



Investigation and Ecological Risk Assessment of Atlantic Shellfish Site

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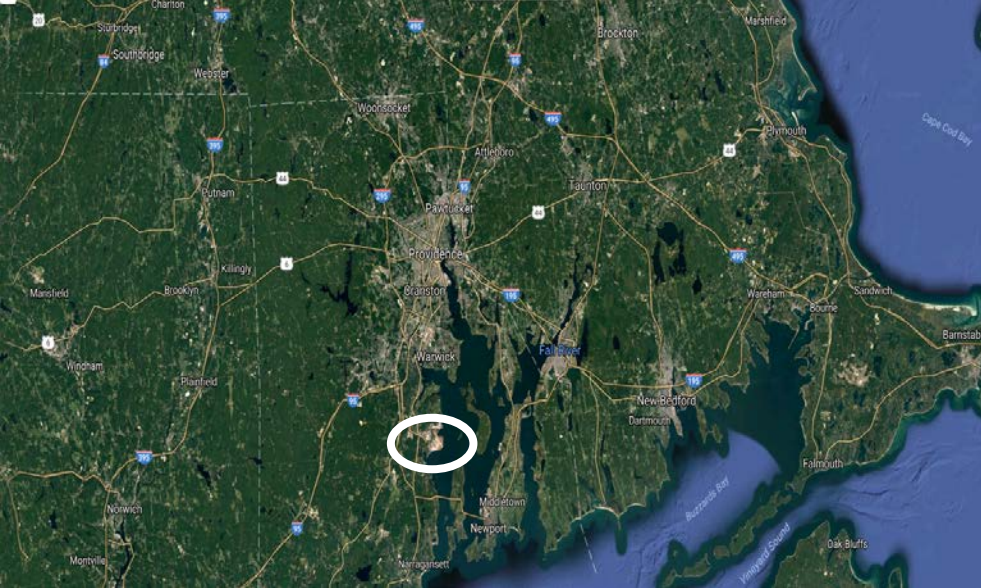
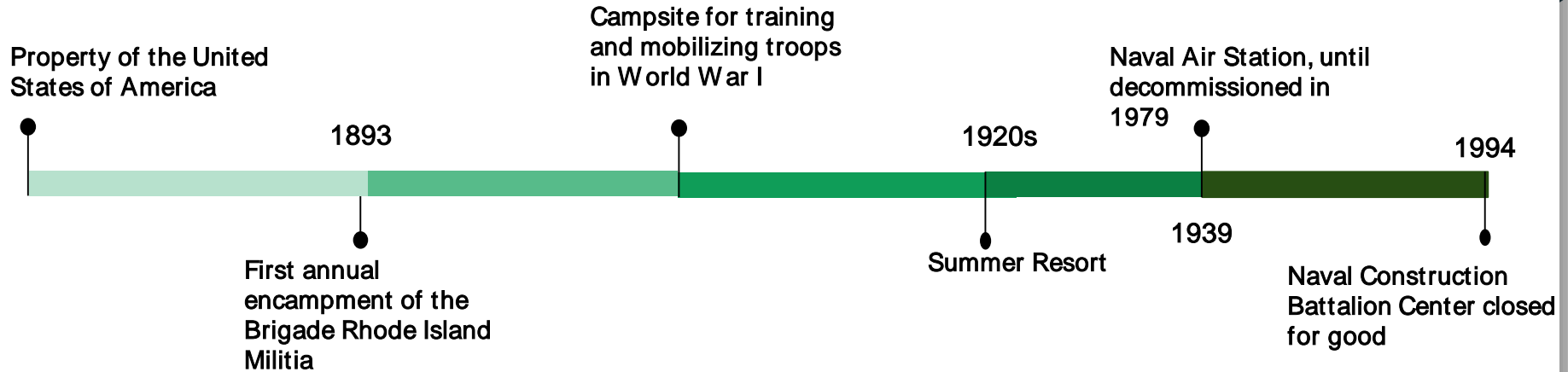


Figure 2 – Site Map
Atlantic Shellfish HTRW Site
Quonset Point NAS
North Kingstown, Rhode Island



Site Map

Historic Use



Available Data

- Environmental Science Services (ESS) conducted an Environmental Site Assessment (ESA) in 1994
- ESA identified 13 locations of potential sources of contamination
- A limited number of soil borings and monitoring wells were installed and some laboratory data for soil and groundwater samples are shown in the report

SUMMARY OF SOIL ANALYSES
December 23, 1994

	ESS-1 (4-6)	ESS-2 (4-6)	ESS-3 (14-16)
Description	West Side of Site Downgradient of Aqua Tank Site	Within Berm of Former Fuel AST West of Bldg 63	Downgradient of Bldg 65
TPH-IR (mg/kg)	340	ND	29
PCBs (mg/kg)	ND	ND	ND
VOCs (µg/kg)			
Acetone	ND	148	ND
Vinyl Chloride	ND	ND	96
Cis-1,2-Dichloroethene	ND	ND	22
Ethylbenzene	ND	ND	58
Total Metals (mg/kg)			
Arsenic	ND	5	4
Barium	59	55	55
Cadmium	ND	ND	ND
Chromium	8	12	10
Lead	ND	ND	ND
Mercury	ND	ND	ND
Selenium	ND	2	1
Silver	ND	ND	ND

SUMMARY OF GROUNDWATER ANALYSES
December 29, 1994

	ESS-1	ESS-2	ESS-3	GZA MW-8
Description	West Side of Site Downgradient of Aqua Tank Site	Within Berm of Former Fuel AST West of Bldg 63	Downgradient of Bldg 65	
TPH-IR (mg/l)	ND	ND	ND	ND
VOCs (µg/l)				
Methylene chloride	ND	6	ND	ND
Vinyl Chloride	ND	ND	850	ND
cis-1,2-Dichloroethene	ND	ND	270	ND
Toluene	11	ND	ND	ND
Ethylbenzene	ND	ND	410	ND
Xylenes	ND	ND	120	ND

SUMMARY OF MISCELLANEOUS ANALYSES (SLUDGE)
December 29, 1994

	CB-65	FT-65	FD-65	CB-63	VAULT 63
Description	Catch Basin West of Bldg 65	Floor Trenches in Bldg 65	Circular Floor Drain in Bldg 65	Catch Basin West of Bldg 63	Vault North of Bldg 63
TPH-IR (mg/kg)	1,400	2,300	NA	96	76,000
PCBs (mg/kg)	ND	1.0	NA	ND	ND
VOCs (µg/kg)					
Tetrachloroethene	5,680,000	202	32,000	6	ND
Trichloroflouromethane	ND	ND	100,000	ND	ND
Methylene chloride	ND	36	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	625
Xylenes	ND	26	ND	ND	1440
SVOCS (µg/kg)					
1,2-Dichlorobenzene	723	ND	NA	ND	ND
Bis(2-ethylhexyl)phthalate	2,470	ND	NA	ND	ND
Phenanthrene	ND	5,510	NA	409	ND
Fluoranthene	ND	6,840	NA	464	ND
Pyrene	ND	ND	NA	429	ND
Chrysene	ND	ND	NA	587	ND
Total Metals (mg/kg)					
Arsenic	ND	ND	NA	ND	ND
Barium	216	588	NA	52	406
Cadmium	16	24	NA	ND	65
Chromium	37	81	NA	10	223
Lead	2,170	17,400	NA	27	2,130
Mercury	5.1	0.7	NA	ND	3.1
Selenium	ND	ND	NA	ND	ND
Silver	4	ND	NA	ND	14

The Five Categories of Identified Contaminants

Volatile Organic Compounds (VOCs)

Semi Volatile Organic Compounds (SVOCs)

Polychlorinated biphenyls (PCB)

8 RCRA Metals (Metals)

Total Petroleum Hydrocarbon (TPH)

Our Objectives

- Address all the missing data gaps on site
- Design a Field Sampling Plan and investigation based on Areas of Concern
- Design a Screening-level Ecological Risk Assessment Plan to evaluate the risk to wildlife and biota due to the contaminants on site



Field Sampling Plan

AOCs

Rectangular

QUONSET POINT STATE AIRPORT

INDUSTRIAL PARKS WASTEWATER
TREATMENT PLANT

FORMER AQUA TANK FARM FACILITY

TANKS AND MAJORITY OF THE
ASSOCIATED PIPING REMOVED

SITE LOCATION
BOUNDARIES

ZARBO AVENUE

ZARBO AVENUE

NARRAGANSETT BAY

SHIPYARD

UCMW-2

BLDG. 817

BLDG. 65A

CONCRETE PAD OF
FORMER AST

BLDG T-93

BLDG. 168

CATCH
BASIN

UC-6

UC-5

UC-19

UC-3

UC-2

UCMW-1

UC-1

UC-12

UC-11

UC-10

UC-9

UC-15

CATCH
BASIN

UNDERGROUND
VAULT/ OWS

GROUNDWATER
DIRECTION

GROUNDWATER
DIRECTION

MONITORING WELL/SOIL BORING

SOIL BORING

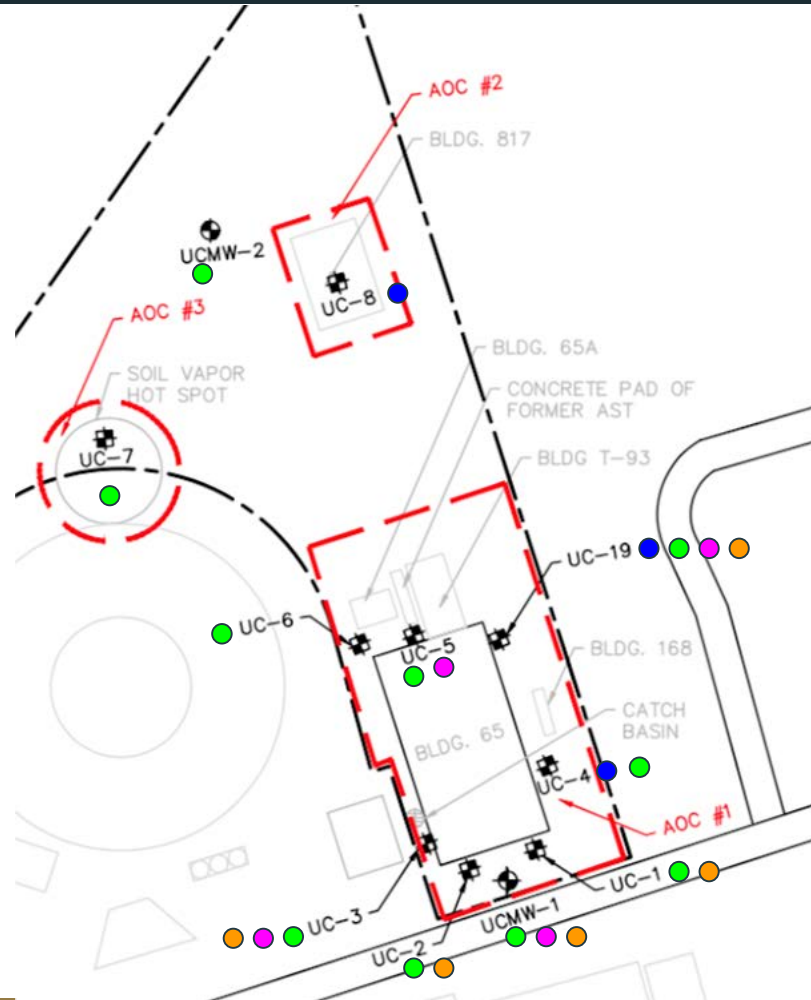
SITE LOCATION BOUNDARY

STEEL BULKHEAD

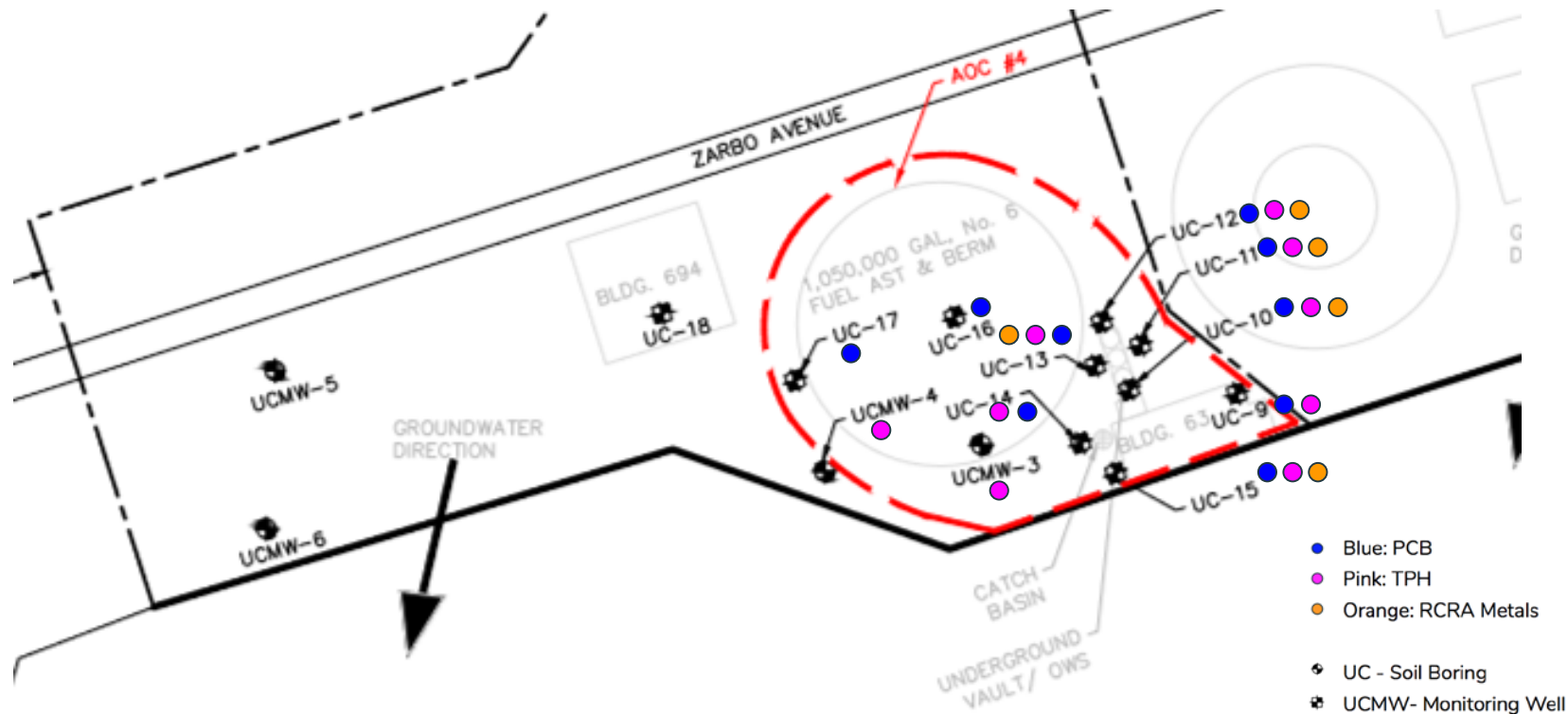
Figure
Site Plan and Proposed
Sampling Locations

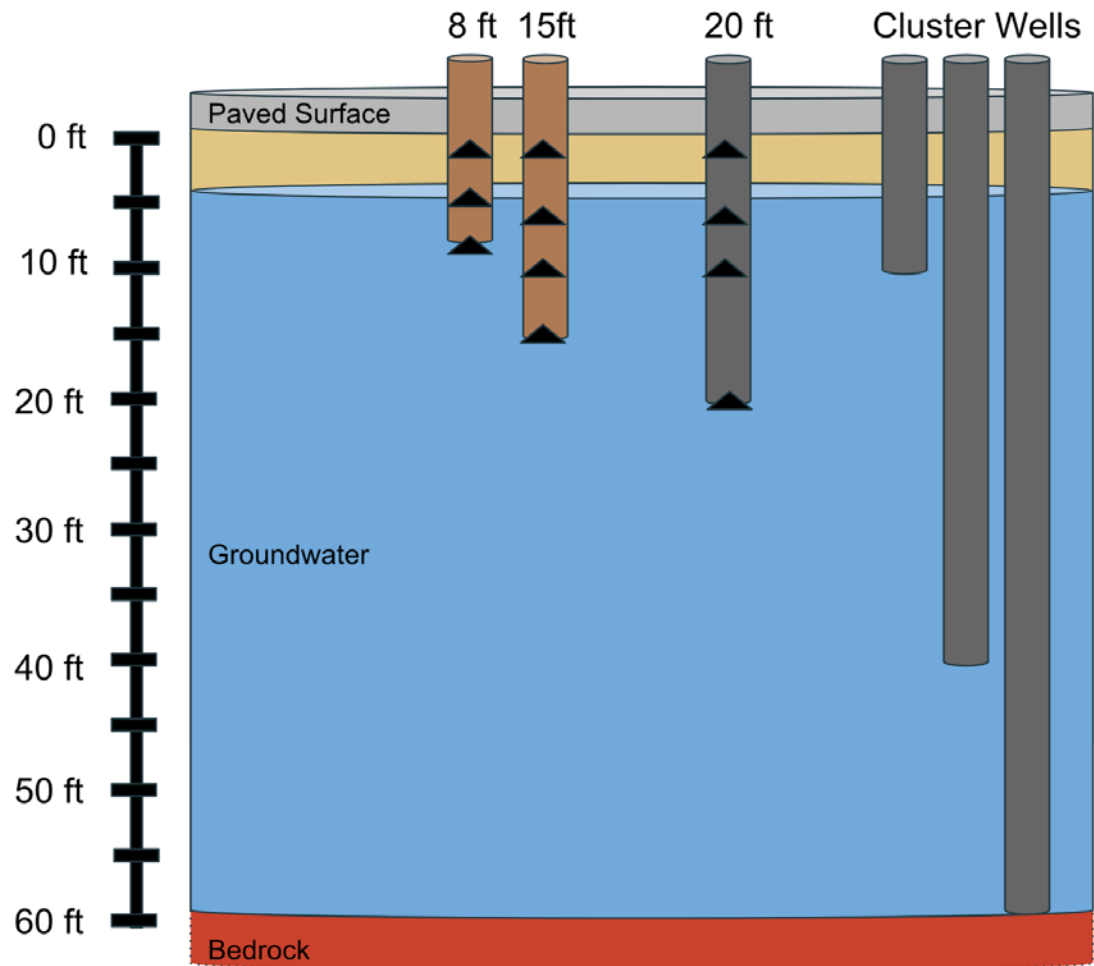
Sampling Locations North

- Blue: PCB
- Green: VOCs and chlorinated solvents
- Pink: TPH
- Orange: RCRA Metals
- ⊕ UC - Soil Boring
- ⊞ UCMW - Monitoring Well



Sampling Locations South





Sampling Depths (ft):
8: 3, 6, 8
15: 3, 7, 11, 15
20: 3, 7, 11, 20
Cluster wells (10 ft. 40
ft, and bedrock)

Soil Boring Methods

Geoprobe Dual Tube Soil Sampling System:

- DT22 where there's no monitoring wells
 - Continuous, unconsolidated
 - Outer casing- 2.25 in
 - Inner probe rod- 1.25 in
- DT60 where monitoring wells will be installed
 - Inner probe rod- 4 in



Example of soil sample
pulled from a DT22
GeoProbe

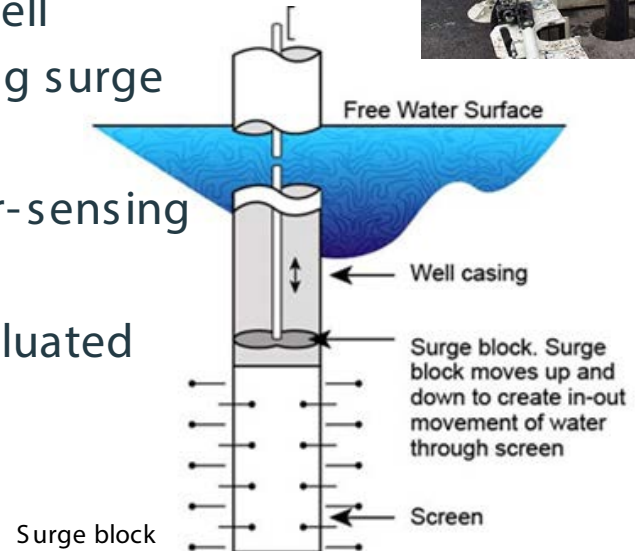


DT22 Soil
Sampling
GeoProbe

Monitoring Well Installation and Methods

- Geoprobe DT60 soil sampling system
 - Works with soil borings to install wells
 - Expendable cutting shoe can be attached to dual tube soil sampler to install monitoring well
- Once drilling completed, well developed using surge block and pump
- Water level measured using electronic water-sensing device
 - At 2 monitoring wells, tidal changes evaluated
- Multi-parameter monitoring device

DT60 Soil
Sampling
Geoprobe



Decontamination Procedures

- Important so that future sampling not affected
- Cleaning & decontamination only on leak-proof decontamination pad
- Use EPA-recommended detergent and methods of wastewater disposal
- For direct push technology in contact with sample media
 - Clean equipment with brush, detergent, tap water
 - Rinse with organic-free water
 - Allow to air dry then wrap in aluminum foil or place in clean plastic bag
- If potential for hazardous waste, as defined by RCRA, may need to be handled in alternative manner

Sampling Analysis

- Con-Test Analytical Laboratory
- Samples will be labeled appropriately
- Chain-of-custody will be filled out appropriately
- Equipment Blanks
- Field Duplicates (Dups)
- Matrix Spike/Matrix Spike Duplicate (MS/MSD)
- Temperature Blank
- 98 Total Samples:
 - 30 water samples
 - VOCs, SVOCs, Metals, TPH
 - 68 soil samples
 - VOCs, SVOCs, Metals, TPH
 - 64 PCBc



Project Cost Analysis

- Subcontractors Services
- Labor Cost:
 - Engineer cost \Rightarrow \$100/hour
 - 1 working day = 8 hours

BUDGET	\$106,526.79
Pre-Field Labor	\$4,800.00
<i>Analysis and Spatial Mapping of Exceedances</i>	\$1,600.00
<i>Development of Sampling Plan Drawing and Write up</i>	\$2,400.00
<i>Coordinating With All the Subcontractors</i>	\$800.00
Geophysics	\$7,200.00
<i>GPR Services</i>	\$3,200.00
<i>Labor</i>	\$4,000.00
Sampling	\$46,890.79
<i>Contest Quote</i>	\$46,890.79
Drilling and Installation	\$36,760.00
<i>TDS Quote</i>	\$14,360.00
<i>Labor</i>	\$11,200.00
Environmental Services	\$6,150.00
Rental Equipment	\$4,726.00
<i>Rental</i>	\$4,406.00
<i>Permanent Purchase</i>	\$320.00



Planning of Screening Ecological Risk Assessment

Screening Ecological Risk Assessment Outline

- Evaluates the likelihood that adverse ecological effects may occur or are occurring as a result of exposure to one or more stressors
- Based on two major elements:
 - Characterization of effects
 - Characterization of exposure
- Chemicals focused on are based on a historical evaluation of the site
 - Volatile organic compounds (VOCs) are the main chemicals of concern
- South edge of site is bordered by the Narragansett Bay - large, shallow estuary

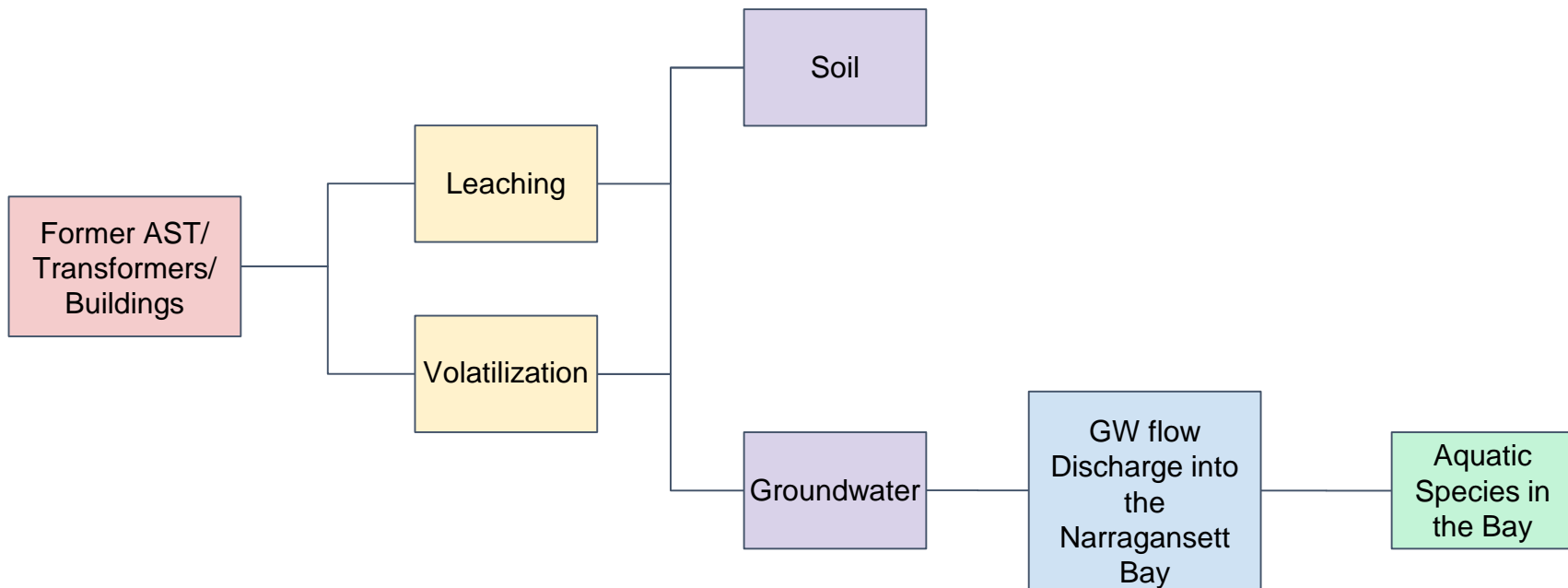
Contaminant Source

Release Mechanism

Impacted Media

Exposure Pathways

Receptors



Further Investigation Required

- Laboratory toxicology report on aquatic life near site
- Multiple analyses on groundwater discharge by the bulkhead to help understand which contaminants are going into Bay
- Hydraulic conductivity test for site groundwater
- Test the sediment at the bottom of the bay for anything that may sink
- Plume model of all contaminants discharging into the Bay which should indicate concentration of contaminants





Questions?