Site Location Map

RETEC

RETEC ENGINEERING, P.C.

DRAWING NO. | REV.

Figure 1-1

Address: 120 Dart Street, Buffalo (terrestrial site)

Background: This site is a compound site which includes two plots of land on both sides of Scajacuada Creek as well as area in the creek itself. 915141 A is the site specific area for the Creekside cleanup and restoration while 915141 B is specific to the restoration of the creek. This site in the past was owned by the Iroquois Gas company which manufactured gas from coal. Due to the process the site had high levels of PAHs and BTEX which contaminated the ground sediment as well as became a problem of contaminated runoff into the creek. The site was used by Iroquois Gas between 1925 and 1955 as a factory and from 1955 to 1972 as a storage facility for gas. In 1968 the company demolished some of the on-site structures and buried waste materials such as heavy tars, sludges, coal, coke and demolition debris. The site changed hands to Westwood Pharmaceutical (now Bristol-Myers Squibb Company, Inc.) in 1972 where they then demolished all remaining structures. In 1985 during the construction of a warehouse in the north end of the property soil and groundwater contamination were encountered. Between 1986 and 1988 a few monitoring wells were installed and samples were collected and analyzed. From the results the DEC listed the site in the Registry of Inactive Hazardous Waste Disposal Sites in 1989 when cleanup and remediation began.

The creek section specifically is a length of 1,600 feet stretching from the West Avenue Bridge to a point 400 feet north of the New York central Railroad Bridge.

Type of Project: Site is a shoreline/creek bank project as well as a sub aquatic project when remediating the creek bed.

Site Class: ***Terrestrial Site:*** Began as a Class 2 and was changed in 1998 to a class 4

Creek Site: Began as a Class 2 and was changed in 2002 to a class 4

Site Elevation: Site is relatively flat with a maximum relief of 5 feet except along the bank of the creek.

Water flow: On the Western part of the site groundwater is likely to flow toward the creek. From the northeast side of the site runs to the northeast corner of the site. Surface water in the southeast quadrant drains toward the southeast.

Scajacuada Creek Waterflow: The creek flows southwest toward the Black Rock canal of the Niagara River. The direction temporarily flows in reverse as a closing of the Black Rock Canal Locks. The canal rate of flow has ranged between 2.4cfs to 111cfs when studied between 1957 and 1991.

Physical Description of Soils: From an early soil boring test in 1987 shows that the site is underlain from the surface down by a fill (0-32ft), a silty clay layer (20-58ft), a sand layer (3-28ft), and fractured shale and gypsum containing dolomite and argillaceous limestone bedrock. The fill is thickest in the northwest portion and the whole site is filled in a random manner with gravels, sands, silt, clay, rubble, cinders, wood chips and slag.

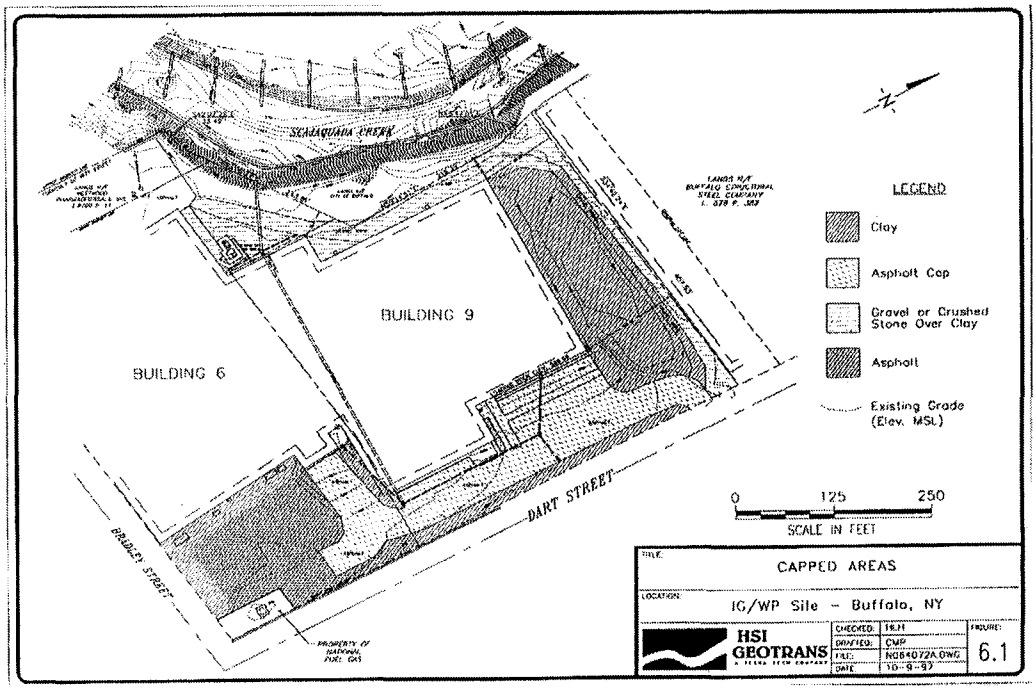
Contamination is as follows:

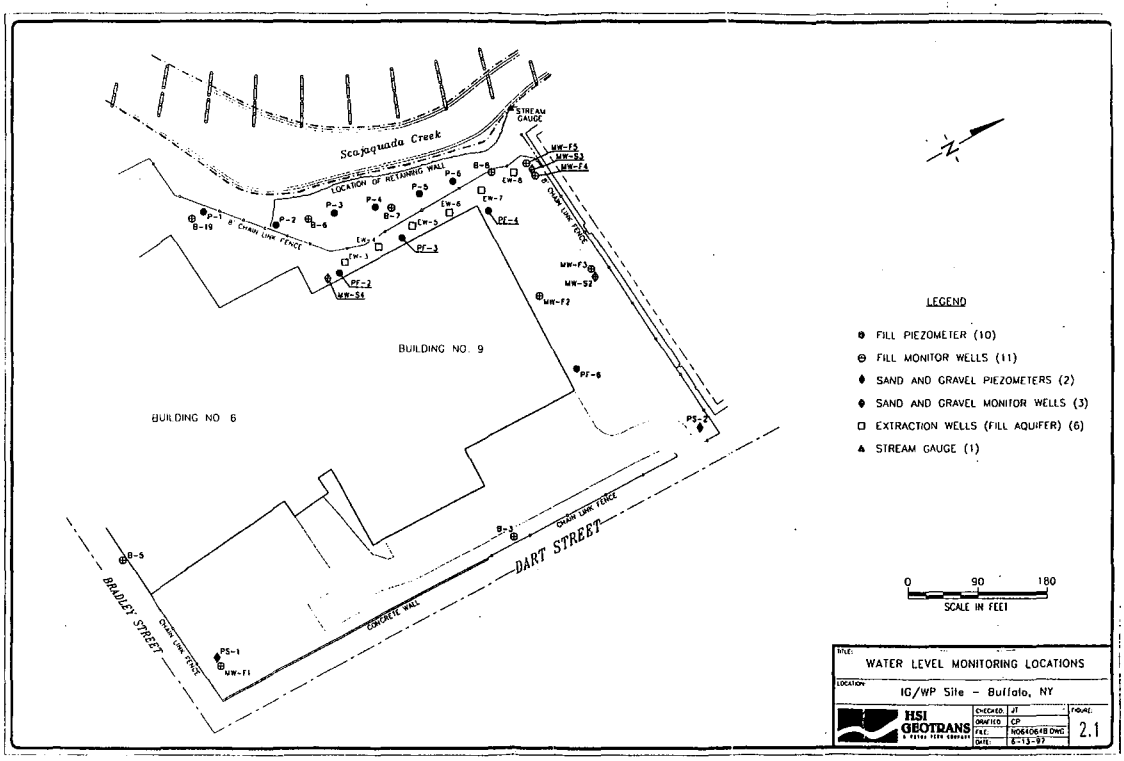
Table 1-1. Known substances on site.

Chemical	Maximum Concen. Detected (ppm) Water Matrix	Solid Matrix	NAPL Matrix
Polycyclic Aromatic Hydrocarbons			
Acenaphthene	32.80	520	43,000
Acenaphthylene	5.02	463	6,300
Anthracene	17.50	1114	5,800
Benzo (a) anthracene	14.55	1028	5,800
Benzo (a) pyrene	15.23	109	870
Benzo (b) fluoranthene	10.12	599	1,200
Benzo (g,h,i) perylene	ND	612	400
Benzo (k) fluoranthene	8.23	0.30	1,800
Chrysene	8.72	65.0	3,200
Dibenzo (a,h) anthracene	0.074	767	550
Fluoranthene	13.8	ND	28,000
Fluorene	3.59	520	6,000
Indeno (1,2,3-c,d) pyrene	0.40	ND	230
Napthalene	90.4	3713	23,000
Phenanthrene	38.19	85	16,000
Pyrene	32.8	449	36,000
Volatile Organic Compounds			
Benzene	5.50	ND	1,200
Chlorobenzene	1.09	ND	1,700
Chloroform	0.004	ND	ND
1,2 Dichlorobenzene	2.20	ND	2,900
1,3 Dichlorobenzene	0.003	ND	ND
1,4 Dichlorobenzene	2.70	ND	10,000
Ethylbenzene	5.496	ND	10,000
Tetrachloroethylene	0.014	ND	ND
Toluene	1.50	ND	1,100
1,1,1-Trichloroethane	0.037	0.032	ND
Xylene	10.4	--	8,000
Other Organic Parameters			
Phenol (total)	0.335	1.94	35
Total Organic Carbon	1130	NA	NA
Total Halogenated Organics (as Lindane)	3.05	3.33	22.0
PCBs	ND	ND	ND
Oil and Grease	5.1	NA	NA
Metals and Other Inorganics			
Arsenic	0.049	1.20	9.4
Antimony	0.85	ND	ND
Barium	NA	18.1	NA
Beryllium	0.013	0.087	ND
Cadmium	0.009	0.93	0.66
Chromium	0.110	10.3	4.0
Copper	0.46	26.4	26.0
Lead	0.93	229.0	12.0
Mercury	0.004	ND	1.5
Nickel	0.25	14.2	ND
Selenium	0.08	0.08	ND
Silver	0.087	0.96	3.0
Thallium	0.10	ND	4.6
Zinc	92.3	176.0	47.0
Sulfide	184	135	NA
Cyanide	ND	88.0	NA

NOTE: ND = None Detected
NA = Not Analyzed
PAH = Polycyclic Aromatic Hydrocarbons
VOC = Volatile Organic Compound
Source: Termini Quarterly Sampling Reports 1987 and 1988.

	SOIL	GroundWater	NAPL	Creek sediment
PAHs (Polynuclear Aromatic Hydrocarbons)	0-21,000ppm	0-10,081ppm	158,900 ppm	4.5-19,600ppm
BTEX (Benzene, Toluene, Ethylbenzene, Xylene)	0-1,100ppm	0-2,606ppm	12,800 ppm	
lead	9.6-865ppm			
cyanide	1.4-270ppm			





Description of Remediation:

Terrestrial Site

The remedy proposed in the ROD included:

- Clay Cap
  - Bi-layer cap used to keep contamination contained and impenetrable with a runoff collection system located on the edge of the cap to reduce erosion and send runoff water to a storm sewer
  - Part of the cap, where original asphalt lies, will be asphalt while the other area where not covered will be capped with clay and then gravel or earthen materials.
- Impermeable sheet piling barrier wall
- Extraction wells
- Groundwater and dense non-aqueous phase liquid (DNAPL) treatment by oil/water separation, filtration and activated carbon or equivalent
  - Pump and treat (P&T) system put in place on site to be used for 30 years
    - Consists of a series of 6 wells which water is pumped from a shallow unconfined aquifer, and a conveyance system to transport this water to the treatment system which removes contamination and renders the water acceptable for discharge to the Buffalo Sewer Authority (BSA)

        - Each well is capable to pump up to four gallons per minute however the actual number for pumping is much less than that
    - In-situ bio treatment system of soil and groundwater to enhance the remediation process if the treatability study determines this treatment to be effective
    - Long term monitoring, land use restrictions, and fencing

All remedies were then subject to a standard maintenance procedure and basic upkeep. Required in the O&M manual are weekly, monthly and yearly reports as well as proper upkeep of the cap to ensure its structure.

Creek Site

- Excavation of contaminated sediments from the site
- Containment of the creek and restriction of the area during excavation of the sediments
- Construction of a temporary storage and dewatering facility for the excavated sediments
- Pretreatment and disposal of wastewater from dewatering operation
- Off-site transportation of the dewatered sediments for thermal destruction or disposal by other approved and suitable methods consistent with Federal/State regulations
    - 18,976 cubic yards of contaminated sediment was removed from the creek
- Capping the creek bed
    - Consisted of (from top down)
        - 5,00 tons of armor stone, minimum 6 inches thick on the top of the cap
        - 140,000 ft^2 of geotextile fabric
        - 20,000 tons of clean sand, minimum 18 inches thick
        - 95,000 ft^2 of geosynthetic clay liner
- Post Sediment removal confirmatory sampling
- A DNAPL recovery well was installed at a sheet pile barrier near both bridges
- Sheet Piling wall placed the width of the creek to provide for DNAPL collection at the West Avenue recovery well
    - Approximately 2,500 ft^2 of steel sheet piling

Site restoration also included post construction planting along the creek as well as introduction of organic fiber rolls placed parallel to the creek at the 571.5 foot elevation contour and the placement of organic topsoil to further facilitate growth

Restoration specifics for topsoil and the fiber roll

- Topsoil – placed a minimum of 4 inches along the disturbed creek areas and covered with organic fiber mesh to control for erosion
    - Clay 10-30%
    - Sand 10-60%
    - Silt 30-70%
    - Organic matter >5%
    - 2-inch Sieve 100% passing
    - pH 5.5-7.0

- Fiber Roll
  - Organic coconut fiber
  - Min18 inches in diameter
  - 520 linear feet placed on creek bank

Biological Species Planted:

Terrestrial Site: **There seems to be no documents which explain planting for the terrestrial site. FER and Closing Documents are missing from all records*

Creek Site: *done spring 1999 (Survival rates presently are unknown but significantly lower than the original planted numbers this is due to the overhead shade of the Scajacuada Expressway)*

- Grass
  - K-31 tall fescue 45%
  - Perrenial Ryegrass 25%
  - Creeping Red Fescue 20%
  - Kentucky Bluegrass 10%

Trees Planted	**Number planted**
Green Ash	8
Elder	24
Willow	8
Hackberry	8
Black Alder	10
Big Tooth	9

Shrubs Planted	
Red Osher Dogwood	8
Silky Dogwood	9
Staghorn Sumac	9
Blackberry	9
Arrowroot	10
Button Bush	9
Salix Willow	9
Elder	3

Aquatic Species	
Coontail	618
Wild Celery	412
Water Weed	412
Pond Weed	618
Yellow iris	412

Soft Stem Bullrush	412
Soft Rush	412
Blue Flag Iris	412
River Rush	412
Arrowhead	412

*Trees were planted 30ft on center along the bike path. Plants and aquatic

Site visit Plants Seen (12/22/14):

These plants were identified on the site visit with the aid of Biologist Tim DePriest:

- Box Elder
- Green Ash
- Red Osher Dogwood
- Staghorn Sumac
- Blue Flag/ Yellow Iris

Invasive Species

- Tree of Heaven
  - This plant may be noted as a helper plant due to its ability to grow with very little sun or water which is present at the site due to the expressway overhead
- Japanese Knot Weed
  - This plant is severely overgrown in this area. The plant has the ability to keep new plants from thriving and may be the cause of the lowered diversity in the Creekside area.

Current Monitoring Being Done:

Today there is a subcontractor doing the monitoring of the cap as well as the oil-water separator on site. Currently the site is being visited twice per week by this contractor as a minimum. The cap is inspected on a quarterly basis by the contractor for any damages, weathering, or for any threats to its structure. An OMM or PRR report is required for the maintenance of the pump and treat system and the groundwater maintenance system annually.

The NYSDEC is participating in formal site inspections twice a year. Last conducted December 22, 2014.

Recent Developments on site: Starting in September 2011 seepage of NAPL was noted coming from eyeholes of some of the sheet pile wall. During this time the eyehole in question was filled behind with hydraulic cement to stop any more seepage.

Site Photos: **Current photos found in folder labelled Westwood site Visit 12/22/14**

Previous photos of restoration may be located for the creek remediation in Appendix P of the FER and the document entitled SCAck4.pdf (8 MB) in UIS

After Restoration Analysis:

Words with project managers (Glenn May and Brian Sadowski):

While interviewing both project managers(PMs) it is important to note that each received the site years after the design work was finished and time progressed into the O&M site management. With the site, both managers state the 198 expressway as being a hindrance to any design regarding habitat. In this case the habitat aspect has gone unnoticed as well due to the large amount of Japanese Knot weed obscuring the view of other trees or shrubs in the area. Views of aquatic vegetation are also overlooked due to water turbidity. Another parts of the design which was addressed was the problem of the sheet wall seeps. This problem first realized in 2011 was, on the part of the PMs, most likely overlooked for years. This oversight was said to be due to the contractors not fully inspecting the site. Another flaw in the design noted was that the city of Buffalo's portion of the site was left uncapped. This section not explicitly noted in the design plan rests between the upland site managed by Natural Fuel Gas and Westwood and the Creek bank. This portion of the site lacking a cap was considered a hazard due to its influence on the creek.