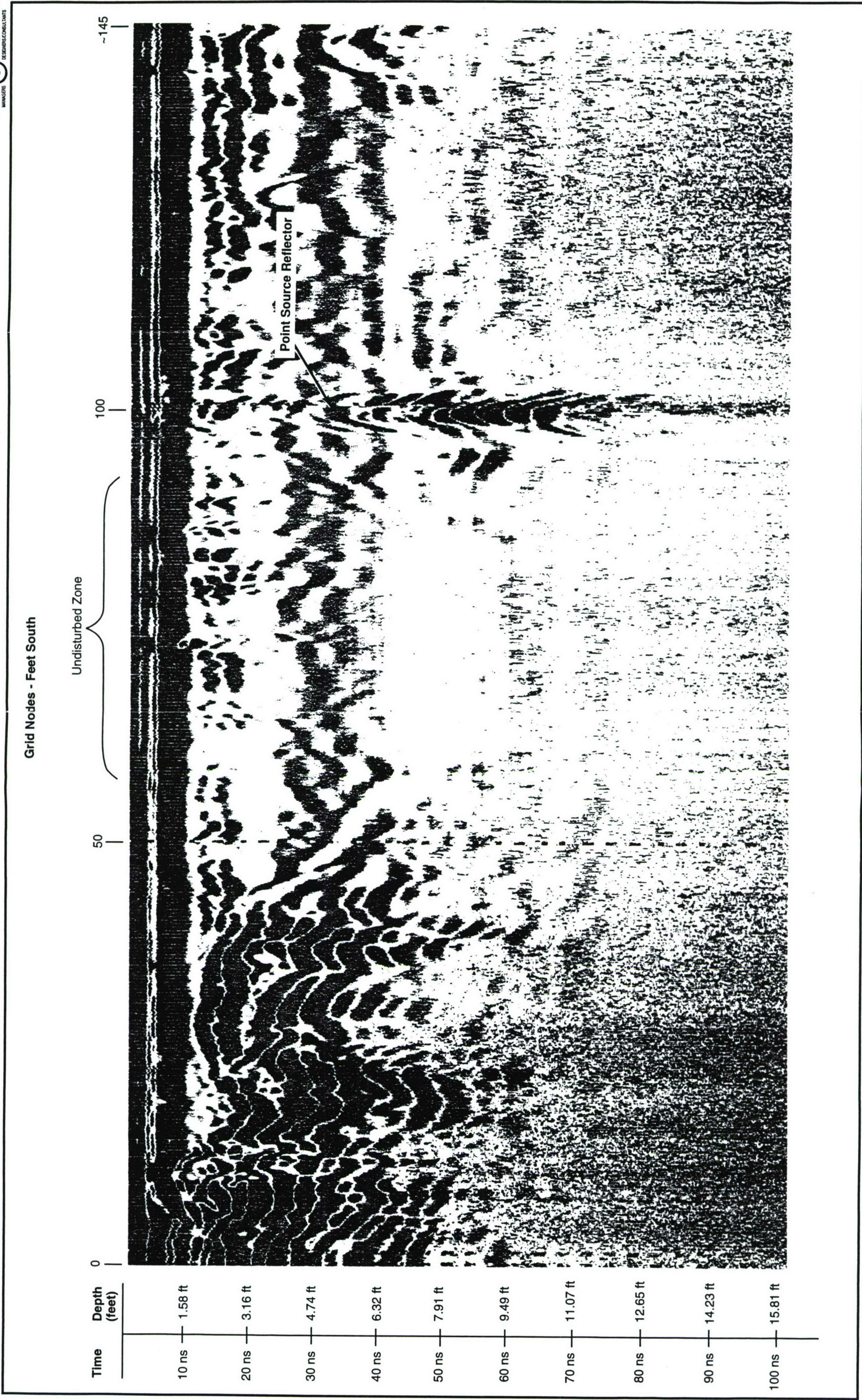
Figure 3-10
 Groundwater Contours
 Water Table Wells



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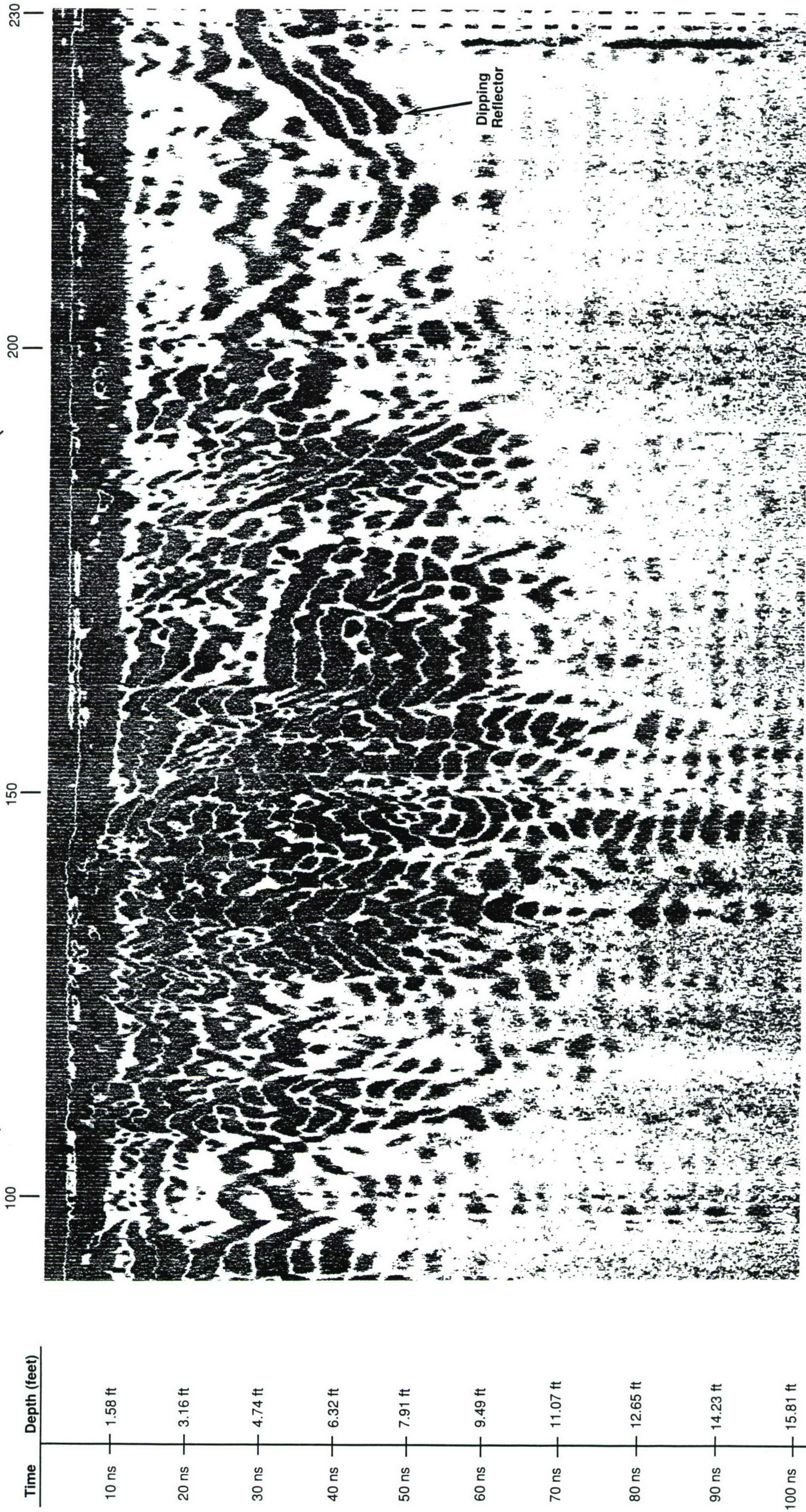


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Grid Nodes - Feet South

Area with Multiple Point Source Reflectors



Building 37

Kingsbury Avenue

Northern Island

4S
8S
12S
16S
20S
25S
30S
35S
40S

7 6 5 4 3

40N

30N

Southern Island

20N

10N

0N

30E

40E

50E

60E

70E

12" Sewer

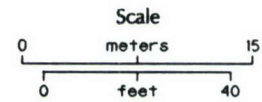
Building 131

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Figure 4-3
Geophysical Interpretation
Parking Lot Between
Buildings 37 and 131

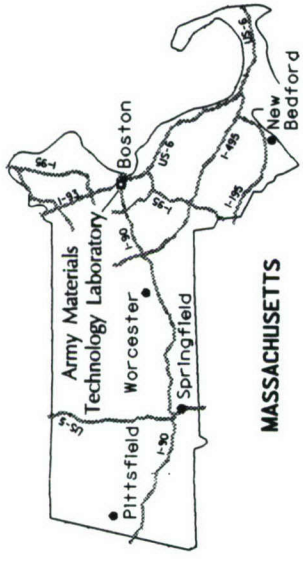
- * Discrete Buried Object
- High Conductivity Readings
- Disturbed or Fill Area
- ▬ GPR Traverse
- ▬ Buried Utilities

F-21



26-MAY-1992





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- * Discrete Buried Object
- High Conductivity Readings
- Disturbed or Fill Area
- ▤ GPR Traverse
- Buried Utilities

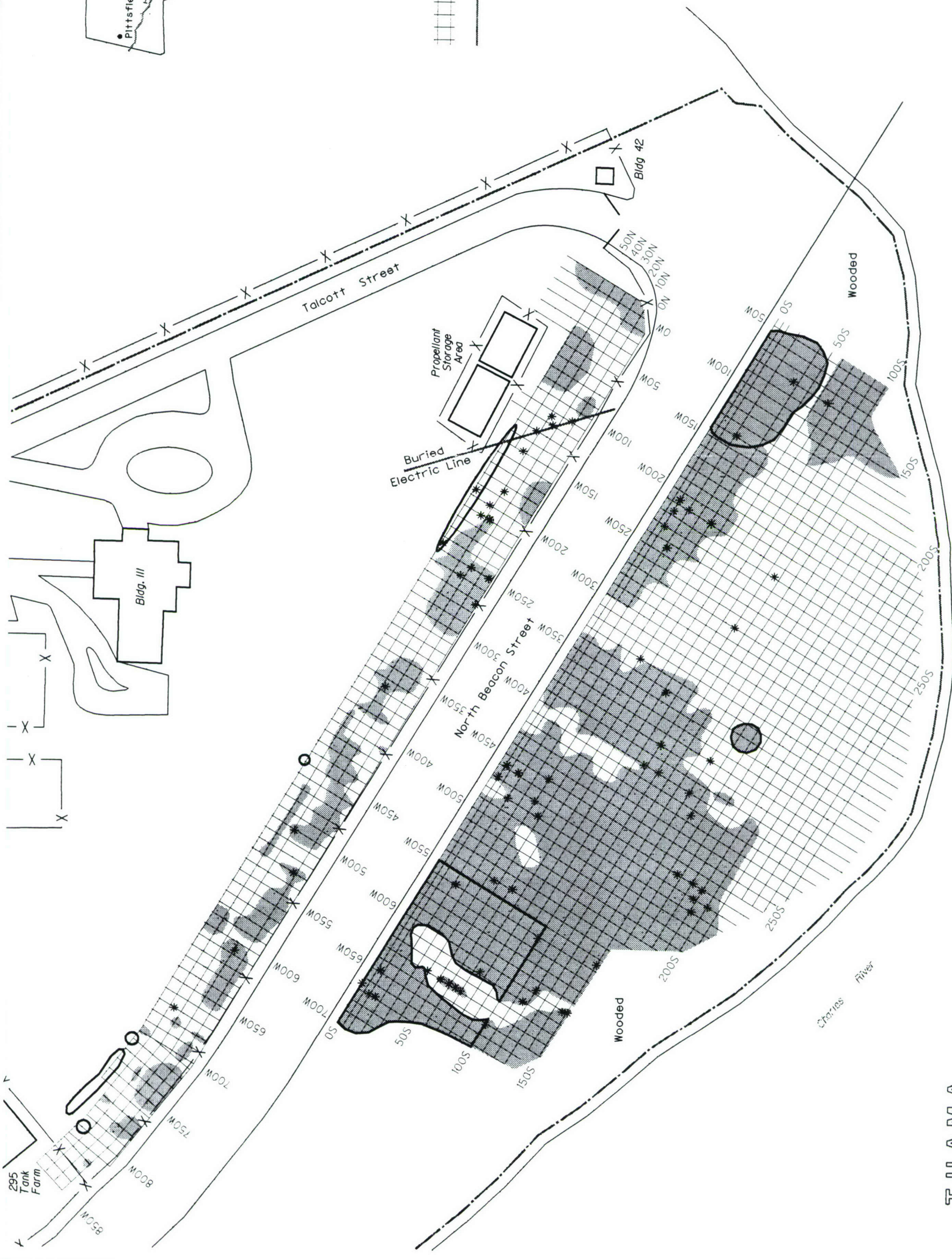
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Figure 4-4
Geophysical Interpretation
Along North Beacon Street

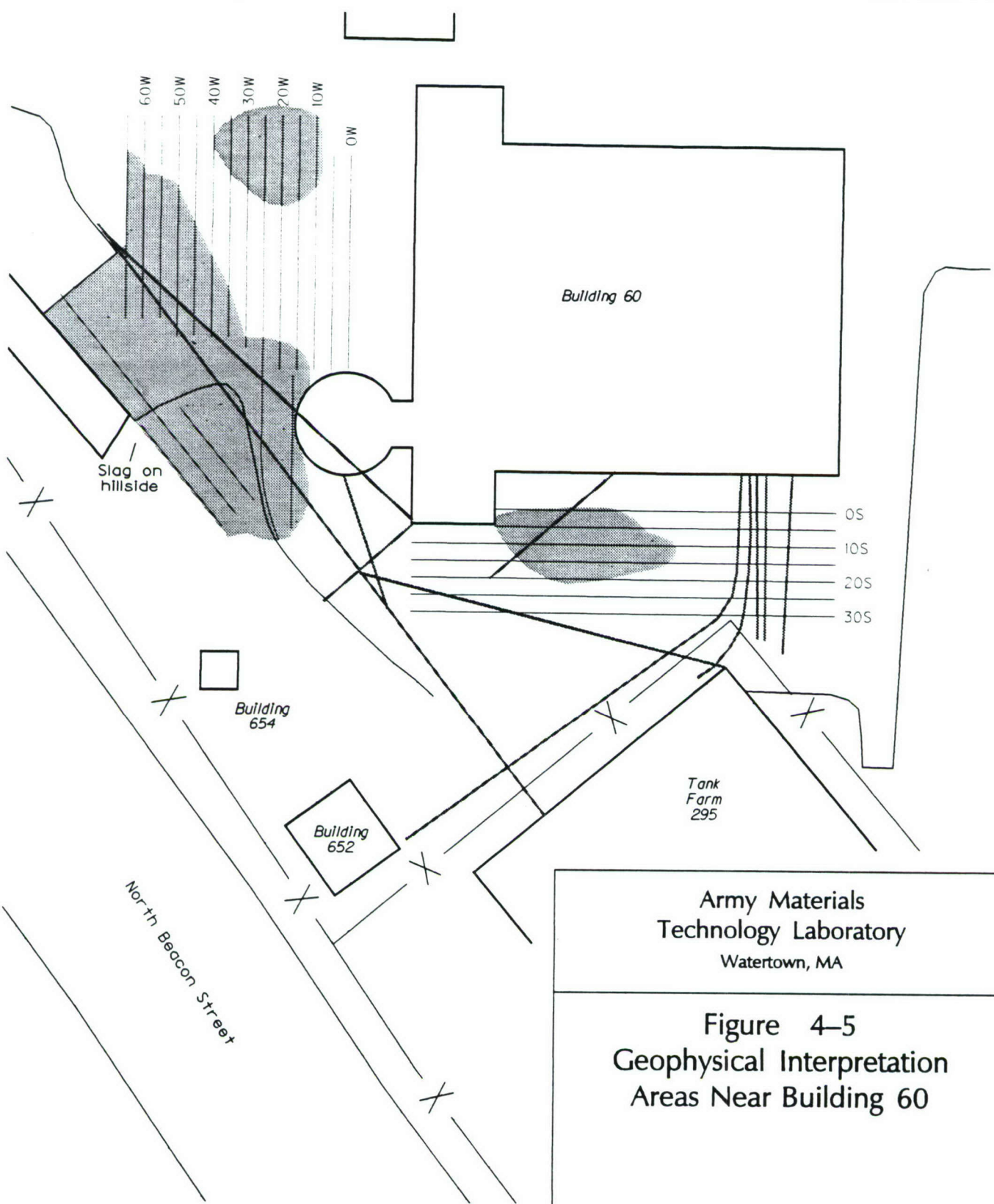


Scale
meters 0 30
feet 0 80

07-OCT-1992



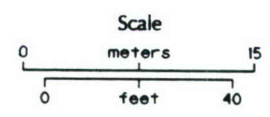
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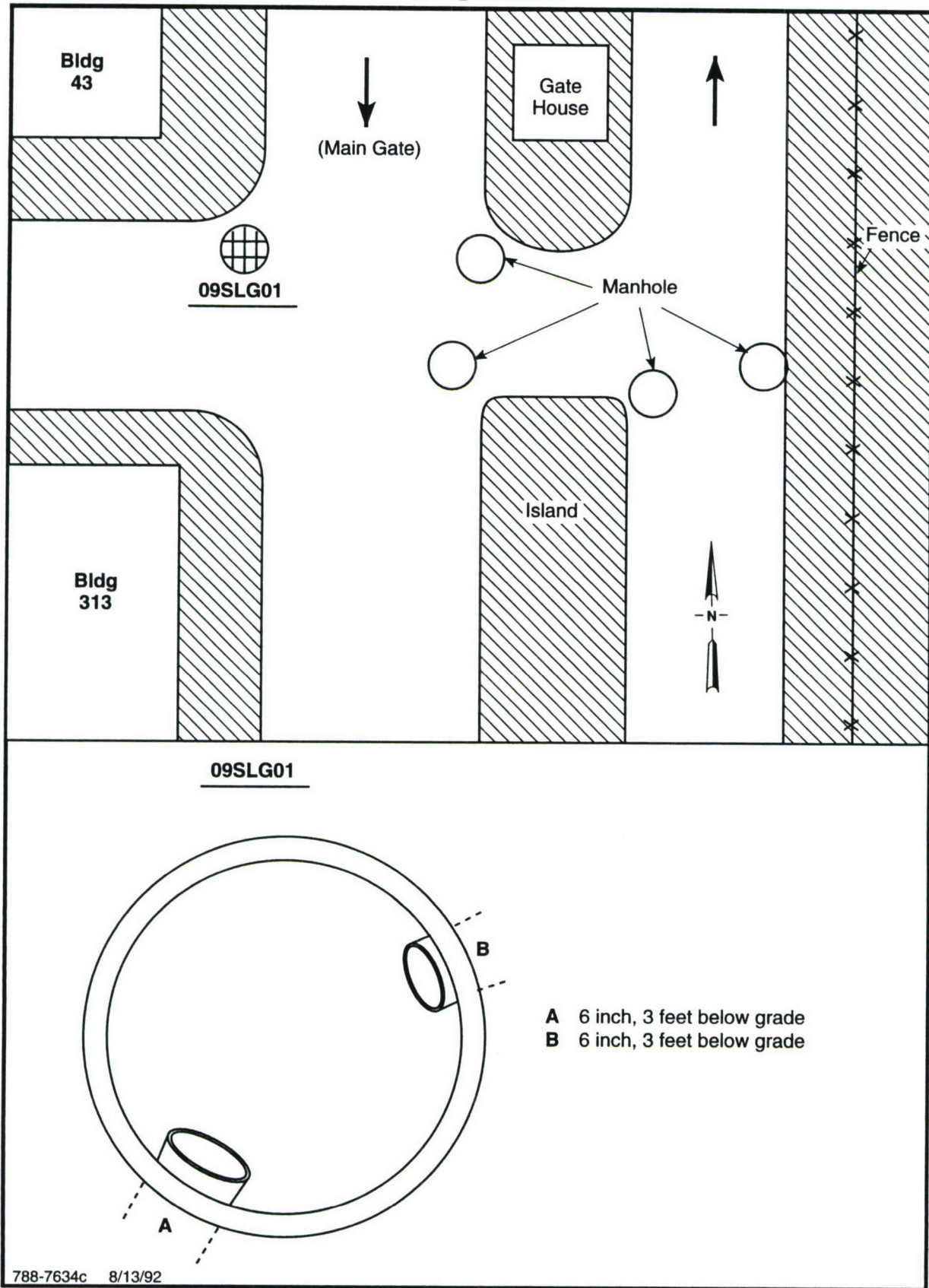


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Figure 4-5
Geophysical Interpretation
Areas Near Building 60

-  Disturbed or Fill Area
-  GPR Traverse
-  Buried Utilities





788-7634c 8/13/92

FIGURE 4-6A GEOPHYSICAL CONFIRMATION OF PIPE CONFIGURATIONS AT VARIOUS SEWER JUNCTIONS: 09SLG01

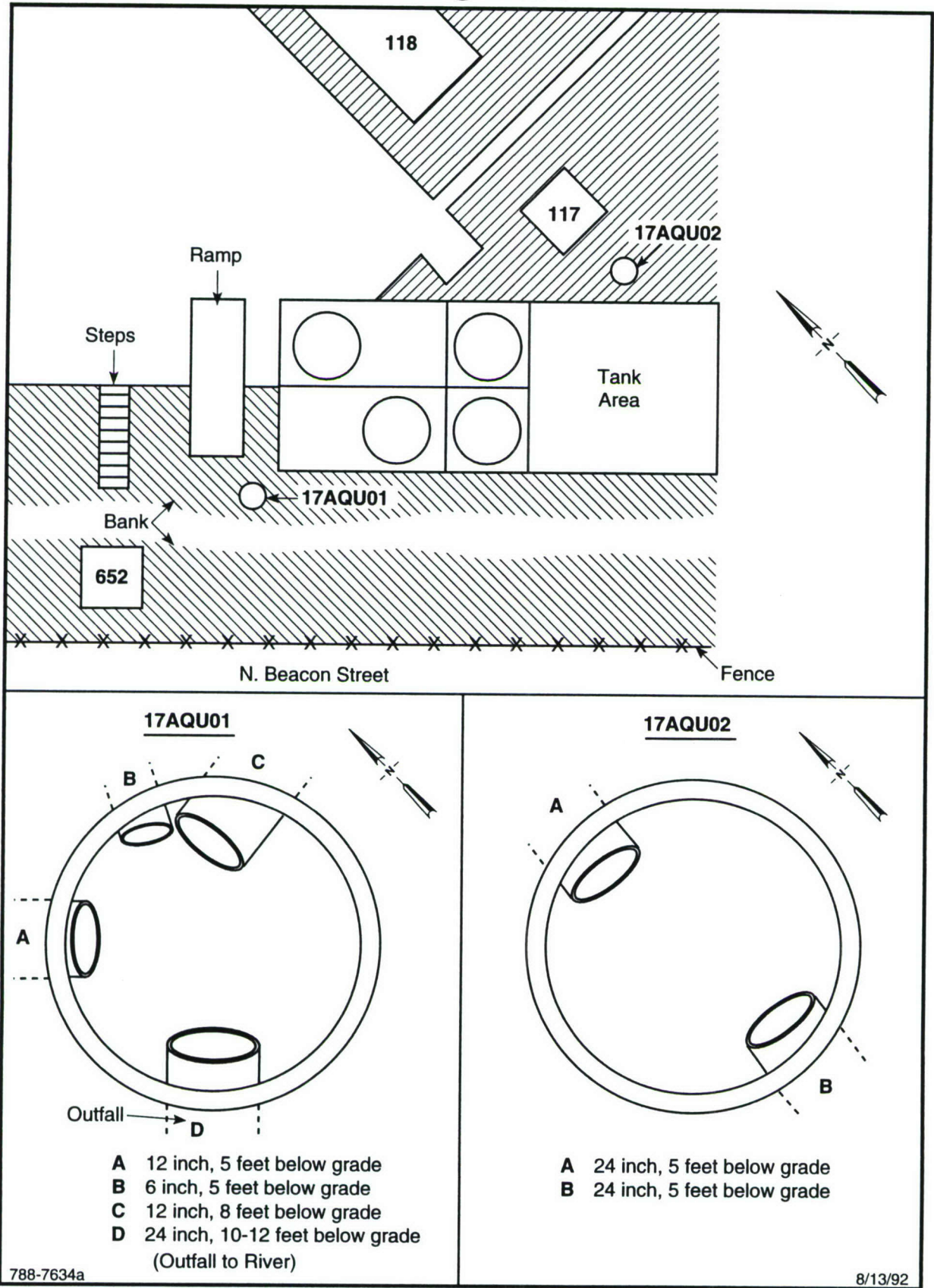
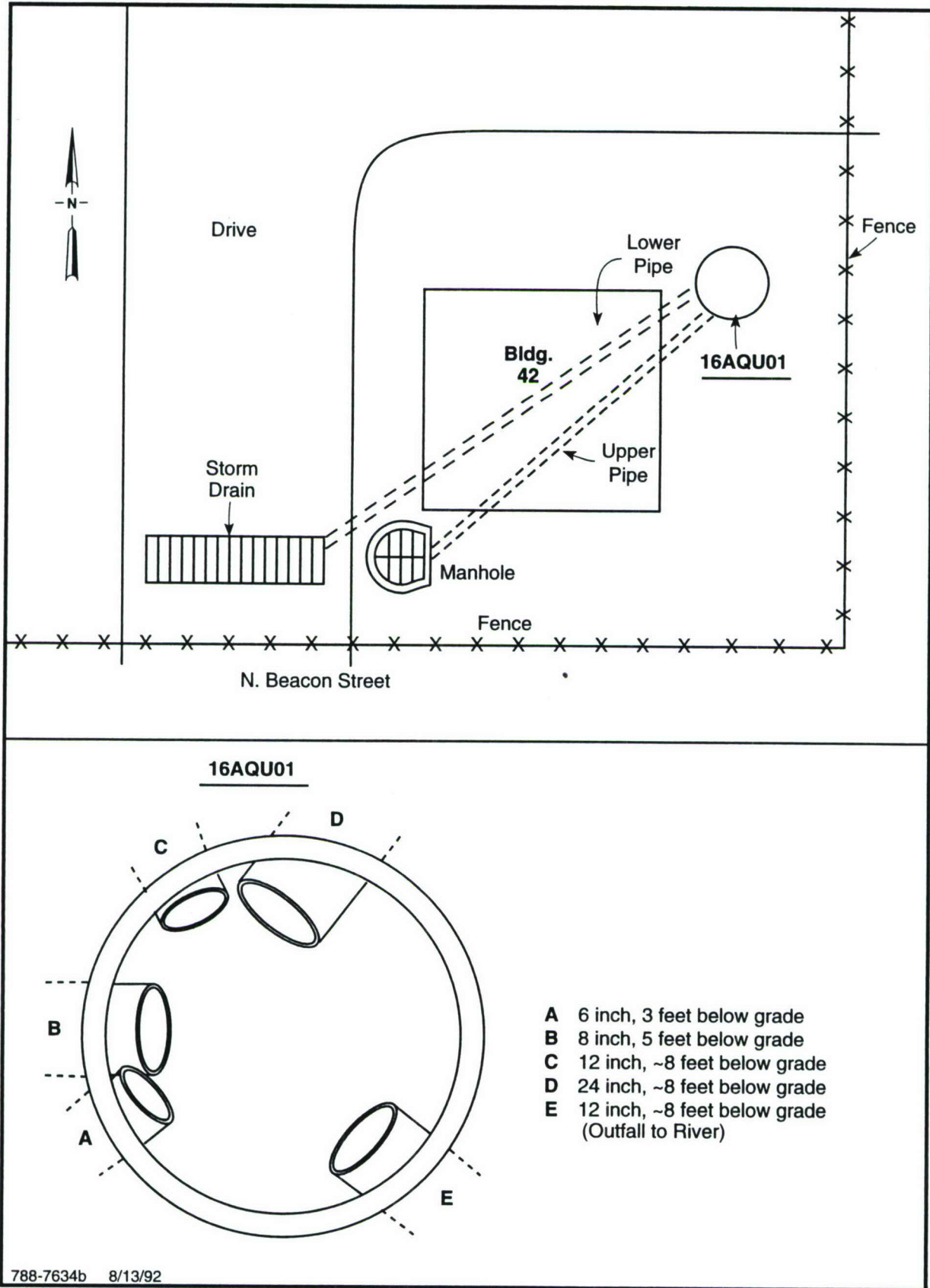


FIGURE 4-6B GEOPHYSICAL CONFIRMATION OF PIPE CONFIGURATIONS AT VARIOUS SEWER JUNCTIONS: 17AQU01 AND 17AQU02



788-7634b 8/13/92

FIGURE 4-6C GEOPHYSICAL CONFIRMATION OF PIPE CONFIGURATIONS AT VARIOUS SEWER JUNCTIONS: 16AQU01

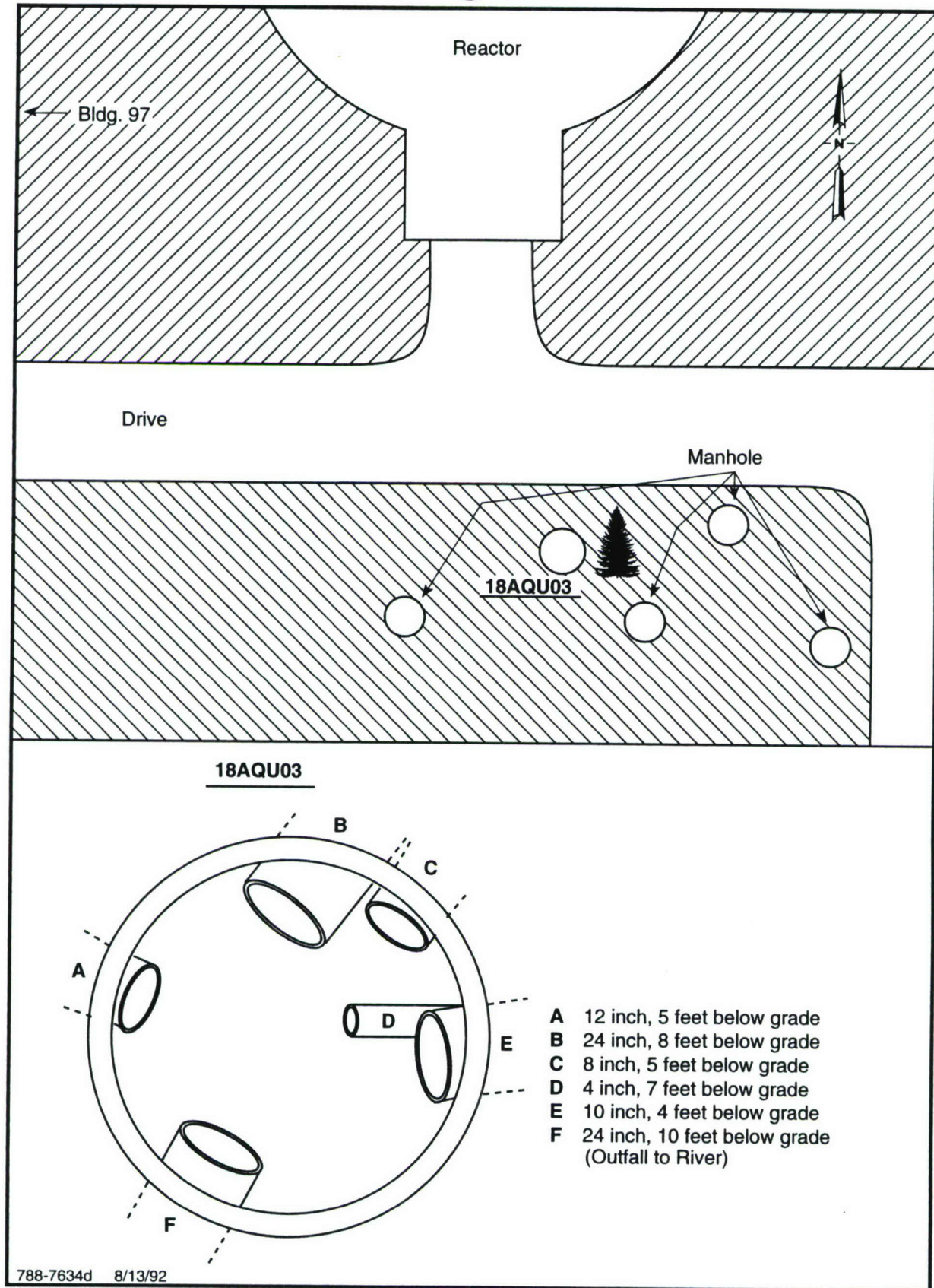
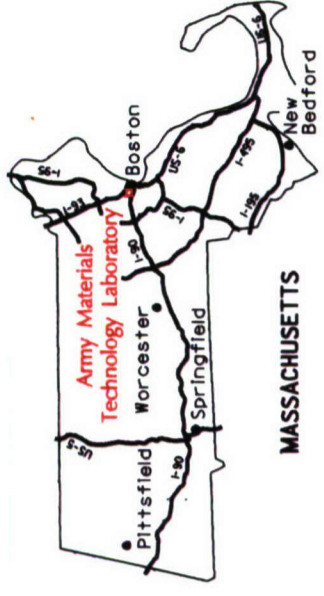


FIGURE 4-6D GEOPHYSICAL CONFIRMATION OF PIPE CONFIGURATIONS AT VARIOUS SEWER JUNCTIONS: 18AQU03

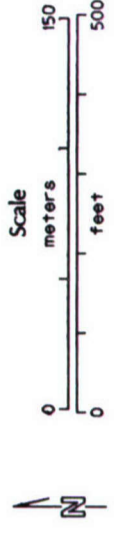


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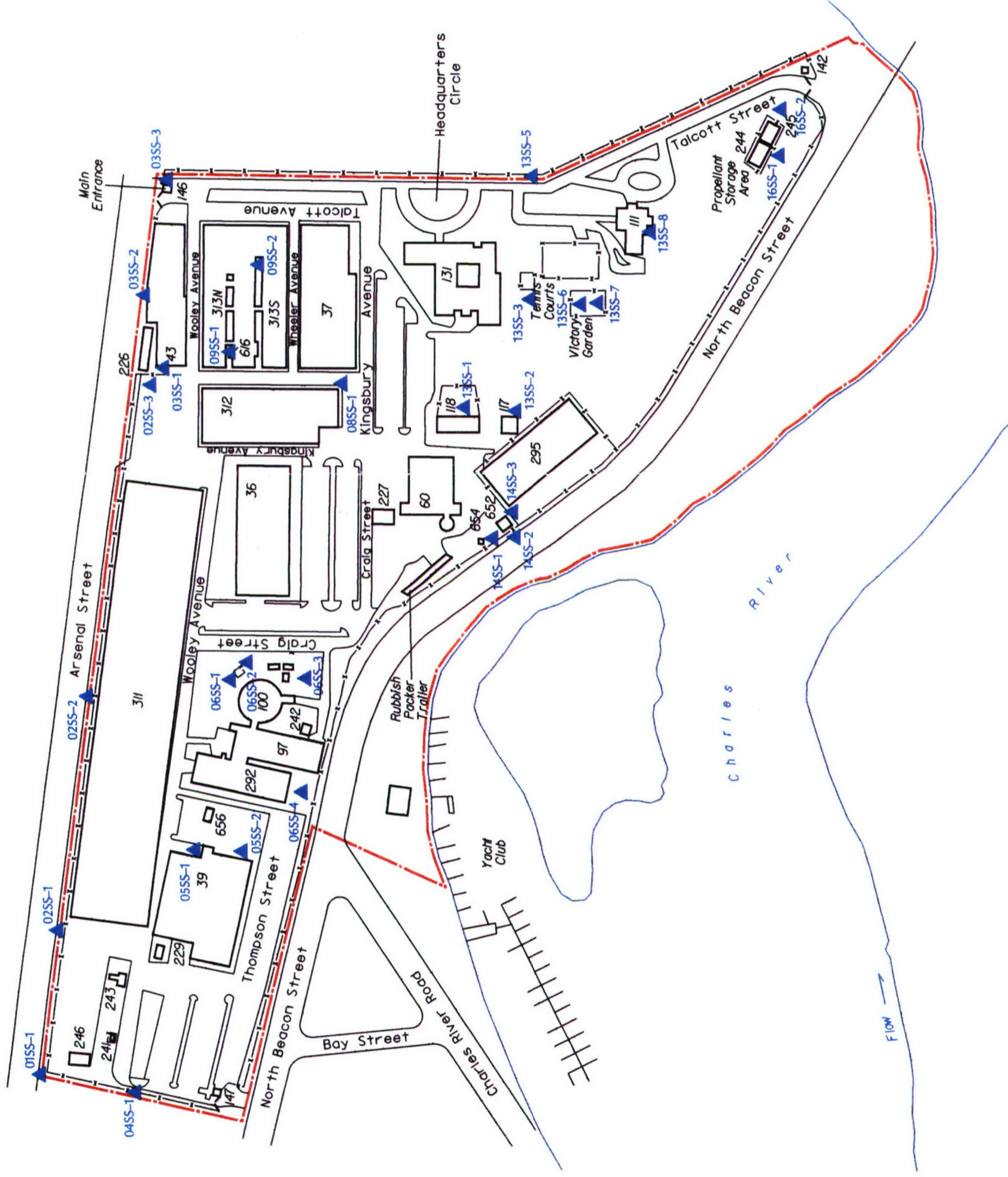
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Figure 4-7
Phase 2 Surface
Soil Sampling Locations

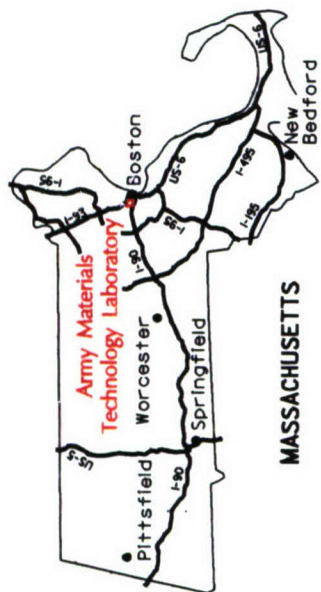
▲ Surface Soil Sampling Location



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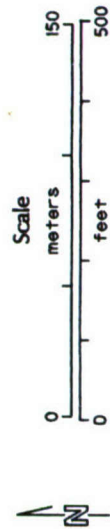


MASSACHUSETTS

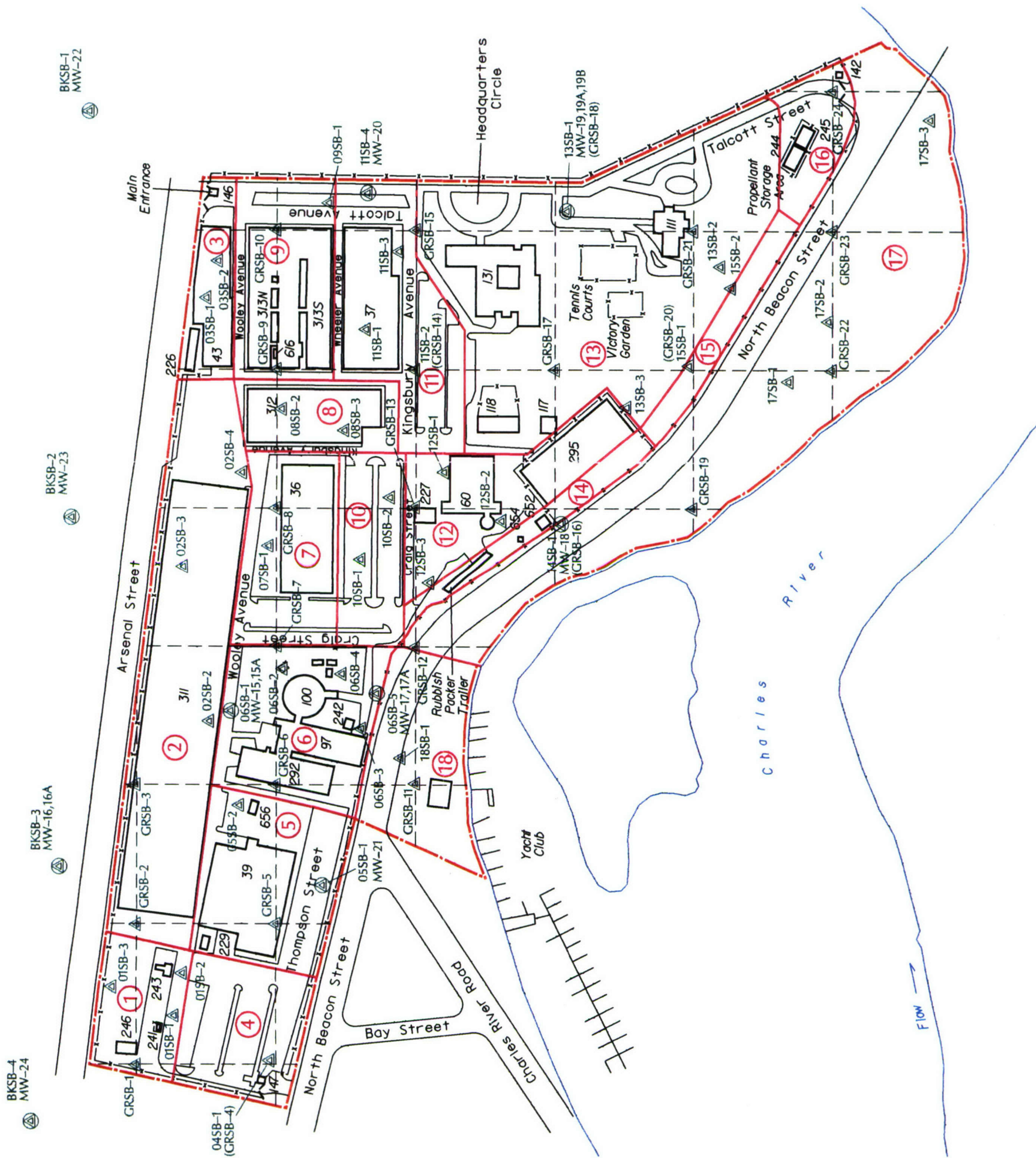
- Soil Boring Location
- Soil Boring/Monitor Well Location
- Sampling Unit Numbers (Source: E.G.&G., 1988)
- Sampling Unit Boundary (Source: E.G.&G., 1988)
- Soil Sampling Grid

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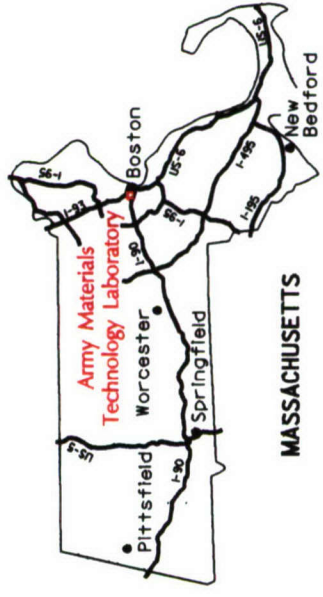
Figure 4-8
Phase 2 Soil
Boring Locations



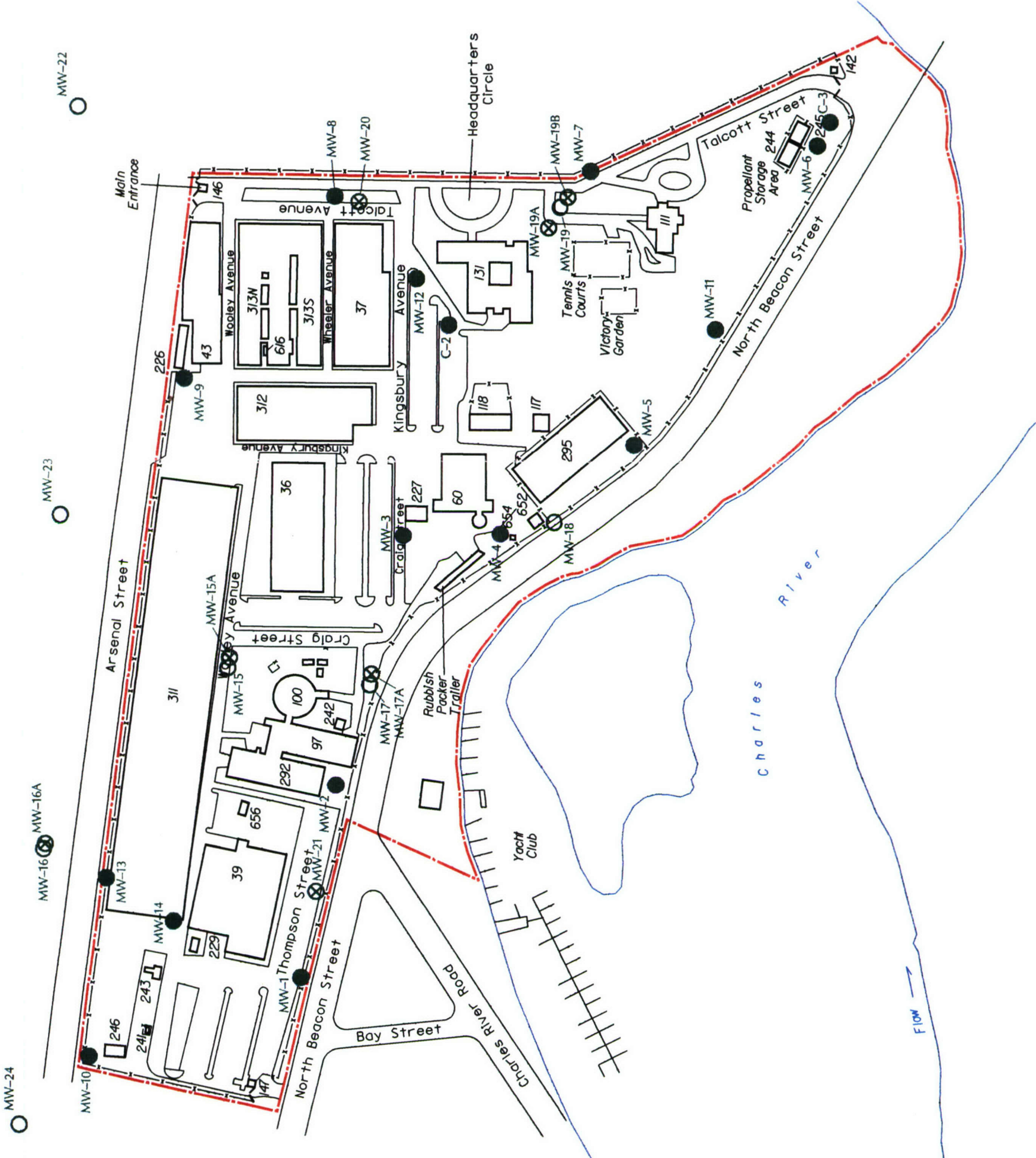
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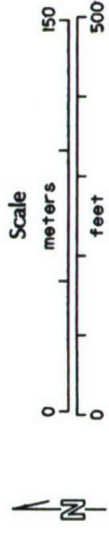
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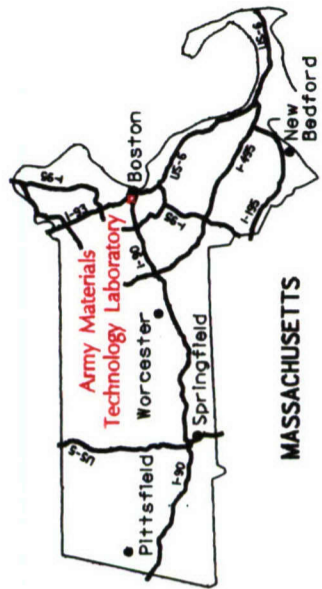
Figure 4-9
Phase 2 Monitor
Well Sampling Locations

- Pre-Existing Monitor Well
- Phase 2 Monitor Well
- ⊗ Phase 2 Deep Monitor Well



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- SW/SD-14 Sediment and Surface Water Sampling Location (with Identification)
- SW/SD-8 Shallow and Deep Sediment Sampling Location (and Surface Water Sampling Location if Identified as such)
- SD-14P Sediment/Liquid Sample to be Taken from Storm Sewer Outfall Pipe (with Identification)
- SW-10P Liquid Storm Sewer Sample
- Storm Drain Main
- Drain Manhole
- Catch Basin
- DW Dry Well
- Direction of Flow
- Cistern
- Line Plugged

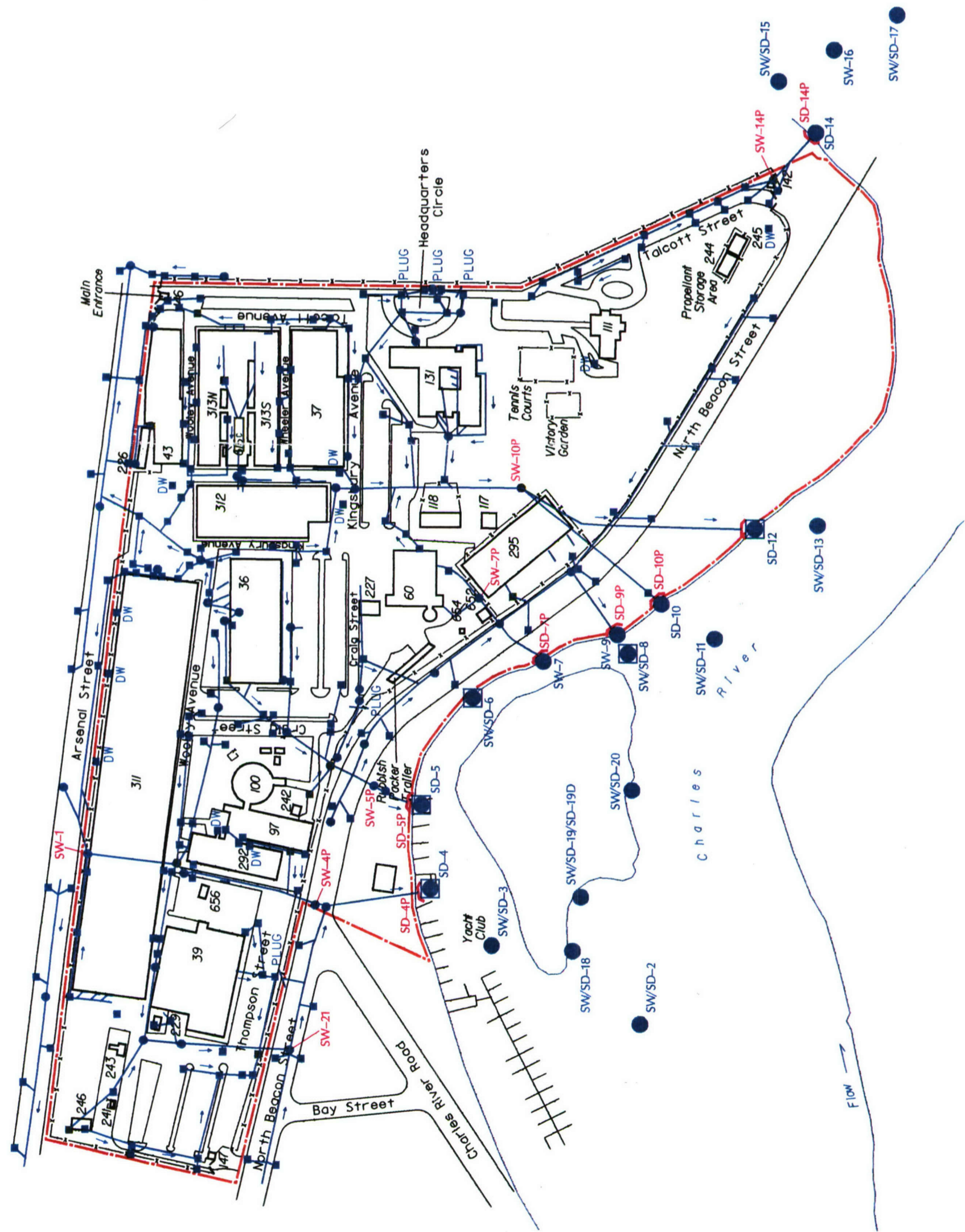
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Figure 4-10
Phase 2 River
And Storm Sewer
Sampling Locations

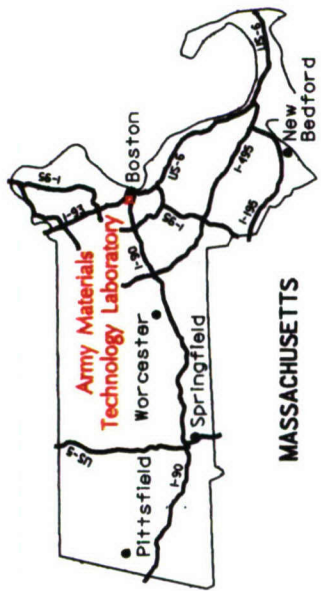
Scale
meters 0 150
feet 0 500

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WESTON



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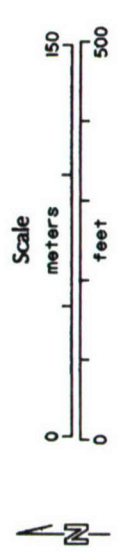


MASSACHUSETTS

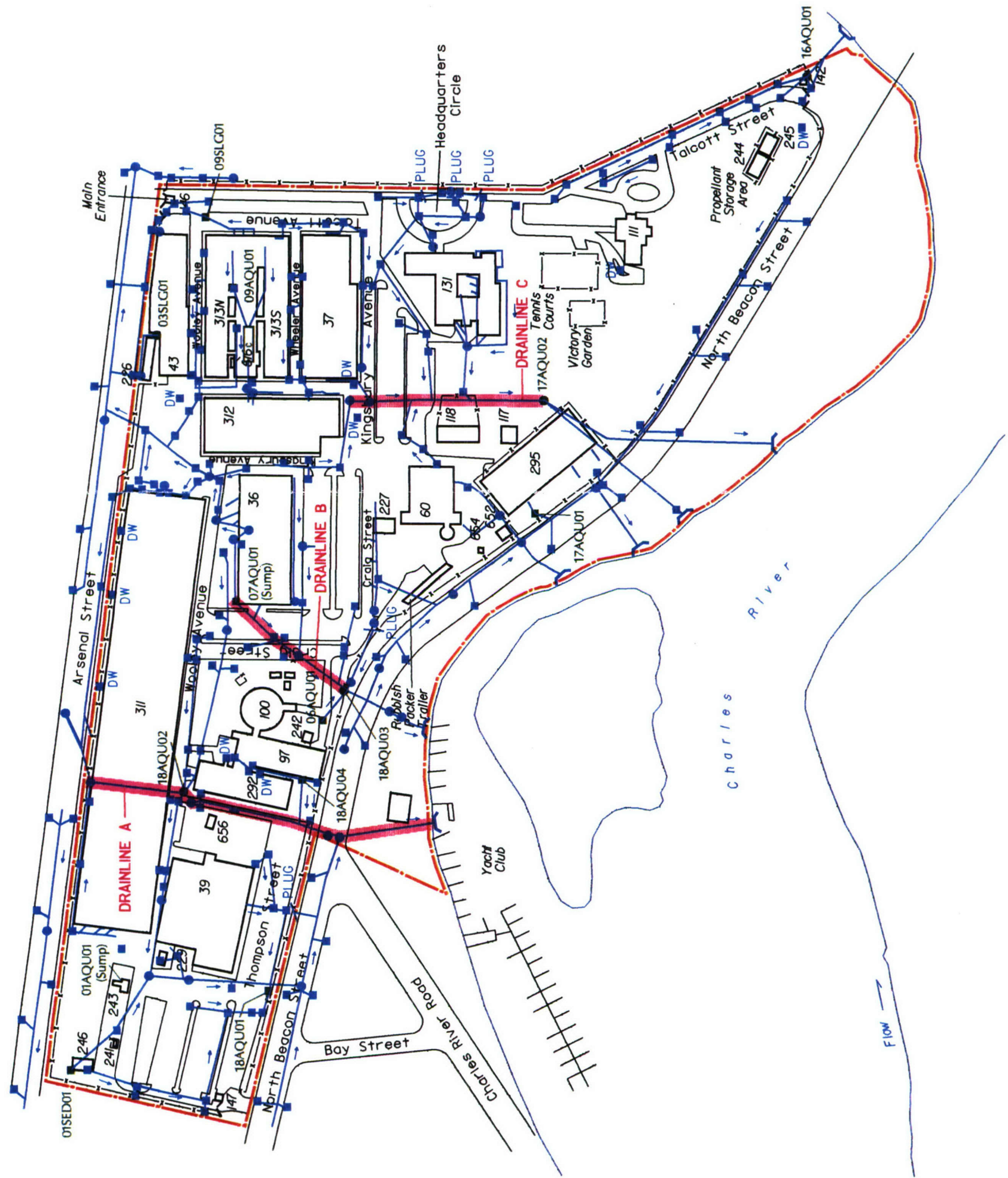
- Charles River Outfall
- Formerly Sampled Location
- Storm Drain Main
- Drain Manhole
- Catch Basin
- Dry Well
- Direction of Flow
- Cistern
- Line Plugged
- Storm Sewer Line to be Inspected by T.V.

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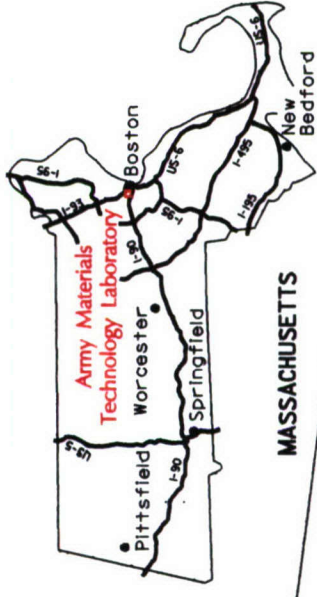
Figure 4-11
Areas of Storm
Sewer Inspection



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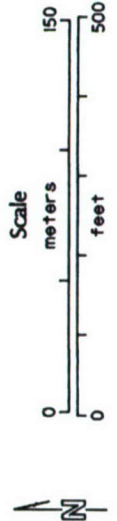


MASSACHUSETTS

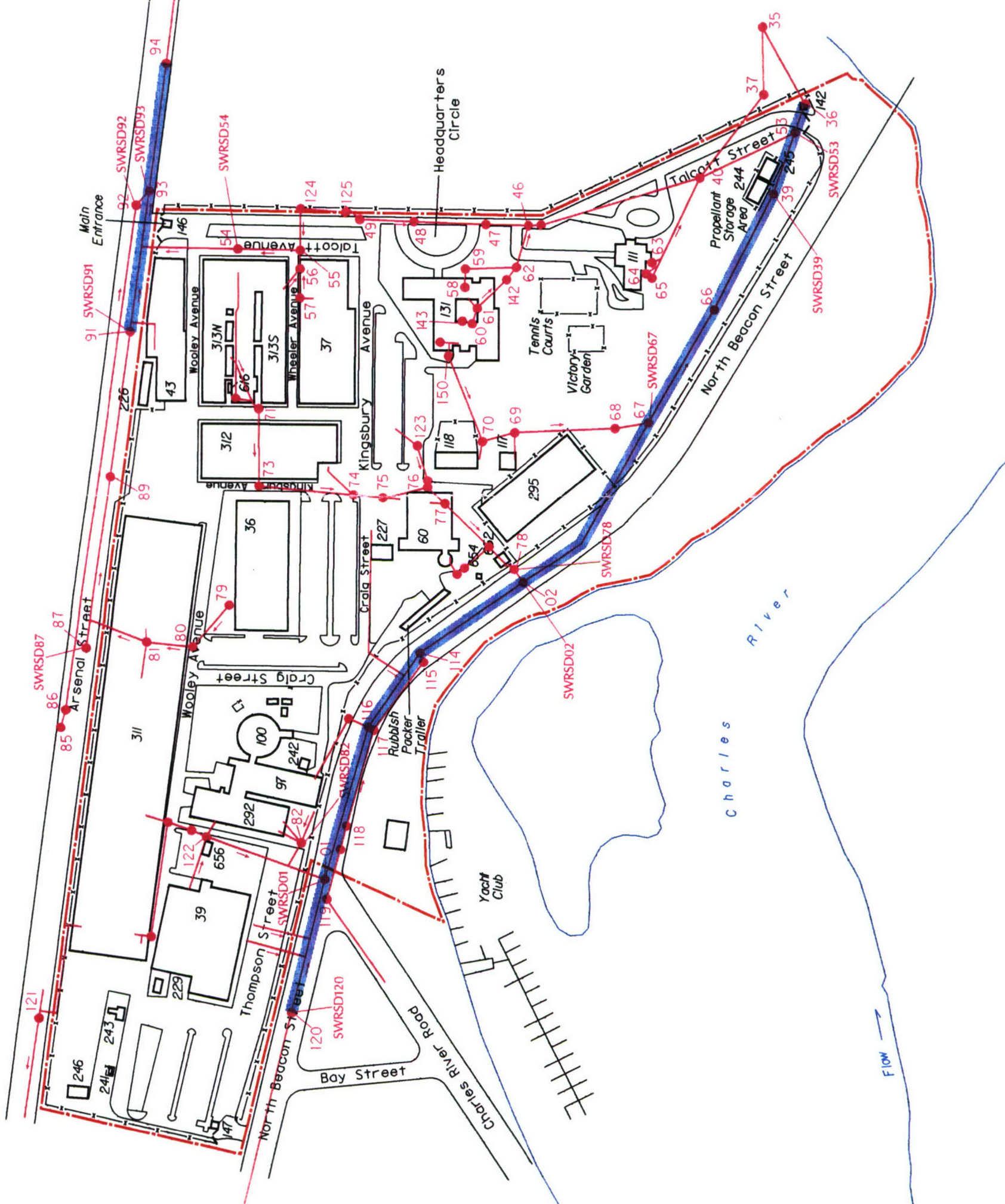
- Sanitary Sewer Line
- 93 ● Manhole (with ID Number)
- SWRSD93 Sediment/Liquid Sample Taken From Manhole
- Inspected Portion of Sanitary Sewer Line

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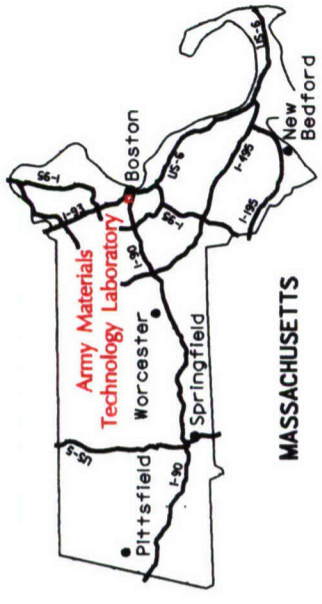
Figure 4-12
Phase 2 Sanitary and
Sewer Inspection and
Sampling Locations



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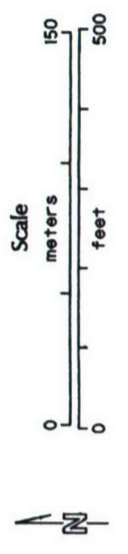


MASSACHUSETTS

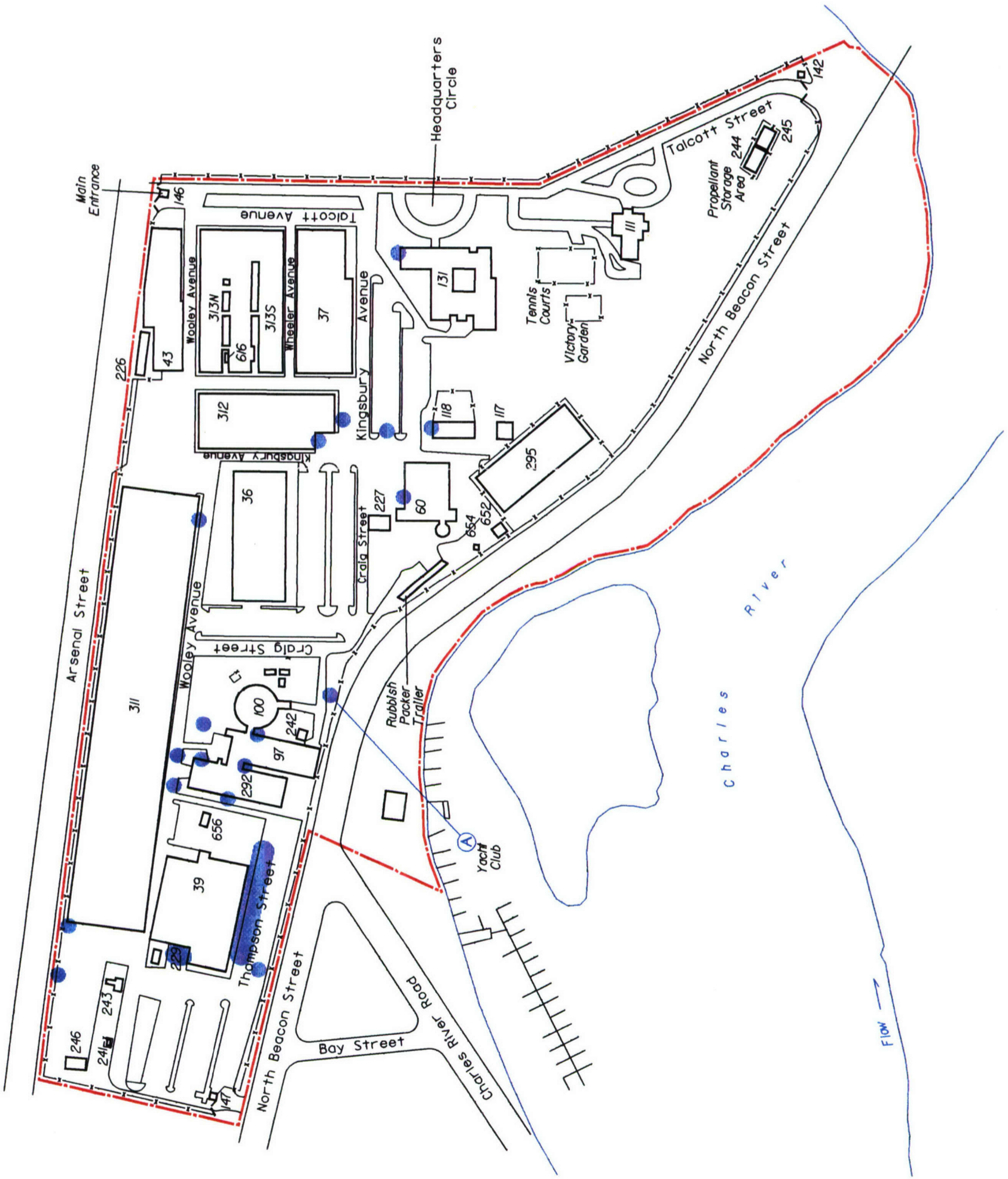
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Figure 4-13
Elevated Outdoor
Gamma Readings

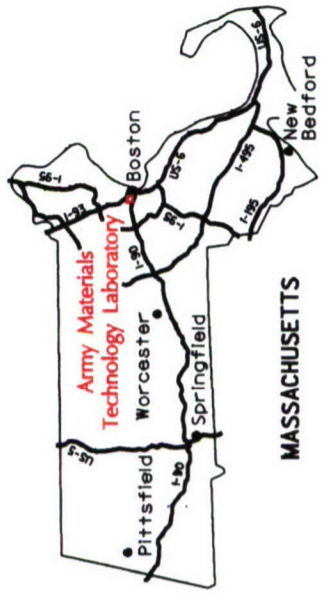
- Location of Fidler Readings of 9000 cpm or above
- Ⓐ Potential Contamination



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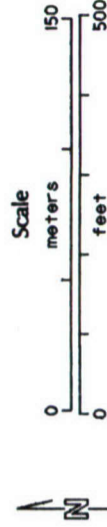
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- Container Sample
- Water
- Sediment
- Storm Drain Main
- Drain Manhole
- Catch Basin
- Dry Well
- Direction of Flow
- Cistern
- Line Plugged

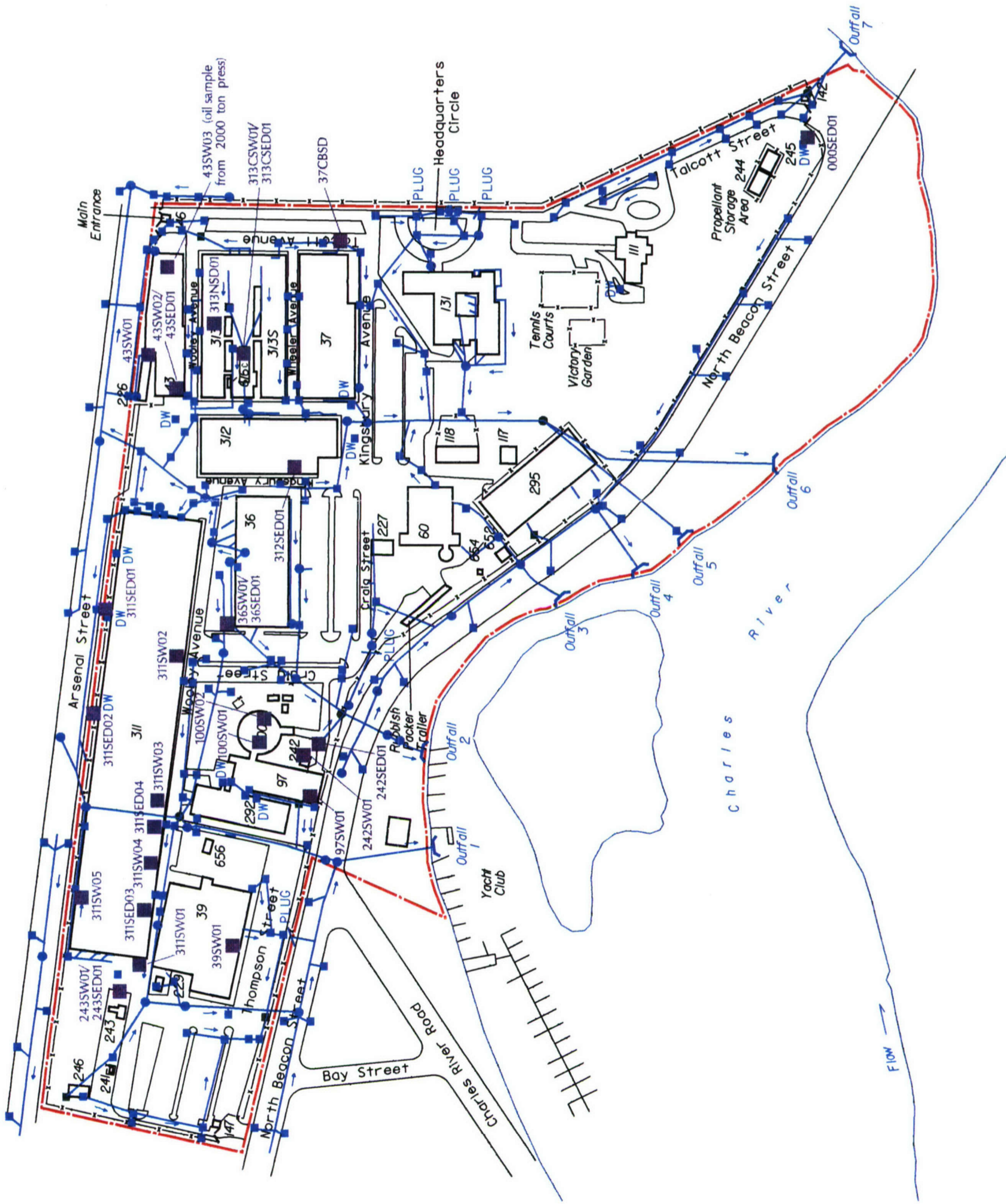


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Figure 4-15
Phase 2 Cistern,
Tank, Sump and
Dry Well Samples



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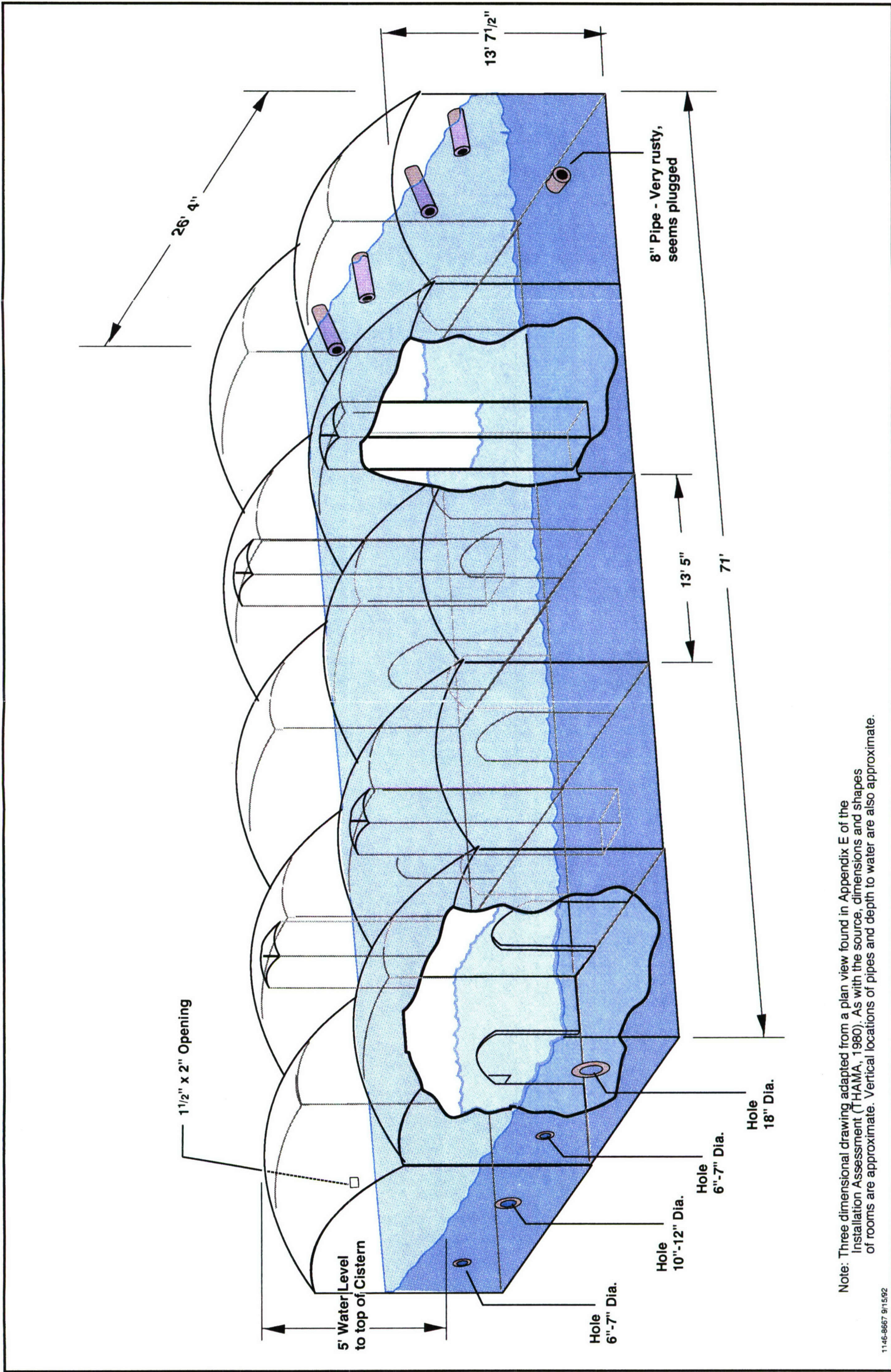


FIGURE 4-16
SCHEMATIC OF BUILDING 313C CISTERNS
 F-37

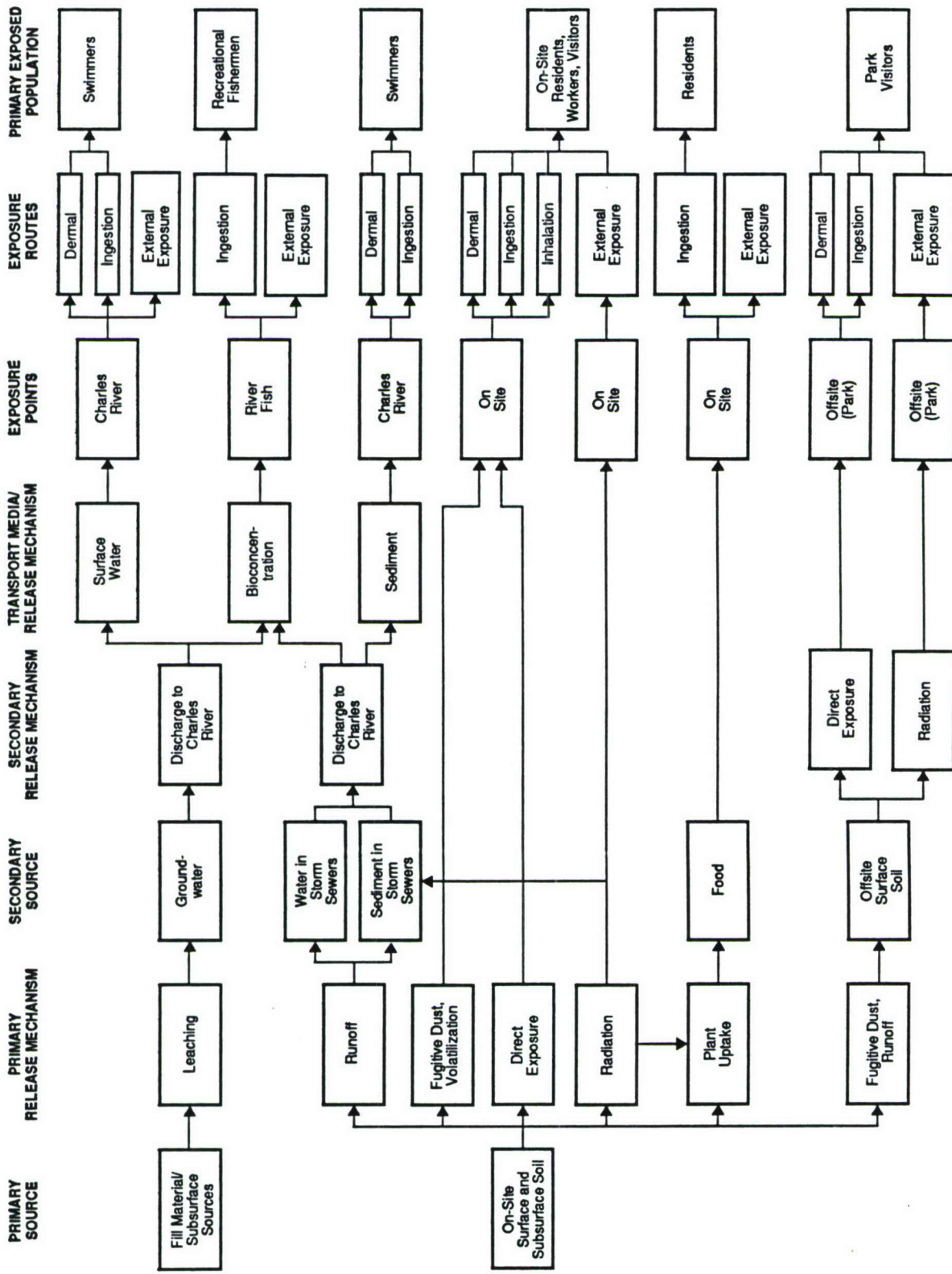


FIGURE 6-1 CONCEPTUAL SITE DIAGRAM FOR MTL BASELINE RISK ASSESSMENT

