FISH & WILDLIFE IMPACT ASSESSMENT

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Fish & Wildlife Resource Impact Assessment

Of The

The Unnamed Tributary #1 of Crooked Brook &
REALCO Incorporated RCRA Site
90 Willowbrook Road
Dunkirk, Chautauqua County, New York

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1. Introduction

This document presents the results of a fish and wildlife resource impact assessment (FWIA) for the REALCO Incorporated Site (the site or REALCO Site). It was prepared by Kurt A. Frantzen, Ph.D. d/b/a Environmental Risk Group (EnRG), for Benchmark Engineering & Environmental Science, PLLC (Benchmark)

The purpose of this assessment was to characterize (identify and describe) fish and wildlife resources at and around the site, identify contaminate migration pathways and possible resource exposure pathways, identify contaminants of ecological concern, and draw conclusions regarding actual or potential adverse impacts to fish and wildlife resources, consistent with New York State Department of Environmental Conservation's (NYSDEC's) guidance (NYSDEC 1994, 2002b).

Subject Property

The Subject Property is the REALCO Incorporated (REALCO) Site or the Al-Tech Specialty Steel site, having the following regulatory identifier: NYSDEC Site #907022, and CERCLIS #NYD030215529.

Figure 1 (Locus Plan) graphically indicates the physical location of the Subject Property within the state and locally; and it can be found on the Dunkirk, NY USGS 7.5-min topographic quadrangle map (#42079-D3 1954, Photorevised 1986 and 1990, NAD 1983).

The site occupies approximately 90-acres at the corner of Brigham Road and Willowbrook Avenue, Dunkirk, Chautauqua (C), NY 14048. Currently, production facilities owned by Universal Stainless Steel are located on 79 acres and the remaining 11 acres, which do not support manufacturing activities, are owned by RealCo Inc (USEPA 2004). Figure 2 (Site Plan) diagrammatically presents the boundaries and general layout of the Subject Property.

General location information for the Subject Property follows:

Street Address:	90 Willowbrook Avenue
Hamlet/Town:	Dunkirk
County:	Chautauqua
State:	New York
Zip Code:	14048
Latitude (North):	42.4671
Longitude (West):	-79.3348
Elevation:	630 feet above sea level (approx.)
NYSDEC Site #	907022
EPA CERLIS#	NYD030215529

The site is an industrial property (with restricted and controlled access) in a generally flat area near Lake Erie on the city boundary of Dunkirk, NY. The site is bounded:

- To the north by a Norfolk Southern Railroad right-of-way and West Lucas Ave., immediately to the north is residential property.
- To the east by Central Ave., and immediately east is residential property.
- To the South by Willowbrook Ave., along the southern side of the street is residential property and beyond this to the south is semi-rural, fallow agricultural property.
- To the west by Brigham Road that has a mixture of commercial/light industrial land use and which trends rural in nature. Further to the west and northwest is a large right-of-way for rail and electrical transmission lines.

Unnamed Tributary #1 of Crooked Brook begins at an elevation of approximately 650 feet above mean sea level (msl) just east of Central Ave. and north of Interstate 90 (see USGS topographic quadrangle (3 km S of Dunkirk, NY near the following point: 79W 19' 52.15" 42N 27' 30.01"). This tributary runs through the southwest corner of the site and then in a northwesterly course emptying into Crooked Brook about 0.5 miles upstream of Crooked Brook's mouth at Lake Erie (see Figures 1 and 2).

Background

According to the USEPA (2004) and the NYSDEC (2004), Al-Tech submitted a RCRA Facility Assessment (RFA) in 1992 following the Resource Recovery and Conservation Act (RCRA) Corrective Action Program. This assessment identified 24 Solid Waste Management Units (SWMUs) and 11 Areas of Concern (AOCs). A RCRA Facilities Investigation (RFI) was performed between 1995 and 1997, documenting hazardous waste disposal in areas of the plant, and levels of hazardous waste that are impacting the environment, *i.e.,* groundwater and surface water/sediments. Soil surrounding transformers were found to have polychlorinated biphenyl (PCB) contamination (87 mg/kg in oil), while sediments in the on-site, man-made Willowbrook pond had PCBs as high as 2,100 mg/kg. These wastes are located in areas that may migrate to a nearby surface water stream or through groundwater to off site locations.

The RFA and RFI provided groundwater monitoring data that indicate excursions of standards for metals and chlorinated solvents. Hazardous wastes (including chromium, lead, and chlorinated solvents, as well as PCBs) are present on the site and the data suggest contaminated groundwater is migrating off-site. Further, significant levels of metals in surface soils may contribute to the metal concentrations observed in the Unnamed Tributary #1 passing through from the site (*i.e.*, chromium at 630 μg/L compared to a guidance value of 50 μg/l).

Based on residential areas surrounding the site, the proximity of the surface water stream, which has been impacted by site runoff, and the ability of the waste material to migrate from the site the NYSDEC listed this site on the State's *Registry of Inactive Hazardous Waste Disposal Sites* (Registry, #907022).

NYSDEC Fish and Wildlife Resources Impact Analysis Decision Key

Completion of the NYSDEC's FWIA Decision Key (see Appendix 3C of NYSDEC 2002) based upon this background information suggests that the Resource Characterization component of the FWIA should be prepared (see below). Decision key answers are shown in **BOLD**.

1. Is the site or area of concern a discharge or spill event? If "YES" go to: 13 If "NO" go to: 2
2. Is the site or area of concern a point source of contamination to the groundwater that will be prevented from discharging to surface water? Soil contamination is not widespread, or if widespread, is confined under buildings and paved areas. If "YES" go to: 13 If "NO" go to: 3
3. Is the site, and all adjacent property, a developed area with buildings, paved surfaces and little or no vegetation? If "YES" go to: 4 If "NO" go to: 9
4. Does the site contain habitat of an endangered, threatened, or special concern species? If "YES" go to: PRC If "NO" go to: 5
5. Has the contamination gone off site? If "YES" go to: 6 If "NO" go to: 14
6. Is there any discharge or erosion of contamination to surface water or the potential for discharge or erosion of contamination? If "YES" go to: 7 If "NO" go to: 14
7. Are the site contaminants PCBs, pesticides or other persistent, bioaccumulable substances? If "YES" go to: PRC If "NO" go to: 8
8. Does contamination exist at concentrations that could exceed SCGs or be toxic to aquatic life if discharged to surface water? If "YES" go to: PRC If "NO" go to: 14
9. Does the site or any adjacent or downgradient property contain any of the following resources?

a)	Any endangered, threatened, or special concern species or rare plants or their habitat	g)	Other surface water feature
b)	Any State designated significant habitats or rare State Ecological Communities	h)	Other marine or freshwater habitat
c)	Tidal or freshwater wetlands	i)	Forest
d)	Stream, creek or river	j)	Grassland or grassy field
e)	Pond, lake, lagoon	k)	Parkland or woodland
f)	Drainage ditch or channel	l)	Shrubby area
		m)	Urban wildlife habitat
		n)	Other terrestrial habitat

If "YES" go to: 11 If "NO" go to: 10

10. Is the lack of resources due to the contamination? If "YES" go to: PRC If "NO" go to: 14
11. Is the contamination a localized source which has not migrated and will not migrate from the source to impact any on-site or off-site resources? If "YES" go to: 14 If "NO" go to: 12
12. Does the site have widespread soil contamination that is not confined under and around buildings or paved areas? If "YES" go to: PRC If "NO" go to: 13
13. Does the contamination at the site or area of concern have the potential to migrate to, erode into or otherwise impact any on-site or off-site habitat of endangered, threatened or special concern species or other fish and wildlife resource? (See #9 for list of potential resources. Contact appropriate agency for information regarding endangered species.) If "YES" go to: PRC If "NO" go to:14
14. No Fish and Wildlife Resources Impact Analysis needed.

PRC Perform Resource Characterization

Area of Concern

The NYSDEC defines AOCs as (§1.8(a) NYSDEC 2002):

> *[A]ny existing or former location(s) where hazardous substances, hazardous wastes, or petroleum are or were known or suspected to have been discharged, generated, manufactured, refined, transported, stored, handled, treated, released, disposed, or where hazardous substances, hazardous wastes, or petroleum have or may have migrated.*

Based upon this definition, AOC #9 (as defined in the RFA/RFI) was established for the Unnamed Tributary #1 of Crooked Brook. It is this AOC that is the subject of this FWIA Resource Characterization.

Scope of Work

Under contract to Benchmark, EnRG will: review available and applicable data and information, tour the site, and conduct a FWIA consistent with NYSDEC guidelines (1994, 2002b) and all relevant updates and policies, as well as apply sound scientific principles concerning environmental chemistry (fate and transport), site biology, and ecotoxicology (effects). The assessment follows through several steps, namely:

- Characterize the environmental resources associated with the Unnamed Tributary consistent with the requirements of the FWIA guidance, including a Cover Type map; identify contaminants of concern, but will focus (per Benchmark's request) upon PCBs; define the relevant assessment and measurement endpoints, prepare a conceptual model of the site (that considers site condition chemistry and biology, fate & transport, and the current/foreseeable future exposure scenarios of potentially impacted resources) in order to effectively formulate the contamination problem.
- Outline current/foreseeable future exposure scenarios for appropriate receptor populations and evaluate chemical fate/transport variables and biology/ecology of the relevant receptors in order to understand the potential for and magnitude of exposure.
- Prepare ecotox-profiles for at least PCBs and evaluate the available contaminant data for potential effects to receptors at the site using appropriate Standards, Criteria, or Guidance values, as well as the potential for bioavailability/bioaccessibility.
- Prepare a conclusion concerning the actual or potential adverse impacts to fish and wildlife resources.

2. Resource Characterization

Resource Characterization defines the contamination problem within a fish and wildlife resource exposure context and provides a broad assessment of the potential for impacts to such resources. This is accomplished by:

1. Defining the environmental setting and describing the resources present.
2. Identifying the chemical constituents known or suspected at the site, and establishing the Contaminants of Potential Concern (COPCs), in particular those of ecological concern.
3. Define the transport and fate mechanisms that might exist at the site, and identify what complete exposure pathways might exist (an exposure pathway includes a source, a release mechanism form the source, a transport pathway in the environmental, an exposure pathway, an exposure route into the ecological resource, and a receiving ecological resource or receptor).
4. Outline the mechanisms of ecotoxicity associated with the contaminants and likely categories of receptors (plants, animals, birds, and the like).
5. Based upon the resources and contaminants present and the potential for exposure provide an assessment regarding actual or potential adverse impacts.

Resource characterization results in the definition of the risk system, as depicted in the Conceptual Risk System Model (CRSM). The CRSM is a schematic depiction of a site and its environment that presents several types of information. This information includes possible sources of chemical constituents at the site, how they might be transported through the environment resulting either in their ultimate fate in some environmental media (such as soil, sediment, water, or air), and/or in exposure to plants and/or animals, through various routes of exposure.

Environmental Setting and Resources

General Setting

The REALCO is located on the broad glacial lacustrine sedimentary deposits (from pro-glacial lakes) of generally laminated silt and clay prevalent along the southern shore of Lake Erie (NYSGS 1988). Upper Devonian age Dunkirk Shale bedrock of the Canadaway Group underlies the site (NYSGS 1970).

Groundwater exists within the sediments of the lake plain. The depth to groundwater is shallow throughout, generally occurring within 10 feet below ground surface (bgs). Wetland areas exist along topographic lows where streams run from higher elevations towards the lake. The regional direction of groundwater flow is northward toward Lake Erie.

Ecoregions are areas within which ecosystems are generally similar with respect to the type, quality, and quantity of environmental resources. The REALCO Site occurs in the USEPA Level II Ecoregion #8.1 **Mixed Wood Plains** of the **Eastern Temperate Forest** Level I Ecoregion #8.

More specifically, the site falls within the **Eastern Great Lakes and Hudson Lowlands** (USEPA Level III Ecoregion #83):

> *Ecoregion #83 is a glaciated region of irregular plains bordered by hills generally contains less surface irregularity and more agricultural activity and population density than the adjacent ecoregions. Although orchards, vineyards, and vegetable farming are important locally, a large percentage of the agriculture is associated with dairy operations. The portion of this ecoregion in close proximity to the Great Lakes experiences an increased growing season, more winter cloudiness, and greater snowfall* (2005 Enviromapper).

The site is immediately north of the **Erie Drift Plains** (Level III Ecoregion #61).

> *Once largely covered by a maple-beech-birch forest, much of the Erie Drift Plain is now agricultural in use. The glaciated Erie Drift Plain is characterized by low rounded hills, scattered end moraines, kettles, and areas of wetlands, in contrast to the adjacent unglaciated ecoregions to the south and east that are hillier and less agricultural. Areas of urban development and industrial activity occur locally.*

The REALCO site also is located with the Major Land Resource Area (MLRA) **#101—Ontario Plain and Finger Lakes Region** (USDA 1981). This MLRA has the following characteristics.

> **Land Use:** Most of this area is in farms. About one-half of the acreage is cropland used mainly for hay, corn, and small grains associated with dairy operations. Cash crops, including canning and truck crops, wheat, and dry beans, are also produced. Orchard crops are important locally, particularly near Lake Ontario. Vineyards are common near some of the Finger Lakes. About one-third of the area is forested, mostly in farm woodlots. Urban uses account for about 14 percent of the area and are expanding around the larger cities, such as Buffalo, Rochester, and Syracuse.
>
> **Elevation and Topography:** Elevation is 100 to 400 m, increasing gradually from the shores of the Ontario and Oneida Lakes to the Allegheny Plateau, the southern border of the area. Most of the area is a nearly level to rolling plain. Low remnant beach ridges are commonly interspersed with a relatively level lake plain in the north. Drumlins (long, narrow, steep-sided, cigar-shaped hills) are prominent in an east-west belt in the center of the area. The Finger Lakes area consists of a gently sloping to rolling till plain. Local relief is mostly a few meters, but the larger drumlins and many valley sides rise 25 to 100 m above the adjacent lowlands or valley floors. Streams generally flow northward, but the Mohawk River flows eastward.
>
> **Climate:** Average annual precipitation 900 to 1,150 mm, increasing from west to east. Precipitation is evenly distributed throughout the year. Snowfall is heavy in winter. Average annual temperature 7 to 10 C. Average freeze-free period? Mainly 140 to 160 days, but it is 180 days in a narrow belt along Lake Ontario.
>
> **Water:** In most years the moderate precipitation is adequate for crops, but in years of little or no precipitation yields are reduced by a lack of moisture. The Finger Lakes, Lake Ontario, streams, farm ponds, and wells are potential sources of irrigation water for high-value crops. Ground water is abundant in most areas. It is

close to the surface throughout much of the year in the lowlands, which extend across the northern part of the area. Lake Ontario and many of the larger lakes provide opportunities for recreation. The New York State Barge Canal, traversing the area from east to west, is an important transportation artery.

Soils: Most of the soils are Udalfs. They are deep, medium textured and moderately fine textured. These soils have a mesic temperature regime, an udic moisture regime, and mixed mineralogy. Well drained and moderately well drained, undulating to moderately sloping Hapludalfs formed in high lime glacial till (Honeoye, Cazenovia, and Hilton series) and lacustrine sediments (Collamer, Schoharie, and Galen series). Nearly level to gently sloping, somewhat poorly drained Ochraqualfs (Appleton and Niagara series) are extensive in low areas. Poorly drained and very poorly drained Haplaquepts (Canadaigua and Lamson series) formed in lacustrine sediments and are common at the lowest elevations in the northern part of the area. Hapludalfs (Palmyra and Wampsville series) formed in calcareous outwash deposits, and moderately deep tills (Aurora and Lairdsville series) are prominent locally but are of small extent. Well drained and moderately well drained Eutrochrepts (Hamlin and Teel series) formed in alluvial deposits along streams.

Potential Natural Vegetation: This area supports forest vegetation, particularly hardwoods. The potential forest types are elm-ash-red maple or beech-birch-sugar maple in varying proportions. Other species associated with these types include basswood, hemlock, white pine, black cherry, and some species of upland oak. Northern white cedar, red maple, black ash, and aspen grow on the wet soils. Cattails and mosses grow on the organic soils and on other extremely wet sites.

Current Conditions

The REALCO/Al-Tech site currently has production facilities owned by Universal Stainless Steel are located on 79 acres and the remaining 11 acres, which do not support manufacturing activities, are owned by RealCo Inc (USEPA 2004).

As the reader can see from the aerial photos in Figure 3 (Soil Survey Map) and Figure 4 (Land Cover) there is a perennial stream flowing to the northwest, and which crosses the southwestern corner of the REALCO Site proper. To help present the findings of this assessment, the Unnamed Tributary # 1 and Crooked Brook were divided into "reaches:"

- **Reach 0-UT** of the Unnamed Tributary #1 of Crooked Brook begins at the tributary's source less than a mile to the southeast of the REALCO site. In this area upstream of the REALCO site, the Tributary flows through an area of mixed use, including a semi-rural residential area and a fairground.
- Crossing Willowbrook Ave., Unnamed Tributary #1 enters the REALCO site proper exiting to the northeast and crossing Brigham road (**Reach 1-UT**).
- The Tributary then flows from Brigham road through another are of mixed land use, including residential/light industrial, and crosses Willow Rd. (**Reach 2-UT**).
- **Reach 3-UT** of Unnamed Tributary #1 extends from Willow Rd through a junkyard and to the Norfolk Southern rail right-of-way.

- **Reach 4-UT** of Unnamed Tributary #1 then flows in a more northerly fashion through a large expanse of shrub/scrub and wetlands, as well as successional northern hardwoods comprising a rail and electric utility right-of-way, across the Conrail right-of-way and to its confluence with Crooked Brook.
- **Reach 0-CB** of Crooked Brook is the arm upstream of its confluence with Unnamed Tributary #1.
- **Reach 1-CB** begins at the confluence of Crooked Brook and the Unnamed Tributary #1 (about ¾ of a mile northwest of the REALCO site) and continues through a small commercial area before crossing Route 5.
- After crossing Route 5, **Reach 2-CB** of Crooked Brook flows through a lake-front residential area of Dunkirk before emptying into Lake Erie.

Soils

As stated above, the REALCO Site and the Unnamed Tributary #1 are located on glacial sediments that have been somewhat disturbed by the development of the City of Dunkirk. The site occurs on a lowland lake plain in an area dominated by deep and very deep soils formed in glacial lake sediments, in particular soils of the Niagara-Canandaigua-Minoa complex, which are predominately nearly level to gently sloping, very deep, somewhat poorly drained, of moderately fine to fine textured silt with a moderate lime content, as described by the NRCS (1994).

Figure 3 presents the soil survey information, including the NRCS Soil Component Descriptions, for the site and surrounding area. The REALCO site proper is sits primarily on Udorthent soils (Ud), whereas Canandaigua Silt Loam (Cb) predominates along the course of the Unnamed Tributary #1 of Crooked Brook. Otherwise, the soils are of the Niagara Silt Loam unit, predominately NgA with NgB only occurring in gently sloping areas. The wetlands along the Unnamed Tributary #1 occur over Cb and NgA soils (compare the wetlands map provided in the EDR NEPA Check Report in Appendix 2 to the Soils Map Figure 3). These soils typically have soil organic matter level at 2-6% (Organic Carbon levels at 1.2-3.5%), whereas the Canandaigua Silt Loam (Cb), as a hydric soil, runs 4-15% organic matter (Soil Carbon 2.3-8.7%).

Terrestrial Setting and Cover Types

Based upon a site visit in October 2005, the 1992 USGS National Land Cover Data Set (available via the USGS National Map, 2005), and a review of various aerial photos, EnRG identified several distinct terrestrial habitat types in the vicinity of the site (Figure 4). No federally-defined rare, endangered, or threatened (RET) plant species are known to be on site or in the general vicinity (see letters to and from US Fish and Wildlife Service in Appendix 3). A similar RET request was made of the NYS Natural Heritage Program (Appendix 3) and they report both protected animal and plant species, as well as protected communities adjacent to the REALCO site and the Unnamed Tributary #1. The NHP's response is discussed more below.

Whenever possible, these the cover types were classified according to the New York State Natural Heritage Program's Ecological Communities of New York State ([NYNHP]

Edinger, *et al.* 2002 and Reschke, 1990). These cover types are indicated by the NYNHP's report outline numbers (*e.g.,* VI D 1). Figure 4 indicates the locations of these cover types and land uses across in the vicinity of the site superimposed on aerial photos from the NYS Geographic Information System (NYSGIS 2005).

Cover Type #1: Mowed Roadside/Lawn (with or without trees)

The REALCO site itself and the Unnamed Tributary #1 are located at the edge western/southwestern end of City of Dunkirk, placing them within a rural/semi-rural landscape. For this reason, the Terrestrial—Cultural upland community system predominates, with a small patch/linear arrangement. Cover Type #1 is a composite of the NYNHP types: **Mowed Lawn with Trees** (#VI D 11), **Mowed Lawn** (#VI D 12), and **Mowed Roadside/Pathway** (#VI D 13). The groundcover is typically clipped grasses and forbs, with or without shade tree cover but less than 30%, although more significantly taller vegetation and trees may develop along roadways and utility right-of-ways (Figure 4A-D).

Cover Type #2: Cropland (Row or Field Crops)

As the REALCO site and the Unnamed Tributary #1 are located at a rural/semi-rural landscape edge and there are occasional row and field crops within 0.25–0.5 miles (Figure 4A-B). Cover Type #2 is a composite of the NYNHP types: **Cropland/Row Crops** (#VI D 1) and **Cropland/Field Crops** (#VI D 1). This cover type is usually adjacent to either Cover Type #1 or one of the successional communities (see below).

Cover Type #3: Successional Old Field

Cover Type #3 is a terrestrial open upland community (#VI A 25, Figure 4A-C) characterized by weedy fields, dominated by grasses and forbs at locations historically cleared for agriculture or development. Dominant plant species include rough-stemmed goldenrod (*Solidago rugosa*), Canada goldenrod (*Solidago canadensis*), gray goldenrod (*Solidago nemoralis*), and late goldenrod (*Solidago gigantea*). In some areas, especially near the forested areas, woody vegetation such as staghorn sumac (*Rhus typhina*) and tartarian honeysuckle invades these fields.

Cover Type #4: Successional Shrubland

Cover Type #3 is another terrestrial open upland community (#VI A 26, Figure 4A-D) that successionally follows after a site is cleared and which then develops Cover Type #2 and/or which succeeds to being covered at least 50% by shrubs. Characteristic shrubs may be dogwood (*Cornus* spp.), cedar (*Juniperis* spp.), raspberries (*Rubus* spp.), hawthorn (*Crataegus* spp.), sumac (*Rhus* spp.), Viburnum spp., and/or multiflora rose (*Rosa multiflora*).

Cover Type #5: Successional Northern Hardwood Forest

Generally the last successional stage in these kinds of areas is Cover Type #5, a terrestrial forested upland community (#VI C 26, Figure 4A-D). This cover type is

dominated and shrubs such as by black cherry (*Prunus* spp.), cottonwood, and maple (*Acer spp.*). The understory is generally sparse except in areas where more sunlight penetrates. It is comprised of staghorn sumac, dewberry (*Rubus spp.*) and honeysuckle (*Lonicera* spp.).

Cover Type #6: Railroad

There are two railroad right-of-ways (Conrail to the north and Norfolk Southern to the south) that run through the site vicinity meeting the definition of the terrestrial cultural community Cover Type #6 (#VI D 16, Figure 4B).

Cover Type #7: Junkyard

Cover Type #6 is a terrestrial upland community that has been cleared for disposal/storage of generally inorganic refuse such autos, equipment, mechanical parts, etc. (#VI D 31). In the current case, the junkyard (see Figure 4A. is located amid Cover Types #4 & 5, straddling the Unnamed Tributary #1 of Crooked Brook.

Wetlands Cover Types

Both the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) and New York State Freshwater Wetlands Map for Dunkirk, NY topographic map were reviewed for the presence of wetlands within two miles of the site. Several federal and state wetlands are present (see wetlands section in Appendix 2), in particular there are three wetland areas co-incident with the tributary.

Cover Type #8: Shrub Swamp

There is a defined Shrub Swamp wetland that occurs in certain locations along the Unnamed Tributary #1 (Figure 4B). This wetland is Cover Type #8 (#V A 2 in Edinger, *et al.* 2002) and is identified on the NWI map as a palustrine, scrub/shrub, broad-leaved deciduous, seasonal flooded/saturated (PSS1E) wetland. The wetland is perennially saturated along the Unnamed Tributary #1, with a mineral soil or muck substrate.

Surface Water Bodies and Cover Types

Drainage patterns in the area of the REALCO/Dayton area are dendritic when uncontrolled, and included control via the sewer system, with all surficial waters and overland flow ultimately going northwest towards Lake Erie. The area is located within the Chautauqua Watershed basin (HUC#04120101; see Figure 5).

Cover Type #9: Reservoir/Artificial Impoundment

Willowbrook Pond occurs on the REALCO site (Figure 4A) and is by definition an artificial impoundment (#IV B 5 in Edinger, *et al.* 2002). The presence of biological resources is limited at best.

Cover Type #10: Marsh Headwater Stream

The perennial stream Crooked Brook is defined as a Marsh Headwater Stream (Cover Type #10 III A 2 in Edinger, *et al.* 2002); and it occurs within 0.25 miles north and east of the REALCO site (see Figures 1, 2, 3, and 4A-C). Crooked Brook is classified by NYSDEC as Class C fresh surface waters unregulated Stream (according to J. Dietz of the Permits Office, Division of Water at NYSDEC Region 9). [Class C fresh surface waters are defined in 6 NYCRR §701.8 with the best usage of such waters as fishing, and shall be suitable for primary and secondary contact recreation and fish propagation and survival.] Because the Unnamed Tributary # 1 of Crooked Brook is derivative of a Class C surface water body and is not otherwise classified or regulated, then it too is defined for regulatory purposes as Class C fresh surface waters (as confirmed with Dietz [2005] and Evans [2005]). This tributary also is a Marsh Headwater stream. Although the REALCO site itself is not within the 100- or 500-year flood plains, much of the Unnamed Tributary #1 and Crooked Brook are within these zones (see the Flood Plain Map in Appendix 2).

Fish and Wildlife Resources

In the vicinity of the REALCO Site, land use is a mixture of urban residential, commercial/industrial, wetlands, woodlands, and agricultural fields. This area appears to support a diverse set of wildlife that may be somewhat limited due to urban development. Wildlife uses in the area were evaluated using literature sources.

Rare, Endangered, and Threatened Species/Communities

EnRG contacted the USFWS and the NYSDEC NHP for information concerning endangered and threatened species (see Appendix 3). No federal listed RET species are located on the site (Appendix 3).

In their letter of January 24th, the NYSDEC NHP indicate that rare or state-listed animals and plants and significant natural communities occur in, at, around, or in the vicinity of the REALCO site and/or the Unnamed Tributary #1 of Crooked Brook. This information is "sensitive" and only the NHP letter is included in Appendix 3. Furthermore, the project location is adjacent to a designated Significant Coastal Fish and Wildlife Habitat, part of the state's Coastal Management Program administered by the New York State Department of State (NYSDOS, Division of Coastal Resources and Waterfront Development, see Figure 4C).

Upland Resources

The successional old field and shrub cover types provide wildlife with edge, cover, and food. These areas will have songbirds and mammalian species such as goldfinches (*Carduelis tristis*), song sparrows (*Melospiza melodia*), white-footed mice (*Peromyscus leucopus*), and meadow voles (*Microtus pennsylvanicus*), which consume the seeds of grass and forbs. With an abundant prey base, carnivores, such as red fox (*Vulpes vulpes*), red-tailed hawks (*Buteo jamaicensis*), and barn owls (*Tyto alba*) may reside in the area.

When discussing the wildlife value of forest stands, the composition of tree species is important. The variability of each individual stand will slightly alter the wildlife present, and the greater the diversity of tree species, the greater the wildlife value. Although there is considerable overlap between food sources that wildlife may use in each stand, in general, the greater the diversity within the stand, and the larger the tract size, the more significant the value of the habitat.

The northern hardwood successional forests have a variety of species including cottonwoods, maple, and black cherry. Black cherry is one of the most important wildlife food sources. Wild cherries comprise most of the diet of songbirds such as rose-breasted grosbeaks (*Pheucticus ludovicianus*), American robin (*Turdus migratorius*), cedar waxwing (*Bombycilla cedrorum*) and small mammals such as chipmunks (*Tamias striatus*) (Martin *et al.* 1951). The presence of sugar maples and cottonwoods increase the value of the area by providing additional sources of food and cover.

Wetland Resources

The wetland communities along the Unnamed Tributary #1 of Crooked Brook (occurring in Reaches 4-UT and 1-CB) provide habitat for many animals because of the seasonal presence of water. This water may be used directly for drinking by animals in the general area. In addition, ponded water within the wetlands is essential for breeding populations of amphibians.

Fishery and Coastal Resources

Crooked Brook is listed by NYSDEC (2003) as having a wild steelhead trout fishery. This was confirmed by J. Evans of the NYSDEC Division of Fish and Wildlife in December 2005. Evans indicated that Crooked Brook is generally to shallow and insufficient canopy to provide waters that are sufficiently cool to support spawning, and occasionally sand bars block its mouth on Lake Erie. Therefore, the Unnamed Tributary #1 would be less likely to support a spawning fishery, but could have some foraging trout. Regardless, Evans indicated that both surface waters support sunfish, bass, and other fish common to a recreational fishery. The rail/utility right-of-way corridor, where the Unnamed Tributary #1 flows (Reaches 3-UT and 4-UT), has sufficient access to support such recreation.

Unnamed Tributary #1 drains into Crooked Brook, which subsequently drains into Lake Erie. Crooked Brook enters a designated coastal zone as it empties into Lake Erie; and this mouth lies between Van Buren Point and Dunkirk Harbor, two areas designated by the NYS Department of State (NYSDOS) as Significant Coastal Fish and Wildlife Habitat (see Figure 4C, based upon a review of the NYSDOS map GL126 at the state's internet web site: http://nyswaterfronts.com/maps_lakes_western1.asp).

Contaminant of Potential Concern

As mentioned previously (USEPA 2004), PCB contamination originated at the site from soil surrounding electrical transformers on the property and found its way into the sediments of Willowbrook Pond on site. This observation led to a series of investigations of soils/sediments along the Unnamed Tributary #1. Table 2 and the aerial photos in Figure 6A-C present the analytical data available to EnRG for this Step 1 FWIA.

NYSDEC July 2004 Event

The agency collected six soil/sediment samples and analyzed them for PCB, total chromium, and nickel (NYSDEC 2004).

- Samples D08801 - D08804 were sediment/soil collected from the channel of the Unnamed Tributary #1 near the culvert at Willow Rd. (Reach 2-UT, see Figure 6).
- Samples D08805 and D08806 were soil collected on the normal flood plain outside of the channel near Brigham Rd. (Reach 2-UT, see Figure 6).

NYSDEC did not compare the four sediment samples to the agency's PCB sediment criteria due to a lack of total organic carbon (TOC) data for the samples. Instead, they compared the data to the agency's surface soil guidance values (TAGM 4046). Four of the samples in this set were greater than the 1 mg/kg surface soil concentration guidance value (Table 1, Figure 6). The two samples farthest from the channel centerline (D08804—sediment and D08806—soil) were below this guidance value.

NYSDEC December 2004 Event

The agency collected another five sediment/soil samples from the Unnamed Tributary #1 and analyzed them for PCBs and total nickel (NYSDEC 2005a).

- Two samples were collected 50 feet from the southern end of the culvert along the Norfolk Southern rail right-of-way: D088A (3" sediment) & D088AA (6" soil) (Reach 3-UT, see Figure 6).
- Two samples were collected from the northern end of the culvert along the Norfolk Southern rail right-of-way: D088B (3" sediment) – D088C (6-8" above stream. 6" soil) (Reach 4-UT, see Figure 6)
- Sample D88D (3" sediment) was located about 195 feet east of Route 5 in an oxbow in the stream (Reach 1-CB, see Figure 6).

NYSDEC did not compare the four sediment samples to the agency's PCB sediment criteria due to a lack of TOC data for the samples. Instead, they compared the data to surface soil guidance values. Four of the samples were greater than the 1 mg/kg surface soil concentration guidance value (Table 1). Only sediment sample (D088D) in this set of samples was less than the cleanup guidance value of 1 mg/kg.

NYSDEC April 2005 Event

Six sediment/soil samples were collected by the NYSDEC (2005b)

- Sample NF04E was a shallow (0-6 inches bgs) sediment sample collected upgradient of Willowbrook Pond, about 200 feet south of Willowbrook Road (Reach 0-UT, see Figure 6).
- Sample NF04F was a shallow sediment sample collected in the Unnamed Tributary #1 within the area of the wetland (Reach 4-UT, see Figure 6).
- Sample NF04G was a shallow sediment sample collected in the tributary at the culvert by the main Conrail rail line, south of 4th Street (Reach 4-UT, see Figure 6).
- Sample NF04H was a shallow sediment sample collected in Crooked Brook south of the Marsh Valve site (Reach 0-CB, see Figure 6).
- Sample NF04I was a sediment sample (0-6 inches bgs) collected at location of sample D088D (see above, Reach 1-CB, see Figure 6).
- The last sample, NF04J was a soil sample collected in an oxbow, 10 feet upstream between December's sample D088D and NF04I (Reach 1-CB, see Figure 6).

NYSDEC did not compare the four sediment samples to the agency's PCB sediment criteria due to a lack of TOC data for the samples. Instead, they compared the data to surface soil guidance values. Only sample NF04F/D088F had PCB concentrations greater than the 1 mg/kg surface soil concentration guidance value (Table 1). Sample NF04E/D088E had no detectable PCBs.

Other NYSDEC Data

Eight additional sediment samples were collected by the NYSDEC in 2005, but only the data were available (no reports):

- Sample K was a shallow (0-6 inches bgs) sediment sample collected about 500 feet further upstream of sample D088D in Crooked Brook, about 250 feet east of Route 5 (Reach 1-CB, see Figure 6).
- Sample M was a shallow (0-6 inches bgs) sediment sample collected on the bank of Lake Erie, about __ feet west of the mouth of Crooked Brook.
- Sample P & P´ was a shallow (0-6 inches bgs) sediment sample collected on the bank of Lake Erie, about __ feet east of the mouth of Crooked Brook.
- Sample Q was a shallow (0-6 inches bgs) sediment sample collected on the bank of Lake Erie, about __ feet east of the mouth of Crooked Brook.
- Sample R was a shallow (0-6 inches bgs) sediment sample collected at the stream on the east bank of Lake Erie.
- Sample S was a shallow (0-6 inches bgs) sediment sample collected at the stream on the west bank of Lake Erie.
- Sample T was a shallow (0-6 inches bgs) sediment sample collected at the mouth of Crooked Brook at Lake Erie (Reach 2-CB, see Figure 6).

Seven of these samples had no detectable PCBs; only K had a low (88 mg/kg) level of PCBs in it.

RFI Sample Data & Benchmark Supplemental RFI II Event

Benchmark also collected sediment data along the stream, but only between Brigham and Willow Roads (Reach 2-UT, see Figure 6). Their data are typically less than 0.5 mg/kg; however, the highest detected concentrations (3.7, 7.4, 17 mg/kg) occurred well downstream towards Willow Rd. These data suggest that the areal extent of PCB-impacted sediment/soil extends from the REALCO site downstream to Willow Road, some 750-1,000 linear feet.

Ecotoxicity of PCBs

The ecological effect of a chemical depends on many factors, such as its concentration in the environment and/or receptor organism, its accessibility and bioavailability to biota, synergistic interactions among constituents, the duration and frequency of exposure to that constituent, the receptor species, and the metabolic rate and metabolic process characteristics of the species. Chemicals can affect biota and ecosystems in both lethal and sub-lethal ways, such as the following:

- Altered development, behavior metabolic/physiologic rates, or processes/functions
- Increased susceptibility to disease, parasitism, or predation
- Disrupted reproductive functions
- Mutations or other reductions in offspring viability

Evaluation of potential ecological effects of chemicals requires an understanding of the toxicology involved. Appendix 4 of this report briefly summarizes toxicological information for PCBs.

Contaminant Transport, Fate, and Exposure

The transport and ultimate fate of chemicals in the environment are influenced by a variety of physical and chemical (physicochemical) factors of the chemicals themselves, as well as site-specific factors of the environmental media (soil, water, or air) where they occur. The chemical constituents detected at the REALCO Site include PCBs, SVOCs, and inorganic constituents. However, as discussed above, only PCBs are of concern for this assessment. Environmental fate and transport processes for the retained types of chemicals are briefly discussed below.

Physicochemical Properties

The fate and transport of chemicals in the environment depends on the properties of both the chemicals and the environmental media in which they occur. Table 2 lists the respective physical and chemical properties (*e.g.*, water solubility, Henry's Law Constant, Octanol-Water partition coefficient, and organic-carbon partition coefficient) for total PCBs.

Water solubility is the maximum concentration of a compound that dissolves in water at a specific temperature. Highly soluble compounds can be rapidly leached from soils and water and are generally mobile in groundwater and surface water. Chemicals of low water solubility are relatively immobile in aquifers but may be transported rapidly in turbulent surface waters as suspended particles. Some water-insoluble compounds become readily mobile when in contact with organic solvents.

Vapor pressure is a measure of the volatility of a chemical in its pure state and is a determinant of vaporization from waste sites. A compound's tendency to volatilize from water depends upon its Henry's Law Constant. Henry's Law Constant is the ratio, at equilibrium, of a compound's vapor pressure (atmospheres) to its water solubility (moles/m^3). Compounds with Henry's Law Constants greater than 10^{-3} atm-m^3/mol readily volatilize from water. Those with Henry's Law Constants from 10^{-3} to 10^{-5} atm-m^3/mol volatile less readily, while those with Henry's Law Constant less than 10^{-5} atm-m^3/mol volatilize slowly.

The Octanol-Water partition coefficient (K_{ow}) expresses the equilibrium distribution of an organic compound between octanol and water. Kow is often used to estimate the extent to which a chemical will partition from water into fatty tissues of animals. Log K_{ow} values range from –2.5 to 10.5. Organic chemicals with log K_{ow} values less than 3 are generally considered not to concentrate in animal tissues: that is, they do not bioaccumulate.

The Organic Carbon Partition Coefficient (K_{oc}) is a measure of the tendency of organic compounds to sorb to soil and sediment and is expressed by this equation:

$$K_{oc} = \frac{\text{(mg chemical sorbed / kg organic carbon)}}{\text{(mg chemical dissolved / L solution)}}$$

K_{oc} reflects the tendency of organic compounds to sorb to organic matter in soil and sediment. K_{oc} values for organic compounds range from 1 to 107; higher values indicate greater sorption potential. Chemicals with K_{oc} values less than 103 generally do not sorb strongly enough to soil to affect overall leachability.

As with organic chemicals, inorganic chemicals, metals, have a different Soil-Water Partition Coefficient (called the distribution or adsorption coefficient, $K_d = C_{soil} / C_{water}$). The relationship between organic carbon and sorption does not apply to these constituents. The soil-water distribution coefficient (K_d) is affected by many geochemical parameters and processes such as pH, sorption to various materials in soil (clay, organic matter, iron oxides, etc.), the oxidation/reduction conditions of the soil, and the chemical form of the metal, as well as other major ions present. The greater the adsorption to soil, then the magnitude of K_d will be greater.

Transport Mechanisms and Fate of Detected Chemicals

As stated previously, it appears that the source of PCBs at the REALCO site was originally from a transformer oil spill, which contained PCBs in the oil. The precise nature of this spill/release is unclear to EnRG, but two scenarios seem possible. It is possible that overland erosion (either wind or rain driven) caused contaminated soils to enter Willowbrook Pond. Another possible scenario is the direct release of transformer oil containing PCBs into the pond.

Regardless of the nature of the original release, PCBs entered into Willowbrook Pond and then migrated into the Unnamed Tributary #1 in the area of Reach-1UT as either PCB-tained oil or PCB-contaminated soil/sediment particles. Subsequent downstream contamination occurred as either PCB-tainted oil and/or contaminated sediment through the normal course of perennial flow and/or due to occasional erosion or scour due to high flow conditions.

Exposure

There are five elements necessary to have a complete Exposure Pathway:

1. A contaminant source, such as any waste disposal area;
2. A contaminant release and transport mechanism, which might carry contaminants from the source to points where exposure may occur;
3. A point of exposure, where actual or potential contact with contaminated media may occur;
4. A route of exposure (inhalation, ingestion, absorption); and
5. A receptor population that could be exposed to the contaminants at the point of exposure.

The following outlines the basis regarding whether an exposure pathway exists or not:

- An **exposure pathway**, as defined, **exists** when all of these elements exist.
- A **potential exposure pathway exists** when one or more of the elements are not fully known, but the others are present and identifiable.
- An **exposure pathway does not exist** when any one of the five elements does not exist, has not existed in the past, and will not exist in the future.

An Exposure Pathway is the course that a chemical may take from a source to an individual receptor, and includes:

- A **Source** and **Release Mechanism**
- An **Exposure Point**—location/potential contact point in the environment (*e.g.,* soil, surface water, sediment, and the like) between receptor and a COPC
- An **Exposure Route**—the way a receptor contacts a COPC (ingestion of contaminated media or dietary items [uptake by plants] and dermal contact with contaminated media, such as soil).

The primary environmental media most likely encountered by biota are surface soil and sediment through digging/burrowing, dermal contact, incidental ingestion of contaminated soil and/or sediment along with food items. Surface soil and sediment also can act as secondary contaminant sources.

Upon release, some constituents persist and may be transformed to more bioavailable forms and mobilized in the food chain via:

- Root uptake by wetland and terrestrial macrophytes
- Contact and absorption of chemicals in surface soil and sediments, leading to incidental ingestion
- Feeding on contaminated food by aquatic and terrestrial invertebrates
- Bioaccumulation from vegetation (less likely in the case of PCBs) and/or animal prey (more likely considering the BCF of PCBs, see Table 2) at the base of the food chain by wildlife

Contaminant Source

The contaminant source was the original release circumstance, discussed previously.

Release/Transport Mechanisms

The following release/transport mechanisms have been identified for the Site:

- Migration from the transformer release/spill into Willowbrook Pond—via contaminated soil and/or tainted oil
- Migration of contaminated sediment and/or tainted oil from Willowbrook Pond into Unnamed Tributary #1
- Migration of contaminated sediment and/or tainted oil along Unnamed Tributary #1 and into wetlands

- Migration of contaminated sediment and/or tainted oil along Unnamed Tributary #1 and Crooked Brook
- Migration of contaminated sediment and/or tainted oil along Crooked Brook and Into Lake Erie

Based on a review of the release/transport mechanisms, the potential for ongoing migration of these COPCs exists.

Points & Routes of Exposure

The following have been identified as the potential points and routes of exposure for fish and wildlife resources:

- **Sediment**—ingestion of contaminated media along with food items and dermal contact with contaminated media during digging/burrowing
- **Soil**—ingestion of contaminated media along with food items and dermal contact with contaminated media during digging/burrowing
- **Prey**—bioaccumulation and/or biomagnification in predators at higher trophic levels

In summary, there are potentially complete pathways of exposure present at the Site.

Ecological Receptor Resources

The ecological values of the site include populations and communities of plants and animals in terrestrial and wetland habitats. This site has many ecological resources and it is beyond this assessment's scope to evaluate every resource in detail. In broad terms, the values to be protected (called Assessment Endpoints) for each of habitat type includes the structure and function of site ecosystems, and the survival and reproduction of organisms/populations typical of the region (USEPA, 1997b), and these typically include (USEPA 2003):

- Officially Designated Endpoints (critical habitat for rare, endangered, or threatened (RET) species or special places)
- Organism-Level Endpoints (particular organisms within an assessment population or community, such as RET species or organisms critical to the food chain)
- Population Endpoints (focus on critical game, resource species, or harvested species)
- Community- or Ecosystem-Level Endpoints (consider larger areas with important habitat, *e.g.,* certain plant assemblages, sensitive aquatic communities, or wetlands)

Based on the exposure pathways identified above, exposure of the following general classes of ecological receptors and certain several sensitive receptors to PCBs at and near the REALCO Site may potentially occur:

- Plants (primarily aquatic and wetland)
- Facultative aquatic wildlife species that may be in contact with the wetland sediments and/or frequently use the wetlands for foraging
- Obligate aquatic species (such as herptiles) that contact wetland sediments and surface water regularly.
  - In particular, the Crooked Brook steelhead trout fishery
- Terrestrial wildlife species that may be in contact with the soils and that feed within the terrestrial/wetland/surface water food chain
- Avian species that use the terrestrial and/or wetland areas for forage and prey (invertebrates or small fish)
- RET species and communities within the vicinity of the REALCO site and the Unnamed Tributary #1 and Crooked Brook watershed.
- The wetland communities along the Unnamed Tributary #1 of Crooked Brook (occurring in Reaches 4-UT and 1-CB)
- The Coastal Zone between Lake Erie and Route 5 along the Crooked Brook corridor

Environmental Screening Criteria

EnRG used a set of criteria to evaluate the sediment and soil concentration data (see Table 3). The set included criteria include a range of protectiveness that addresses a variety of potential receptors, including macrobenthic invertebrates, microorganisms, plants, soil invertebrates, and microorganisms, and upper trophic levels. The table has the criteria arranged in a manner running from lower effects levels to higher effects levels, as one reads left to right. EnRG obtained these criteria from the US Department of Energy (USDOE) Oak Ridge National Laboratory (ORNL, 2005) Risk Assessment Information System (RAIS) Ecological Benchmark Database; see additional information on each criterion and a reference citation in the cited table). RAIS contains various criteria, including: Risk-Based Preliminary Remediation Goal (PRG) calculations, a Toxicity database, Risk Calculations, and Ecological Benchmarks.

These environmental criteria are media-specific screening levels for comparison to and evaluation of PCB concentrations in sediments and soils. Excursions above these criteria by measured environmental media concentrations may indicate that those particular sampling locations where the criteria exclusions occurred should be evaluated in more detail and/or remediated. Thus, the purpose of these environmental screening criteria is to help focus the investigation on those areas most likely to pose an unacceptable risk to the environment.

According to NYSDEC's sediment criteria document (1998b), an analyst can adjust the criteria by the amount of organic carbon (OC) in the particular sediment and COPCs (such as PCBs) under consideration. Unfortunately, no organic carbon data are available for the data set considered in this FWIA. However, soil survey information was available, including approximate organic matter (OM) content. The Van Bumlen equation is the common conversion tool relating OM to OC, as soil OM generally contains about 56% OC (see table within Figure 7). EnRG adjusted the criteria according to three assumed levels of OC: 1, 2, and 3% (see Figure 7).

Exposure Point Concentration

The Exposure Point Concentration (EPC) represents the environmental concentration of a chemical in a particular medium to which an ecological receptor at that site would be exposed. Due to the focus of this assessment and a limited data set, it was decided to evaluate the entire data set in order to consider the linear feet of reach of impacted stream.

Findings and Significance

Screening-Level Analysis

As discussed above, the ORNL RAIS database was the source of various Environmental Screening Criteria as well as the NYSDEC soil cleanup goals outlined in TAGM 4046 and the sediment criteria (NYSDEC 1998b). EnRG performed the analysis by a simple comparison of soil or sediments as discussed below.

Sediment

Figure 7 presents all of the sediment data in a bar chart according to the approximate linear location of the sample point from the mouth of Crooked Brook. The figure only shows total PCBs due to the lack of congener data for each sample. In order to provide a consist picture of concentration for the entire set, samples with only Non-Detect (ND) were arbitrarily set at 0.01 mg/kg (ppm).

The analysis shown in Figure 7 indicates that a considerable length of the Unnamed Tributary # 1 and even Crooked Brook have measurable levels of PCBs within surficial sediments and occasionally at depth (about 6 inches). Further, the concentrations in some case extend well beyond the centerline of the stream by several feet. The concentrations range over five orders of magnitude, but the highest concentrations occur within Reach-2UT between Willow and Brigham Roads. All upstream reaches (Reach-0UT and -0CB) appear to be clear of PCBs in this dataset.

Soil

Only a limited set of true soil samples are available (see the separate graph in Figure 7). The figure only shows total PCBs due to the lack of congener data for each sample. The screening analysis includes arrows showing the NYSDEC surficial and subsurface criteria for soils. The highest concentrations of PCBs in soil occur within the wetland area of Reach-4UT.

Significance

The analysis, following guidance, suggests potential risk or impact to fish and wildlife resources from PCBs in the sediments and soils in and along the Unnamed Tributary #1, and to a lesser extent Crooked Brook. The concentration of the particular COPC, its bioavailability and ability to bioaccumulate and biomagnify through the food chain, as well as the mechanism and amount of exposure, and exposure frequency and duration, determines the potential ecological risk or impact. Figure 7 indicates that sediments and soils in and along Reaches-1UT and -2UT are particularly impacted in comparison to the criteria.

Conceptual Risk System Model and Conclusions

The first step of a FWIA provides a definition of the risk system to be assessed, which can be graphically depicted by way of a Conceptual Site Model (the CSM, Figure 8). This is a schematic of the site and its environs, presenting information regarding sources, the release, transport, and fate of site-related chemicals, exposed plant or animal receptors, or critical habitat:

- The REALCO Site had a release of PCB-tainted transformer oil that reached Willowbrook Pond and then into the Unnamed Tributary #1 of Crooked Brook. This oil or soil impacted by this PCB-containing oil entered by some mechanism into Willowbrook Pond and then into the Unnamed Tributary #1 of Crooked Brook.
- PCBs most likely sorbed onto soil/sediment particles then migrated along the tributary, and occasionally over the banks and into the wetland area, as well as downstream almost to the point of where Crooked Brook crosses Route 5 and enters the Coastal Zone.
- Various flora and fauna may ingest or contact these PCB-impacted sediments/soils either directly by way of accumulation within biota (*e.g.*, flora, terrestrial and benthic invertebrates, and fish) and when predated upon expose organisms higher in the food chain.

The fish and wildlife within the area is significant and productive, and there are protected species and communities near the site and the affected streams.

Consistent with the NYSDEC's FWIA process and as described in its draft DER-10 guidance EnRG concludes the following:

- The site has considerable capability to support fish and wildlife.
- Although it is on the edge of an urban area, the site and streams are ecologically productive and diverse.
- Currently, there appears to be no apparent actual impact based upon the available information.
- There is a potential for adverse impacts, considering the concentration levels in stream sediments and the linear length of elevated concentrations.

Therefore, the available information indicates a potential for adverse ecological risk effects, and we believe that a more thorough assessment (FWIA Step 2: Ecological Impact Assessment) is warranted.

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environmental
risk Group

Tables

Table 1
Soil and Sediment Analytical Data
REALCO Slte
Dunkirk, NY

ENVIRONMENTAL RISK GROUP

		Sample No.	D08801		D08802		D08803		D08804		D08805		D08806		D0880A	
		Reference	*NYSDEC 2004*		*NYSDEC 2004*		*NYSDEC 2004*		*NYSDEC 2004*		*NYSDEC 2004*		*NYSDEC 2004*		*NYSDEC 2005a*	
		Media	Sediment		Sediment		Sediment		Sediment		Soil		Soil		Sediment	
		Date	07/12/04		07/12/04		07/12/04		07/12/04		07/12/04		07/12/04		12/08/04	
		Location--description	3" under creek bed at Willow Rd culvert		18" up creek bank at Willow Rd culvert		36" up creek bank at Willow Rd culvert		54" up creek bank at Willow Rd culvert		South bank near Bingham Rd before channel turns south.		6" deep, 20' from south bank, ≈60' south of D8805 nearer Brigham Rd		South of Western RR @ culvert	
		Approx. dist. from mouth of CB (ft)	6,440		6,440		6,440		6,440		6,950		6,950		5,160	
Analyte	CAS No.	Units	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Benzo(a) anthracene																
Arsenic																
Cadmium																
Chromium	7440-47-3		762.0		299.0		180.0		31.5		287.0		282.0			
Copper																
Iron																
Lead																
Manganese																
Nickel	7440-02-0		549.0		295.0		179.0		35.0		317.0		263.0		199.0	
Zinc																
PCB-1248	12672-29-6		16.0		11.0		5.0	J	0.45		7.1		0.7		5.8	
PCB-1254	11097-69-1														1.1	J
PCB-1260	11096-82-5		nd		nd		nd				nd		nd			
TOTAL PCBs			16.0		11.0		5.0		0.50		7.1		0.7		6.9	

Notes	
UT	Unnamed Tributary #1 of Crooked Brook
CB	Crooked Brook
LE	Lake Erie

Table 1
Soil and Sediment Analytical Data
REALCO Slte
Dunkirk, NY

ENVIRONMENTAL RISK GROUP

		Sample No.	D0880AA		D0880B		D088C		D088D		NF04E / D088E		NF04F / D088F		NF04G / D088G
		Reference	*NYSDEC 2005a*		*NYSDEC 2005a*		*NYSDEC 2005a*		*NYSDEC 2005a*		*NYSDEC 2005b*		*NYSDEC 2005b*		*NYSDEC 2005b*
		Media	Soil		Sediment		Soil		Sediment		Sediment		Sediment		Sediment
		Date	12/08/04		12/08/04		12/08/04		12/08/04		01/12/05		01/12/05		01/12/05
		Location--description	South of Western RR @ culvert		North of Western RR @ culvert		North of Western RR @ culvert		CB 200' east of Route 5		Upstream, 220' south of Willowbrook Rd		3" channel UT w/i wetland		UT So of Conrail RR w/l wetland
		Approx. dist. from mouth of CB (ft)	5,160		4,850		4,850		1,325		8,125		4,650		3,050
Analyte	CAS No.	Units	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg
Benzo(a) anthracene															
Arsenic															
Cadmium															
Chromium	7440-47-3														
Copper															
Iron															
Lead															
Manganese															
Nickel	7440-02-0		209.0		256.0		348.0		457.0						
Zinc															
PCB-1248	12672-29-6		6.6	J	7.0		10.0	J	0.6		nd		3.9		0.54
PCB-1254	11097-69-1		3.3	J	nd		2.7	J	0.3		nd		nd		nd
PCB-1260	11096-82-5										nd		nd		nd
TOTAL PCBs			9.9		7.0		12.7		0.9		nd		3.9		0.54

Notes	
UT	Unnamed Tributary #1 of Crooked Brook
CB	Crooked Brook
LE	Lake Erie

Table 1
Soil and Sediment Analytical Data
REALCO Slte
Dunkirk, NY

ENVIRONMENTAL RISK GROUP

		Sample No.	NF04EH/ D088H		NF04I / D088I		NF04J / D088J		K		M		P		p'		Q		R	
		Reference	*NYSDEC 2005b*		*NYSDEC 2005b*		*NYSDEC 2005b*		*?*		*?*		*?*		*?*		*?*		*?*	
		Media	Sediment		Sediment		Soil		Sediment?		Sediment		Sediment		Sediment		Sediment		Sediment	
		Date	01/12/05		01/12/05		01/12/05		*?*		*?*		*?*		*?*		*?*		*?*	
		Location--description	Upstream CB		CB 200' east of Route 5		CB 210' east of Route 5		CB near UT mouth		LE-west		LE-east 2		LE-east 2		LE-east 1		LE/CB-e	
		Approx. dist. from mouth of CB (ft)	3,450		1,325		1,325		1,450		-625		-1,500		-1,500		-900		-475	
Analyte	CAS No.	Units	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Benzo(a) anthracene																				
Arsenic																				
Cadmium																				
Chromium	7440-47-3																			
Copper																				
Iron																				
Lead																				
Manganese																				
Nickel	7440-02-0																			
Zinc																				
PCB-1248	12672-29-6		nd		0.62		0.30													
PCB-1254	11097-69-1		nd		0.17		0.20													
PCB-1260	11096-82-5		0.019	J	nd		nd													
TOTAL PCBs			0.019	J	0.79		0.50		0.088		ND		ND		ND		ND		ND	

Notes	
UT	Unnamed Tributary #1 of Crooked Brook
CB	Crooked Brook
LE	Lake Erie

Table 1
Soil and Sediment Analytical Data
REALCO Slte
Dunkirk, NY

ENVIRONMENTAL RISK GROUP

		Sample No.	S		T		SD-S-01-06		SD-S-02-06		SD-S-03-06		SD-04		SD-05		SD-06		SD-07	
		Reference	*?*		*?*		*BEES 2005*		*BEES 2005*		*BEES 2005*		*BEES 2005*		*BEES 2005*		*BEES 2005*		*BEES 2005*	
		Media	Sediment		Sediment		Sediment		Sediment		Sediment		Sediment		Sediment		Sediment		Sediment	
		Date	*?*		*?*		*RFI I*		*RFI I*		*RFI I*		*RFI II*		*RFI II*		*RFI II*		*RFI II*	
		Location--description	LE/CB-w		CB-mouth		So. Willowbrook Rd		Brigham Rd		Brigham Rd		Brigham Rd		Willow Rd -- Brigham Rd		Willow Rd -- Brigham Rd		So. Willowbrook Rd	
		Approx. dist. from mouth of CB (ft)	-300		0		8,125		7,170		7,040		7,180		6,965		6,890		8,125	
Analyte	CAS No.	Units	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Benzo(a) anthracene													7,300		3,900					
Arsenic							7.7	J					6.7		8.6				7.3	
Cadmium							3	J	3	J	2	J								
Chromium	7440-47-3								430	J	47	J	373		397		48.6			
Copper							20	J	25	J	16	J	49.7		54.1		19.2			
Iron													24,000		26,000				23,500	
Lead							40	J			190	J	52.7		85.1					
Manganese							710	J	480	J			2,370		1,860					
Nickel	7440-02-0						24	J	240	J	39	J	221		300		64			
Zinc													192		211					
PCB-1248	12672-29-6												140		3,700		380			
PCB-1254	11097-69-1																			
PCB-1260	11096-82-5																			
TOTAL PCBs			ND		ND		ND		ND		ND		140		3,700		380		ND	

Notes	
UT	Unnamed Tributary #1 of Crooked Brook
CB	Crooked Brook
LE	Lake Erie

Table 1
Soil and Sediment Analytical Data
REALCO Slte
Dunkirk, NY

ENVIRONMENTAL RISK GROUP

		Sample No.	SD-08		SD-09		SD-10		SD-11		SD-12		SD-13		SD-14		SSD-1
		Reference	*BEES 2005*		*BEES 2005*		*BEES 2005*		*BEES 2005*		*BEES 2005*		*BEES 2005*		*BEES 2005*		*BEES 2005*
		Media	Sediment		Sediment		Sediment		Sediment		Sediment		Sediment		Sediment		Sediment
		Date	*RFI II*		*RFI Supp. II*		*RFI Supp. II*		*RFI Supp. II*		*RFI Supp. II*		*RFI Supp. II*		*RFI Supp. II*		*RFI Supp. II*
		Location--description	So. Willowbrook Rd		Willow Rd -- Brigham Rd		Willow Rd -- Brigham Rd		Willow Rd -- Brigham Rd		Willow Rd -- Brigham Rd		Willow Rd -- Brigham Rd		Creek bed at Willow Rd culvert		Brigham Rd
		Approx. dist. from mouth of CB (ft)	8,125		6,815		6,740		6,665		6,590		6,515		6,440		7,100
Analyte	CAS No.	Units	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg
Benzo(a) anthracene																	
Arsenic			10.4														
Cadmium																	
Chromium	7440-47-3		53.8		2,230		158		583		70.8		44.5		926		1,140
Copper			22.3														
Iron			23,400														
Lead																	
Manganese																	
Nickel	7440-02-0		22.2		1,150		100		375		68.2		44.9		529		614
Zinc																	
PCB-1248	12672-29-6						80		450		7,400		69		17,000		400
PCB-1254	11097-69-1																
PCB-1260	11096-82-5																
TOTAL PCBs			ND		ND		80		450		7,400		69		17,000		400

Notes	
UT	Unnamed Tributary #1 of Crooked Brook
CB	Crooked Brook
LE	Lake Erie

Table 1
Soil and Sediment Analytical Data
REALCO Slte
Dunkirk, NY

ENVIRONMENTAL RISK GROUP

		Sample No.	SSD-2		SSD-2A		SSD-3		SSD-4		SSD-5	
		Reference	*BEES 2005*		*BEES 2005*		*BEES 2005*		*BEES 2005*		*BEES 2005*	
		Media	Sediment		Sediment		Sediment		Sediment		Sediment	
		Date	*RFI Supp. II*		*RFI Supp. II*		*RFI Supp. II*		*RFI Supp. II*		*RFI Supp. II*	
		Location--description	Willow Rd -- Brigham Rd		Willow Rd -- Brigham Rd		Willow Rd -- Brigham Rd		Willow Rd -- Brigham Rd		Creek bed at Willow Rd culvert	
		Approx. dist. from mouth of CB (ft)	6,950		6,940		6,590		6,515		6,440	
Analyte	CAS No.	Units	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Benzo(a) anthracene												
Arsenic												
Cadmium												
Chromium	7440-47-3		1,510		46						64.4	
Copper												
Iron												
Lead												
Manganese												
Nickel	7440-02-0		1,270		77.5		37.2		226		56	
Zinc												
PCB-1248	12672-29-6		360		240				170		85	
PCB-1254	11097-69-1											
PCB-1260	11096-82-5											
TOTAL PCBs			360		240		ND		170		85	

Notes	
UT	Unnamed Tributary #1 of Crooked Brook
CB	Crooked Brook
LE	Lake Erie

Table 2
Physico-Chemcial Parameters of PCBs (CAS 1336363)
REALCO Site
Dunkirk, NY

ENVIRONMENTAL RISK GROUP

Molecular Weight (g/mole)	Physical State at 20°C	Melting Point (°C)	Boiling Point (°C)	Ref.	Water Solubility (mg/l)	Ref.	Log K_{ow}	Ref.	K_{oc}* (L/kg)	Ref.	Soil-Water Partition Coef. (Kd) (L/kg)	Ref.
292.0	solid	122.32	291.99	A	0	A	6.29	A	44,800.0	A	NA	

Vapor Pressure (mm Hg)	Ref.	Unitless Henry's Law Constant	Ref.	Henry's Law Constant (atm-m3/mol)	Ref.	Diffusivity in Air (cm^2/s)	Ref.	Diffusivity in Water (cm^2/s)	Ref.
8.63E-05	A	1.40E-02	A		A	0.0175	B	8.00E-06	B

Bioconcentration Factor (BCF_{aq}) (L/kg)	Ref.	Soil-to-Dry Plant Uptake (BCF_{plant})	Ref.	Soil-to-Wet Plant Uptake (BCF_{plant})	Ref.
58,000	A	0.013	C	0.003	C

Notes: * K_{oc} ranges from 10,300 for Aroclor® 1221 to 207,000 for Aroclor 1260. The value cited in the table reflects a general value for a mixture.

References:

A USEPA, 2000, EPI Suite Software (V3.12 June 2004) see website: http://www.epa.gov/oppt/exposure/docs/episuitedl.htm

B USEPA, 2004, WATER9 Software (Version 2.0), see website: http://www.epa.gov/ttn/chief/software/water/index.html

C McKone, T. E. 1994. Uncertainty and variability in human exposures to soil contaminants through home-grown food: a Monte Carlo assessment. Risk Anal. 14(4):449-463

Table 3
Sediment Soil Ecological Screening Criteria
REALCO Site
Dunkirk, NY

ENVIRONMENTAL RISK GROUP

SOIL	USEPA Reg. 5 ESL	USEPA Reg. 4	Dutch Target	NYSDEC	Dutch Intervention	USEPA Reg. 6 Plants	ORNL Plants
Surface	0.000332	0.02	0.02	1	1	40	40
Subsurface				10			
SEDIMENT	USEPA OSWER Ecotox Threshold	USEPA ARCS TEC	USEPA Reg. 4	USEPA Reg. 5 ESL	USEPA ARCS NEC	USEPA ARCS PEC	US EPA Reg. 6 FW
	0.02	0.03	0.03	0.05	0.194	0.24	0.341
	Canadian ISQG	Canadian PEL	Consensus TEC	Consensus PEC	Ontario Low	Ontario Severe	
	0.0341	0.277	0.05	0.67	0.07	5.3	
	FDEP TEL	FDEP PEL	Washington NEL	Washington MAEL			
	0.02	0.18	0.12	0.65			
	NOAA ERL	NOAA ERM				BCMOELP 1998 Fish	Swain & Holms--Fish
	0.02	0.18				0.1	0.5
	NYSDEC Sediment (mg PCB / kg OC)						
	Health Bioaccum.	Wildlife Bioaccum.	Benthic--acute	Benthic--chronic			
	0.0008	1.4	2,760	19			

Notes: All concentrations and criteria are in mg/kg, unless otherwise indicated NA Not Available

Comments:

SOIL ECOLOGICAL CRITERIA

Dutch Intervention & Taget Values

Target Values for soil are related to negligible risk for ecosystems. This is assumed to be 1% of the Maximal Permissible Risk (MPR) level for ecosystems, where MPR is the concentration expected to be hazardous for 5% of the species in the ecosystem, or the 95% protection level. For metals, background concentrations are taken into account in arriving at a value. The relationship between soil concentration and irreparable damage to terrestrial species composition and the relationship between soil concentration and adverse effects on microbial and enzymatic processes were derived to quantify the ecotoxicological effects on ecosystems. The ecological Intervention Value is the concentration expected to be hazardous to 50% of the species in the ecosystem. It cannot be assumed that sensitive species will be protected at the Intervention levels. Site concentrations less than Target Values indicate no restrictions necessary; concentrations between Target Values and Intervention Values suggests further investigation or restrictions may be warranted. Site concentrations exceeding the Intervention Value indicate remediation is necessary. Site-specific values based on percent clay and organic matter for metals and percent organic matter for organic compounds may be derived.

Swartjes, F.A. 1999. Risk-based Assessment of Soil and Groundwater Quality in the Netherlands: Standards and Remediation Urgency. Risk Analysis 19(6): 1235-1249

The Netherlands Ministry of Housing, Spatial Planning and Environment's Circular on target values and intervention values for soil remediation http://www.minvrom.nl/minvrom/docs/bodem/S&I2000.PDF and Annex A: Target Values, Soil Remediation Intervention Values and Indicative Levels for Serious Contamination http://www.minvrom.nl/minvrom/docs/bodem/annexS&I2000.PDF were also consulted, but they combine the ecological and human health values.

EPA Region 4	EPA. 2001. Supplemental Guidance to RAGS: Region 4 Bulletins, Ecological Risk Assessment. Originally published: EPA Region IV. 1995. Ecological Risk Assessment Bulletin No. 2: Ecological Screening Values. U.S. Environmental Protection Agency Region 4, Waste Management Division, Atlanta, GA. Website version last updated 30 November 2001: http://www.epa.gov/region4/waste/ots/epatab4.pdf
EPA Region 5 ESLs - Soil	The ESL reference database consists of Region 5 media-specific (soil, water, sediment, and air) Ecological Screening Levels (ESLs) for RCRA Appendix IX hazardous constituents. The ESLs are initial screening levels with which the site contaminant concentrations can be compared. The ESLs help to focus the investigation on those areas and chemicals that are most likely to pose an unacceptable risk to the environment. ESLs also impact the data requirements for the planning and implementation of field investigations. ESLs alone are not intended to serve as cleanup levels. See the August 2003 revision of the ESLs (formerly EDQLs) at http://www.epa.gov/reg5rcra/ca/ESL.pdf
EPA Region 6 Ecological Screening Benchmarks: Surface Soil -- Plants	U.S. EPA Region 6 recommends use of benchmarks adopted by the Texas Natural Resource Conservation Commission. For the most part, these are benchmark values for terrestrial plants developed by Efroymson et al. (1997), but values for arsenic, cadmium, chromium, and zinc are from EPA's Ecological Soil Screening Level Guidance effort. Texas Natural Resource Conservation Commission. 2001. Guidance for Conducting Ecological Risk Assessments at Remediation Sites in Texas. Toxicology and Risk Assessment Section, Texas Natural Resource Conservation Commission, Austin, TX. RG-263 (revised).
ORNL Plants	Efroymson, R.A. , M.E. Will, G.W. Suter II, and A.C. Wooten. 1997a. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision. Oak Ridge National Laboratory, Oak Ridge, TN. ES/ER/TM-85/R3. (Available at http://www.esd.ornl.gov/programs/ecorisk/documents/tm85r3.pdf)

SEDIMENT ECOLOGICAL BENCHMARKS

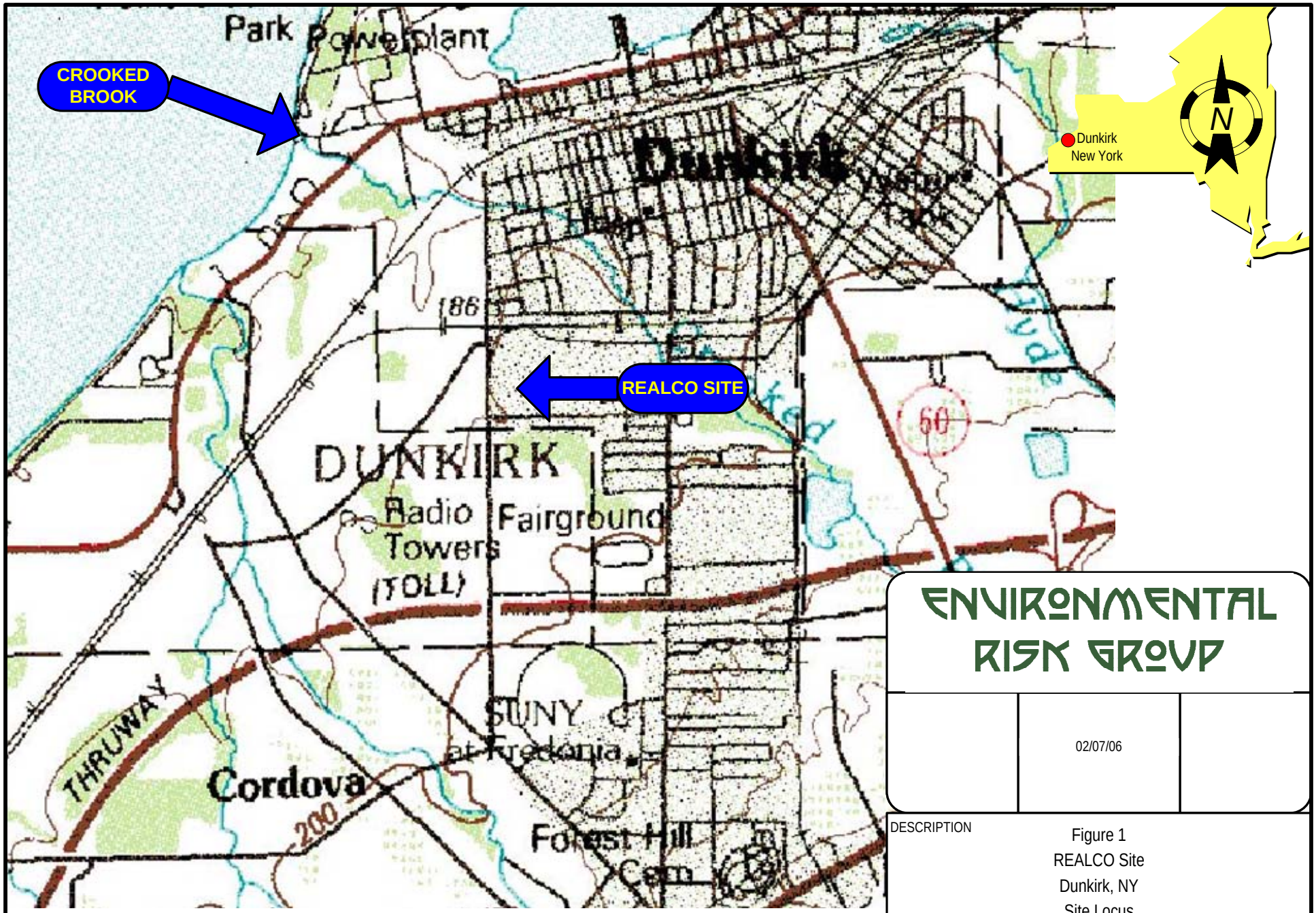
ARCS NEC, TEC, & PEC:	Assessment and Remediation of Contaminated Sediments Program-The representative effect concentration selected from among the high No-Effect-Concentrations (NECs) for Hyalella azteca and Chironomus riparius. It is a concentration above which statistically significant adverse biological effects always occur. Effects may occur below these levels. The majority of the data are for freshwater sediments. The Threshold Effect Concentration (TEC) is the geometric mean of the 15th percentile in the effects data set and the 50th percentile in the no effects data set. It is a concentration that represents the upper limit of the range dominated by no effects data. Concentrations above the TEC may result in adverse effects to these organisms; concentrations below the TEC are unlikely to result in adverse effects. The majority of the data are for freshwater sediments. These are possible-effects benchmarks. The Probable Effects Concentration (PEC) is the geometric mean of the 50th percentile in the effects data set and the 85th percentile in the no effects data set. It represents the lower limit of the range of concentrations usually associated with adverse effects. A concentration that is greater than the PEC is likely to result in adverse effects to these organisms. The majority of the data are for freshwater sediments. These are probable-effects benchmarks. USEPA, 1996, Calculation and evaluation of sediment effect concentrations for the amphipod Hyalella azteca and the midge Chironomus riparius, EPA 905/R96/008, Great Lakes National Program Office: Chicago, IL (http://www.cerc.usgs.gov/clearinghouse/data/brdcerc0004.html http://www.cerc.usgs.gov/pubs/sedtox/sec-dev.html)
Canadian ISQG & PEL:	The Water Quality Guidelines Task Group of the Canadian Council of Ministers of the Environment (CCME) developed chemical concentrations recommended to support and maintain aquatic life associated with bed sediments. These values are derived from available scientific information on biological effects of sediment-associated chemicals and are intended to support the functioning of healthy ecosystems. The Sediment quality guidelines protocol relies on the National Status and Trends Program approach and the Spiked-Sediment Toxicity Test approach. The Interim Sediment Quality Guidelines (ISQG) correspond to threshold level effects below which adverse biological effects are not expected. The Probable Effects Levels (PEL) correspond to concentrations above which adverse biological effects are frequently found. See Environment Canada's Environmental Quality Guidelines at http://www.ec.gc.ca/ceqg-rcqe/English/Ceqg/Sediment/default.cfm and http://www.ccme.ca/assets/pdf/e1_06.pdf

Consensus PEC & TEC:	Consensus-based Sediment Quality Guidelines (SQG) represent the geometric mean of published SQGs from a variety of sources. Sources for Probable Effect Concentrations (PEC) include probable effect levels, effect range median values, severe effect levels, and toxic effect thresholds (see MacDonald et al. 2000 for references). PECs are intended to identify contaminant concentrations above which harmful effects on sediment-dwelling organisms are expected to occur more often than not. Sources for Threshold Effect Concentrations (TEC) include threshold effect levels, effect range low values, lowest effect levels, minimal effect thresholds, and sediment quality advisory levels. TECs are intended to identify contaminant concentrations below which harmful effects on sediment-dwelling organisms are not expected. MacDonald, DD, CG Ingersoll, and TA Berger, 2000, Development and evaluation of consensus-based sediment quality guidelines for freshwater ecosystems, Arch Environ Contam Toxicol 39: 20-31
USEPA Region 4:	The higher of the EPA Contract Laboratory Program Practical Quantitation Limit and the Effects Value, which is the lower of the ER-L and the TEL. These are possible effects benchmarks. USEPA Region IV, 1995, Ecological Screening Values, Ecological Risk Assessment Bulletin No. 2, Waste Management Division. Atlanta, Georgia. (Superseded by http://www.epa.gov/region04/waste/ots/ecolbul.htm#tbl3)
USEPA Region 5 ESLs:	The ESL reference database consists of Region 5 media-specific (soil, water, sediment, and air) Ecological Screening Levels (ESLs) for RCRA Appendix IX hazardous constituents. The ESLs are initial screening levels with which the site contaminant concentrations can be compared. The ESLs help to focus the investigation on those areas and chemicals that are most likely to pose an unacceptable risk to the environment. ESLs also impact the data requirements for the planning and implementation of field investigations. ESLs alone are not intended to serve as cleanup levels. (See the August 2003 revision of the ESLs (formerly EDQLs) at http://www.epa.gov/reg5rcra/ca/ESL.pdf.)
USEPA Region 6 Ecological Screening Benchmarks: Freshwater Sediment:	USEPA Region 6 recommends use of benchmarks developed for the Texas Natural Resource Conservation Commission. These benchmarks are conservative screening level values intended to be protective of benthic biota. Values were compiled from a prioritized list of published values. The primary benchmarks are Threshold Effects Levels (TELs) from Smith et al. (1996), but values for antimony and silver are Effect Range-Low (ER-L) values from Long and Morgan (1990), values for iron, manganese, total PAHs, several pesticides, and PCBs are Lowest Effects Levels (LELs) from Persaud et al. (1993), anthracene, dibenzo(a,h)anthracene, and naphthalene are Threshold Effect Concentrations (TECs) from MacDonald et al. (2000), and DDT, DDE, and DDD values are from Environment Canada (1997). Texas Natural Resource Conservation Commission, 2001, Guidance for Conducting Ecological Risk Assessments at Remediation Sites in Texas, Toxicology and Risk Assessment Section, Texas Natural Resource Conservation Commission, Austin, TX, RG-263 revised).
FDEP TEL & PEL: (Threshold Effects Levels and Probable Effects Levels)	Sediment quality assessment guidelines developed for the State of Florida for 34 priority substances based on the approach recommended by Long and Morgan (1990). They are intended to assist sediment quality assessment applications, such as identifying priority areas for non-point source management actions, designing wetland restoration projects, and monitoring trends in environmental contamination. They are not intended to be used as sediment quality criteria. Long, ER and LG Morgan, 1990, The potential for biological effects of sediment-sorbed contaminants tested in the National Status and Trends Program, NOAA Technical Memorandum NOS OMA 52, National Oceanic and Atmospheric Administration, Seattle, WA; and MacDonald, DD, 1994, Approach to the Assessment of Sediment Quality in Florida Coastal Waters, Office of Water Policy, Florida Department of Environmental Protection, Tallahassee, FL http://www.dep.state.fl.us/dwm/documents/sediment/volume1.pdf)
NOAA ERL & ERM:	Effects Range Low and Median are from-NOAA National Status and Trends Program, Sediment Quality Guidelines (Has values for As, Cd, Cr, Cu, Pb, Hg, Ni, Ag, Zn, DDE, PAHs, total DDT, total PCBs, and total PAH were obtained from this source, see http://response.restoration.noaa.gov/cpr/sediment/SPQ.pdf); Long, ER and LG Morgan,1991,The Potential for Biological Effects of Sediment-Sorbed Contaminants Tested in the National Status and Trends Program, National Oceanographic and Atmospheric Administration, Tech. Memorandum NOS OMA 52, August 1991,Seattle, WA (Has values for DDD, DDT, Antimony, Chlordane, Dieldrin, and Endrin were obtained from this source.); and Long, ER, DD MacDonald, SL Smith, and FD Calder, 1995, Incidence of Adverse Biological Effects within Ranges of Chemical Concentrations in Marine and Estuarine Sediments, Environ Manage19: 81-97 (for all other metals and organics not listed the other two sources.)

Ontario Low & Severe:	See-Persaud, D, R Jaagumagi, and A Hayton, 1993, Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario, Ontario Ministry of the Environment and Energy, August, ISBN 0-7729-9248-7. (Available at http://www.ene.gov.on.ca/envision/gp/B1_3.pdf)
OSWER:	OSWER Ecotox thresholds, US Environmental Protection Agency (ECO Update 3 (2):1-12 1996, (http://www.epa.gov/superfund/programs/risk/eco_updt.pdf)
WA NEL, MAEL, & AET:	Washington NEL: Washington NEL Sediment Quality Standards are used as a sediment quality goal for Washington state sediments. These are "no effects" level values. No effects means a concentration that does not result in acute or chronic adverse effects to biological resources relative to reference and does not result in significant human health risk. Washington lists criteria for organics other than phenol, 2-methyl phenol, 4-methyl phenol, 2,4-dimethyl phenol, benzyl alcohol, and benzoic acid on a total organic carbon basis. The values included in SADA have been converted to mg/kg sediment assuming 1% organic carbon (criteria from Washington table were multiplied by 0.01). The value for Low Molecular Weight PAHs (LPAH) applies to the sum of concentrations of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, and Anthracene. The value for High Molecular Weight PAH's (HPAH) applies to the sum of Fluoranthene, Pyrene, Benz(a)anthracene, Chrysene, total Benzofluoranthenes, Benzo(a)pyrene, Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene, and Benzo(g,h,i)perylene. Total Benzofluoranthenes represents the sum of the b, j, and k isomers. MAEL values represent Impact Zone Maximum Level and Cleanup Screening Level / Minimum Cleanup Level values. These are an upper regulatory level for source control and cleanup decision making. They are "minor adverse effects" level values--concentrations that result in an acute/chronic adverse effect to biological resources relative to reference in no more than one appropriate biological test, result in a significant response relative to reference , and do not result in significant human health risk. WA lists criteria for organics other than phenol, 2-methyl phenol, 4-methyl phenol, 2,4-dimethyl phenol, benzyl alcohol, and benzoic acid on a total organic carbon basis. The values included in RAIS are converted to mg/kg sediment assuming 1% TOC (criteria from WA table were multiplied by 0.01). Low Molec. Weight PAH (LPAH) applies to the sum of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, and Anthracene. High Molec. Weight PAH (HPAH) applies to the sum of Fluoranthene, Pyrene, Benz(a)anthracene, Chrysene, total Benzofluoranthenes, Benzo(a)pyrene, Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene, and Benzo(g,h,i)perylene. Total Benzofluoranthenes represent b/j/k isomers. The AET is a concentration above which toxic effects occurred at all sites in Puget Sound. These are probable effects benchmarks. See Washington Department of Ecology, Sediment Management Unit, Sediment Quality Chemical Criteria, http://www.ecy.wa.gov/programs/tcp/smu/sed_chem.htm)
BCMOELP	British Columbia Ministry of Environment, Land, and Parks, 1988. British Columbia approved water quality guidelines (Criteria): 1998 Edition. British Columbia Ministry of Environment, Land, and Parks. Environmental Protection Department. Water Management Branch. Victoria, British Columbia.
NYSDEC Soil	Techncial and Administravie Guidance #4046, Determination of Soil Cleanup Objectives and Cleanup Levels, Div. of Environmental Remediation, Albany, NY
NYSDEC Sediment	1999. Technical Guidanmce for Screening Contaminated Sediments, Divi. Of Fish, Wildlife, and Marine Resources, Albany, NY
Swain & Holmes	Swain, L.G. and G.B. Holms. 1985. Fraser- Delta Area: Fraser River Sub-basin from Kanaka Creek to the mouth water quality assessment and objectives. Water Management Branch. British Columbia Ministry of Environment. Victoria, British Columbia

environmental
risk Group

Figures



ENVIRONMENTAL RISK GROUP

	02/07/06	

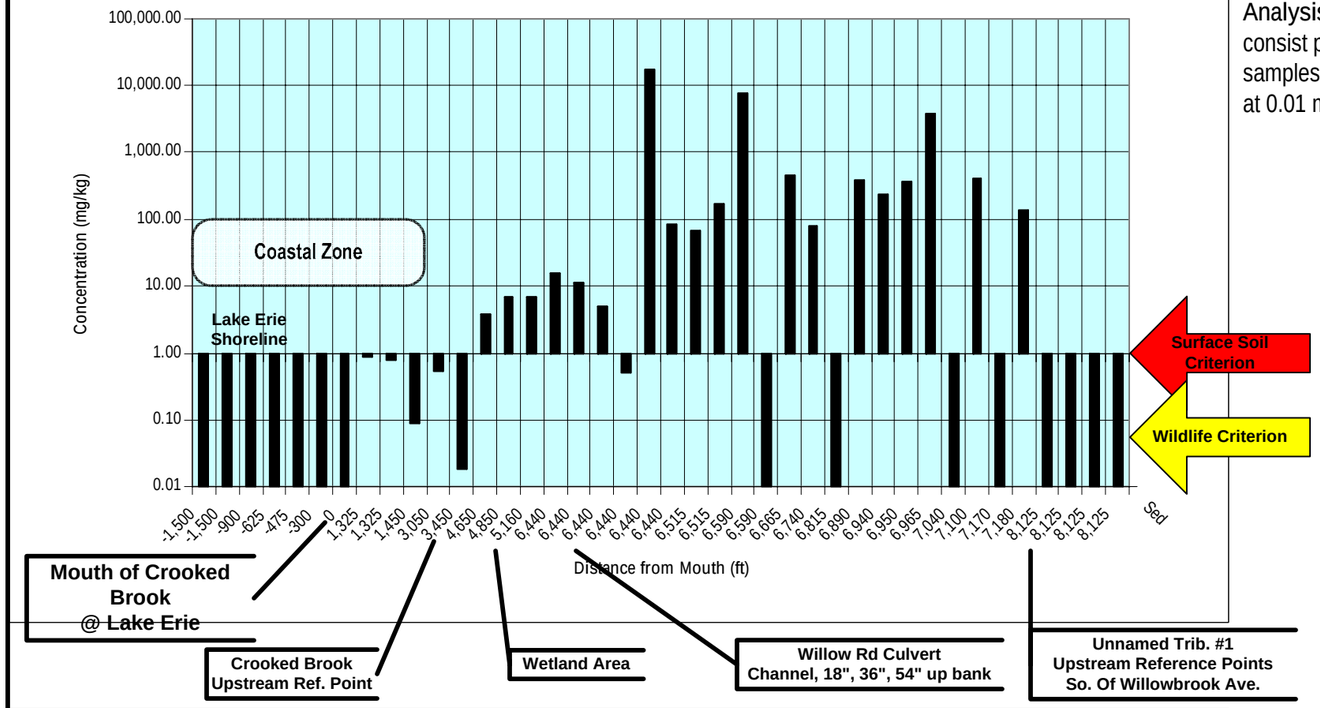
DESCRIPTION

Figure 1
REALCO Site
Dunkirk, NY
Site Locus

FILENAME

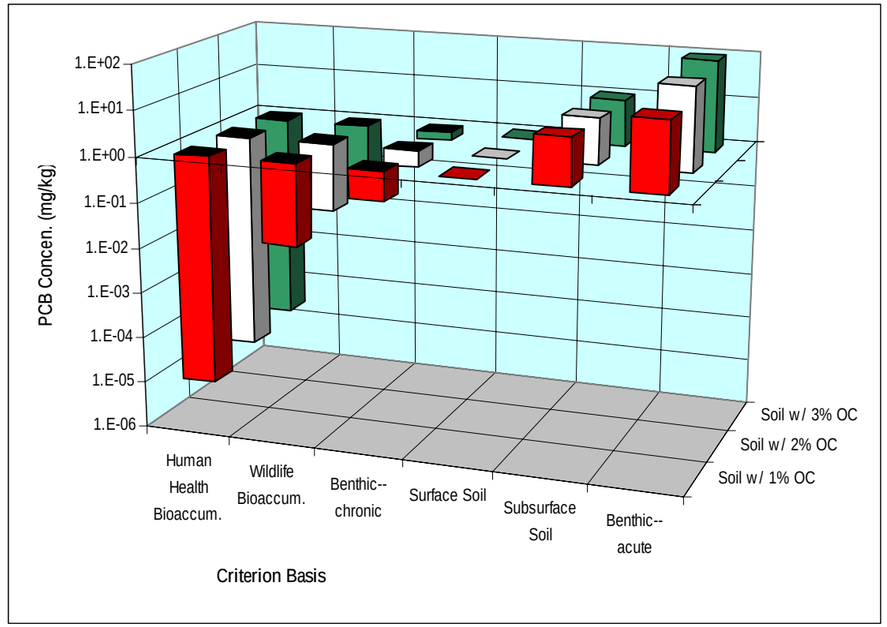
2005BE2 FIGURES.VSD

Analysis of Sediment Results

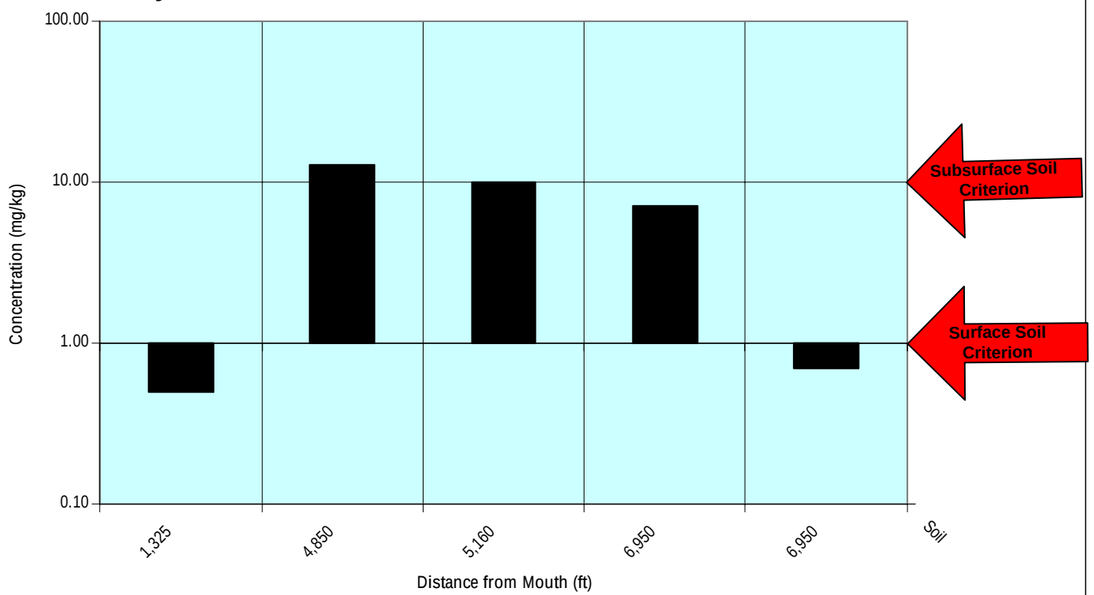


Analysis of Sediment Note: In order to provide a consist picture of concentration for the entire set, samples with only Non-Detect (ND) were arbitrarily set at 0.01 mg/kg (ppm).

Conversion from Soil Organic Matter to Organic Carbon				
Soil Types: CoA, NgA, NgB, & Ud	Organic Matter	2%	4%	6%
	Organic Carbon	1.2%	2.3%	3.5%
Soil Type: Cb	Organic Matter	4%	9%	15%
	Organic Carbon	2.3%	5.2%	8.7%
	%OC = %OM / 1.724			



Analysis of Soil Results



Linear Feet of Stream Above Criterion		
Criterion	Basis	Feet
10	Subsurface Soil	750
1	Surface Soil	2,500
0.05	Wildlife (3% OC)	5,900

ENVIRONMENTAL RISK GROUP

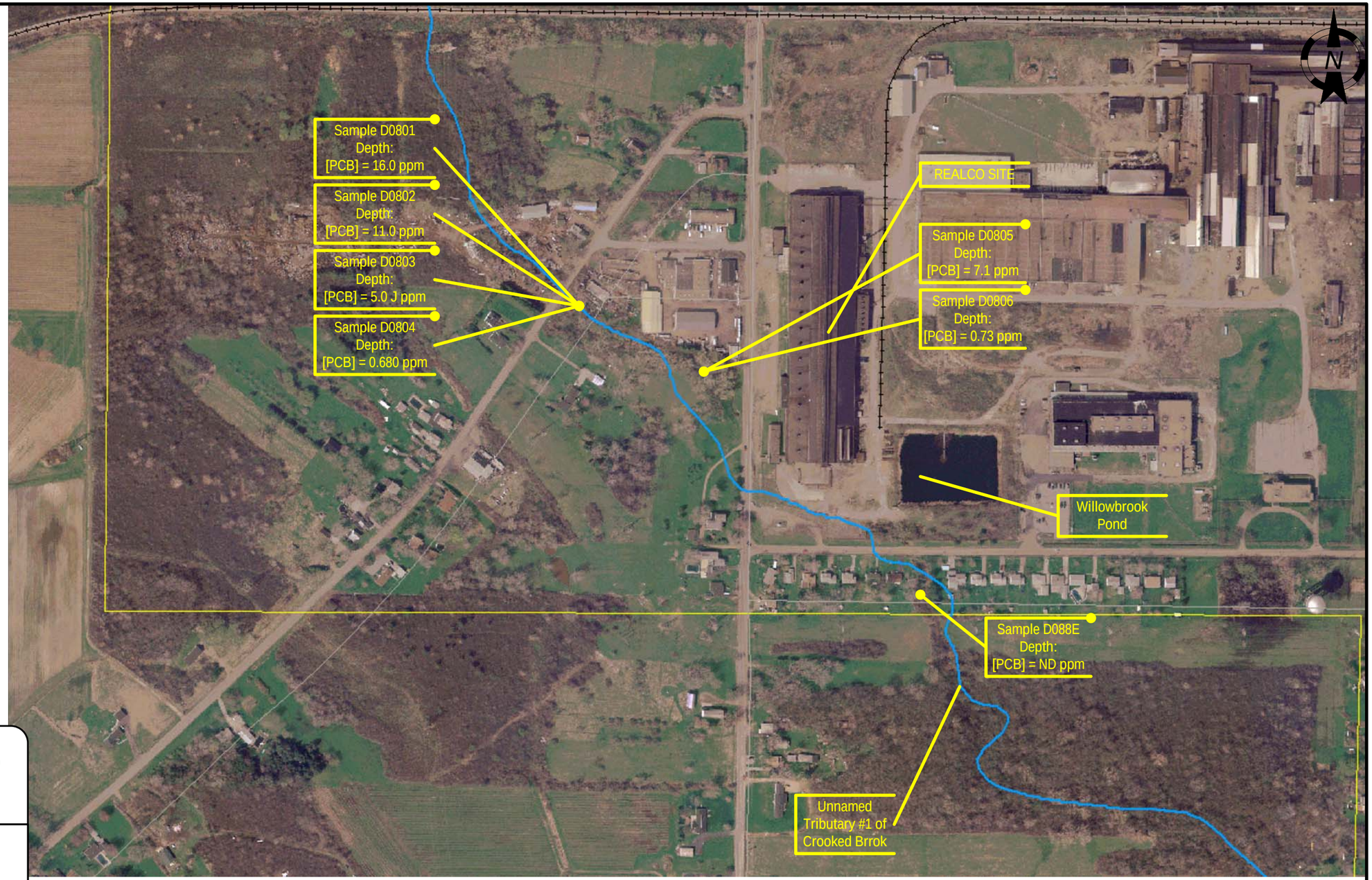
02/07/06

DESCRIPTION

Figure 7
REALCO Site
Dunkirk, NY
Comparative Analysis of PCB Concentrations
Along Crooked Brook and Unnamed Tributary #1

FILENAME

2005BE2 FIGURES.VSD



0 250 500
feet

ENVIRONMENTAL RISK GROUP

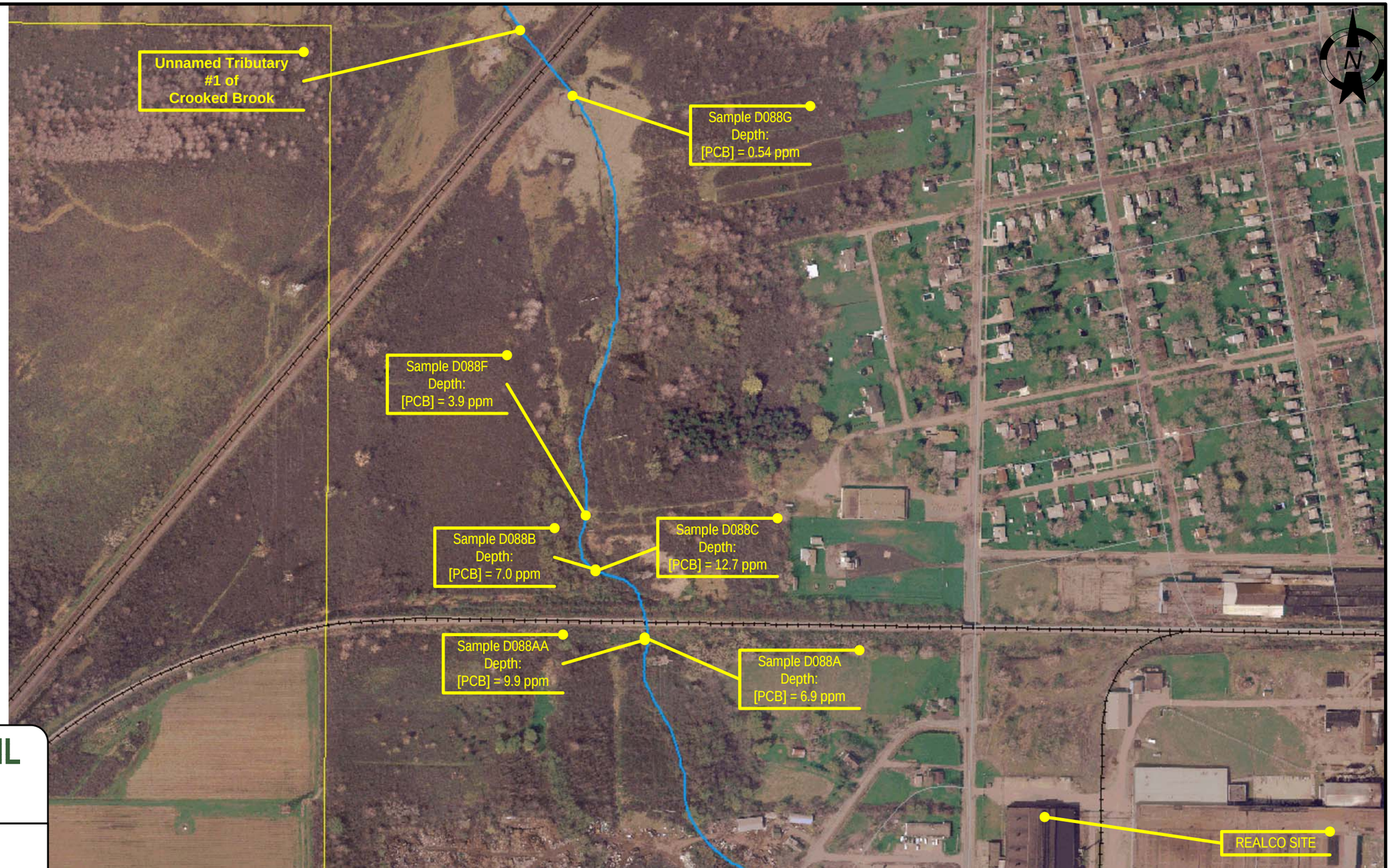
	02/05/06	

DESCRIPTION

Figure 6A
REALCO Site
Dunkirk, NY
Sample Location & Data

FILENAME

2005BE2_REALCO SAMPLE DATA.VSD



0 250 500
feet

ENVIRONMENTAL RISK GROUP

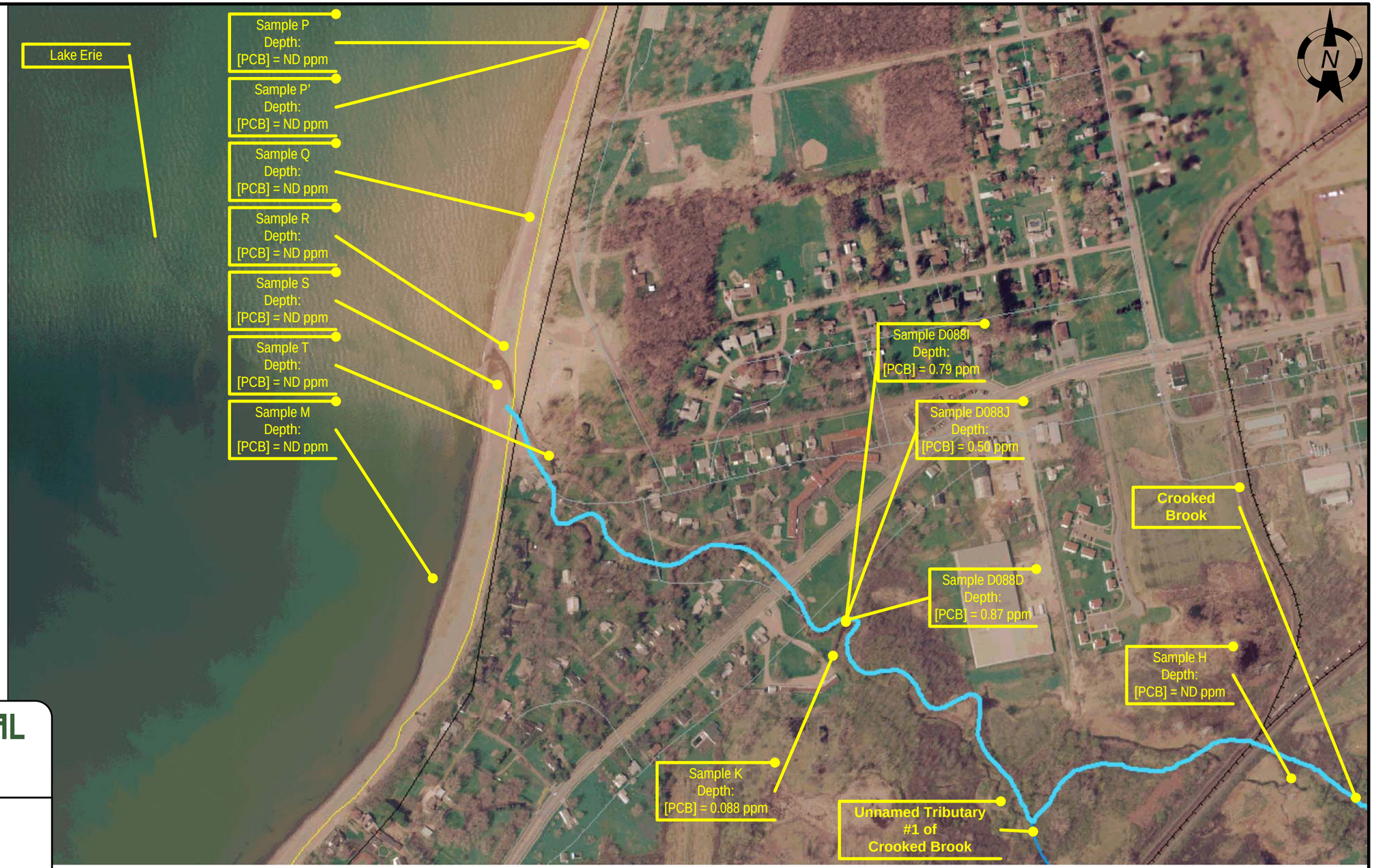
	02/05/06	

DESCRIPTION

Figure 6B
REALCO Site
Dunkirk, NY
Sample Location & Data

FILENAME

2005BE2_REALCO SAMPLE DATA.VSD



ENVIRONMENTAL RISK GROUP

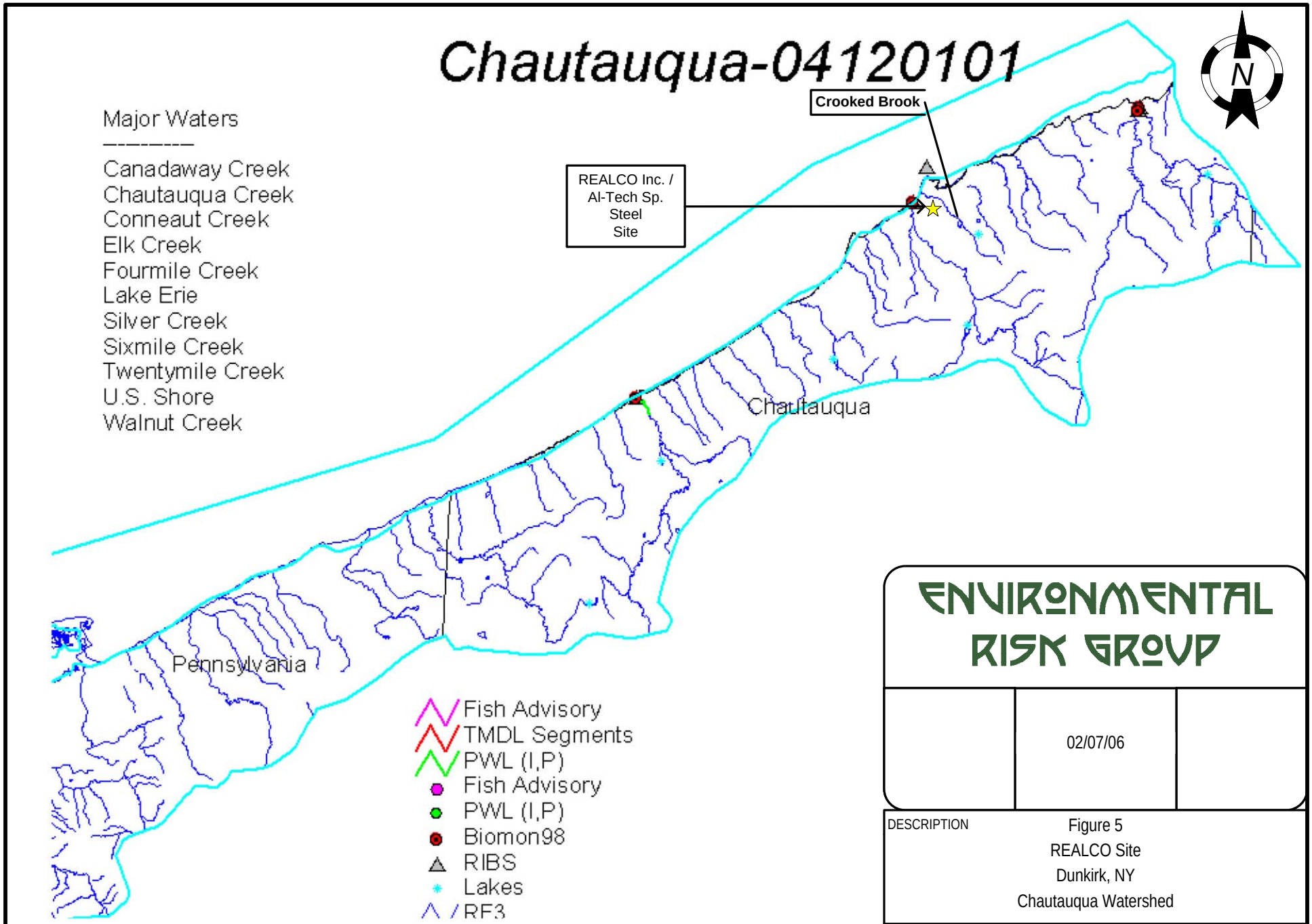
	02/05/06	

DESCRIPTION

Figure 6C
REALCO Site
Dunkirk, NY
Sample Location & Data

FILENAME

2005BE2_REALCO SAMPLE DATA.VSD



ENVIRONMENTAL RISK GROUP

02/07/06

DESCRIPTION

Figure 5
REALCO Site
Dunkirk, NY
Chautauqua Watershed

FILENAME

2005BE2 FIGURES.VSD

Source: NYSDEC, 2005, Division of Water Internet Website (http://www.dec.ny.us/website/dow/uwa/p4120101.gif)

N

Railroad
Right-of-Way
Cover Type #6

Junkyard
Cover Type #7

Cropland
Cover Type #2

Successional
Old Field
Cover Type #3

Successional
Shrubland &
N. Hardwood
Cover Types #4 & 5

Mowed Roadside/
Lawn
Cover Type #1

Mowed Roadside/
Lawn
Cover Type #1

Mowed Roadside/
Lawn
Cover Type #1

Mowed Roadside/
Lawn
Cover Type #1

Successional
Old Field
Cover Type #3

Willowbrook Pond
(Artificial Impoundment)
Cover Type #9

Successional
Old Field
Cover Type #3

Unnamed Tributary # 1 of
Crooked Brook
Corridor
Cover Type #10

0 250 500
feet

Source: Aerial Photo from NYS GIS Website

ENVIRONMENTAL RISK GROUP

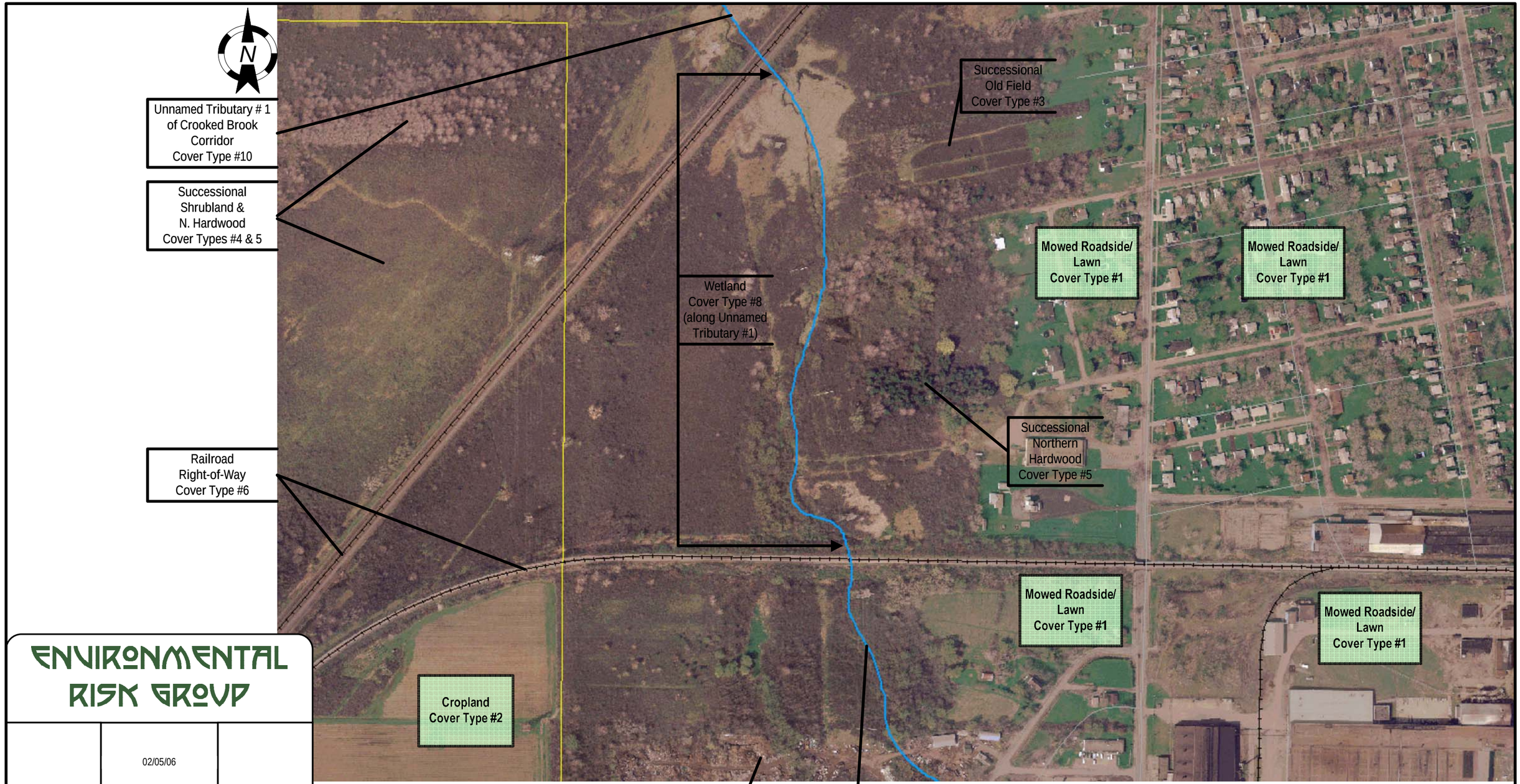
	02/05/06	

DESCRIPTION

Figure 4A
REALCO Site
Dunkirk, NY
Land Cover Type Map

FILENAME

2005BE2_REALCO LAND COVER.VSD



ENVIRONMENTAL RISK GROUP

	02/05/06	

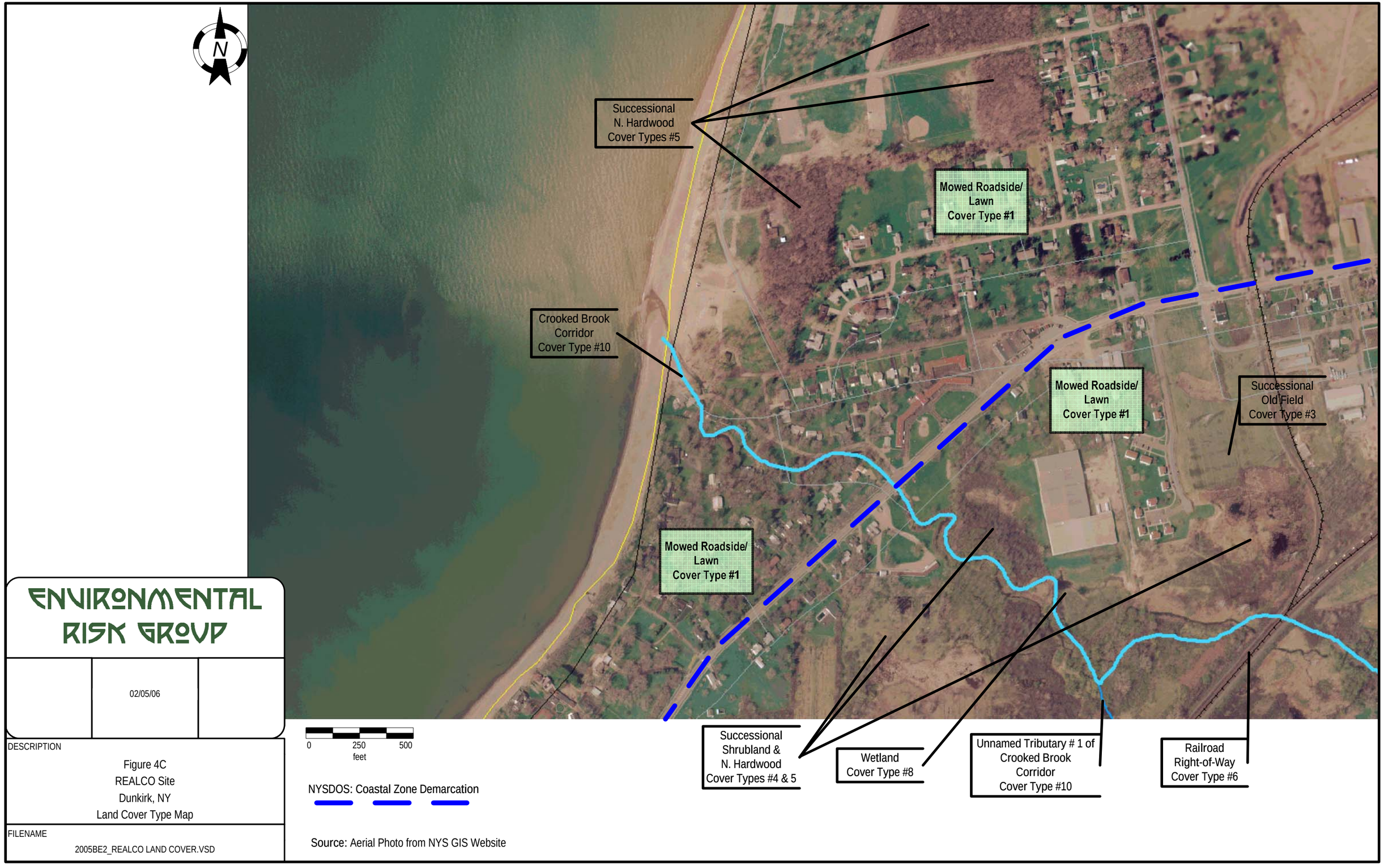
DESCRIPTION

Figure 4B
REALCO Site
Dunkirk, NY
Land Cover Type Map

FILENAME

2005BE2_REALCO LAND COVER.VSD

Source: Aerial Photo from NYS GIS Website



ENVIRONMENTAL RISK GROUP

	02/05/06	

DESCRIPTION

Figure 4C
REALCO Site
Dunkirk, NY
Land Cover Type Map

FILENAME

2005BE2_REALCO LAND COVER.VSD

Source: Aerial Photo from NYS GIS Website

BOUNDARIES

State and Province Boundaries (USGS)

- State and Province Boundaries

State Boundaries (USGS)

- State Boundaries

LAND USE/LAND COVER

USGS NLCD

- Open Water
- Perennial Ice/Snow
- Low Intensity Residential
- High Intensity Residential
- Commercial/Industrial/Transportation
- Bare Rock/Sand/Clay
- Quarries/Strip Mines/Gravel Pits
- Transitional
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrubland
- Orchards/Vineyards/Other
- Grasslands/Herbaceous
- Pasture/Hay
- Row Crops
- Small Grains
- Fallow
- Urban/Recreational Grasses
- Woody Wetlands
- Emergent Herbaceous Wetlands

TRANSPORTATION

County Road Labels (USGS)

No legend available

New York Roads (BTS)

- BTS Roads-New York Ferry Crossings
- BTS Roads-New York Interstates
- BTS Roads-New York Local Roads
- BTS Roads-New York Local Roads (Small Scale)
- BTS Roads-New York Secondary Roads
- BTS Roads-New York Trails
- BTS Roads-New York US/Major State Highways

State Highway Labels (USGS)

No legend available

US Highway Labels (USGS)

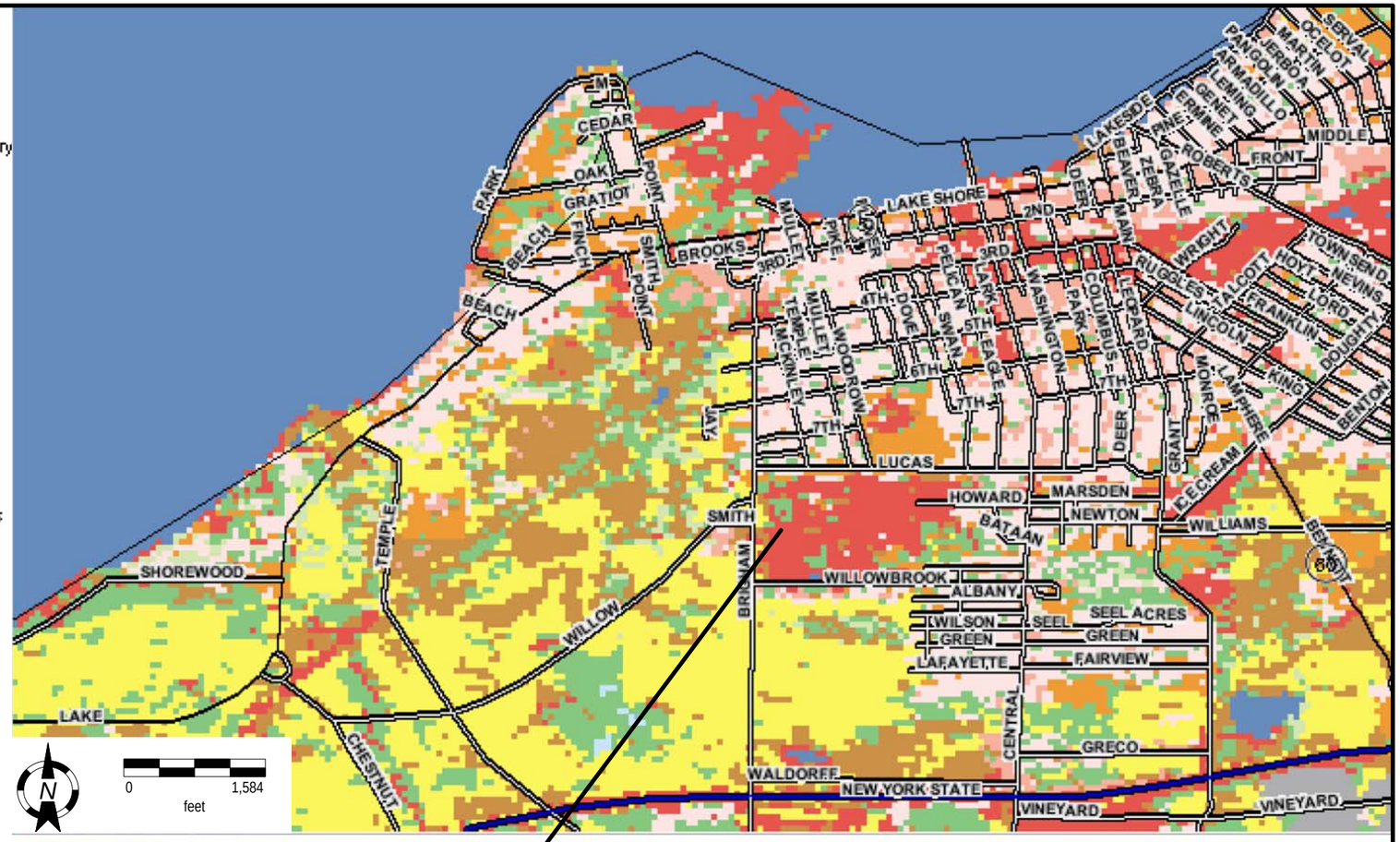
No legend available

US Road Labels

No legend available

ELEVATION

1/3 ArcSecond NED, CONUS



42°29'47"N
79°22'52"W Map Extent 79°18'55"W
42°27'26"N

USGS science for a changing world

The National Map

Source: USGS 2005 The National Map Viewer, National Land Cover Data Set

ENVIRONMENTAL RISK GROUP

02/05/06

DESCRIPTION

Figure 4D
REALCO Site
Dunkirk, NY
USGS NLCD Land Cover Use

FILENAME

2005BE2_REALCO LAND COVER.VSD

Soil Type: Cb – Canandaigua Silt Loam (loamy substratum) A deep nearly level and poorly drained soil mainly in flat areas on lake plains, well suited to wetland wildlife habitat, high water capacity with water at a depth of 1 foot (November-May). 4-15% Organic Matter. Hydric soil.
Soil Type: CoA -- Chenango Channery Loam (Fan 0-3% slope) A deep nearly level well drained to excessively drained soil. On alluvial fans and remnant deltas. Provides good habitat for open land wildlife. 2-6% Organic Matter
Soil Type: NgA – Niagara Silt Loam (0-3% slope loamy substratum) A deep nearly level somewhat poorly drained soil, mainly in low areas on lake plains. Provides good habitat for open land and wood land wildlife. Seasonal wetness and high water table.
Soil Type: NgB– Niagara Silt Loam (3-8% slope loamy substratum) A gently loping somewhat poorly drained soil, mainly in low areas on lake plains. Seasonal wetness and high water table. 2-6% Organic Matter
Soil Type: Ud –Udorthents (landfill) Nearly level to steep loamy soils in areas of re-worked soil; highly variable profile, permeability and water table. 2-6% Organic Matter

Source: NRCS 1994 Soil Survey of Chautauqua County New York, Soil Map Sheet #8 superimposed on Dunkirk aerial available through NYS GIS website.

ENVIRONMENTAL RISK GROUP

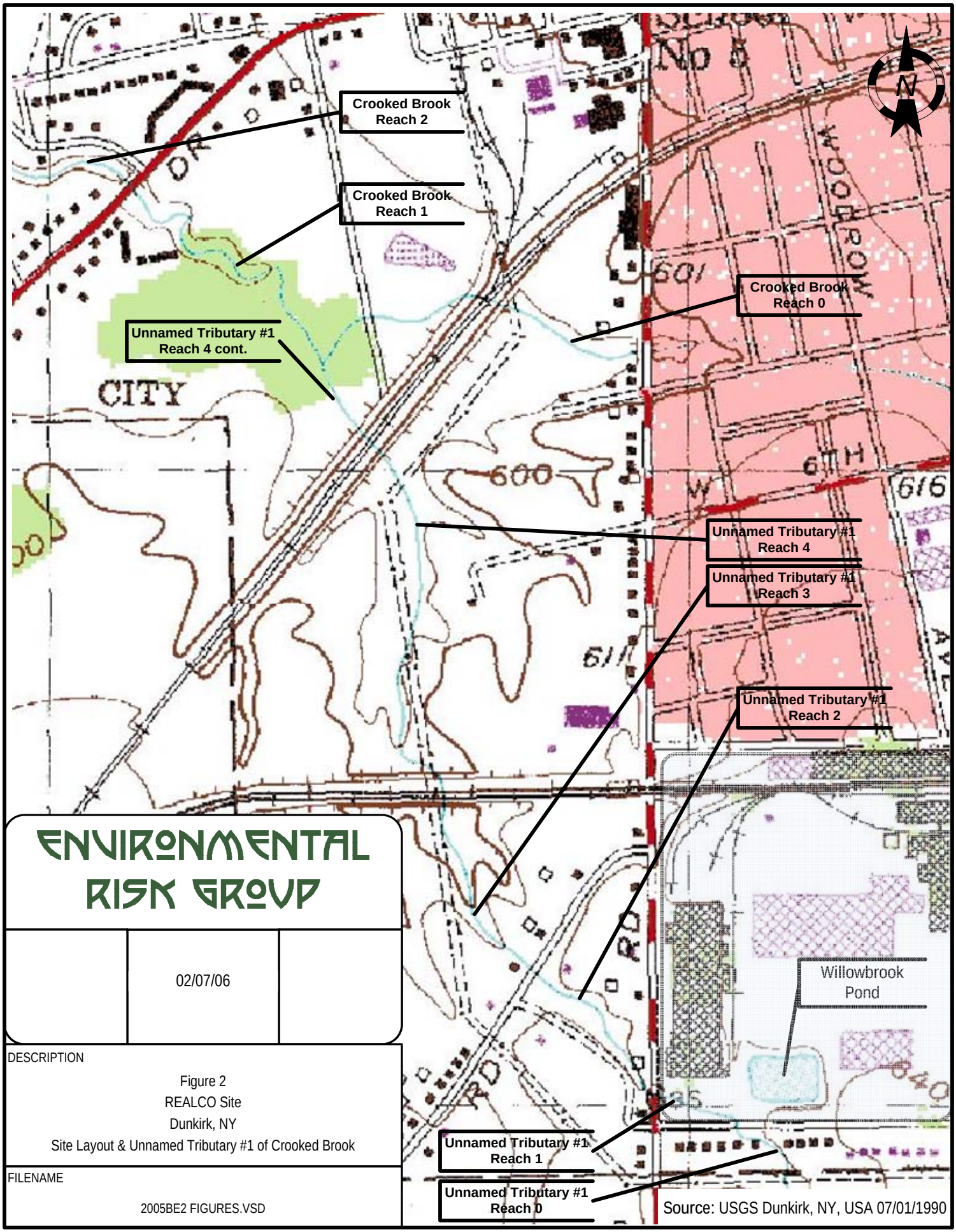
	02/05/06	

DESCRIPTION

Figure 3
REALCO Site
Dunkirk, NY
Soil Survey Map

FILENAME

2005BE2_REALCO SOIL FIG.VSD



ENVIRONMENTAL RISK GROUP

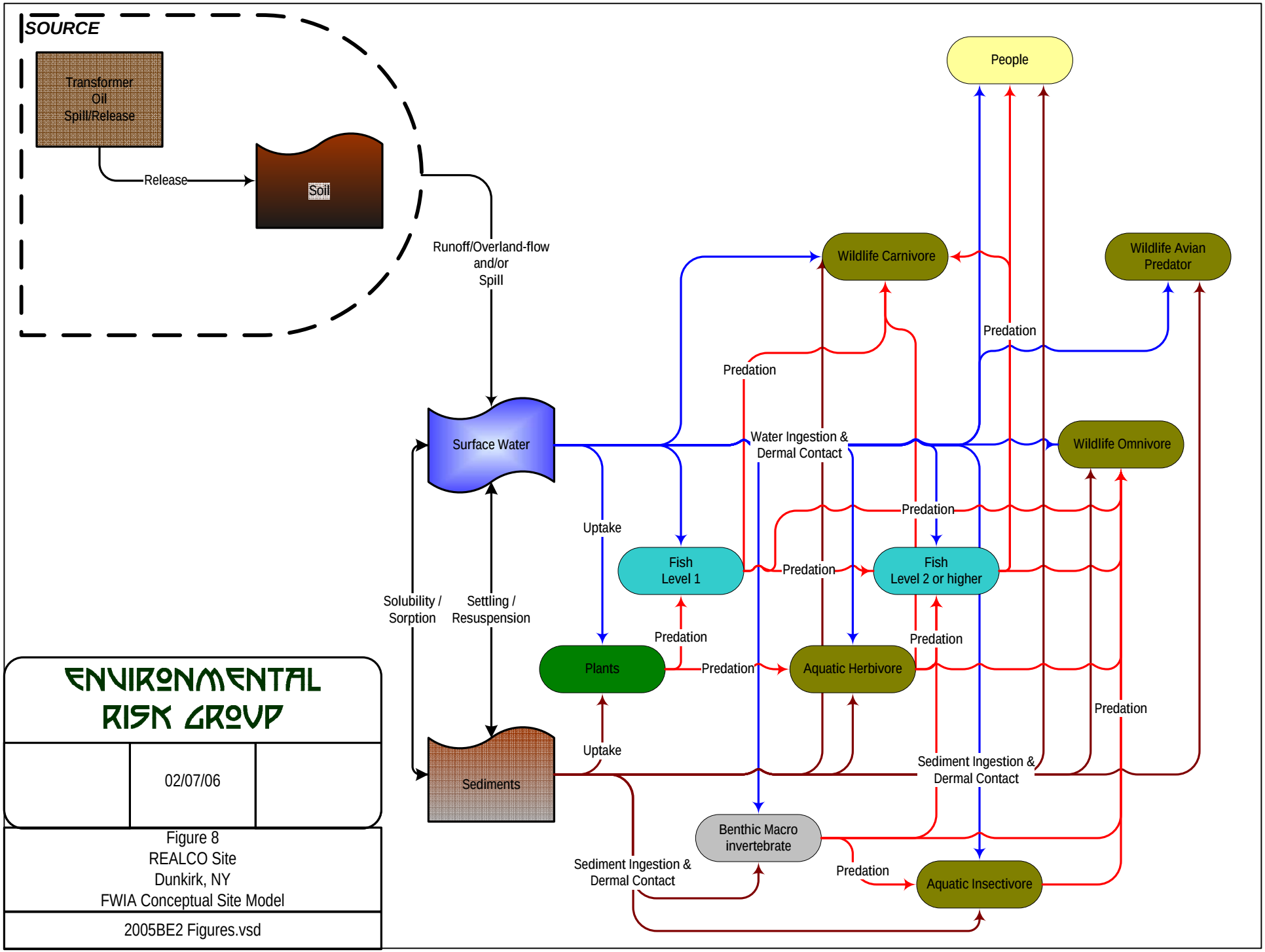
	02/07/06	

DESCRIPTION

Figure 2
REALCO Site
Dunkirk, NY
Site Layout & Unnamed Tributary #1 of Crooked Brook

FILENAME

2005BE2 FIGURES.VSD



ENVIRONMENTAL RISK GROUP

	02/07/06	

Figure 8
REALCO Site
Dunkirk, NY
FWIA Conceptual Site Model

2005BE2 Figures.vsd

environmental
risk Group

Appendix 1

Comment Responsiveness Summary

environmental
risk Group

Appendix 2

EDR NEPA Check Report

EDR NEPACheck®

REALCO Site and Unnamed Tributary
90 Willowbrook Ave
Dunkirk, NY 14048

Inquiry Number: 1570491.8s

December 09, 2005

The Standard in Environmental Risk Management Information

440 Wheelers Farms Road
Milford, Connecticut 06461

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

TABLE OF CONTENTS

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EDR NEPACheck® DESCRIPTION

The National Environmental Policy Act of 1969 (NEPA) requires that Federal agencies include in their decision-making processes appropriate and careful consideration of all environmental effects and actions, analyze potential environmental effects of proposed actions and their alternatives for public understanding and scrutiny, avoid or minimize adverse effects of proposed actions, and restore and enhance environmental quality as much as possible.

The EDR NEPACheck provides information which may be used, in conjunction with additional research, to determine whether a proposed site or action will have significant environmental effect.

The report provides maps and data for the following items (where available). Search results are provided in the Map Findings Summary on page 2 of this report.

Section	Regulation
Natural Areas Map	
• Federal Lands Data:	
- Officially designated wilderness areas	47 CFR 1.1307(1)
- Officially designated wildlife preserves, sanctuaries and refuges	47 CFR 1.1307(2)
- Wild and scenic rivers	40 CFR 6.302(e)
- Fish and Wildlife	40 CFR 6.302
• Threatened or Endangered Species, Fish and Wildlife, Critical Habitat Data (where available)	47 CFR 1.1307(3); 40 CFR 6.302
Historic Sites Map	
• National Register of Historic Places	47 CFR 1.1307(4); 40 CFR 6.302
• State Historic Places (where available)	
• Indian Reservations	
Flood Plain Map	
• National Flood Plain Data (where available)	47 CFR 1.1307(6); 40 CFR 6.302
Wetlands Map	
• National Wetlands Inventory Data (where available)	47 CFR 1.1307(7); 40 CFR 6.302
FCC & FAA Map	
• FCC antenna/tower sites, AM Radio Towers, FAA Markings and Obstructions, AM Radio Interference Zones, Airports, Topographic gradient	47 CFR 1.1307(8)
Key Contacts and Government Records Searched	

MAP FINDINGS SUMMARY

The databases searched in this report are listed below. Database descriptions and other agency contact information is contained in the Key Contacts and Government Records Searched section on page 29 of this report.

TARGET PROPERTY ADDRESS

REALCO SITE AND UNNAMED TRIBUTARY
90 WILLOWBROOK AVE
DUNKIRK, NY 14048

Inquiry #: 1570491.8s
Date: 12/9/5

TARGET PROPERTY COORDINATES

Latitude (North):	42.474701 - 42° 28' 28.9''
Longitude (West):	79.347099 - 79° 20' 49.6''
Universal Tranverse Mercator:	Zone 17
UTM X (Meters):	635872.6
UTM Y (Meters):	4703593.0

Applicable Regulation from 47 CFR/FCC Checklist	Database	Search Distance (Miles)	Within Search	Within 1/8 Mile
NATURAL AREAS MAP				
1.1307a (1) Officially Designated Wilderness Area	US Federal Lands	2.00	NO	NO
1.1307a (2) Officially Designated Wildlife Preserve	US Federal Lands	2.00	NO	NO
1.1307a (2) Officially Designated Wildlife Preserve	NY Wildlife Management Areas	2.00	NO	NO
1.1307a (3) Threatened or Endangered Species or Critical Habitat	County Endangered Species	County	YES	N/A
HISTORIC SITES MAP				
1.1307a (4) Listed or eligible for National Register	National Register Hist. Places	2.00	YES	NO
	Indian Reservation	2.00	NO	NO
	APPAL_TRAIL	2.00	NO	NO
FLOODPLAIN MAP				
1.1307 (6) Located in a Flood Plain	FLOODPLAIN	2.00	YES	YES
WETLANDS MAP				
1.1307 (7) Change in surface features (wetland fill)	NWI	2.00	YES	NO
FCC & FAA SITES MAP				
	FCC Cellular	2.00	NO	NO
	FCC Antenna	2.00	YES	NO
	FCC Tower	2.00	YES	NO
	FCC AM Tower	2.00	YES	NO
	FAA DOF	2.00	YES	NO
	Airports	2.00	NO	NO
	Power Lines	2.00	YES	YES

Natural Areas Map

Target Property
Roads
County Boundary
Waterways
Water
Locations
Federal Areas
Federal Linear Features
State Areas
State Linear Features

0 1/2 1 2 Miles

N

TARGET PROPERTY:	REALCO Site and Unnamed Tributary	CUSTOMER:	Environmental Risk Group
ADDRESS:	90 Willowbrook Ave	CONTACT:	Kurt Frantzen
CITY/STATE/ZIP:	Dunkirk NY 14048	INQUIRY #:	1570491.8s
LAT/LONG:	42.4747 / 79.3471	DATE:	December 09, 2005

NATURAL AREAS MAP FINDINGS

Endangered Species Listed for: CHAUTAUQUA County, NY.
Source: EPA Endangered Species Protection Program Database
MAMMAL: BAT, INDIANA

Map ID Direction Distance Distance (ft.)	EDR ID Database

No mapped sites were found in EDR's search of available government records within the search radius around the target property.

Historic Sites Map

Target Property
Streets
County Boundary
Waterways
Water

Historic Sites
Federal Historic Areas
State Historic Areas
US Indian Reservations
Scenic Trail

0 1/2 1 2 Miles

N

TARGET PROPERTY:	REALCO Site and Unnamed Tributary	CUSTOMER:	Environmental Risk Group
ADDRESS:	90 Willowbrook Ave	CONTACT:	Kurt Frantzen
CITY/STATE/ZIP:	Dunkirk NY 14048	INQUIRY #:	1570491.8s
LAT/LONG:	42.4747 / 79.3471	DATE:	December 09, 2005

HISTORIC SITES MAP FINDINGS

Map ID Direction Distance Distance (ft.)			EDR ID Database
1 NE 1/2-1 mi 4570	Resource Name: Alternate Name: Resource Address: Resource Type: Location: County: Primary Certification: Certification Date: Number of Buildings: Number of Sites: Number of non-contributing Buildings: Number of non-contributing Objects: Number of non-contributing Sites: Num. of non-contributing Structures: Applicable Criteria: Areas of Significance: Current Function: Building Material: Other Names:	US Post Office--Dunkirk US Post Offices in New York State, 1858-1943, TR 410 Central Ave. Building DUNKIRK, NY CHAUTAUQUA, NY Listed in the national register 19881117 Acreage: 9 1 Number of Objects: 0 0 Num. of Structures: 0 0 0 0 0 Event, Architecture/Engineering Politics/government, Architecture Government None listed, Brick, Limestone, Iron Dunkirk Post Office	88002488 National Register Hist. Places
2 NNW 1-2 mi 7236	Resource Name: Alternate Name: Resource Address: Resource Type: Location: County: Primary Certification: Certification Date: Number of Buildings: Number of Sites: Number of non-contributing Buildings: Number of non-contributing Objects: Number of non-contributing Sites: Num. of non-contributing Structures: Applicable Criteria: Areas of Significance: Current Function: Building Material:	Dunkirk Light U.S. Coast Guard Lighthouses and Light Stations on the Great Lakes TR Dunkirk Harbor Building DUNKIRK, NY CHAUTAUQUA, NY Listed in the national register 19840719 Acreage: 40 5 Number of Objects: 0 0 Num. of Structures: 0 0 0 0 0 Event, Architecture/Engineering Engineering, Transportation Defense, Transportation None listed, Brick, Stone, Iron	84002067 National Register Hist. Places

UNMAPPABLE HISTORIC SITES

Due to poor or inadequate address information, the following sites were not mapped:

	Status EDR ID Database

No unmapped sites were found in EDR's search of available government records.

Flood Plain Map

Major Roads
Contour Lines
Waterways
County Boundary
Power Lines
Pipe Lines
Fault Lines
Water
100-year flood zone
500-year flood zone
Electronic FEMA data available
Electronic FEMA data not available

0 1/2 1 2 Miles

N

TARGET PROPERTY:	REALCO Site and Unnamed Tributary	CUSTOMER:	Environmental Risk Group
ADDRESS:	90 Willowbrook Ave	CONTACT:	Kurt Frantzen
CITY/STATE/ZIP:	Dunkirk NY 14048	INQUIRY #:	1570491.8s
LAT/LONG:	42.4747 / 79.3471	DATE:	December 09, 2005

FLOOD PLAIN MAP FINDINGS

Source: FEMA Q3 Flood Data

County	FEMA flood data electronic coverage
CHAUTAUQUA, NY	YES
Flood Plain panel at target property:	3601370005B
Additional Flood Plain panel(s) in search area:	
00000000000	
3611080005C	
3610780005B	
3601390001D	

National Wetlands Inventory Map

Major Roads
Contour Lines
Waterways
County Boundary

Power Lines
Pipe Lines
Fault Lines

Water
Federal Wetlands
State Wetlands
Electronic NWI data available
Electronic NWI data not available

TARGET PROPERTY:	REALCO Site and Unnamed Tributary	CUSTOMER:	Environmental Risk Group
ADDRESS:	90 Willowbrook Ave	CONTACT:	Kurt Frantzen
CITY/STATE/ZIP:	Dunkirk NY 14048	INQUIRY #:	1570491.8s
LAT/LONG:	42.4747 / 79.3471	DATE:	December 09, 2005

WETLANDS MAP FINDINGS

Source: Fish and Wildlife Service NWI data

NWI hardcopy map at target property: Dunkirk
Additional NWI hardcopy map(s) in search area:
North of Dunkirk
Brocton

Map ID Direction Distance Distance (ft.)	Code and Description*	Database
1 SW 1/8-1/4 mi 751	PSS1E [P] Palustrine, [SS] Scrub-Shrub, [1] Broad-Leaved Deciduous, [E] Seasonally Flooded/Saturated	NWI
2 West 1/8-1/4 mi 838	PSS1E [P] Palustrine, [SS] Scrub-Shrub, [1] Broad-Leaved Deciduous, [E] Seasonally Flooded/Saturated	NWI
3 NW 1/4-1/2 mi 2346	PSS1E [P] Palustrine, [SS] Scrub-Shrub, [1] Broad-Leaved Deciduous, [E] Seasonally Flooded/Saturated	NWI
4 SSW 1/2-1 mi 3639	PFO1E [P] Palustrine, [FO] Forested, [1] Broad-Leaved Deciduous, [E] Seasonally Flooded/Saturated	NWI
5 SSW 1/2-1 mi 4006	PSS1E [P] Palustrine, [SS] Scrub-Shrub, [1] Broad-Leaved Deciduous, [E] Seasonally Flooded/Saturated	NWI
6 SSW 1/2-1 mi 4048	PEM5E Description not reported	NWI
7 West 1/2-1 mi 4423	PFO1E [P] Palustrine, [FO] Forested, [1] Broad-Leaved Deciduous, [E] Seasonally Flooded/Saturated	NWI
8 ESE 1/2-1 mi 4436	PFO1C [P] Palustrine, [FO] Forested, [1] Broad-Leaved Deciduous, [C] Seasonally Flooded	NWI
9 NW 1/2-1 mi 4461	L2UBH [L] Lacustrine, [2] Littoral, [UB] Unconsolidated Bottom, [H] Permanently Flooded	NWI

*See Wetland Classification System for additional information.

WETLANDS MAP FINDINGS

Map ID Direction Distance Distance (ft.)	Code and Description*	Database
10 NNE 1/2-1 mi 4521	L2UBH [L] Lacustrine, [2] Littoral, [UB] Unconsolidated Bottom, [H] Permanently Flooded	NWI
11 SSW 1/2-1 mi 4885	PUBZx [P] Palustrine, [UB] Unconsolidated Bottom, [Z] Intermittently Exposed/Permanent, [x] Excavated	NWI
12 South 1/2-1 mi 4892	PUBZx [P] Palustrine, [UB] Unconsolidated Bottom, [Z] Intermittently Exposed/Permanent, [x] Excavated	NWI
13 West 1/2-1 mi 4916	PFO1E [P] Palustrine, [FO] Forested, [1] Broad-Leaved Deciduous, [E] Seasonally Flooded/Saturated	NWI
14 WNW 1/2-1 mi 5003	L1UBH [L] Lacustrine, [1] Limnetic, [UB] Unconsolidated Bottom, [H] Permanently Flooded	NWI
15 West 1/2-1 mi 5080	PFO1E [P] Palustrine, [FO] Forested, [1] Broad-Leaved Deciduous, [E] Seasonally Flooded/Saturated	NWI
16 North 1/2-1 mi 5185	PUBZx [P] Palustrine, [UB] Unconsolidated Bottom, [Z] Intermittently Exposed/Permanent, [x] Excavated	NWI
17 WNW 1/2-1 mi 5275	L2BBJ [L] Lacustrine, [2] Littoral, [BB] Beach/Bar (obs), [J] Intermittently Flooded	NWI
18 West 1-2 mi 5734	L2BBJ [L] Lacustrine, [2] Littoral, [BB] Beach/Bar (obs), [J] Intermittently Flooded	NWI
19 NNE 1-2 mi 5989	L2UBH [L] Lacustrine, [2] Littoral, [UB] Unconsolidated Bottom, [H] Permanently Flooded	NWI

*See Wetland Classification System for additional information.

WETLANDS MAP FINDINGS

Map ID Direction Distance Distance (ft.)	Code and Description*	Database
20 NNE 1-2 mi 6757	L2UBH [L] Lacustrine, [2] Littoral, [UB] Unconsolidated Bottom, [H] Permanently Flooded	NWI
21 ESE 1-2 mi 6928	PFO1C [P] Palustrine, [FO] Forested, [1] Broad-Leaved Deciduous, [C] Seasonally Flooded	NWI
22 SSW 1-2 mi 7258	PFO1A [P] Palustrine, [FO] Forested, [1] Broad-Leaved Deciduous, [A] Temporarily Flooded	NWI
23 ESE 1-2 mi 7383	PUBZx [P] Palustrine, [UB] Unconsolidated Bottom, [Z] Intermittently Exposed/Permanent, [x] Excavated	NWI
24 SW 1-2 mi 7410	PUBZ [P] Palustrine, [UB] Unconsolidated Bottom, [Z] Intermittently Exposed/Permanent	NWI
25 ESE 1-2 mi 8158	PEM5E Description not reported	NWI
26 South 1-2 mi 8838	R3USA [R] Riverine, [3] Upper Perennial, [US] Unconsolidated Shore, [A] Temporarily Flooded	NWI
27 SSW 1-2 mi 9126	PFO1E [P] Palustrine, [FO] Forested, [1] Broad-Leaved Deciduous, [E] Seasonally Flooded/Saturated	NWI
28 South 1-2 mi 9376	R3USA [R] Riverine, [3] Upper Perennial, [US] Unconsolidated Shore, [A] Temporarily Flooded	NWI
29 South 1-2 mi 9820	PUBZx [P] Palustrine, [UB] Unconsolidated Bottom, [Z] Intermittently Exposed/Permanent, [x] Excavated	NWI

*See Wetland Classification System for additional information.

WETLANDS MAP FINDINGS

Map ID Direction Distance Distance (ft.)	Code and Description*	Database
30 SW 1-2 mi 10101	PSS1E [P] Palustrine, [SS] Scrub-Shrub, [1] Broad-Leaved Deciduous, [E] Seasonally Flooded/Saturated	NWI
31 South 1-2 mi 10191	PUBZx [P] Palustrine, [UB] Unconsolidated Bottom, [Z] Intermittently Exposed/Permanent, [x] Excavated	NWI

*See Wetland Classification System for additional information.

WETLANDS CLASSIFICATION SYSTEM

National Wetland Inventory Maps are produced by the U.S. Fish and Wildlife Service, a sub-department of the U.S. Department of the Interior. In 1974, the U.S. Fish and Wildlife Service developed a criteria for wetland classification with four long range objectives:

- to describe ecological units that have certain homogeneous natural attributes,
- to arrange these units in a system that will aid decisions about resource management,
- to furnish units for inventory and mapping, and
- to provide uniformity in concepts and terminology throughout the U.S.

High altitude infrared photographs, soil maps, topographic maps and site visits are the methods used to gather data for the productions of these maps. In the infrared photos, wetlands appear as different colors and these wetlands are then classified by type. Using a hierarchical classification, the maps identify wetland and deepwater habitats according to:

- system
- subsystem
- class
- subclass
- modifiers

(as defined by Cowardin, et al. U.S. Fish and Wildlife Service FWS/OBS 79/31. 1979.)

The classification system consists of five systems:

1. marine
2. estuarine
3. riverine
4. lacustrine
5. palustrine

The marine system consists of deep water tidal habitats and adjacent tidal wetlands. The riverine system consists of all wetlands contained within a channel. The lacustrine systems includes all nontidal wetlands related to swamps, bogs & marshes. The estuarine system consists of deepwater tidal habitats and where ocean water is diluted by fresh water. The palustrine system includes nontidal wetlands dominated by trees and shrubs and where salinity is below .5% in tidal areas. All of these systems are divided in subsystems and then further divided into class.

National Wetland Inventory Maps are produced by transferring gathered data on a standard 7.5 minute U.S.G.S. topographic map. Approximately 52 square miles are covered on a National Wetland Inventory map at a scale of 1:24,000. Electronic data is compiled by digitizing these National Wetland Inventory Maps.

SYSTEM **MARINE**

SUBSYSTEM **1 - SUBTIDAL** **2 - INTERTIDAL**

CLASS	RB-ROCK BOTTOM	UB-UNCONSOLIDATED BOTTOM	AB-AQUATIC BED	RF-REEF	OW-OPEN WATER / Unknown Bottom	AB-AQUATIC BED	RF-REEF	RS-ROCKY SHORE	US-UNCONSOLIDATED SHORE
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 3 Rooted Vascular 5 Unknown Submergent	1 Coral 3 Worm		1 Algal 3 Rooted Vascular 5 Unknown Submergent	1 Coral 3 Worm	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic

SYSTEM **E - ESTUARINE**

SUBSYSTEM **1 - SUBTIDAL**

CLASS	RB-ROCK BOTTOM	UB-UNCONSOLIDATED BOTTOM	AB-AQUATIC BED	RF-REEF	OW-OPEN WATER / Unknown Bottom
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	2 Mollusk 3 Worm	

SUBSYSTEM **2 - INTERTIDAL**

CLASS	AB-AQUATIC BED	RF-REEF	SB - STREAMBED	RS-ROCKY SHORE	US-UNCONSOLIDATED SHORE	EM-EMERGENT	SS-SCRUB SHRUB	FO-FORESTED
Subclass	1 Algal 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	2 Mollusk 3 Worm	1 Cobble- Gravel 2 Sand 3 Mud 4 Organic	1 Bedrock 2 Rubble	1 Cobble- Gravel 2 Sand 3 Mud 4 Organic	1 Persistent 2 Nonpersistent	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6 Deciduous 7 Evergreen	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6 Deciduous 7 Evergreen

SYSTEM — **R - RIVERINE**

SUBSYSTEM	1 - TIDAL	2 - LOWER PERENNIAL	3 - UPPER PERENNIAL	4 - INTERMITTENT	5 - UNKNOWN PERENNIAL
CLASS	RB-ROCK BOTTOM UB-UNCONSOLIDATED BOTTOM *SB-STREAMBED AB-AQUATIC BED RS-ROCKY SHORE US-UNCONSOLIDATED SHORE **EM-EMERGENT OW-OPEN WATER/ Unknown Bottom				
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Bedrock 2 Rubble 3 Cobble-Gravel 4 Sand 5 Mud 6 Organic 7 Vegetated	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic 5 Vegetated	2 Nonpersistent

* STREAMBED is limited to TIDAL and INTERMITTENT SUBSYSTEMS, and comprises the only CLASS in the INTERMITTENT SUBSYSTEM.
**EMERGENT is limited to TIDAL and LOWER PERENNIAL SUBSYSTEMS.

SYSTEM — **L - LACUSTRINE**

SUBSYSTEM — **1 - LIMNETIC**

CLASS	RB-ROCK BOTTOM	UB-UNCONSOLIDATED BOTTOM	AB-AQUATIC BED	OW-OPEN WATER/ Unknown Bottom
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	

SUBSYSTEM — **2 - LITTORAL**

CLASS	RB-ROCK BOTTOM	UB-UNCONSOLIDATED BOTTOM	AB-AQUATIC BED	RS-ROCKY SHORE	US-UNCONSOLIDATED SHORE	EM-EMERGENT	OW-OPEN WATER/ Unknown Bottom
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic 5 Vegetated	2 Nonpersistent	

SUBSYSTEM — **P - PALUSTRINE**

CLASS	RB--ROCK BOTTOM	UB--UNCONSOLIDATED BOTTOM	AB-AQUATIC BED	US--UNCONSOLIDATED SHORE	ML--MOSS-LICHEN	EM--EMERGENT	SS--SCRUB-SHRUB	FO--FORESTED	OW-OPEN WATER/ Unknown
Bottom									
Subclass	1 Bedrock 2 Rubble 3 Mud 4 Organic	1 Cobble-Gravel 2 Sand	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic 5 Vegetated	1 Moss 2 Lichen	1 Persistent 2 Nonpersistent	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6 Deciduous 7 Evergreen	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6Deciduous 7 Evergreen	

MODIFIERS

In order to more adequately describe wetland and deepwater habitats one or more of the water regime, water chemistry, soil, or special modifiers may be applied at the class or lower level in the hierarchy. The farmed modifier may also be applied to the ecological system.

WATER REGIME

Non-Tidal

A Temporarily Flooded
B Saturated
C Seasonally Flooded
D Seasonally Flooded/ Well Drained
E Seasonally Flooded/ Saturated
F Semipermanently Flooded
G Intermittently Exposed

Tidal

H Permanently Flooded
J Intermittently Flooded
K Artificially Flooded
W Intermittently Flooded/Temporary
Y Saturated/Semipermanent/ Seasonal
Z Intermittently Exposed/Permanent
U Unknown

Coastal Salinity Modifiers for Inland Salinity pH Modifiers for all Fresh Water

K Artificially Flooded
L Subtidal
M Irregularly Exposed
N Regularly Flooded
P Irregularly Flooded

*S Temporary-Tidal
*R Seasonal-Tidal
*T Semipermanent -Tidal
V Permanent -Tidal
U Unknown

*These water regimes are only used in tidally influenced, freshwater systems.

WATER CHEMISTRY

1 Hyperhaline
2 Euhaline
3 Mixohaline (Brackish)
4 Polyhaline
5 Mesohaline
6 Oligohaline
0 Fresh

7 Hypersaline
8 Eusaline
9 Mixosaline
0 Fresh

a Acid
t Circumneutral
i Alkaline

SOIL

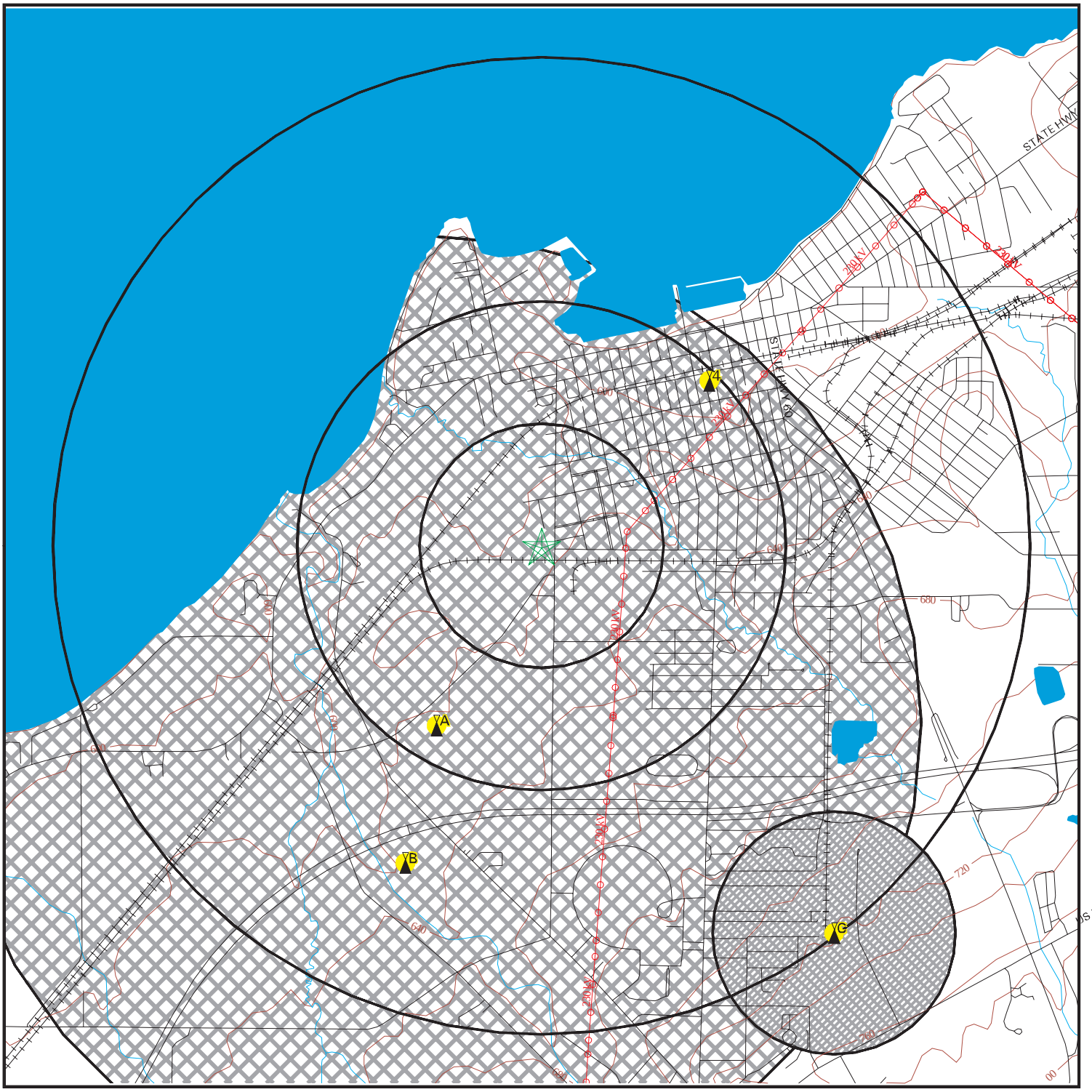
g Organic
n Mineral

SPECIAL MODIFIERS

b Beaver
d Partially Drained/Ditched
f Farmed
h Diked/Impounded
r Artificial Substrate
s Spoil
x Excavated

Source: U.S. Department of the Interior
Fish and Wildlife Service
National Wetlands Inventory

FCC & FAA Sites Map



Streets
Contour Lines
County Boundary
Waterways
Power Lines
Water

Sites
Omni Directional AM Interference
Directional AM Interference

0 1/2 1 2 Miles

N

TARGET PROPERTY:	REALCO Site and Unnamed Tributary	CUSTOMER:	Environmental Risk Group
ADDRESS:	90 Willowbrook Ave	CONTACT:	Kurt Frantzen
CITY/STATE/ZIP:	Dunkirk NY 14048	INQUIRY #:	1570491.8s
LAT/LONG:	42.4747 / 79.3471	DATE:	December 09, 2005

FCC & FAA SITES MAP FINDINGS
TOWERS

Map ID
Direction
Distance
Distance (ft.)

EDR ID
Database

A1
SSW
1/2-1 mi
4452

AMT0020884
AMTOWERS

AM Frequency:	1410	Application Ref:	Not Reported
Item Number:	01	Control Number:	107353
ID Number:	Not Reported	Country:	The United States
Cutoff Date:	Not Reported	File No. Prefix:	Not Reported
Operation Hours:	Nighttime	Region 2 Class:	B
Domestic Pattern:	Augmented	Domestic Class:	0B
Dummy Data Switch:	Nothing is assumed		
Power (KW):	0000.50000		
Bad Data Switch:	NOT REPORTED		
Domestic Status:	License		
Latitude:	42 27 51	Latitude Direction:	N
Longitude:	079 21 21	Longitude Dir:	W
No. of T-S Stations:	Not Reported	No. of Towers:	03
T-S Call Sign 1:	Not Reported	T-S Call Sign 2:	Not Reported
T-S Call Sign 3:	Not Reported	T-S Call Sign 4:	Not Reported
Updator:	Federal Communications Commission (FCC)		
Canadian Coordination Status:		Not applicable	
Mexican Coordination Status:		Not applicable	
Region 2 Coordination Status:		Not applicable	
Station City:	DUNKIRK, NY	Call Sign:	WDOE
IFRB Plan Date:	Not Reported	Q Factor (mV/M):	Not Reported
Antenna Mode:	DAN	Complete Sched:	Unlimited time
No. of Augmentations:	09		
IFRB List:	Not Reported		
Comment:	Not Reported		
Pattern RMS (mV/M):	0201.17	E sub u Value:	Not Reported
Change List No.:	Not Reported	Change List Date:	33333
Limiting Call:	O	Notification Status:	Not Reported
IFRB Serial No.:	Not Reported	Last Update Date:	Not Reported
Notified Pattern:	Not Reported	Biased Coords:	A 1

This record is for a license, and it may or may not indicate a site which has been built.

FCC & FAA SITES MAP FINDINGS
TOWERS

Map ID
Direction
Distance
Distance (ft.)

EDR ID
Database

A2
SSW
1/2-1 mi
4452

AMT0020883
AMTOWERS

AM Frequency:	1410	Application Ref:	Not Reported
Item Number:	01	Control Number:	107352
ID Number:	Not Reported	Country:	The United States
Cutoff Date:	Not Reported	File No. Prefix:	Not Reported
Operation Hours:	Daytime	Region 2 Class:	B
Domestic Pattern:	Theoretical	Domestic Class:	0B
Dummy Data Switch:	Nothing is assumed		
Power (KW):	0001.00000		
Bad Data Switch:	NOT REPORTED		
Domestic Status:	License		
Latitude:	42 27 51	Latitude Direction:	N
Longitude:	079 21 21	Longitude Dir:	W
No. of T-S Stations:	Not Reported	No. of Towers:	01
T-S Call Sign 1:	Not Reported	T-S Call Sign 2:	Not Reported
T-S Call Sign 3:	Not Reported	T-S Call Sign 4:	Not Reported
Updator:	Federal Communications Commission (FCC)		
Canadian Coordination Status:		Not applicable	
Mexican Coordination Status:		Not applicable	
Region 2 Coordination Status:		Not applicable	
Station City:	DUNKIRK, NY	Call Sign:	WDOE
IFRB Plan Date:	Not Reported	Q Factor (mV/M):	Not Reported
Antenna Mode:	DAN	Complete Sched:	Unlimited time
No. of Augmentations:	00		
IFRB List:	Not Reported		
Comment:	Not Reported		
Pattern RMS (mV/M):	0313.82	E sub u Value:	Not Reported
Change List No.:	Not Reported	Change List Date:	01806
Limiting Call:	O	Notification Status:	Not Reported
IFRB Serial No.:	Not Reported	Last Update Date:	Not Reported
Notified Pattern:	Not Reported	Biased Coords:	T 1

This record is for a license, and it may or may not indicate a site which has been built.

A3
SSW
1/2-1 mi
4591

DOF000000046017
FAA DOF

Unique ID:	330491	Obstruction #:	0491
City:	DUNKIRK	State:	New York
Verification Status:	verified	Obstruction Type:	TOWERS 3
Latitude:	42 27 49N	Longitude:	079 21 20W
Frequency:	Not Reported	Type of Lighting: Red Lighting	
Above Ground Level Height (Ft.):		0200	
Above Mean Sea Level Height (Ft.):		00830	
Horizontal Accuracy:	+-250’	Vertical Accuracy:	+-50’
Painted/Marked:	Yes	FAA Study #:	Not Reported

FCC & FAA SITES MAP FINDINGS
TOWERS

Map ID
Direction
Distance
Distance (ft.)

EDR ID
Database

4
NE
1/2-1 mi
5089

ANT100000007030
ANTREG

Tower ID:	1007222		
Address:	418 WASHINGTON ST, DUNKIRK, NY		
Lat (NAD 27):	422904	Lon (NAD 27):	0792002
Lat (NAD 83):	422904	Lon (NAD 83):	0792001
Construction Date:	Jan 1 1982	Dismantled Date:	
Nepa Flag:	N	FAA ID:	90-AEA-1588-OE
Structure Type:	B	Elevation (M):	182.80
Structure Hgt (M):	38.70	Hgt Above Ground:	38.70
Hgt Above Ground (M):	38.7100677	Hgt Above Mean Sea Level (M):	221.592285
Date Activated:	Jan 15 1997	License Issue Date:	Jan 15 1997
Date Keyed:	Nov 8 1996	Date Printed:	Feb 10 1997
Date Processed:	Nov 8 1996	Date Received:	Nov 1 1996
Licensee Signature	E A HELLMAN		
Nature of Modification:		Purpose:	R
Company (DBA) Name:			
Owner Name:	NYNEX		
Attention:			
Owner Address:	395 FLATBUSH AVE EXT RM 506, BROOKLYN, NY 11201		
Owner PO Box:		Phone Number:	
E-Mail Address:			
Internet Domain:			
Painting & Lighting Specs:		Date of Last Remarks:	Jan 15 1997
Special Conditions #1:			
Special Conditions #2:			

Key Remarks:
CORRECTED OVERALL STRUCTURE HEIGHT, SUBMITTED WITH AMSL.
CLEARED STRUCTURE BASED ON CLEARANCE FILE COPY.

This record is for a license, and it may or may not indicate a site which has been built.

B5
SSW
1-2 mi
7440

DOF000000000712
FAA DOF

Unique ID:	331800	Obstruction #:	1800
City:	FREDONIA	State:	New York
Verification Status:	verified	Obstruction Type:	TOWER
Latitude:	42 27 21N	Longitude:	079 21 29W
Frequency:	Not Reported	Type of Lighting:	Dual, Red with MEDIUM Intensity White Strobe
Above Ground Level Height (Ft.):		0230	
Above Mean Sea Level Height (Ft.):		00859	
Horizontal Accuracy:	+-50’	Vertical Accuracy:	+-50’
Painted/Marked:	No	FAA Study #:	96EA2004

FCC & FAA SITES MAP FINDINGS
TOWERS

Map ID
Direction
Distance
Distance (ft.)

EDR ID
Database

B6
SSW
1-2 mi
7469

ANT100000009443
ANTREG

Tower ID:	1009675		
Address:	556 TEMPLE ST, FREDONIA, NY		
Lat (NAD 27):	422721	Lon (NAD 27):	0792130
Lat (NAD 83):	422721	Lon (NAD 83):	0792129
Construction Date:	Jun 10 1997	Dismantled Date:	
Nepa Flag:	N	FAA ID:	96-AEA-2004-OE
Structure Type:	TOWER	Elevation (M):	191.70
Structure Hgt (M):	67.10	Hgt Above Ground:	70.10
Hgt Above Ground (M):	70.1048507	Hgt Above Mean Sea Level (M):	261.826385
Date Activated:	Jun 24 1997	License Issue Date:	Dec 6 1996
Date Keyed:	Dec 6 1996	Date Printed:	Dec 9 1996
Date Processed:	Dec 6 1996	Date Received:	Dec 3 1996
Licensee Signature	MICHAEL J SHORTLEY III		
Nature of Modification:		Purpose:	N
Company (DBA) Name:			
Owner Name:	NEW YORK RSA NO 3 CELLULAR PARTNERSHIP		
Attention:	TODD PHILIPP		
Owner Address:	1050 PITTSFORD VICTOR RD, PITTSFORD, NY 14534		
Owner PO Box:		Phone Number:	7167770292
E-Mail Address:			
Internet Domain:			
Painting & Lighting Specs:		Date of Last Remarks:	
Special Conditions #1:			
Special Conditions #2:			
Key Remarks:			

This record is for a license, and it may or may not indicate a site which has been built.

FCC & FAA SITES MAP FINDINGS
TOWERS

Map ID
Direction
Distance
Distance (ft.)

EDR ID
Database

B7
SSW
1-2 mi
7469

TOW100000031366
TOWER

Tower ID:	135443		
Tower Owner Name:	NEW YORK RSA 3 CELLULAR PARTNERSHIP , FREDONIA, NY		
Latitude:	42 27' 152841"	Latitude (in seconds):	152841
Longitude:	79 21' 30"	Longitude (in seconds):	285690
Transmitter Latitude:	422721	Transmitter Longitude	0792130
Construction Date:		Activation Date:	Apr 3 1997
FAA Date:	Dec 12 1996	FCC Date:	Mar 25 1997
File Number:	02089-CL-ML-97	FAA ID:	96-AEA-2004-OE
Antenna Height:	0.0000	Antenna Height (M):	0.0000
Beacon Height:	0.0000	Beacon Height (M):	0.0000
Elevation:	859.0000	Elevation FAA:	859.0000
Elevation FAA (M):	261.8000	Elevation (M):	261.8000
Structure Height:	230.0000	Structure Height (M):	70.1000
Structure Height FAA:	230.0000	Structure Height FAA (M):	70.1000
Supporting Struct Hgt:	0.0000	Supporting Struct Hgt (M):	0.0000
Tower Height:	0.0000	Tower Height (M):	0.0000
Structure Type:	TOW	Tower Type:	E
Key Remarks:		Date:	
Key Site:	86591	Record Action:	ADD
ID Exam:	PRB5	ID_ASB_ACC:	
Paint and Lighting Specs:	11 21 22 3 A H		

Special Conditions/Remarks:
FCC FORM 715A (DAY) AND FCC FORM 715 (NIGHT), DUAL LIGHTING.
PARAGRAPH A MODIFIED TO REQUIRE USE OF L-865 MEDIUM
INTENSITY LIGHTS IN LIEU OF L-856.

This record is for a license, and it may or may not indicate a site which has been built.

FCC & FAA SITES MAP FINDINGS
TOWERS

Map ID
Direction
Distance
Distance (ft.)

EDR ID
Database

C8
SE
1-2 mi
10490

AMT0026865
AMTOWERS

AM Frequency:	1570	Application Ref:	Not Reported
Item Number:	01	Control Number:	109675
ID Number:	Not Reported	Country:	The United States
Cutoff Date:	Not Reported	File No. Prefix:	Not Reported
Operation Hours:	Nighttime	Region 2 Class:	B
Domestic Pattern:	Theoretical	Domestic Class:	0D
Dummy Data Switch:	Nothing is assumed		
Power (KW):	0000.14300		
Bad Data Switch:	NOT REPORTED		
Domestic Status:	License		
Latitude:	42 27 06	Latitude Direction:	N
Longitude:	079 19 26	Longitude Dir:	W
No. of T-S Stations:	Not Reported	No. of Towers:	01
T-S Call Sign 1:	Not Reported	T-S Call Sign 2:	Not Reported
T-S Call Sign 3:	Not Reported	T-S Call Sign 4:	Not Reported
Updator:	Federal Communications Commission (FCC)		
Canadian Coordination Status:		Not applicable	
Mexican Coordination Status:		Not applicable	
Region 2 Coordination Status:		Not applicable	
Station City:	FREDONIA, NY	Call Sign:	WBUZ
IFRB Plan Date:	Not Reported	Q Factor (mV/M):	Not Reported
Antenna Mode:	ND1	Complete Sched:	Unlimited time
No. of Augmentations:	00		
IFRB List:	Not Reported		
Comment:	RENWL HRG D85-92-RENWL LIC DEN BY COMM (MO&O) 3/89-RECN DEN (MO&O) 890815		
Pattern RMS (mV/M):	0307.38	E sub u Value:	Not Reported
Change List No.:	Not Reported	Change List Date:	02098
Limiting Call:	O	Notification Status:	Not Reported
IFRB Serial No.:	Not Reported	Last Update Date:	Not Reported
Notified Pattern:	Not Reported	Biased Coords:	T 1

This record is for a license, and it may or may not indicate a site which has been built.

FCC & FAA SITES MAP FINDINGS
TOWERS

Map ID
Direction
Distance
Distance (ft.)

EDR ID
Database

C9
SE
1-2 mi
10490

AMT0026864
AMTOWERS

AM Frequency:	1570	Application Ref:	Not Reported
Item Number:	01	Control Number:	109674
ID Number:	Not Reported	Country:	The United States
Cutoff Date:	Not Reported	File No. Prefix:	Not Reported
Operation Hours:	Daytime	Region 2 Class:	B
Domestic Pattern:	Theoretical	Domestic Class:	0D
Dummy Data Switch:	Nothing is assumed		
Power (KW):	0000.25000		
Bad Data Switch:	NOT REPORTED		
Domestic Status:	License		
Latitude:	42 27 06	Latitude Direction:	N
Longitude:	079 19 26	Longitude Dir:	W
No. of T-S Stations:	Not Reported	No. of Towers:	01
T-S Call Sign 1:	Not Reported	T-S Call Sign 2:	Not Reported
T-S Call Sign 3:	Not Reported	T-S Call Sign 4:	Not Reported
Updator:	Federal Communications Commission (FCC)		
Canadian Coordination Status:		Not applicable	
Mexican Coordination Status:		Not applicable	
Region 2 Coordination Status:		Not applicable	
Station City:	FREDONIA, NY	Call Sign:	WBUZ
IFRB Plan Date:	Not Reported	Q Factor (mV/M):	Not Reported
Antenna Mode:	ND1	Complete Sched:	Unlimited time
No. of Augmentations:	00		
IFRB List:	Not Reported		
Comment:	RENWL HRG D85-92-RENWL LIC DEN BY COMM (MO&O) 3/89-RECN DEN (MO&O) 890815		
Pattern RMS (mV/M):	0307.38	E sub u Value:	Not Reported
Change List No.:	Not Reported	Change List Date:	02082
Limiting Call:	O	Notification Status:	Not Reported
IFRB Serial No.:	Not Reported	Last Update Date:	Not Reported
Notified Pattern:	Not Reported	Biased Coords:	T 1

This record is for a license, and it may or may not indicate a site which has been built.

FCC & FAA SITES MAP FINDINGS
AIRPORTS

EDR ID
Database

No Sites Reported.

FCC & FAA SITES MAP FINDINGS
POWERLINES

EDR ID
Database

POW0010095
POWERLINES

Msid:	MSX1007497- 1	Voltage:	230
Rangeflg:	0	Hi_range:	0
Type:	AC	Status:	AC
Corridor:	N	Ownr_id:	Not Reported
Own_name:	Not Reported	Opr_id:	Not Reported
Ownr_flg:	S	Coname:	Not Reported
Physaddres:	Not Reported	Physcity:	Not Reported
Physstate:	Not Reported	Physlposta:	Not Reported
Mailaddres:	Not Reported	Mailcity:	Not Reported
Mailstate:	Not Reported	Mailpostal:	Not Reported
Phone:	Not Reported	Fax:	Not Reported
Webpage:	Not Reported		

POW0002554
POWERLINES

Msid:	MSX1008929- 1	Voltage:	230
Rangeflg:	0	Hi_range:	0
Type:	AC	Status:	AC
Corridor:	Y	Ownr_id:	Not Reported
Own_name:	Not Reported	Opr_id:	Not Reported
Ownr_flg:	S	Coname:	Not Reported
Physaddres:	Not Reported	Physcity:	Not Reported
Physstate:	Not Reported	Physlposta:	Not Reported
Mailaddres:	Not Reported	Mailcity:	Not Reported
Mailstate:	Not Reported	Mailpostal:	Not Reported
Phone:	Not Reported	Fax:	Not Reported
Webpage:	Not Reported		

POW0002553
POWERLINES

Msid:	MSX1007498- 1	Voltage:	230
Rangeflg:	0	Hi_range:	0
Type:	AC	Status:	AC
Corridor:	Y	Ownr_id:	Not Reported
Own_name:	Not Reported	Opr_id:	Not Reported
Ownr_flg:	S	Coname:	Not Reported
Physaddres:	Not Reported	Physcity:	Not Reported
Physstate:	Not Reported	Physlposta:	Not Reported
Mailaddres:	Not Reported	Mailcity:	Not Reported
Mailstate:	Not Reported	Mailpostal:	Not Reported
Phone:	Not Reported	Fax:	Not Reported
Webpage:	Not Reported		

KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

Various Federal laws and executive orders address specific environmental concerns. NEPA requires the responsible offices to integrate to the greatest practical extent the applicable procedures required by these laws and executive orders. EDR provides key contacts at agencies charged with implementing these laws and executive orders to supplement the information contained in this report.

NATURAL AREAS
Officially designated wilderness areas
Government Records Searched in This Report

FED_LAND: Federal Lands
Source: USGS
Telephone: 703-648-5094
Federal data from Bureau of Land Management, National Park Service, Forest Service, and Fish and Wildlife Service.
- National Parks
- Forests
- Monuments
- Wildlife Sanctuaries, Preserves, Refuges
- Federal Wilderness Areas.
Date of Government Version: 12/31/2004

Federal Contacts for Additional Information

National Park Service, Northeast Region
200 custom Street, Fifth Floor
Philadelphia, PA 19106
215-597-7013

USDA Forest Service, Eastern
310 West Wisconsin Avenue
Milwaukee, WI 53203
414-297-3693

BLM - Eastern States Office
7450 Boston Blvd.
Springfield, VA 22153
703-440-1713

Fish & Wildlife Service, Region 5
Div. Of Personnel Mgmt. 300 Westgate Center Drive
Hadley, MA 01035-9589
413-253-8313

Officially designated wildlife preserves, sanctuaries and refuges
Government Records Searched in This Report

FED_LAND: Federal Lands
Source: USGS
Telephone: 703-648-5094
Federal data from Bureau of Land Management, National Park Service, Forest Service, and Fish and Wildlife Service.
- National Parks
- Forests
- Monuments
- Wildlife Sanctuaries, Preserves, Refuges
- Federal Wilderness Areas.
Date of Government Version: 12/31/2004

NY Wildlife Management Areas: Wildlife Management Areas
Borders of New York State Wildlife Management Areas
Source: Dept. of Env. Conservation.
Telephone: 518-783-5733

Federal Contacts for Additional Information

Fish & Wildlife Service, Region 5
Div. Of Personnel Mgmt. 300 Westgate Center Drive
Hadley, MA 01035-9589
413-253-8313

State Contacts for Additional Information

Dept. of Environmental Conservation 518-457-5690

Wild and scenic rivers

Government Records Searched in This Report

FED_LAND: Federal Lands
Source: USGS
Telephone: 703-648-5094
Federal data from Bureau of Land Management, National Park Service, Forest Service, and Fish and Wildlife Service.
- National Parks
- Forests
- Monuments
- Wildlife Sanctuaries, Preserves, Refuges
- Federal Wilderness Areas.

Date of Government Version: 12/31/2004

Federal Contacts for Additional Information

Fish & Wildlife Service, Region 5
Div. Of Personnel Mgmt. 300 Westgate Center Drive
Hadley, MA 01035-9589
413-253-8313

Endangered Species

Government Records Searched in This Report

Endangered Species Protection Program Database
A listing of endangered species by county.
Source: Environmental Protection Agency
Telephone: 703-305-5239

Federal Contacts for Additional Information

Fish & Wildlife Service, Region 5
Div. Of Personnel Mgmt. 300 Westgate Center Drive
Hadley, MA 01035-9589
413-253-8313

State Contacts for Additional Information

Natural Heritage Program, Dept. of Environmental Conservation 518-783-3932

KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

LANDMARKS, HISTORICAL, AND ARCHEOLOGICAL SITES
Historic Places

Government Records Searched in This Report

National Register of Historic Places:

The National Register of Historic Places is the official federal list of districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, engineering, and culture. These contribute to an understanding of the historical and cultural foundations of the nation.

The National Register includes:

- All prehistoric and historic units of the National Park System;
- National Historic Landmarks, which are properties recognized by the Secretary of the Interior as possessing national significance; and
- Properties significant in American, state, or local prehistory and history that have been nominated by State Historic Preservation Officers, federal agencies, and others, and have been approved for listing by the National Park Service.

Date of Government Version: 03/15/2000

Federal Contacts for Additional Information

Park Service; Advisory Council on Historic Preservation
1849 C Street NW
Washington, DC 20240
Phone: (202) 208-6843

State Contacts for Additional Information

Parks, Recreation & Historic Preservation 518-474-0443

Indian Religious Sites

Government Records Searched in This Report

Indian Reservations:

This map layer portrays Indian administrated lands of the United States that have any area equal to or greater than 640 acres.
Source: USGS
Phone: 888-275-8747
Date of Government Version: 10/01/2003

Federal Contacts for Additional Information

Department of the Interior- Bureau of Indian Affairs
Office of Public Affairs
1849 C Street, NW
Washington, DC 20240-0001
Office: 202-208-3711
Fax: 202-501-1516

National Association of Tribal Historic Preservation Officers
1411 K Street NW, Suite 700
Washington, DC 20005
Phone: 202-628-8476
Fax: 202-628-2241

KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

State Contacts for Additional Information
A listing of local Tribal Leaders and Bureau of Indian Affairs Representatives can be found at:
http://www.doi.gov/bia/areas/agency.html

Eastern Area Office, Bureau of Indian Affairs
3701 N. Fairfax Drive Mail Stop 260-VASQ
Arlington, VA 22203
703-235-2571

Scenic Trails

Government Records Searched in This Report
APPAL_TRAIL: Appalachian Trail
Source: Appalachian Trail Conference
Telephone: (304) 535-6331
Appalachian Trail centerline.

State Contacts for Additional Information
Appalachian Trail Conference
799 Washington Street P.O. Box 807
Harpers Ferry, WV 25425-0807
(304) 535-6331

North County Trail Association
49 Monroe Center Suite 200B
Grand Rapids, Michigan 49503
616-454-5506

FLOOD PLAIN, WETLANDS AND COASTAL ZONE

Flood Plain Management
Government Records Searched in This Report
Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

Federal Contacts for Additional Information
Federal Emergency Management Agency 877-3362-627

State Contacts for Additional Information
New York State Emergency Management Office 518-457-2200

Wetlands Protection
Government Records Searched in This Report
NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 from the U.S. Fish and Wildlife Service.

New York State Wetlands
Source: Department of Environmental Conservation
Telephone: 518-402-8961
Coverages are based on official New York State Freshwater Wetlands Maps as described in Article 24-0301 of the Environmental Conservation Law.

Federal Contacts for Additional Information
Fish & Wildlife Service 813-570-5412

KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

State Contacts for Additional Information
Dept. of Environmental Conservation 518-457-5690

Coastal Zone Management
Government Records Searched in This Report
CAMA Management Areas
Dept. of Env., Health & Natural Resources
919-733-2293

Federal Contacts for Additional Information
Office of Ocean and Coastal Resource Management
N/ORM, SSMC4
1305 East-West Highway
Silver Spring, Maryland 20910
301-713-3102

State Contacts for Additional Information
Dept of State, Div. Of Coastal Resources & Waterfront Revitalization 518-474-3643

FCC & FAA SITES MAP
For NEPA actions that come under the authority of the FCC, the FCC requires evaluation of Antenna towers and/or supporting structures that are to be equipped with high intensity white lights which are to be located in residential neighborhoods, as defined by the applicable zoning law.

Government Records Searched in This Report
Cellular
Federal Communications Commission
Mass Media Bureau
2nd Floor - 445 12th Street SW
Washington DC 20554 USA
Telephone (202) 418-2700

Tower
Federal Communications Commission
Mass Media Bureau
2nd Floor - 445 12th Street SW
Washington DC 20554 USA
Telephone (202) 418-2700

Antenna Registration
Federal Communications Commission
Mass Media Bureau
2nd Floor - 445 12th Street SW
Washington DC 20554 USA
Telephone (202) 418-2700

AM Tower
Federal Communications Commission
Mass Media Bureau
2nd Floor - 445 12th Street SW
Washington DC 20554 USA
Telephone (202) 418-2700

KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

FAA Digital Obstacle File
National Oceanic and Atmospheric Administration
Telephone: 301-436-8301
Describes known obstacles of interest to aviation users in the US. Used by the Federal Aviation Administration (FAA) and the National Oceanic and Atmospheric Administration to manage the National Airspace System.

Airport Landing Facilities
Federal Aviation Administration
Telephone (800) 457-6656
Private and public use landing facilities.

Electric Power Transmission Line Data
PennWell Corporation
Telephone: (800) 823-6277
This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Excessive Radio Frequency Emission
For NEPA actions that come under the authority of the FCC, Commission actions granting construction permits, licenses to transmit or renewals thereof, equipment authorizations or modifications in existing facilities, require the determination of whether the particular facility, operation or transmitter would cause human exposure to levels of radio frequency in excess of certain limits.

Federal Contacts for Additional Information
Office of Engineering and Technology
Federal Communications Commission
445 12th Street SW
Washington, DC 20554
Phone: 202-418-2470

OTHER CONTACT SOURCES

STREET AND ADDRESS INFORMATION

environmental
risk Group

Appendix 3

Rare, Endangered, and Threatened Species Inquiries

ENVIRONMENTAL RISK GROUP

PO Box 848
Colchester, CT 06415

99 Lamberton Road, Suite 201
Windsor, CT 06095

860-925-6276 voice
860-683-4206 fax

VIA US MAIL

December 8, 2005

Information Services
New York Natural Heritage Program
625 Broadway, 5th Floor
Albany, NY 12233-4757

RE: EnRG Project #2005-BE-2
REALCO Incorporated RCRA Site (EPA ID#NYD030215529)
Natural Heritage Program Information

To Whom It May Concern:

Environmental Risk Group (EnRG) has been retained to prepare a Fish and Wildlife Resources Impact Assessment (FWIA) for activities at the referenced site. This is a 90-acre, industrial property within the City of Dunkirk, NY (southwest corner) at 90 Willowbrook Avenue (cross street: Brigham Rd), Chautauqua County, NY 14048 (Lat: 42.4671 Long: -79.3348). The site was used for steel working and fabrication from 1908 until the present, under various ownership and operational names.

The purpose of the FWIA is to identify potential impacts to ecological receptors associated with potential migration of constituents downgradient of this site along the unnamed Tributary #1 of Crooked Brook. This stream flows through the southwest corner of the site crossing Brigham Road, ultimately flowing into Crooked Brook about 1-mile northwest of the site. This analysis is being conducted for Benchmark Engineering who is under contract to NYSDEC, and is consistent with NYSDEC guidance. One component of the analysis requires the identification of any ecologically sensitive species (within a 2-mile radius) such as rare, endangered, and threatened species, protected plant communities, and any other ecologically sensitive are that may be present at, on, in, or near the vicinity of the site, particularly along the unnamed Tributary #1 of Crooked Brook.

In closing, please direct any correspondence concerning this request to my attention at the address noted in the letterhead. We appreciate your assistance in this matter; should you have any questions concerning this request or desire additional information, please call us at 860-925-6276.

Sincerely,

ENVIRONMENTAL RISK GROUP

Kurt A. Frantzen, Ph.D.
Owner

Enclosures Site-Specific Abstract of USGS Topographic 7.5-min Quadrangle Map—Dunkirk
USFWS Wetlands Mapper (Geocortex) Approximate Site Location

ENVIRONMENTAL RISK GROUP

PO Box 848
Colchester, CT 06415

99 Lamberton Road, Suite 201
Windsor, CT 06095

860-925-6276 voice
860-683-4206 fax

VIA US MAIL

December 8, 2005

Information Services
U.S. Fish and Wildlife Service
3817 Luker Road
Cortland, NY 13045-9349

RE: EnRG Project #2005-BE-2
REALCO Incorporated RCRA Site (EPA ID#NYD030215529)
Natural Heritage Program Information

To Whom It May Concern:

Environmental Risk Group (EnRG) has been retained to prepare a Fish and Wildlife Resources Impact Assessment (FWIA) for activities at the referenced site. This is a 90-acre, industrial property within the City of Dunkirk, NY (southwest corner) at 90 Willowbrook Avenue (cross street: Brigham Rd), Chautauqua County, NY 14048 (Lat: 42.4671 Long: -79.3348). The site was used for steel working and fabrication from 1908 until the present, under various ownership and operational names.

The purpose of the FWIA is to identify potential impacts to ecological receptors associated with potential migration of constituents downgradient of this site along the unnamed Tributary #1 of Crooked Brook. This stream flows through the southwest corner of the site crossing Brigham Road, ultimately flowing into Crooked Brook about 1-mile northwest of the site. This analysis is being conducted for Benchmark Engineering who is under contract to NYSDEC, and is consistent with NYSDEC guidance. One component of the analysis requires the identification of any ecologically sensitive species (within a 2-mile radius) such as rare, endangered, and threatened species, protected plant communities, and any other ecologically sensitive are that may be present at, on, in, or near the vicinity of the site, particularly along the unnamed Tributary #1 of Crooked Brook.

In closing, please direct any correspondence concerning this request to my attention at the address noted in the letterhead. We appreciate your assistance in this matter; should you have any questions concerning this request or desire additional information, please call us at 860-925-6276.

Sincerely,

ENVIRONMENTAL RISK GROUP

Kurt A. Frantzen, Ph.D.
Owner

Enclosures Site-Specific Abstract of USGS Topographic 7.5-min Quadrangle Map—Dunkirk
USFWS Wetlands Mapper (Geocortex) Approximate Site Location

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New York Field Office
3817 Luker Road
Cortland, NY 13045
Phone: (607) 753-9334 Fax: (607) 753-9699

December 1, 2005

We have received your request to review your project for potential presence of Federally-listed threatened or endangered species or critical habitat. Due to the loss of two-thirds of our endangered species staff to retirement, there will likely be significant delays in our response to your request. We are presently unable to determine the length of this delay and appreciate your patience and understanding during this time. For additional information on Federally-listed species, please visit our website at http://www.fws.gov/northeast/nyfo/es/esdesc.htm. We are planning to update our endangered species pages to provide additional technical assistance to applicants, consultants, and other Federal agencies in the near future.

FAX TRANSMITTAL RE: LISTED SPECIES REQUEST

U.S. FISH AND WILDLIFE SERVICE
New York Field Office
3817 Luker Road, Cortland, NY 13045
Phone: (607) 753-9334 Fax: (607) 753-9699

January 19, 2006

To: Kurt A. Frantzen

This responds to your December 8, 2005, request for listed species information in the vicinity of the 90-acre industrial property at 90 Willowbrook Avenue in the City of Dunkirk, Chautauqua County, New York.

Except for occasional transient individuals, no Federally-listed or proposed endangered or threatened species under our jurisdiction are known to exist within the project impact area. In addition, no habitat in the project impact area is currently designated or proposed "critical habitat" in accordance with provisions of the Endangered Species Act (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*). Therefore, no further ESA coordination or consultation with the U.S. Fish and Wildlife Service (Service) is required. Should project plans change, or if additional information on listed or proposed species or critical habitat becomes available, this determination may be reconsidered. The most recent compilation of Federally-listed and proposed endangered and threatened species in New York* is available for your information. If the proposed project is not completed within one year from the date of this FAX, we recommend that you contact us to ensure that the listed species presence/absence information for the proposed project is current. Should our determination change and any part of the proposed project be authorized, funded, or carried out, in whole or in part, by a Federal agency, further consultation between the Service and that Federal agency pursuant to the ESA may be necessary.

The above comments pertaining to endangered species under our jurisdiction are provided as technical assistance pursuant to the ESA. This response does not preclude additional Service comments under other legislation.

For additional information on fish and wildlife resources or State-listed species, we suggest you contact the appropriate New York State Department of Environmental Conservation regional office(s)* and New York Natural Heritage Program Information Services.*

Thank you for your time. If you require additional information please contact me at (607) 753-9334. Future correspondence with us on this project should reference project file 60362.

Sincerely,

Robyn A. Niver
Endangered Species Biologist

*Additional information referred to above may be found on our website at:
http://www.fws.gov/northeast/nyfo/es/section7.htm

environmental
risk Group

Appendix 4

Ecological Effects Summary

Ecotoxicological Profiles for COPCs

The following sections summarize information from scientific literature on chemical toxicity; likely mechanisms of toxicity; and potential effects on receptor biota, populations, and ecosystems. The following is complied from the references that follow.

Polychlorinated Biphenyls (PCBs)

Overview

PCBs are inert, thermally and physically stable, and have dielectric properties; and, therefore, they have been used in closed systems such as heat transfer liquids, hydraulic fluids and lubricants, and in open systems such as plasticizers, surface coatings, inks, adhesives, pesticide extenders, and for microencapsulation of dyes for carbonless duplicating papers.

In the environment, the behavior of PCB mixtures is correlated to the amount of chlorination. PCBs are strongly sorbed to soil and generally remain immobile even under flooding conditions; and they are resistant to chemical degradation by oxidation or hydrolysis. PCB mixtures are highly mobile in the presence of organic solvents. These chemicals have high bioconcentration factors and tend to accumulate in the fat of fish, birds, mammals, and humans. In humans, relatively greater amounts of PCBs have been identified in skin, liver, and breast milk. They also tend to biomagnify through the food chain, that is, the concentration increases (per kilogram of body weight) at higher trophic levels (producers > consumers > predators).

Aroclor® 1254 (CAS # 11097691)

Aroclor® 1254 is a viscous, light yellow liquid mixture of PCB mixture containing approximately 21% $C_{12}H_6Cl_4$, 48% $C_{12}H_5Cl_5$, 23% $C_{12}H_4Cl_6$, and 6% $C_{12}H_3Cl_7$ and an average chlorine content of 54%.

Aroclor® 1260 (CAS # 11096825)

Aroclor® 1260 is a colorless, liquid PCB mixture containing approximately 38% $C_{12}H_4C_{l6}$, 41% $C_{12}H_3C_{l7}$, 8% $C_{12}H_2C_{l8}$, and 12% $C_{12}H_5Cl_5$ with an average chlorine content of 60%.

Ecotoxicity Overview

In mammalian systems, PCBs are readily absorbed through the gut, respiratory system, and skin in mammals and concentrate in the liver, blood, muscle, adipose (fatty) tissue, and skin (Eisler 1986). PCBs can induce mutation and cause cancer, and they are teratogenic.

Mink are very sensitive to PCBs, with concentrations as low as 0.1 mg/kg dietary fresh weight producing a LD-50 (lethal dose - 50: the level of contamination at which 50% of the sample population dies) in 3 months and complete reproductive inhibition among the survivors (Eisler 1986). Other effects include anorexia, weight loss, and lethargy. On the other hand, compared to mink, the European ferret is highly resistant to PCBs. Rhesus monkeys are extremely sensitive to PCBs, with an increase in stillborns and abortions,

lowered birth rates, hyperpigmentation, skin eruptions, eye problems, and altered behavioral patterns.

In aquatic systems generally, toxicity increases with exposure and lower chlorinated biphenyls, and is higher in younger developmental stages and crustaceans (Eisler 1986). An increase in somatic (non-reproductive cell) mutation have been observed in ostrich ferns (*Matteuccia struthiopteris*) due to PCB exposure.

Eisler (1986) overviews a number of effects observed in aquatic organisms due to exposure to PCBs: growth reduction in algae and brook trout, reduced egg survival and reduced fertilization success in flounder, minnows, sea urchins (prior to fertilization, eggs were more resistant to PCBs at insemination and afterwards), and complete reproductive failure in brook trout. Cancer effects and other biochemical changes have been reportedin trout liver cells and marine fishes; with anemia, hyperglycemia, and altered cholesterol metabolism in brown trout fed diets with 10 PPM PCBs (USEPA 1980).

(Eisler (1986) summarizes various toxic effects in avian species include: death, tremors, upward pointing beaks, muscular in-coordination, and hemorrhagic liver. Sublethal effects include delayed reproduction and chromosomal aberrations in Ringed Turtle-doves; courtship and nest building behavioral impairments in Mourning Doves; reduced hatchability in chicken eggs; and decline in sperm concentration in American Kestrels. However, birds tend to more resistant to acute exposure than other groups: no adverse reproductive effects were observed in Screech Owls fed 3 ppm PCB diets or in Japanese Quail, Northern Bobwhites, and Mallard Ducks.

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